



Restoring trust in ESG investing through the adoption of just transition ethics

DOI:
[10.1016/j.rser.2024.114557](https://doi.org/10.1016/j.rser.2024.114557)

Document Version
Final published version

[Link to publication record in Manchester Research Explorer](#)

Citation for published version (APA):

Foley, A., Heffron, R., Al Kez, D., Furszyfer Del Rio, D., McInerney, C., & Welfle, A. (2024). Restoring trust in ESG investing through the adoption of just transition ethics. *Renewable and Sustainable Energy Reviews*, 199, Article 114557. <https://doi.org/10.1016/j.rser.2024.114557>

Published in:
Renewable and Sustainable Energy Reviews

Citing this paper

Please note that where the full-text provided on Manchester Research Explorer is the Author Accepted Manuscript or Proof version this may differ from the final Published version. If citing, it is advised that you check and use the publisher's definitive version.

General rights

Copyright and moral rights for the publications made accessible in the Research Explorer are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

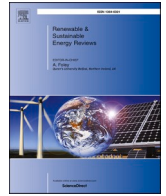
Takedown policy

If you believe that this document breaches copyright please refer to the University of Manchester's Takedown Procedures [<http://man.ac.uk/04Y6Bo>] or contact uml.scholarlycommunications@manchester.ac.uk providing relevant details, so we can investigate your claim.



Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Renewable and Sustainable Energy Reviews

journal homepage: www.elsevier.com/locate/rser

Restoring trust in ESG investing through the adoption of just transition ethics[☆]

Aoife M. Foley^a, Raphael J. Heffron^{b,c,*}, Dizar Al Kez^{a,d}, Dylan D. Furszyfer Del Rio^e,
Celine McInerney^{f,g}, Andrew Welfle^a

^a School of Engineering, The University of Manchester, Manchester, UK

^b E2S UPPA, CNRS, TREE, Université de Pau et des Pays de l'Adour, Pau, France

^c Energy Policy Research Group, University of Cambridge, Cambridge, UK

^d School of Mechanical and Aerospace Engineering, Queen's University Belfast, Belfast, UK

^e Science Policy Research Unit (SPRU), University of Sussex Business School, Brighton, UK

^f Gaothlinn Energy, Cork, Ireland

^g Cork University Business School, University College Cork, Cork, Ireland

ARTICLE INFO

Keywords:

ESG factors
Ethics
Global finance
Just transition
Sustainable finance

ABSTRACT

The prominent growth in environmental, social and governance (ESG) investment is evident, with the number of global assets managed sustainably more than doubled over the last decade. This trend is expected to continue until 2030. This type of financial data is positive but given the United Nations stated 'climate emergency' and 'climate survival' in society today, there needs to be an even greater acceleration of growth in ESG investment. Unfortunately, significant negativity has emerged on ESG in recent years. This 'Cutting Edge' study explores the reasons why and how ESG investment has veered off the journey towards enabling society to achieve both its targets under the 2030 United Nations Sustainable Energy Agenda and the 2015 Paris Agreement. It examines the factors prompting leading multinational companies, particularly in the energy and food sectors, to shift their corporate strategies. The key message advanced is that ESG frameworks and guidelines are not problematic; rather, the issue lies in the practice of ethics in decision-making within corporations. Addressing this ethical challenge, which is at the heart of ESG practices, across different professions and disciplines can rebuild trust among stakeholders in ESG investing. This form of interdisciplinary 'just transition ethics' can re-orient us back on the journey towards a just and sustainable world.

Nomenclature

Abbreviations	
ESG	Environmental, social and governance
UN SDGs	United Nations Sustainable Development Goals
GHG	Greenhouse gas
UK	United Kingdom
EU	European Union
US	United States
MNCs	Multinational corporations
COP	Conference of the Parties
Symbols	
\$	United States Dolar
°C	degree Celsius

1. Introduction

Sustainable finance refers to equity investment decisions that consider environmental, social and governance (ESG) factors. This approach is designed to increase long-term investments in sustainable economic projects and activities [1]. The surge in ESG investments can be attributed to two primary factors. First, consumer demands to incorporate ESG factors throughout their entire supply chain. This includes aspects ranging from manufacturing and procurement processes to product development and hiring practices [2]. Consumers are

[☆] The other authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

* Corresponding author. E2S UPPA, CNRS, TREE, Université de Pau et des Pays de l'Adour, Pau, France.

E-mail address: raphael.heffron@univ-pau.fr (R.J. Heffron).

<https://doi.org/10.1016/j.rser.2024.114557>

Received 10 December 2023; Received in revised form 8 May 2024; Accepted 8 May 2024

Available online 14 May 2024

1364-0321/© 2024 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

increasingly seeking out companies that not only deliver high-quality products but also operate in a manner that is environmentally friendly, socially responsible, and governed by ethical standards. Secondly, investors preference for investments that offer not just economic returns but also positive social and environmental impacts [3]. This shift reflects a broader societal trend towards valuing businesses that contribute to sustainable development and have a positive impact on society and the environment. Investors are looking for investment opportunities that align with their values and expectations for long-term financial performance, alongside positive social and environmental outcomes. As a result, investments in this area have increased due to a global trend that seeks to contribute to global improvements in a broad range of environmental and social areas. Indeed, globally, organisations have been actively more "transparent" about investments, and now over 90 % of S&P 500 companies publish their ESG reports, equivalent to 70 % of Russell 1000 companies (a key global index of companies) [4].

The prominent growth in ESG investments is clear, with a notable increase in global assets managed according to sustainable investment strategies. Prior to the COVID-19 pandemic, there was a substantial surge in this sector, with assets managed in this manner more than doubled from 2012 to 2020 [5]. This growth saw the figure rise from *circa* \$13.3 trillion to over \$35.3 trillion. Despite the challenges posed by the pandemic, this trend continues, with projections indicating that global sustainable investment could reach \$50 trillion by 2025 [5] this would represent a significant portion of the total assets under management globally, accounting for one-third of the projected total. Further, the significant increases in the mentions of 'ESG' in quarterly earnings calls indicate the degree to which investors are attuned to these issues [6]. This increased awareness and interest in ESG factors among investors underscore the growing importance of sustainability in the investment landscape.

All these above-mentioned increases were accelerated by the 2015 Paris Agreement and the introduction of the United Nations Sustainable Development Goals (UN SDGs) in the same year. These two developments provided the impetus for legal certainty over the medium to longer term, which enabled investors to move and reallocate capital to ESG investments. In addition, the focus of banking regulators on green versus brown assets in capital adequacy measures has been a key factor. For example, in the European Union (EU), the Sustainable Finance Disclosure Regulation has had a major impact on improving transparency for sustainable finance products.

This study aims to highlight the critical role of ethics in the evaluation of ESG practices. It suggests that for ESG to progress to the next phase of its development, it must integrate ethical considerations that support the transition towards a low-carbon economy, a concept known as 'just transition ethics'. The importance and impact of ESG is explored in Section 2. Then, in Section 3, the key reasons for the erosion of trust in ESG are detailed. It is noted that there are attempts to obfuscate the benefits of ESG by stating that it (ESG) has attracted too much opprobrium. However, this is not the case, and in Section 4, it is advanced that ethics can improve ESG and assist it in achieving its goals that overall will be highly positive for society. Further, and as highlighted in the conclusion in Section 5, ESG performance with 'just transition ethics' has a clear role to play as society aims to achieve a just transition to a low-carbon economy.

2. The importance of ESG and its impact

Companies seek to invest in ESG because physical and transition risks could impact companies' value and assets. For instance, physical risks arising from extreme weather events could impact labour productivity, production costs, the reliability of physical assets, the supply chain and the demand for products and services [7]. In this area, sector-specific analyses found that higher temperatures have negatively influenced corporations' outputs and productivity. For example, one case study from the Indian manufacturing sector shows a 2 % fall in productivity

for a one-degree Celsius (°C) increase in temperature and research from China demonstrates similar results [8].

Meanwhile, transition risks emerging from market changes, for instance, those in policy, regulation, technology and consumer sentiment, could also influence investors' portfolios and decision-making and drive, for example, the transition towards a low-carbon future [9]. From an investor's perspective, these investments that support ESG and a low-carbon economy are recognised to improve the performance of managed portfolios, reducing portfolio risk and increasing returns [10, 11]. Moreover, disclosing social and material climate-related financial information can support investment decisions as society advances towards a low-carbon future. With such data, it is easier to compare companies' exposures to climate-related opportunities and risks, and therefore, investors are equipped to integrate these risks into their business decisions and investments [12]. As a result, this also provides information to other stakeholders whereby, for example, consumers can demand companies develop and utilise higher ethical standards and more transparent business practices, contributing to greater demand for ESG data.

The common perception is that implementing ESG initiatives and strategies incurs substantial costs for organisations. In this context, research has been initially mixed as some reports show a negative relationship between ESG performance and the corporate financial performance of corporations [13,14]. However, another study reports a significant and positive relationship between ESG operations and activities with corporate financial performance [15–17]. Significantly, given the recent turmoil over the last few years with COVID-19 and the associated financial downturn, ESG aligned investments have been shown to deliver lower downside risks and returns that are less volatile during difficult times.

Indeed, recent empirical evidence notes that ESG engagement reduces exposure to downside risk factors and the firms' downside risks [18]. For example, evidence demonstrates that ESG performance correlated with higher cumulative abnormal returns amid the COVID-19 pandemic. These findings imply that the significance of ESG performance is strengthened during periods of crisis, aligning with the notion that investors perceive ESG performance as an indicator of future returns and risk reduction [19]. In addition, this was corroborated by studies that note ESG information can increase the expected returns, and improve information ratio and other performance metrics of tracking portfolios [20–22]. Despite these positive impacts, there is a notable gap between the theoretical endorsement of the UN SDGs, particularly SDGs 7, 12, and 13, and their tangible implementation in higher education curricula [23]. This highlights potential challenges in fostering sustainability practices across sectors, as future generations may not be adequately equipped with the knowledge and skills to effectively implement ESG principles.

3. The erosion of trust in ESG

In recent years, the inclusion of ESG factors in mainstream investment strategies has faced difficulties in gaining widespread adoption. This resistance has stemmed because of multiple issues that affect the decision-making processes. Seven key reasons are identified below (which are discussed in detail later in this section).

1. Investors' mistaken belief that sustainable investing limits choices and undermines crucial financial objectives;
2. the notion that ESG practices represent a misappropriation and misallocation of corporate resources; and
3. the fact that many investors are not willing to accept sub-optimal financial performance to pursue ethical and social objectives [24];
4. the lack of clear definitions and variations in ESG terminology and practices among different stakeholders, especially across borders, have contributed to challenges in achieving their widespread adoption;

5. the absence of standardised reporting practices and transparency (with highlighted examples below);
6. the difficulty of converting qualitative information into quantitative data generates another barrier to effectively integrating sustainability factors into investment decision-making; and
7. finally, ESG rating providers sometimes prioritise disclosure metrics over climate transition-focused metrics; and this becomes relevant because bridging the information gap on sustainable risks and opportunities is critical in directing capital towards investments supporting low-carbon transitions and sustainable growth (with highlighted examples below).

It is worth noting that ESG investment remains a market-based voluntary action and hence can give the false impression that the trillions of dollars needed for transitioning to a more sustainable future are already being allocated. For some, this can lead to the notion of greenwashing, which undermines trust in the whole ESG mechanism. These distortions that can be created or advanced can reduce the urgency to introduce vital regulatory reforms and large-scale public-private partnerships needed to address environmental and social challenges [25]. Further, ESG as of yet has not received a dominant platform at the annual UN COP conferences to cement it into business practice.

There are several examples of this, and one concerns Coca-Cola, which received a high ESG rating for achieving its self-imposed target of becoming "water neutral" ahead of schedule. However, this rating failed to consider the water consumption in the company's agricultural supply chain, which accounts for over 90 % of its total water usage. This example highlights the significance of using comprehensive and accurate metrics when evaluating a company's ESG performance [25]. Further evidence highlights widespread greenwashing practices within the food and drinks industry. Companies like Danone, Arla Foods, Danish Crown, Nestlé, Marfrig, JBS, and Saputo have faced accusations of employing deceptive marketing campaigns to exploit consumers' environmental concerns without taking concrete action [26].

Other big companies have also made "applaudable" net-zero pledges; however, a deeper malaise lies underneath the loud public relations statements. Consider the following: (i) Saudi Aramco, responsible for about 4 % of greenhouse gas (GHG) emissions globally since 1965, ignored the emissions caused by their supply chains (Scope 3 emissions); (ii) Walmart, the world's largest retailer also decided to ignore Scope 3 on its route to net zero even though Scope 3 makes up 95 % of its emissions; and finally, (iii) Shell Oil Company included Scope 3 emissions in its net zero strategy and failed to include Scope 3 emissions from its non-energy products, including but not limited to bitumen, chemicals and lubricants [27].

Such contradictions as above are pervasive when looking at other key sectors of the economy. For instance, during COP26, a joint call of 450 financial firms, including big names such as Goldman Sachs, Santander, and J.P. Morgan Chase, pledged \$130 trillion of private capital to invest towards a net zero future. However, according to Net-Zero Tracker, financial institutions like J.P. Morgan Chase fail to provide clear guidelines on measures to reduce CO₂ emissions, and they lack formal accountability strategies [27]. Moreover, some of the world's largest asset managers are employing investment funds marketed as socially responsible or green to allocate hundreds of millions of dollars to fossil fuel companies. Key examples of this behaviour are BlackRock, Legal & General and State Street, where between February and April 2023, they held \$1 billion in fossil fuel company bonds within their ESG funds despite claims of being sustainable [28].

Such issues highlight a discrepancy between the branding of these funds and their actual investment practices about fossil fuels. As such, Tariq Fancy, BlackRock's former chief investment officer for sustainable investing, in a significant statement, said, *"In essence, Wall Street is greenwashing the economic system and, in the process, creating a deadly distraction. I should know; I was at the heart of it"* [29]. His message accompanied the argument that this ethereal illusion that Wall Street is

combating climate change has led not only to displacing the urgency in climate action but also to the increasing economic inequality.

Further, sustainability pledges are also responsible for the disintegration of societal trust in big business. Claims of sustainability (adherence to the UN SDGs) from big companies can often be contested, with current research suggesting that 42 % of green claims are deceptive, false or exaggerated, pointing to industrial greenwashing [30]. Further research adds to this claim and notes that despite the significant increase in voluntary target setting, gaps in corporate action persist. For example, 80 % of the Fortune 500 companies have neither set nor officially committed to set science-based targets through the Science Based Targets initiative; and associated with this, about 40 % of the Fortune 500 companies have no public climate or energy-related targets and less than one in five of these companies cover Scope 3 on its climate goals [31].

All of this evidence reinforces our call for more detailed information regarding the impacts of companies, as it is frequently the case that their detrimental environmental and social impacts, as well as their financial performance, remain unreported, or it is significantly challenging to observe due to methodological limitations [32]. These issues cross country borders, there is a commonality here in that ESG and ethics is an international issue that reflects change – it would be what scholars refer to as a cosmopolitan justice issue whereby it is a global issue that reflects itself at a national level. This is in part due also to the power of multinational companies. For example, some international companies have resorted to blatant dishonest practices and evade regulations, as exemplified by Volkswagen's violation of the United States (US) Clean Air Act in 2015 [33].

4. Restoring trust in ESG through ethics

Undoubtedly, the lack of transparency in assessing and using appropriate metrics to measure impacts presents a significant challenge when addressing greenwashing. A notable example is the case of McDonald's and its rating upgrade by MSCI, a major ESG global index. The upgrade was primarily based on the company's environmental efforts related to "packaging material and waste," such as installing recycling bins at undisclosed locations in France and the United Kingdom (UK). However, MSCI's evaluation failed to account for McDonald's emissions in the supply chain, which in 2019 alone surpassed those of, for example, Portugal or Hungary; where McDonald's emitted 54 million tons of GHG emissions in 2019, indicating a growth of over 7 % in just four years [34].

In addition to the above examples, numerous criticisms of "greenwashing" exist, whereby financial institutions and corporations deceive clients and customers regarding their environmental or social impacts and the credibility of their products. It is crucial to place greater emphasis on this aspect, particularly when ESG investing is fundamentally driven by the goal of minimising exposure to risks like climate regulation or labour disputes rather than focusing on achieving tangible positive outcomes in the real world [35]. Furthermore, these deceptive practices can have unintended consequences, as when companies fail to fulfil their social responsibility goals or misrepresent their impacts, it significantly undermines customers' trust and satisfaction with their products or services [36]. These greenwashing issues, strategies and their effects are now international and national concerns, they are not restricted from country to country, and that is why placing 'ethics' within ESG is a solution for all countries at the national level.

In other cases, companies often fall short of their envisioned purpose despite good intentions and mitigation strategies. In this sense, "nature-based solutions" could also lead to unintended consequences, as it assumes that harm in one area can be balanced out elsewhere. For instance, when dealing with tree planting initiatives to offset carbon emissions, it must be considered that each habitat is unique and irreplaceable; thus, planting non-native trees on a large scale has proven to disrupt natural ecosystems [37], worsening wildfires and even depleting

groundwater levels. Therefore, it is crucial to prioritise long-term, sustainable solutions rather than relying on potentially harmful trade-offs.

Therefore, maintaining societal trust in companies' commitment to promoting environmental and social wellbeing becomes increasingly challenging in light of the numerous reports raising concerns about key aspects of the ESG framework. In this context, many reports highlight human rights violations, modern-day slavery, forced labour in supply chains, human trafficking and illegal surveillance of workers. For example, recent investigations have revealed that Apple's supplier, Lens Technology, allegedly used forced labour from Uighur Muslims transferred from Xinjiang to produce iPhone glass [38]. In fact, "Apple is lobbying against a bill aimed at stopping forced labour in China" and similarly, internal documents [39] suggest that Amazon violates basic workers' rights by restricting rights to unionise.

Such questionable practices cast doubts about how these companies truly align intending to build a more sustainable and just world. Therefore, when assessing the companies' ESG ratings, it is crucial to examine whether the factors emphasised in reports, such as ethical policies and corporate behaviour, genuinely drive significant environmental and social advancements or merely address matters already considered illegal, such as bribery and money laundering. It is also important to consider that some countries have weak institutions that struggle to uphold the rule of law and protect fundamental rights. Thus, firms can end up operating in such countries where authorities are unable to deal with the negative externalities caused by these companies.

Nevertheless, ethics in decision-making needs to have a clear role. It should be clarified into ESG processes to restore trust in ESG and ensure climate and sustainability targets are achieved. More accountability and responsibility need to apply and if practitioners remain unwilling, new guidelines for international business need to be accelerated (i.e., to advance a just transition ethics). These new guidelines need to be global and national so that they can then trickle down to a local level. There is a need for a global organisation such as the UN to take a leadership role on this issue.

Finally, it is clear that ESG (as stated in Section 2) is a force for good and an improvement on past systems, which some of the ESG detractors want to go back to. There is no more time to wait for many countries with the clear onset of accelerated climate change. Overall, given the need to align the financial system with energy and climate targets for 2030 and beyond to 2060 net-zero ambitions, ESG can fulfil that function. Further, in this context, it can ensure that ESG plays its role in the just transition to a low-carbon economy, where the key message is to leave no one behind; this is key for countries that are developed and developing. As stated earlier, a failure to have functioning ESG processes for the corporate world will lead to more economic inequality. Hence, ESG can be a beacon for improving just socio-economic outcomes in society.

5. Conclusion - the path Forward: achieve ESG performance through utilising just transition ethics

The implementation of more rigorous corporate regulatory frameworks, such as those being developed in the US [40], the EU [41] and the UK [42] could help create stricter market standards that limit harmful environmental and social practices from happening in the first place. ESG emerges as a pivotal tool for catalyzing global transformative change, contingent upon several key factors: (i) its integration with empirical scientific data; (ii) comprehensive coverage across the entire business value chain; (iii) incorporation into mandatory assessments of a business's future societal impacts; and (iv) alignment with the overarching global just transition to a low-carbon economy. Such measures are essential to counteract the strategies employed by certain companies that seek to exploit regulatory loopholes. Big businesses, in particular multinational corporations (MNCs), distort many international processes such as advertising, taxation and their environmental impact, so it is no surprise that 'greenwashing' occurs. To effectively combat such

practices, the ESG framework must continually evolve, adopting a proactive stance that outpaces corporate attempts to conduct 'business-as-usual'.

The evolution of ESG demands a strategic pivot towards long-term objectives, with a primary focus on facilitating a just transition towards a low-carbon economy. This necessitates a fundamental realignment of ESG principles, placing ethical considerations at the forefront of all its operations. From data gathering and analysis to the development of frameworks and strategic evaluations ethics must permeate every aspect of ESG implementation. Relying solely on regulatory developments risks prolonged delays, potentially undermining public confidence and inadvertently facilitating actions akin to 'climate delay'. Therefore, proactive integration of ethical principles within ESG practices is imperative to expedite progress towards SDGs and forestall further ecological deterioration.

As COP28 has just happened, the UN and other international organisations have been looking at and determining many issues that will affect ESG. However, arguably the main one will be the central focus on justice at COP28 and in particular, the continued establishment of just transition pathways (which was introduced in COP27). A key issue is how these just transition pathways will be financed across all countries, and this is where ESG can realise its future value in terms of impact. ESG data already shows all the positives of adopting ESG but the 'business-as-usual' behaviour continues unabated. ESG could flourish and assist in countries meeting their energy and climate targets if there was international leadership. The first step therefore is to evolve the financial sector so that it introduces 'just transition ethics' to ESG decision-making and frameworks.

CRediT authorship contribution statement

Aoife M. Foley: Conceptualization, Formal analysis, Project administration, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **Raphael J. Heffron:** Conceptualization, Formal analysis, Project administration, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **Dlzar Al Kez:** Writing – review & editing. **Dylan D. Furszyfer Del Rio:** Formal analysis, Validation, Visualization, Writing – original draft, Writing – review & editing. **Celine McInerney:** Formal analysis, Writing – original draft. **Andrew Welfle:** Formal analysis, Writing – original draft.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:

Aoife Foley is a co-author of this paper and is Managing Executive Editor of Renewable & Sustainable Energy Reviews. She was not involved in the editorial and review processes of this paper. The paper was handled by Paul Leahy, Executive Editor. The corresponding author, Raphael Heffron, submitted the paper to the journal and also responded to the reviewers.

Data availability

No data was used for the research described in the article.

References

- [1] Mănescu C. Stock returns in relation to environmental, social and governance performance: Mispricing or compensation for risk? *Sustain Dev* 2011;19:95–118. European Commission. 2022. Overview of sustainable finance. Available at: https://finance.ec.europa.eu/sustainable-finance/overview-sustainable-finance_en (last accessed 30 November 2023). (a) Kanno M. Does ESG performance improve firm creditworthiness? *Financ. Res. Lett.* 2023;55(Part A):103894.
- [2] Henisz W, Koller T, Nuttall R. Five ways that ESG creates value. Available at: <https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/Strategy%20and%20Corporate%20Finance/Our%20Insights/Five%20ways%20that%20ESG>

- %20creates%20value/Five-ways-that-ESG-creates-value.ashx. [Accessed 30 November 2023].
- [3] Boffo R, P R. Available at: ESG Investing: Practices, Progress and Challenges 2020. <https://www.oecd.org/finance/ESG-Investing-Practices-Progress-Challenges.pdf>. [Accessed 30 November 2023].
- [4] Pérez L, Hunt V, Samandari H, Nuttall R, Biniek K. Does ESG really matter—and why?. Available at: <https://www.mckinsey.com/capabilities/sustainability/our-insights/does-esg-really-matter-and-why>. [Accessed 3 November 2023].
- [5] The Global Sustainable Investment Alliance. Global sustainable investment review. Available at: <https://www.gsi-alliance.org/wp-content/uploads/2021/08/GSIR-2021.pdf>. [Accessed 30 November 2023].
- [6] Bernow S, Godsall J, Klempner B, Merten C. More than values: the value-based sustainability reporting that investors want. Available at: <https://www.mckinsey.com/capabilities/sustainability/our-insights/more-than-values-the-value-based-sustainability-reporting-that-investors-want>. [Accessed 30 November 2023].
- [7] Pörtner H-O, et al. Climate change 2022: impacts, Adaptation and Vulnerability. Available at: <https://www.ipcc.ch/report/ar6/wg2/>. [Accessed 3 November 2023].
- [8] Somanathan E, et al. The impact of temperature on productivity and labor supply: evidence from Indian manufacturing. *J Polit Econ* 2021;129(6):1797–827.
- [9] Bank of England. Climate change: what are the risks to financial stability?. Available at: <https://www.bankofengland.co.uk/explainers/climate-change-what-are-the-risks-to-financial-stability>. [Accessed 30 November 2023].
- [10] Broadstock DC, Chan K, Cheng LTW, Wang X. The role of ESG performance during times of financial crisis: evidence from COVID-19 in China. *Financ. Res. Lett.* 2021; 38:101716.
- [11] Díaz V, Ibrushi D, Zhao J. Reconsidering systematic factors during the Covid-19 pandemic – the rising importance of ESG. *Financ. Res. Lett.* 2021;38:101870.
- [12] Department of Energy and Climate Change. Mandatory climate-related financial disclosures by publicly quoted companies, large private companies and LLPs. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1056085/mandatory-climate-related-financial-disclosures-publicly-quoted-private-cos-llps.pdf. [Accessed 30 November 2023].
- [13] Duque-Grisales E, Aguilera-Caracul J. Environmental, social and governance (ESG) Scores and financial performance of Multilatinas: moderating effects of Geographic International Diversification and financial Slack. *J Bus Ethics* 2021; 168:315–33.
- [14] Nirino N, Santoro G, Miglietta N, Quaglia R. Corporate controversies and company's financial performance: Exploring the moderating role of ESG practices. *Technol. Forecast. Soc. Chang* 2021;162:120341.
- [15] Friede G, Busch T, Bassen A. ESG and financial performance: aggregated evidence from more than 2000 empirical studies. *J. Sustain. Financ. Invest.* 2015:210–33 (5AD).
- [16] Sánchez-Infante JP, Yañez-Araque B, Moreno-García J. Moderating effect of firm size on the influence of corporate social responsibility in the economic performance of micro-, small- and medium-sized enterprises. *Technol. Forecast. Soc. Chang.* 2020;151:119774.
- [17] Inigo EA, Albareda L. Sustainability oriented innovation dynamics: levels of dynamic capabilities and their path-dependent and self-reinforcing logics. *Technol. Forecast. Soc. Chang* 2019:334–51 (139AD).
- [18] Pedersen LH, Fitzgibbons S, Pomorski L. Responsible investing: the ESG-efficient frontier. *J Financ Econ* 2021;142:572–97.
- [19] Li Z, Feng L, Pan Z, Sohail HM. ESG performance and stock prices: evidence from the COVID-19 outbreak in China. *Humanit. Soc. Sci. Commun.* 2022;9:242.
- [20] Ling A, Li J, Wen L, Zhang Y. When trackers are aware of ESG: Do ESG ratings matter to tracking error portfolio performance? *Econ. Model.* 2023;106346 (125AD).
- [21] Kanno M. Does ESG performance improve firm creditworthiness? *Financ. Res. Lett.* 2023;55(Part A):103894.
- [22] Henisz W, Koller T, Nuttall R. Five ways that ESG creates value. Available at: <https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/Strategy%20and%20Corporate%20Finance/Our%20Insights/Five%20ways%20that%20ESG%20creates%20value/Five-ways-that-ESG-creates-value.ashx>. [Accessed 30 November 2023].
- [23] Al Kez D, Lowans C, Foley A. Sustainable development in third level Programs: Distilling a pathway to a True net-zero education. *Sustainability* 2024;16:1998. <https://doi.org/10.3390/su16051998>.
- [24] Renneboog L, Horst J Ter, Zhang C. Socially responsible investments: Institutional aspects, performance, and investor behavior. *J. Bank. Financ.* 2009;32:1723–42. (a) Demers E, Hendrikse JJoos, P, Lev B. ESG did not immunise stocks during the COVID-19 crisis, but investments in intangible assets did. *J. Bus. Financ. Account.* 2021;48:433–62.
- [25] Pucker K, King A. ESG investing Isn't designed to Save the Planet. *Harv Bus Rev* 2022. Available at: <https://hbr.org/2022/08/esg-investing-isnt-designed-to-save-the-planet>. [Accessed 30 November 2023].
- [26] Burrows D. Goldilocks and the EU green claims crunch. *Just Food* 2023. Available at: <https://www.just-food.com/comment/goldilocks-and-the-eu-green-claims-crunch/>. [Accessed 30 November 2023].
- [27] Barry E. As more companies make net-zero pledges, some Aren't as good as they Sound. *Time*; 2021.
- [28] Flinders S. Sustainable" ESG funds Hold over \$1.5 billion in coal, Oil and gas bonds. *Common Wealth*; 2023. Available at: <https://www.common-wealth.co.uk/auth-or/sophie-flinders>. [Accessed 30 November 2023].
- [29] Fancy T. Financial world greenwashing the public with deadly distraction in sustainable investing practices. Available at: <https://eu.usatoday.com/story/opinion/2021/03/16/wall-street-esg-sustainable-investing-greenwashing-column/6948923002/>. [Accessed 30 November 2023].
- [30] The International Consumer Protection and Enforcement Network. Screening of websites for 'greenwashing': half of green claims lack evidence. Available at: <https://icpen.org/news/1146>. [Accessed 30 November 2023].
- [31] Cervantes L, et al. Power Forward 4.0 A progress report of the Fortune 500's transition to a net-zero economy. Available at: https://files.worldwildlife.org/wwfmsprod/files/Publication/file/62y7qtld0_Power_Forward_4.0.pdf?ga=2.264987087.1703671438.1686754193-1754264079.1683396895. [Accessed 30 November 2023].
- [32] Giuliani E. Regulating global capitalism amid rampant corporate wrongdoing—Reply to "Three frames for innovation policy". *Res. Policy* 2018;47: 1577–82.
- [33] Topham G, Clarke S, Levett C, Scruton P, Fidler M. The Volkswagen emissions scandal explained. *Guardian* 2015.
- [34] Simpson C, Rathi A, Kishan S. The ESG Mirage. *Bloomberg*; 2021.
- [35] Buller A. What's really behind the failure of green capitalism? *Guardian* 2022.
- [36] Delmas MA, Burbano VC. The Drivers of greenwashing. *Calif. Manage. Rev.* 2011; 54.
- [37] Fagan ME, et al. The expansion of tree plantations across tropical biomes. *Nat Sustain* 2022;5:681–8.
- [38] Washington Post. Apple's long time supplier accused of using forced labour in China. Available at: <https://www.washingtonpost.com/technology/2020/12/29/lens-technology-apple-uighur/>. [Accessed 30 November 2023].
- [39] Amnesty International. Public statement: it is time for Amazon to Respect Worker's right to unionise. Available at: <https://www.amnesty.org/en/latest/research/2020/10/time-for-amazon-to-respect-workers-right-to-unionize/>. [Accessed 30 November 2023].
- [40] Securities and Exchange Commission. SEC Proposes rules to Enhance and Standardise climate-related disclosures for investors. Available at: Press Release; 2022. <https://www.sec.gov/news/press-release/2022-46>. [Accessed 30 November 2023].
- [41] European Commission. Corporate sustainability reporting. *Financial Markets* 2022. Available at: https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en. [Accessed 30 November 2023].
- [42] IEA. Companies and LLPs ESG regulatory Requirement. Available at: <https://www.iea.org/policies/15886-companies-and-llps-esg-regulatory-requirement>. [Accessed 30 November 2023].