Social Premiums

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April 24, 2024

Abstract

While there is extensive research on governance (G) and a growing focus on environmental (E) issues, the social dimension (S) of ESG investing is still underscrutinized. Using the MSCI social scores, we find that the two main components of a firm's social score, human capital and product safety, command statistically significant (yet opposing) return premiums in the cross-section of US stocks. Specifically, stocks with a high human capital score earn higher returns, and stocks with a high product safety score earn lower returns. Consequently, the aggregate social score commands no premium as the opposing effects of its components neutralize each other. Our findings challenge the common ESG investing approach of amalgamating factors without considering their distinct, potentially contradictory, risk and return implications.

Keywords: ESG, MSCI, return predictability, risk premiums, S, social scores.
JEL codes: G11, G12, G14, M14.

*For their helpful comments and suggestions, we thank Lin Peng, Lukas Roth, and David Schumacher. Briscoe-Tran (Alberta School of Business, University of Alberta), Elabd (HEC Montréal): reem.elabd@hec.ca, Meier, iA Financial Group Chair in Sustainable Finance, (HEC Montréal): iwan.meier@hec.ca (corresponding author), Sokolovski (Alberta School of Business, University of Alberta): vsokolov@ulaberta.ca.

1 Introduction

Global investors have invested trillions of dollars based on environmental, social, and governance (ESG) criteria, frequently citing the prospect of enhanced returns as their primary motivation for ESG investing.[1] Many ESG opponents, however, argue that it is purely value-destructive, with some policymakers even attempting to criminalize the use of ESG criteria in state pension funds.[2] Therefore, research into the relation between a firm's ESG ratings and its future returns is crucial. There exists an established literature on governance (G), predominantly demonstrating that improved governance enhances firm value (e.g., Gompers, Ishii, and Metrick, 2003), and an expanding and active body of research on the impact of the environmental (E) dimension on stock returns (e.g., Bolton and Kacperczyk, 2021, 2023; Pástor, Stambaugh, and Taylor, 2021, 2022). In contrast, the social (S) dimension has received relatively little attention. In this paper, we aim to fill this gap, examining whether a firm's social ratings predict its future stock returns.

We concentrate on the social scores within the MSCI ESG ratings. We do so for three main reasons. First, MSCI is the largest provider of ESG ratings by revenue (Berg, Koelbel, Pavlova, and Rigobon, 2022). Second, as stated by Berg, Heeb, and Kölbel (2022) in their study of five major ESG ratings, "only the MSCI ESG ratings can explain the holdings of US funds with an ESG mandate." Similarly, Serafeim and Yoon (2023) find that the power to predict ESG news is strongest for MSCI ratings compared to those of other major competing rating agencies. Third, existing research studying the returns on ESG investing often uses MSCI ratings (e.g., Pástor et al., 2022). Thus, by focusing on the MSCI social rating, we can better relate our findings to the studies on the other aspects of ESG.

The MSCI social rating is comprised of two primary components: the human capital score and the product safety score. For the human capital score, MSCI assesses how well a company manages its relationships with employees, labor health and safety, human cap-

[1] See, e.g., Schroders' "Global Investor Study" of 2020 or BNP Pariabas' "The ESG Global Survey 2019".
[2] See "Making ESG a Crime", M. Levine, 17 January 2024, Bloomberg.

ital development, and supply chain labor standards. We validate this measure and find, consistent with its description, that the MSCI human capital score is a strong predictor of a firm's likelihood to be listed on Fortune's "100 Best Companies to Work For" (Best Companies hereafter), which is determined based on an anonymous survey of the firms' employees. For the product safety score, MSCI assesses companies on their control of potential product-related liabilities, including product recalls and quality, chemical safety, privacy and data security, and consumer financial protection, as applicable. We also validate this measure and find, consistent with its intent, that a higher product safety score strongly predicts product-related controversies, such as drug or medical equipment safety violations for a pharmaceutical company, for up to three years in the future.

The expected impact of a firm's social ratings on its future stock returns varies depending on whether the ratings pertain to human capital or product safety. There is extensive literature documenting that product safety incidents adversely affect firm value (e.g., Jarrell and Peltzman, 1985; Dowdell, Govindaraj, and Jain, 1992). In other words, product safety incidents are detrimental to business. Consequently, in the absence of any mispricing, we would expect firms with superior product safety to have safer cash flows and command lower expected returns, in line with their lower risk. However, if mispricing exists, which is possible for an intangible like product safety, then stocks with higher product safety scores may not necessarily yield lower average returns.

The expected impact of a firm's human capital score on its stock returns is even less clear. Given that the human capital score incorporates concerns about labor health and safety, economic intuition would suggest that firms with high human capital scores (characterized by fewer accidents due to safer working conditions) could exhibit lower risk in their cash flows. Consequently, these firms could command lower expected returns. However, empirical evidence suggests that firms providing a safe workplace have lower odds and length of survival (Pagell, Parkinson, Veltri, Gray, Wiengarten, Louis, and Fynes, 2020). Therefore, it may be that such firms actually command higher expected returns to compensate for their

lower survival odds. It is also conceivable that investors have a non-pecuniary preference for employee well-being akin to investors having a preference for environmentally-friendly firms. Thus, investors could be content with lower expected returns in equilibrium (Pástor et al., 2021). However, the prevalence of such preferences, or even their existence, remains uncertain. Notably, employee satisfaction is a key component considered in constructing MSCI human capital scores, and existing literature indicates that employee satisfaction has a positive effect on returns. Specifically, several studies find that firms with high employee satisfaction consistently outperform the market (e.g., Edmans, 2011; Boustanifar and Kang, 2022; Edmans, Pu, Zhang, and Li, 2023), a pattern consistent with the market underpricing employee satisfaction. Therefore, the expected impact of the human capital score on average returns is ambiguous, highlighting the importance of a thorough empirical investigation.

We assess the presence of social premiums in the cross-section of US stock returns using a standard cross-sectional regression approach, following Bolton and Kacperczyk (2021, 2023). Consistent with economic intuition and efficient pricing, we identify a negative and statistically significant premium associated with the product safety score. This means that firms with safer products generate relatively lower average returns. Specifically, a one standard deviation increase in a firm's product safety score is associated with an approximate annual average return reduction of 1.20%, controlling for a battery of other return predictors from the extant literature. Contrary to our findings on product safety, but consistent with prior research, we find a positive and statistically significant premium associated with the human capital score. Moreover, the human capital score supersedes the indicator for Best Companies when both predictors are included in the regression specification. The pattern is consistent with the notion that markets do not fully price intangible assets like human capital (see Bongaerts, Kang, and van Dijk, 2023, for other examples), but price the risks associated with product safety concerns.

Notably, the magnitude of the estimated human capital premium is comparable to that of the product safety score. Consequently, the aggregate social score has no predictive power

for future stock returns, as its two key components have opposing and neutralizing effects. In sum, while the aggregate social score does not predict stock returns in the cross-section, its individual components do. Our results call into question the approach in ESG investing that combines various factors, which may display divergent risk and return characteristics, into a single score. This has implications for investors, portfolio managers, and policy makers.

Related literature This paper contributes to several strands of the literature. First, it adds to the substantial and rapidly expanding ESG investing literature (see Matos, 2020, for a survey). A large portion of this literature investigates the effects of ESG characteristics on returns, treating ESG as a unified category (e.g., Hartzmark and Sussman, 2019; Pedersen, Fitzgibbons, and Pomorski, 2021; Glossner, 2021). Nonetheless, many studies focus on the return impact of one of the three broad ESG categories, predominantly concentrating on the G (e.g., Gompers et al., 2003; Aggarwal, Erel, Stulz, and Williamson, 2009; Bebchuk, Cohen, and Wang, 2013) and more recently, the E (e.g., Bolton and Kacperczyk, 2021, 2023; Pástor et al., 2021, 2022; Aswani, Raghunandan, and Rajgopal, 2024; Zhang, 2024). Our paper contributes to the ESG investing literature by not only focusing on the relatively overlooked S category, but also by dissecting it into its components. In this manner, we directly address Edmans (2023)'s call for ESG research to adopt a more granular approach, as broad ESG categories may encompass many potentially contradictory factors.

Second, our paper contributes to the literature on ESG ratings. Prior research shows that ESG ratings often disagree with each other (e.g., Berg, Koelbel, and Rigobon, 2022). Despite this disagreement, users of commercially available ESG ratings frequently accept these ratings at face value without attempting to validate them. Hence, we conduct formal tests to validate the subcomponent scores of the MSCI ESG ratings, one of the most widely used ESG ratings, focusing specifically on S. This validation is crucial because our research necessitates a deeper examination of the various components within S to fully comprehend what these components capture. By doing this, we gain greater confidence in our inferences and formally connect the widely used ESG ratings to established concepts in the literature,

specifically human capital and product safety. Our findings echo Edmans (2023)'s perspective that ESG is not a new concept in itself but rather a reflection of a firm's intangible capital, a key research topic in finance.[3]

Third, this paper contributes to the literature on the asset pricing impact of product safety. Product safety, as a dimension of a firm's intangible capital, receives significantly less attention in the asset pricing literature compared to human capital. Exceptions include studies examining the impact of ex-post adverse tail events related to product safety on a firm's stock prices, such as product recalls (e.g., Dowdell et al., 1992; Thomsen and McKenzie, 2001; Pozo and Schroeder, 2016), data breaches (Kamiya, Kang, Kim, Milidonis, and Stulz, 2021), and safety concerns (Krüger, 2015). In contrast, our paper investigates product safety in the cross-section, focusing on an ex-ante measure of product safety. Thus, our paper aligns with research at the intersection of marketing and finance, which demonstrates that higher customer satisfaction predicts increased future stock returns (Anderson, Fornell, and Mazvancheryl, 2004; Fornell, Morgeson III, and Hult, 2016; Huang, 2018). Since our findings indicate that improved product safety predicts lower stock returns, this suggests that the product safety score is distinct from a general sense of customer satisfaction.

Finally, our paper contributes to the literature on the asset pricing impact of human capital. Existing research in this area examines indicators of human capital, such as membership on the Best Companies list (Edmans, 2011, 2012; Boustanifar and Kang, 2022; Edmans et al., 2023), and their relationship with stock returns. However, little research has connected these existing indicators with commercially available human capital ratings within ESG frameworks. We demonstrate that commercial ESG ratings indeed capture aspects of human capital related to some of these existing indicators. However, they also encompass information beyond what these indicators provide.

[3] Eisfeldt, Kim, and Papanikolaou (2020) document that over half of the overall corporate capital stock is intangible, with the largest portion being intangible assets created by investments in employees (i.e., human capital), brand, and knowledge capital.

2 Background, definitions, and hypotheses

In this section, we outline the motivation behind our main empirical investigation, offering essential background information on ESG investing. Additionally, we describe how the MSCI S scores are calculated and formulate the hypotheses that are tested in the paper.

2.1 Background on ESG investing

This subsection provides background information on ESG investing and motivates the main empirical questions explored in the paper.

2.1.1 The practice of combining multiple issues into broad ESG categories

The assets under management committed to ESG investing have surged more than tenfold, from under $10 trillion in 2006 to over $120 trillion in 2021.[4] This dramatic increase occurred shortly after the introduction of the acronym"ESG", which was developed in a 2004 report by major financial institutions responding to a call from Kofi Annan, then Secretary-General of the United Nations. Since then, the term "ESG" has been widely adopted to collectively describe environmental, social, and governance practices.

However, the term "ESG" is very broad, encompassing E and S, formerly referred to as CSR (corporate social responsibility), and G (governance).[5] Hence, many have raised questions about the practice of combining G with E and S issues. As Edmans (2023) succinctly notes: "ESG is an umbrella term, capturing many potentially contradictory factors. E and S is primarily about stakeholders, whereas G often ensures that managers act in shareholders' interest (rather than their own)." Aswath Damodaran, in a *Financial Times* article, raises a similar point regarding governance, stating that "its presence in ESG has always been puzzling, since it replaces the original notion of corporate governance, where managers are accountable to shareholders, with one where managers are accountable to all stakeholders,

[4]See UNPRI's Anuual Report 2021 "Enhance our global footprint".
[5]See Gillan, Koch, and Starks (2021) for an overview.

effectively making them accountable to none of them."[6]

Within each broad ESG category, combining many subcategories may not be logical either, as different subcategories can have varied implications for risk, return, and corporate policies. Unfortunately, research on how distinct ESG issues uniquely affect financial returns is scarce, leaving little scientific foundation for the current practice of evaluating firms on multiple ESG issues and aggregating them into a composite E, S, or G scores. Edmans (2023) acknowledges this research gap and recommends future research "to be more granular", noting that "sweeping questions such as 'Does ESG work?' are unlikely to be fruitful."

In this paper, we directly address this call by focusing on the S category to examine how its subcomponents influence stock returns. We explain our emphasis on the S category over E and G in the following subsection.

2.1.2 Limited attention to the S category of ESG

In the ESG investing literature, specifically among the studies on stock returns and ESG factors, there is a notable imbalance in the distribution of attention across the E, S, and G.

Corporate governance, or G, issues have been extensively studied in the literature, particularly from a theoretical perspective, since at least the nineties (see, e.g., Shleifer and Vishny, 1997, and references therein). Empirically, Gompers et al. (2003) show that US firms with better corporate governance, characterized by stronger shareholder rights, earn significantly higher stock returns and exhibit higher values, profits, and sales growth. Their seminal study then spawned a large literature on the impact of various dimensions of corporate governance on firm outcomes (see, e.g., McCahery, Sautner, and Starks, 2016, and the extensive references therein). In sum, there exists a comprehensive body of work on G.

Similarly, and more recently, there is a rapidly expanding body of research on the E category. Notably, Pástor et al. (2021) develop a theoretical model featuring heterogeneous investors with "green" preferences, providing clear predictions that environmentally-friendly

[6]See "ESG is beyond redemption: may it RIP", A. Damodaran, 22 October 2023, *Financial Times*.

(green), and hence relatively safer, assets should yield lower expected returns than polluting assets in equilibrium. In other words, the model rationalizes the so-called "greenium", the positive premium paid by investors for green assets, which naturally implies lower expected returns as well. Bolton and Kacperczyk (2021, 2023) offer evidence corroborating the model's predictions, finding that polluting stocks earn a risk premium in the cross-section of US and international stocks. While some disagreements about the empirical conclusions remain (e.g., Pástor et al., 2022; Atilgan, Demirtas, Edmans, and Gunaydin, 2023; Aswani et al., 2024; Zhang, 2024), the E dimension, nevertheless, appears well-researched.

In contrast, the S category has received significantly less attention. Earlier studies explored various aspects of a firm that could be related to social issues, such as employee satisfaction (Edmans, 2011, 2012), and recent work shows that institutional investors tilt their portfolio holdings toward stocks with better S ratings (Pástor, Stambaugh, and Taylor, 2024). However, there is limited research on what a higher S rating signifies for a firm's stock return, and particularly, whether an S premium exists. There are some exceptions, like Lindsey, Pruitt, and Schiller (2023), who examine whether a firm's social rating correlates with stock returns within their broader investigation of ESG ratings' impact on stock returns. These studies typically just document that the aggregate S score does not significantly affect stock returns, and do not delve deeper into the individual components of the S score. Hence, it remains an open question whether investing based on a firm's social ratings is fruitless, or if the diverse components of a firm's social ratings have implications for stock returns but become obscured in the aggregation process. This paper aims to address this gap.

2.2 Hypotheses development

In this sub-section, we articulate our hypotheses regarding the potential effects of S on stock returns. To formulate an ex-ante theoretical prediction about the effect of S on expected returns, one could potentially reinterpret the previously-mentioned equilibrium model of Pástor et al. (2021) to accommodate investors' preferences for S in addition to or instead

of E. The predictions of the model about returns would then mirror those about E: firms that are socially responsible should command lower expected returns. However, while there is little contention over what defines a polluting firm, the criteria for a socially responsible firm are less clear. In other words, without a solid understanding of what S measures, such a theoretical interpretation is not fruitful. Therefore, a precise definition of S is crucial for formulation of a valid hypothesis. As we detail below and in the next section, the MSCI aggregate social score is comprised of two main components: the human capital score and the product safety score (other rating agencies typically also consider similar themes). We, thus, turn to these components to formulate hypotheses about the relation of S to returns.

2.2.1 Human capital score

Definition The MSCI human capital score (Human Capital score hereafter) considers four key issues: Health & Safety, Human Capital Development, Labor Management, and Supply Chain Labor Standards, with Human Capital Development being the primary issue as in cases where data for other issues are missing, the Human Capital Development sub-score is used to compute the aggregate Human Capital score. Health & Safety score assesses companies on their management of workplace safety and adherence to safety standards. Human Capital Development score addresses talent requirements and the ability to recruit, retain, and develop a qualified workforce. Notably, the evaluation of the Human Capital Development score considers attributes such as the frequency of employee satisfaction surveys and external recognition as an employer of choice. This is similar to Fortune's Best Companies list, analysed by Edmans (2011), that is also derived from employee satisfaction surveys. In addition, Human Capital Development score considers the extent of eligibility for employee stock purchase/ownership plans and whether non-officer and non-sales staff are eligible for variable performance-based pay. These remuneration-related attributes are likely to affect employee satisfaction indirectly. Labor Management score evaluates a company's workforce complexity, the management-labor dynamic, worker rights effectiveness, and em-

ployee engagement. Lastly, Supply Chain Labor Standards score reviews the management, transparency, and working conditions within the supply chain.[7] In summary, the core of the Human Capital score centers on employee well-being and satisfaction, as well as effective human resource management — attributes that are potentially value-enhancing.[8]

Hypothesis Economic intuition, theory, and prior empirical research offer somewhat conflicting predictions regarding the expected impact of a firm's human capital score on its stock returns. First, since the human capital score includes considerations about labor health and safety, economic intuition would suggest that firms with high human capital scores, characterized by fewer labor incidents, might exhibit lower risk in their cash flows and, consequently, could command lower expected returns. However, empirical evidence indicates that firms that maintain a safe workplace tend to have shorter lifespans and lower survival probabilities (Pagell et al., 2020). Consequently, these firms might require higher expected returns as compensation for their reduced likelihood of long-term survival. Hence, the effect of that consideration on returns is not ex ante obvious. Second, as previously mentioned, it is plausible that investors have a non-pecuniary preference for employee well-being as in Pástor et al. (2021)'s model, which would suggest that firms with higher human capital scores could have lower expected returns in equilibrium. However the extent to which such "warm glow" preferences influence investment decisions, or whether they are influential at all, is still not clearly established. Third, and perhaps most crucially, employee satisfaction is a fundamental component used in calculating human capital scores, and existing literature suggests that employee satisfaction positively influences returns. Specifically, Edmans (2011) finds that between 1984-2009, firms on Fortune's Best Companies list outperform, achieving a four-factor alpha of 3.5% per year and an industry-matched alpha of 2.1% per year. Boustanifar and Kang (2022) corroborates the original findings over an extended sample period, noting only a slight reduction in outperformance in later years, especially when accounting for a

[7] See, "MSCI ESG Ratings Methodology: Human Capital Development Key Issue" for additional details.

[8] For example, Hazarika, Kashikar, Peng, Röell, and Shen (2023) find that global firms adopting executive ESG-linked pay experience better employee satisfaction and also better financial performance.

more comprehensive set of risk factors. Hence, this outperformance appears persistent and is also documented in other contexts (e.g., Yee, Yeung, and Cheng, 2008; Shan and Tang, 2023). Edmans (2011) provides two potential reasons for these findings: 1) the market is not fully aware of the benefits of employee satisfaction, because theory predictions are not conclusive, 2) conventional valuation methods do not incorporate intangible assets properly. Therefore, the following hypothesis emerges: If we assume that firms with higher human capital scores are characterized by more productive and satisfied employees, and if we further assume that the market does not fully incorporate the value-enhancing properties of greater employee well-being, then we would expect firms with higher human capital scores to earn higher average returns.

2.2.2 Product safety score

Definition The MSCI product safety score (Product Safety score hereafter) considers five key issues: Product Safety & Quality, Chemical Safety, Privacy & Data Security, Consumer Financial Protection, and Responsible Investment. Notably, different issues apply only to firms in certain industries and not to others. Product Safety & Quality issue measures companies' risk of product safety incidents or recalls, supply chain and sourcing system effectiveness, quality control in manufacturing, and responsible marketing. Chemical Safety score evaluates the use of hazardous chemicals in products, exposure to evolving or strict regulations, and efforts to develop safer alternatives. Privacy & Data Security score examines the volume of personal data collected, adherence to privacy regulations, data breach susceptibility, and efficacy of data protection procedures. Consumer Financial Protection score assesses financial institutions on product stewardship, transparency, and handling potential reputation and regulatory risks, such as unethical lending, greenwashing, and misrepresentation of financial products. Responsible Investment score captures how investment companies or asset managers integrate ESG factors in managing their own or others' assets. In summary, the essence of the Product Safety score focuses on assessing the relevant risks associated

with the firms' main products.

Hypothesis In contrast to the factors underpinning the Human Capital score, the issues central to the Product Safety score do not seem inherently value-enhancing, but rather measure potential future liabilities pertaining to a firm's main products (interestingly, MSCI has recently renamed Product Safety to Product Liability).

Product safety concerns form the core of the Product Safety score, and there is ample evidence that product safety issues lead to significant financial losses.[9] The financial impact of product safety violations and recalls includes direct costs in lost revenue and indirect costs from damage to a company's brand reputation and higher future insurance premiums. Direct costs entail expenses associated with notifying customers, the logistics of retrieving products from the market, and repairing, correcting, or replacing defective items. Moreover, a company may need to bear expenses related to compensating retailers and distributors for their losses (supply chain costs). Investigating the source of a safety issue may involve expenses for laboratory testing to identify contamination and costs associated with non-compliance with regulatory standards (e.g., Dranove and Olsen, 1994). Crisis management, which includes responding to media and public relations inquiries or hiring an external crisis management team, also incurs significant costs.[10] In the aftermath of a product recall, defending against lawsuits, settling disputes with consumers harmed by the recalled product, and responding to regulatory inquiries can be costly and time-consuming. Additionally, public relations campaigns aimed at restoring brand image after negative publicity also

[9]The literature documents a negative impact on firm value from (i) recall campaigns by car manufacturers (e.g., Barber and Darrough, 1996), (ii) food recalls (Thomsen and McKenzie, 2001; Pozo and Schroeder, 2016; Kong, Shi, and Yang, 2019), (iii) recalls or repairs of consumer goods (Davidson III and Worrell, 1992), and (iv) drug recalls (Jarrell and Peltzman, 1985; Dranove and Olsen, 1994; Dowdell et al., 1992; Ahmed, Gardella, and Nanda, 2002). Relatedly, Borenstein and Zimmerman (1988) and Mitchell and Maloney (1989) document significant adverse effects on firm value resulting from airline crashes. Notably, Krüger (2015) examines adverse CSR events within an event study framework, finding that approximately half of the adverse CSR events in his sample pertained to product safety issues. These events resulted in significant negative abnormal returns of around 1.22%.

[10]Mitchell (1989) cites a source estimating that the cost for Johnson & Johnson to achieve as much airtime and print space as it did after the 1982 Tylenol poisonings would have been around $1 billion. This corresponds to 43% of Dowdell et al. (1992)'s estimate of the total loss in market capitalization from the Tylenol incident, which was $2.31 billion (approximately -29% of market value).

demand significant financial and time investments.

The indirect costs associated with the loss of brand reputation are often more substantial than direct costs (Jarrell and Peltzman, 1985; Mitchell, 1989; Karpoff and Lott Jr, 1993). Beyond the immediate revenue loss from the recall itself, the perception of reduced quality, erosion of trust among loyal customers, and the loss of goodwill following a product safety issue can lead to decreased sales. Consequently, this often results in a reduction in market share and lost business opportunities (Barber and Darrough, 1996). Additional knock-on costs include the negative impacts of complying with more stringent drug testing requirements (Dranove and Olsen, 1994) and the fact that companies with a history of product safety issues often face higher insurance premiums.

Privacy and data security concerns form another key facet of the Product Safety score. The protection of privacy and data security is becoming increasingly crucial. Technology and internet companies, for instance, process significant amounts of user data on platforms such as social media and e-commerce websites. Similarly, pharmaceutical companies and healthcare providers handle sensitive patient information, while banks and insurance companies store substantial volumes of financial and personal data. The literature finds the adverse impact on firm value from data breaches (Kamiya et al., 2021), privacy breaches (Tripathi and Mukhopadhyay, 2022), and hacker attacks (Hinz, Nofer, Schiereck, and Trillig, 2015).[11]

Consumer financial protection concerns and responsible investing concerns are the final two facets considered in the Product Safety score, with both elements being relevant specifically for the financial industry. To the best of our knowledge, there is no comprehensive academic study that investigates the effect of consumer financial protection breaches on a financial institution's value. However, convincing anecdotal evidence can be seen in the losses associated with Wells Fargo's fraudulent bank accounts scandal, where it was ordered to pay $3.7 billion in fines in addition to suffering significant reputational damage.[12] Regard-

[11] Spanos and Angelis (2016) review the literature, documenting a negative impact of security breaches on affected firms in 20 out of 28 studies, with another five studies showing a negative but insignificant effect.

[12] See, e.g., "Wells Fargo to pay $3.7bn over loan violations", J. Franklin and S. Chavez, 20 December 2022, *Financial Times*.

ing responsible investing issues, Akyildirim, Corbet, Ongena, and Oxley (2023) find that greenwashing scandals are associated with negative abnormal returns.

In summary, the discussion suggests that all the issues covered by the Product Safety score relate to the risks faced by a firm.[13] Therefore, alleviating these issues could help mitigate the risk of significant reputational and financial losses. Consequently, in the absence of any mispricing, we would expect firms with superior product safety to exhibit safer cash flows and earn lower average returns, consistent with their lower risk if such risks are material.

3 Data and empirical methodology

3.1 Data

In this subsection, we describe all the data used in our study.

3.1.1 Social scores

Our data on the aggregate social scores and their components are sourced from the MSCI ESG Ratings database. We focus on firms with International Securities Identification Numbers (ISIN) starting with 'US'. To address data gaps, we use the last available information to fill in gaps for up to 24 months.

The MSCI aggregate S scores (Social scores hereafter) are derived from four sub-component scores (dubbed theme scores in MSCI documentation): Human Capital, Product Safety, Social Opportunities, and Stakeholder Opposition. As previously mentioned, our analysis concentrates on the two primary components, Human Capital and Product Safety, with data availability starting in 2013. Data for the aggregate Social scores is available from 2007, but coverage is limited before 2013. Data for the other two sub-components is only available from 2016 onwards but is limited to only a few industries and firms; we, thus, omit these

[13] Edmans (2023) argues that "some ESG factors may be best thought of as risks rather than assets", and Product Safety seems to fit into that category.

sub-components from our primary analysis.[14] Hence, our sample period spans from 2007 to 2022 for the aggregate Social score, and from 2013 to 2022 for its components, which is slightly longer than the period examined by Pástor et al. (2022) for their analysis of E.

Firms' ratings are based on their exposure to and management of industry-relevant social risks, relative to their peers. Different industries face unique social risks. For example, in the communication services sector, privacy and data security are critically important, accounting for around 49% of the social score, whereas in the materials sector, this risk is not weighted at all. Conversely, health and safety issues represent a significant risk in the health care sector, contributing to around 40% of the social score, while such concerns are not applicable to information technology firms.

MSCI ESG ratings are derived from public and macro-level data relevant to the company and its operating sector. This data includes corporate disclosure documents, datasets from governments, regulatory bodies, and NGOs, as well as media sources. To calculate sub-component scores, MSCI evaluates two to five key issues per industry, with industries classified according to the Global Industry Classification Standard (GICS). All scores are rated on a scale of 0 to 10. Therefore, scores for social score sub-components such as Product Safety are calculated as a weighted average of the underlying key issue scores. These sub-component scores are then combined into an aggregate social score using a weighted methodology for aggregation. Notably, since the rating methodology is tailored to each industry, these aggregate social scores (and their sub-components) are not absolute values and should, thus, be interpreted relative to the scores of industry peers. High scores denote industry leadership, whereas low scores suggest falling behind industry standards.

3.1.2 Social scores data coverage

Figure 1 displays the evolution of firm coverage from January 2007 to December 2022. Panel A shows the number of firms with non-missing data in the CRSP-Compustat merged dataset,

[14] Summary statistics for these sub-components are available in the Internet Appendix.

as well as those reporting Social, Human Capital, and Product Safety scores. Initially, the dataset includes 3,549 firms, decreasing to 3,016 by December 2022. This downward trend is similar to findings of Lindsey et al. (2023), with minor discrepancies in firm counts likely due to different criteria for firm characteristics between our studies. Initially, only 387 firms report the aggregate Social score, increasing to 1,547 firms by the end of 2012, aligning with MSCI ESG's expanded coverage to include smaller firms, a trend also observed in Pástor et al. (2022).[15] Post-2012, the firm count in our sample stabilizes around the 1600s, peaking at 1,760 in 2021. Starting in 2013, MSCI begins reporting scores for the Human Capital and Product Safety scores. By December 2013, 1,633 firms report the Human Capital score, and this number generally remains in the 1500s and 1600s, reaching a maximum of 1,758 in 2021 before slightly decreasing in 2022. While most firms reporting the Social score also report Human Capital, fewer report Product Safety. In December 2013, 1,142 firms report the Product Safety score, which sees a decline in 2014 and 2015, followed by stability until 2018. The count then gradually increases to around 1,300 in 2021 and 2022.

Panel B of Figure 1 shows the total market capitalization of firms in the CRSP-Compustat dataset, along with those reporting Social, Human Capital, and Product Safety scores. Since the start of coverage in 2007, the total market capitalization of the firms in the CRSP-Compustat dataset and those with aggregate Social scores are closely matched. By 2022, the market capitalization of both converged to around $30 trillion. The market capitalization trajectory of firms with Human Capital scores closely mirrors those with Social scores, indicating a significant overlap in reporting entities. The market capitalization of firms with Product Safety scores was initially lower but reaches $23.4 trillion by December 2022.

Analyzing the total market capitalization of firms across different market capitalization tertiles yields further insights.[16] Figure 2 illustrates the distribution of firms by market cap

[15]The surge in coverage reflects MSCI's inclusion of the U.S. Investible Market Index, predominantly comprising smaller US firms. Prior to this, MSCI primarily focused on the largest 1,500 firms in the MSCI World Index and large firms in the UK and Australia MSCI indexes.

[16]Firms reporting Social, Human Capital, and Product Safety scores are classified into three market cap categories: small-cap, mid-cap, and large-cap, using market equity breakpoint data from Kenneth French's website. This dataset employs all NYSE stocks with share codes 10 or 11 to compute market equity per-

categories, while Figure 3 presents their respective total market capitalizations. Notably, the coverage of the largest firms is extensive, encompassing the majority of the market capitalization of the largest listed stocks and, thus, a substantial portion of the overall market capitalization. Essentially, the dataset provides almost complete coverage based on the market capitalization criterion. The addition of small-cap stocks towards the end of 2013 further minimized any discrepancies in market cap coverage.

In Figure 4, we illustrate the distribution of firms reporting Social, Human Capital, and Product Safety scores, categorized by economic sector using GICS two-digit codes. Upon examining the CRSP-Compustat dataset, we observe that sectors like health care, finance, and information technology boast the highest number of firms. In contrast, sectors such as real estate, utilities, communication services, and materials feature a lower number of firms. The distribution of firms reporting Social and Human Capital scores mirrors the market's industry distribution. Firms with Product Safety scores generally also match the market's industry distribution, with some notable exceptions in sectors like Industrials, Energy, Materials, and Utilities (due to Product Safety's focus on consumer-facing products, its coverage is reduced in primary sectors like energy and materials).

3.1.3 Stock returns and firm characteristics

We obtain monthly stock prices, returns, and shares outstanding from CRSP and incorporate firm-level accounting data from Compustat. To clean and merge the CRSP and Compustat datasets, we follow the standard procedures described in Bali, Engle, and Murray (2016).

Given the limited guidance from the existing literature regarding the determinants of social scores, our choice of control variables in our analyses largely mirrors Bolton and Kacperczyk (2021), which includes key predictors of returns in the cross-section of stock returns. Monthly stock returns from CRSP are adjusted for delistings and winsorized at the 0.1% level following Edmans et al. (2023). Beta refers to the CAPM beta, calculated

centiles from 5% to 100%, spanning from December 1925 to June 2023. The cutoff percentiles for constructing market cap buckets are the 30^{th} and 70^{th} percentiles.

using the WRDS Beta Suite with daily returns, employing a one-year rolling window, and requiring a minimum of 200 observations. The Momentum of firm i at time t is the cumulative monthly stock return over the year from month t–12 to month t–1. Volatility of firm i at time t is the standard deviation of monthly returns over the same period. For the construction of accounting ratios, we follow Jensen, Kelly, and Pedersen (2023). Log Size is the natural logarithm of a firm's market capitalization (share price multiplied by the shares outstanding), and BM is the book-to-market ratio, both calculated as of year-end. Leverage is the book value of debt to the book value of assets ratio, and Investments is the capital expenditure to the book value of assets ratio. Log PPE is the natural logarithm of the firm's net plant, property, and equipment. ROE, return to equity ratio, is computed as net income to book value of equity. Sales Growth is the annual sales change to the one-month lagged market capitalization ratio. EPS Growth is the annual change in earnings per share, excluding extraordinary items, to the share price ratio. HHI is the Herfindahl-Hirschman Index, computed using sales data from the Compustat Segments database. Following Bolton and Kacperczyk (2021), we winsorize BM, Leverage, and Investments at 2.5%, and Momentum, Volatility, Sales Growth, and EPS Growth at 0.5%.

3.1.4 Best Company indicator, and product controversies and sentiment

In our analyses to validate the Human Capital score, we use the variable from Edmans (2011) and Boustanifar and Kang (2022) that identifies firms featured in Fortune's annual Best Companies list, derived from independent and anonymous employee surveys.[17] This variable, Best Company indicator, is assigned a value of one for any year a company is included in this top 100 list, and zero otherwise.

To validate the Product Safety score, we relate it to future product controversies. Finding a comprehensive database of product controversies is challenging. However, a start-up,

[17]Each January, Fortune magazine publishes this list, which is compiled by The Great Place to Work Institute. The data is publicly available. We thank Hamid Boustanifar for providing us the data from Boustanifar and Kang (2022). We then extend the dataset to include the years 2021 and 2022.

Market Psych, in partnership with Refinitiv, developed an algorithm to sift through a vast corpus of news and social media sources to score market sentiments on individual firms' various issues, including those related to products. They claim to exclude media sources controlled by firms, such as press releases and company-owned Twitter accounts. Following Aggarwal, Briscoe-Tran, Erel, and Starks (2024), who use the Market Psych database to gauge public sentiments about companies on various issues, we use this database to measure product controversies and product sentiment in order to validate the Product Safety score.

3.1.5 Sample and descriptive statistics

We analyze US companies over the sample period from January 2007 to December 2022. We merge the S scores from the MSCI ESG Ratings database with CRSP-Compustat using the date and the first six digits of the CUSIP.[18] Out of the 7,964 US firms in the MSCI ESG Ratings database, we match 3,580 with CRSP-Compustat. The unmatched firms are mostly not listed on the three major exchanges covered by CRSP (NYSE, Amex, and Nasdaq).

Panel A of Table 1 presents descriptive statistics for the aggregate Social score and the sub-component scores of Human Capital and Product Safety. The aggregate Social score's mean and median is 4.37 and 4.30, respectively, with extreme values being less common as 90% of observations fall between 2 and 6.9. The means and medians for Human Capital (4.16 and 4.10, respectively) and Product Safety (4.64 and 4.50, respectively) are similar. The distributions of all three scores are symmetrical, as evidenced by the close proximity of mean and median values. Product Safety score shows the greatest variability, with a standard deviation of 2.24.[19]

Panel B of Table 1 presents the descriptive statistics for firm characteristics and stock returns. The average monthly return is 1.02%, with a standard deviation of 12.14%. The firms in our sample have a slightly higher market risk than the overall market, with an

[18]The first six digits of the CUSIP identify the firm. To ensure that the merge does not yield incorrect matches, we perform string cleaning and fuzzy matching on company names and manually check the few companies that match by CUSIP but not by names.

[19]Descriptive statistics for social scores by year and by industry are presented in the Internet Appendix.

average beta coefficient of 1.15. There are stocks in our sample with notable momentum, with the 5^{th} and 95^{th} percentiles of cumulative returns being -49% and 95%, respectively. The average return volatility measure is 0.10. The mean log market capitalization is 8, and the mean log PPE is 5.74. The average book-to-market ratio is 0.52, and the mean leverage is 23%. Nearly half (45%) of the sample firms are concentrated in a single business segment, with an HHI across all firms at 0.76. Sales growth averages at 3%, with a notably high standard deviation of 57%. Over our sample period, the average EPS growth for our sample of firms is slightly negative, at -1%. The Internet Appendix reports pairwise correlations among the different variables used in our tests, with few noteworthy correlations (we note that Human Capital and Product Safety scores are slightly negatively correlated, -0.21, and both scores are slightly positively correlated with firm size, 0.10).

Panel C of Table 1 presents the descriptive statistics for the sentiment measures. Product Controversy is a sentiment measure of product-related controversies firm i has in year t across news and social media sources. Product Sentiment is a sentiment measure of media sentiment related to a firm's products in each year across news and social media sources. Both sentiment scores can range from -1 to 1. However, for Product Controversy, negative values are rare. They typically refer to discreet revaluations of the variable such as a sudden decline in product controversies. A higher value of Product Controversy score signals worse perception regarding a firm's product-related controversies, whereas a higher Product Sentiment score reflects better product quality and customer satisfaction. The summary statistics highlight that there is meaningful cross-sectional variation in the two variables, particularly in Product Controversy, which we use for our primary analysis.

3.2 Empirical methodology

Our empirical methodology is standard, largely following Bolton and Kacperczyk (2021) and Bolton and Kacperczyk (2023).

For our main analysis, we examine the relationship between a firm's social scores and its

future stock returns, controlling for other known predictors. Specifically, we estimate pooled OLS regressions of the following form:

$$\mathrm{R}_{i,t} = \beta^{\mathrm{S}}\mathrm{S}_{i,t-1} + c'X_{i,t-1} + \gamma_{\text{industry}} + \gamma_{\text{time}} + \epsilon_{i,t}, \tag{1}$$

where the dependent variable, $R_{i,t}$, is the stock returns of firm i in month t. $S_{i,t-1}$ denotes a social score variable (referring to Social score, Human Capital score or Product Safety score) of firm i in month $t-1$. $X_{i,t-1}$ is a vector of controls. Controls typically include firm characteristics like Log Size, Book-to-Market ratio, Investment, Leverage, Log PPE, ROE ratio, Sales Growth, EPS Growth and business segments HHI; as well as stock characteristics such as: CAPM Beta, Momentum and Volatility. We always include industry fixed effects, γ_{industry}, as social scores are constructed as within-industry scores. We also include time fixed effects, γ_{time}. We follow Abadie, Athey, Imbens, and Wooldridge (2023) in our choice of standard errors. In particular, we cluster standard errors at the level that captures the most variation in our variable of interest – the social scores. Given that these scores predominantly vary across firms, we cluster standard errors at the firm level.

In Section 4, we evaluate whether the MSCI social scores can predict relevant validating variables like product controversies. We use similar regression specifications to equation (1) for that analysis, with key differences including a change in the dependent variable, the use of annual instead of monthly data, and the use of logistic regression in cases where the dependent variables are binary.

4 Validation of social score measures

In this section, we assess whether MSCI social scores accurately capture what they are intended to capture. We do this by examining if the scores forecast a firm's future social outcomes. Specifically, we gather future outcome indicators related to human capital and product safety from independent sources. For each social outcome, we regress its future

value in years $t+1$, $t+2$, or $t+3$ against the social scores, controlling for industry and year fixed effects, along with multiple firm characteristics described previously.

4.1 Validation of Human Capital score

To validate the Human Capital score, we examine whether it predicts a firm's likelihood of appearing in Fortune's Best Companies list. The finance literature on employee satisfaction, initiated by Edmans (2011), has shown that this indicator meaningfully reflects a firm's human capital and has significant implications for firm value. Accordingly, if the Human Capital score accurately captures a firm's human capital, it should positively and strongly correlate with the firm's inclusion in the Best Companies list. Conversely, as a placebo test, we do not anticipate the Product Safety score to have a similar predictive power for this list.

Table 2 presents the logistic regression results. In each specification we regress the Best Company indicator in year $t+1$, $t+2$, or $t+3$ on social scores and controls. Column (1) shows that the aggregate Social score is positively and significantly associated with a firm's likelihood of being in the Best Companies list in one year ahead. Columns (2) and (3) show that the overall positive and significant relation is primarily attributed to the human capital component of the social score. Specifically, the coefficient on the Human Capital score is 0.301 (significant at the 1% level), indicating that a one standard deviation higher in the Human Capital score is associated with a 73% ($e^{0.301\times 184}-1$) increase in the odds of a firm being designated as a Best Company the following year. In contrast, the coefficient on the product safety score is statistically indistinguishable from zero. Similar results are observed for predicting the Best Company two and three years ahead, columns (4) to (9). In sum, the results indicate that the MSCI social scores effectively capture significant variations in a firm's human capital, and importantly, for the relevant dimension of the social scores.

4.2 Validation of Product Safety score

To validate the Product Safety score, we examine whether it predicts a firm's product-related controversies in the future. Specifically, we use the product controversies score and the product sentiment score from Refinitiv Market Psych as our validating indicators of the Product Safety score. A higher value of the product controversies score reflects worse sentiment regarding a firm's product-related controversies, whereas a higher product sentiment score reflects better product quality and customer satisfaction. Product controversy and sentiment scores from Refinitiv Market Psych range from -1 to 1; however, for clarity in the regression tables, we rescale them to be between -100 and 100.

Table 3 presents the regression results for predicting the product controversies score. It indicates that a higher aggregate social score correlates with fewer controversies related to a firm's products in the subsequent one, two, and three years (columns 1, 4, and 7), achieving statistical significance at the 1% or 5% level. This significant relation is attributed solely to the product safety aspect of the social score. Specifically, the Product Safety score significantly predicts sentiment regarding a firm's product-related controversies one, two, and three years ahead, unlike the Human Capital score. The economic impact is notable: a one standard deviation increase in the product safety score corresponds to up to a 6% standard deviation decrease in the product controversies score. Similar patterns emerge in predicting the product sentiment score, where a higher Product Safety score predicts improved product sentiment in the future (see the Internet Appendix). Thus, the Product Safety score effectively captures variations in a firm's product safety, while the Human Capital score does not. Overall, the MSCI aggregate social score and its components successfully capture variations in a firm's human capital and product safety, accurately reflecting the intended dimensions.

5 Cross-sectional asset pricing results

In this section, we relate companies' social scores to their corresponding stock returns in the cross-section. Table 4 presents the cross-sectional regression results, estimating equation (1) on the cross-section of US stock returns. Our coefficient of interest is β^{S}, which we estimate for the three different scores related to the social dimension, the aggregate Social score and the two subcategories Human Capital and Product Safety.

Perhaps surprisingly, we find no effect of a firm's aggregate Social score on its returns, regardless of whether we include the controls (columns 1 and 4). In fact, the estimated coefficients are economically very close to zero.

In contrast, we observe a positive estimate for the Human Capital score, which is statistically significant at the 1% level (columns 2 and 5). In a specification that includes all the controls, the estimate is 0.0427, which corresponds to around 1% higher annual return for stocks with one standard deviation higher Human Capital scores. These results align with the findings of Boustanifar and Kang (2022), who, expanding on Edmans (2011), find that firms on the Best Companies list outperform by around 2% per year.[20] Our results support the hypothesis that firms with superior human capital have higher average returns. This result is consistent with existing literature but suggests that markets do not fully price in the value of human capital.

Additionally, we find a negative estimate for the Product Safety score, which is statistically significant at the 1% level (columns 3 and 6). Notably, the absolute magnitude of the point estimate for the Product Safety score coefficient, -0.0457, is essentially equal to that of the Human Capital score. This similarity accounts for the negligible effect of the aggregate Social Score, as it represents an average of two variables exerting opposite effects on future stock returns. Economically, the estimate translates to around 1.2% lower annual return for

[20] Both our methodology and our sample periods differ substantially from existing studies, hence we do not expect to find identical point estimates. However, given that Edmans (2011) considers only 100 best ranked firms per year, a more suitable comparison would be firms within two standard deviations higher Human Capital scores, which would amount to a premium of exactly 2% per year aligning with the findings of prior research.

stocks with one standard deviation higher Product Safety scores. Our results corroborate the hypothesis that firms with superior product safety exhibit lower average returns, consistent with financial intuition, where lower risk typically necessitates lower expected return.

The estimated coefficients on the control variables have the expected signs and align with prior literature (e.g., larger stocks tend to have lower returns, on average). Both the Human Capital and Product Safety score estimates decrease slightly with the inclusion of the controls but still remain highly statistically significant. Given the comprehensive set of control variables included, this reinforces our conclusion that Human Capital and Product Safety scores provide incremental information not captured by other characteristics.

In Figure 5, we plot the time series of the cumulative values of the estimated human capital and product safety premiums. Specifically, the social premiums are estimated at each month t from the cross-sectional regression in equation (1). Because different social scores have varying ranges, we express the magnitudes in terms of the unit standard deviation of each score at each cross-section in time. This approach ensures that the plots of the cumulative effect display comparable numbers in terms of economic significance. The figure suggests that the premiums remain consistent over time.

Lastly, we evaluate whether the predictive power of the social scores is maintained with the inclusion of the Best Company indicator, which is known as a robust predictor of positive performance and also reflective of the human capital dimension. Table 5 presents the cross-sectional regression results. All the specifications include the full set of controls. In line with the extant literature (Edmans, 2011; Boustanifar and Kang, 2022) and despite differences in our methodology and sample, we find that the Best Company indicator is a positive and statistically significant predictor of future stock returns (column 1). The inclusion of the aggregate Social score does not alter the estimate for the Best Company indicator. However, when we instead control for the Human Capital score, the Best Company indicator estimate decreases by around 30% and loses statistical significance. Conversely, the Human Capital score remains statistically significant at the 1% level, and its magnitude is unaffected by the

inclusion of the Best Company indicator. Therefore, the Human Capital score supersedes the explanatory power of the Best Company indicator. This is consistent with the fact that the Human Capital score considers employee satisfaction surveys in its calculation, and our findings that the Human Capital score predicts the Best Company indicator several years in advance. Additionally, in a specification including both the Best Company indicator and Product Safety score in column (4), both variables are statistically significant with minimal effect on the point estimates. This suggests that Product Safety captures distinct firm information from the Best Company indicator.

In sum, our findings indicate that the two main components of the S score are significant return predictors in the cross-section of stocks, though they operate in opposite directions.

6 Conclusion

Our analysis illuminates the impact of the S dimension of ESG on future stock returns. We find that the aggregate S score does not affect stock returns. However, the two main components of the S score exert significant, yet opposite, effects on returns. Specifically, higher human capital scores are associated with higher returns, aligning with previous research and suggesting that markets may not fully price in firms' human capital. Conversely, higher product safety scores are associated with lower average returns, consistent with the risk-based explanation that firms with safer products exhibit safer cash flows, reduced risk, and therefore, lower expected returns. This divergence questions the practice of combining varied ESG factors into a single score, which can mask the distinct risk and return implications of each component. Our findings underscore the complexity and diversity within ESG factors, particularly the social dimension, advising investors and practitioners to consider ESG criteria's individual aspects in investment decisions.

References

Abadie, A., S. Athey, G. W. Imbens, and J. M. Wooldridge (2023). When should you adjust standard errors for clustering? *Quarterly Journal of Economics 138*(1), 1–35.

Aggarwal, R., H. Briscoe-Tran, I. Erel, and L. Starks (2024). Public sentiment decomposition and shareholder actions. Working paper.

Aggarwal, R., I. Erel, R. Stulz, and R. Williamson (2009). Differences in governance practices between US and foreign firms: Measurement, causes, and consequences. *Review of Financial Studies 22*(8), 3131–3169.

Ahmed, P., J. Gardella, and S. Nanda (2002). Wealth effect of drug withdrawals on firms and their competitors. *Financial Management*, 21–41.

Akyildirim, E., S. Corbet, S. Ongena, and L. Oxley (2023). Greenwashing: Do investors, markets and boards really care? Research Paper 23-90, Swiss Finance Institute.

Anderson, E. W., C. Fornell, and S. K. Mazvancheryl (2004). Customer satisfaction and shareholder value. *Journal of Marketing 68*(4), 172–185.

Aswani, J., A. Raghunandan, and S. Rajgopal (2024). Are carbon emissions associated with stock returns? *Review of Finance 28*(1), 75–106.

Atilgan, Y., K. O. Demirtas, A. Edmans, and A. D. Gunaydin (2023). Does the carbon premium reflect risk or mispricing? Working paper.

Bali, T. G., R. F. Engle, and S. Murray (2016). *Empirical asset pricing: The cross section of stock returns*. John Wiley & Sons.

Barber, B. M. and M. N. Darrough (1996). Product reliability and firm value: The experience of american and japanese automakers, 1973-1992. *Journal of Political Economy 104*(5), 1084–1099.

Bebchuk, L. A., A. Cohen, and C. C. Wang (2013). Learning and the disappearing association between governance and returns. *Journal of Financial Economics 108*(2), 323–348.

Berg, F., F. Heeb, and J. F. Kölbel (2022). The economic impact of ESG ratings. Working paper.

Berg, F., J. F. Koelbel, A. Pavlova, and R. Rigobon (2022). ESG confusion and stock returns: Tackling the problem of noise. Working paper, National Bureau of Economic Research.

Berg, F., J. F. Koelbel, and R. Rigobon (2022). Aggregate confusion: The divergence of ESG ratings. *Review of Finance 26*(6), 1315–1344.

Bolton, P. and M. Kacperczyk (2021). Do investors care about carbon risk? *Journal of Financial Economics 142*(2), 517–549.

Bolton, P. and M. Kacperczyk (2023). Global pricing of carbon-transition risk. *Journal of Finance 78*(6), 3677–3754.

Bongaerts, D., X. Kang, and M. van Dijk (2023). The intangibles premium. Working paper, Erasmus University Rotterdam.

Borenstein, S. and M. B. Zimmerman (1988). Market incentives for safe commercial airline operation. *American Economic Review*, 913–935.

Boustanifar, H. and Y. D. Kang (2022). Employee satisfaction and long-run stock returns, 1984–2020. *Financial Analysts Journal 78*(3), 129–151.

Davidson III, W. N. and D. L. Worrell (1992). Research notes and communications: The effect of product recall announcements on shareholder wealth. *Strategic Management Journal 13*(6), 467–473.

Dowdell, T. D., S. Govindaraj, and P. C. Jain (1992). The Tylenol incident, ensuing regulation, and stock prices. *Journal of Financial and Quantitative Analysis 27*(2), 283–301.

Dranove, D. and C. Olsen (1994). The economic side effects of dangerous drug announcements. *Journal of Law and Economics 37*(2), 323–348.

Edmans, A. (2011). Does the stock market fully value intangibles? employee satisfaction and equity prices. *Journal of Financial Economics 101*(3), 621–640.

Edmans, A. (2012). The link between job satisfaction and firm value, with implications for corporate social responsibility. *Academy of Management Perspectives 26*(4), 1–19.

Edmans, A. (2023). The end of ESG. *Financial Management 52*(1), 3–17.

Edmans, A., D. Pu, C. Zhang, and L. Li (2023). Employee satisfaction, labor market flexibility, and stock returns around the world. *Management Science*.

Eisfeldt, A. L., E. Kim, and D. Papanikolaou (2020). Intangible value. Working paper, National Bureau of Economic Research.

Fornell, C., F. V. Morgeson III, and G. T. M. Hult (2016). Stock returns on customer satisfaction do beat the market: Gauging the effect of a marketing intangible. *Journal of Marketing 80*(5), 92–107.

Gillan, S. L., A. Koch, and L. T. Starks (2021). Firms and social responsibility: A review of ESG and CSR research in corporate finance. *Journal of Corporate Finance 66*, 101889.

Glossner, S. (2021). Repeat offenders: ESG incident recidivism and investor underreaction. Technical report.

Gompers, P., J. Ishii, and A. Metrick (2003). Corporate governance and equity prices. *Quarterly Journal of Economics 118*(1), 107–156.

Hartzmark, S. M. and A. B. Sussman (2019). Do investors value sustainability? A natural experiment examining ranking and fund flows. *Journal of Finance 74*(6), 2789–2837.

Hazarika, S., A. Kashikar, L. Peng, A. Röell, and Y. Shen (2023). ESG-linked pay around the world—trends, determinants, and outcomes. Working paper, Zicklin School of Business, Baruch College - The City University of New York.

Hinz, O., M. Nofer, D. Schiereck, and J. Trillig (2015). The influence of data theft on the share prices and systematic risk of consumer electronics companies. *Information & Management 52*(3), 337–347.

Huang, J. (2018). The customer knows best: The investment value of consumer opinions. *Journal of Financial Economics 128*(1), 164–182.

Jarrell, G. and S. Peltzman (1985). The impact of product recalls on the wealth of sellers. *Journal of Political Economy 93*(3), 512–536.

Jensen, T. I., B. Kelly, and L. H. Pedersen (2023). Is there a replication crisis in finance? *Journal of Finance 78*(5), 2465–2518.

Kamiya, S., J.-K. Kang, J. Kim, A. Milidonis, and R. M. Stulz (2021). Risk management, firm reputation, and the impact of successful cyberattacks on target firms. *Journal of Financial Economics 139*(3), 719–749.

Karpoff, J. M. and J. R. Lott Jr (1993). The reputational penalty firms bear from committing criminal fraud. *Journal of Law and Economics 36*(2), 757–802.

Kong, D., L. Shi, and Z. Yang (2019). Product recalls, corporate social responsibility, and firm value: Evidence from the chinese food industry. *Food Policy 83*, 60–69.

Krüger, P. (2015). Corporate goodness and shareholder wealth. *Journal of Financial Economics 115*(2), 304–329.

Lindsey, L. A., S. Pruitt, and C. Schiller (2023). The cost of ESG investing. Working paper.
Matos, P. (2020). ESG and responsible institutional investing around the world: A critical review.
McCahery, J. A., Z. Sautner, and L. T. Starks (2016). Behind the scenes: The corporate governance preferences of institutional investors. *Journal of Finance 71*(6), 2905–2932.
Mitchell, M. L. (1989). The impact of external parties on brand-name capital: The 1982 Tylenol poisonings and subsequent cases. *Economic inquiry 27*(4), 601–618.
Mitchell, M. L. and M. T. Maloney (1989). Crisis in the cockpit? The role of market forces in promoting air travel safety. *Journal of Law and Economics 32*(2, Part 1), 329–355.
Pagell, M., M. Parkinson, A. Veltri, J. Gray, F. Wiengarten, M. Louis, and B. Fynes (2020). The tension between worker safety and organization survival. *Management Science 66*(10), 4863–4878.
Pástor, L., R. F. Stambaugh, and L. A. Taylor (2021). Sustainable investing in equilibrium. *Journal of Financial Economics 142*(2), 550–571.
Pástor, L., R. F. Stambaugh, and L. A. Taylor (2022). Dissecting green returns. *Journal of Financial Economics 146*(2), 403–424.
Pástor, L., R. F. Stambaugh, and L. A. Taylor (2024). Green tilts. Working paper, University of Chicago, Becker Friedman Institute for Economics.
Pedersen, L. H., S. Fitzgibbons, and L. Pomorski (2021). Responsible investing: The ESG-efficient frontier. *Journal of Financial Economics 142*(2), 572–597.
Pozo, V. F. and T. C. Schroeder (2016). Evaluating the costs of meat and poultry recalls to food firms using stock returns. *Food Policy 59*, 66–77.
Serafeim, G. and A. Yoon (2023). Stock price reactions to ESG news: The role of ESG ratings and disagreement. *Review of Accounting Studies 28*(3), 1500–1530.
Shan, C. and D. Y. Tang (2023). The value of employee satisfaction in disastrous times: Evidence from COVID-19. *Review of Finance 27*(3), 1027–1076.
Shleifer, A. and R. W. Vishny (1997). A survey of corporate governance. *Journal of Finance 52*(2), 737–783.
Spanos, G. and L. Angelis (2016). The impact of information security events to the stock market: A systematic literature review. *Computers & Security 58*, 216–229.
Thomsen, M. R. and A. M. McKenzie (2001). Market incentives for safe foods: an examination of shareholder losses from meat and poultry recalls. *American Journal of Agricultural Economics 83*(3), 526–538.
Tripathi, M. and A. Mukhopadhyay (2022). Does privacy breach affect firm performance? an analysis incorporating event-induced changes and event clustering. *Information & Management 59*(8), 103707.
Yee, R. W., A. C. Yeung, and T. E. Cheng (2008). The impact of employee satisfaction on quality and profitability in high-contact service industries. *Journal of Operations Management 26*(5), 651–668.
Zhang, S. (2024). Carbon returns across the globe. *Journal of Finance, forthcoming*.

Table 1: Descriptive statistics

The table presents summary statistics for firm social scores, returns, characteristics, and product controversies and sentiment measures. The table reports the mean, 5^{th} percentile (P5), median, 95^{th} percentile (P95), standard deviation (SD), and the number of firms for which data is available (N Firm). Social Score, Human Capital Score, and Product Safety Score are MSCI's social scores. Return is the monthly stock return (in %), Log Size is natural log of end-of-year firm market capitalization, BM is the ratio of the book value of equity to the market value of equity; Investment is the ratio of capital expenditure (capex) to the book value of assets; Leverage is the ratio of the book value of debt to the book value of assets; Log PPE is the natural log of the firm's plant, property and equipment; ROE is a profitability measure computed as the ratio of net income to the book value of equity (in %); Beta is the CAPM (market) beta; Momentum is the cumulative stock returns over a one year period from $t-12$ to $t-1$; Volatility is the standard deviation of stock returns over a one-year period from $t-12$ to $t-1$; Sales Growth is the ratio of change in annual sales to the one-month lagged market capitalization; EPS Growth is the change in basic earning per share scaled by the share price; and the HHI is the Herfindahl–Hirschman index computed using a firm's sales over different business segments. Product Controversy is a sentiment measure of product-related controversies firm i has in year t across news and social media sources. Product Sentiment is a sentiment measure of media sentiment related to a firm's products in each year across news and social media sources. Both measures are from Refinitiv MarketPsych. The sample period runs from January 2007 to December 2022.

	Mean	P5	Median	P95	SD	N Firms
Panel A: MSCI social scores						
Social Score	4.37	2.00	4.30	6.90	1.51	3,154
Human Capital Score	4.16	1.20	4.10	7.30	1.84	3,029
Product Safety Score	4.64	1.00	4.50	8.50	2.24	2,336
Panel B: Firm and stock characteristics						
Return	1.02	−17.28	0.92	19.46	12.14	3,154
Log Size	8.00	5.83	7.85	10.82	1.55	3,154
BM	0.52	0.07	0.42	1.27	0.39	3,154
Investment	0.04	0.00	0.02	0.13	0.05	3,154
Leverage	0.23	0.00	0.21	0.58	0.19	3,154
Log PPE	5.74	2.23	5.72	9.49	2.18	3,154
ROE	5.22	−50.41	9.16	39.79	32.91	3,154
Beta	1.15	0.54	1.10	1.92	0.43	3,154
Momentum	0.16	−0.49	0.10	0.95	0.51	3,154
Volatility	0.10	0.04	0.09	0.21	0.06	3,154
Sales Growth	0.03	−0.21	0.02	0.32	0.57	3,154
EPS Growth	−0.01	−0.13	0.00	0.11	0.73	3,154
HHI	0.76	0.29	0.89	1.00	0.27	3,154
Panel C: Product controversies and sentiment						
Product Controversies	0.13	0.01	0.09	0.43	0.15	2,422
Product Sentiment	0.03	−0.01	0.02	0.11	0.04	2,548

Table 2: Validating MSCI human capital score: predicting Best Company

The table presents logit regression results estimating the ability of MSCI social scores to predict a firm's inclusion in Fortune's annual list of "Best Companies to Work For". The independent variable is an indicator taking the value of one if a firm belongs to the Best Companies list in a given year and zero otherwise. The key predictors are Social Score, Human Capital Score, and Product Safety Score. Controls include each firm's log end-of-year market capitalization (Log Size), book-to-market ratio (BM), ratio of capital expenditure to the book value of assets (Investment), ratio of the book value of debt to the book value of assets (Leverage), log value of property, plant and equipment (PPE), ratio of net income to book value (ROE, in %), ratio of change in annual sales to the one-month lagged market capitalization (Sales Growth), change in basic earning per share scaled by the share price (EPS Growth), and the Herfindahl–Hirschman index (HHI) computed using a firm's sales over different business segments. All regressions include industry and year fixed effects. Standard errors in parentheses are clustered by firm. R^2 denotes the pseudo R^2. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively. The data are annual and the sample period runs from January 2007 to December 2022.

	1-year forecast			2-year forecast			3-year forecast		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Social Score	0.278***			0.267**			0.226**		
	(0.101)			(0.106)			(0.107)		
Human Capital Score		0.301***			0.310***			0.275***	
		(0.064)			(0.075)			(0.076)	
Product Safety Score			0.095			0.101			0.111
			(0.089)			(0.103)			(0.108)
Log Size	0.684***	0.631***	0.434**	0.623***	0.575**	0.396*	0.604***	0.585**	0.431*
	(0.199)	(0.214)	(0.213)	(0.215)	(0.225)	(0.232)	(0.228)	(0.232)	(0.243)
BM	−0.231	−0.454	−0.624	−0.067	−0.347	−0.363	−0.042	−0.218	−0.120
	(0.452)	(0.590)	(0.659)	(0.505)	(0.649)	(0.721)	(0.563)	(0.679)	(0.749)
Investment	5.490*	2.531	−1.996	5.021	3.072	−0.905	3.530	3.320	−0.589
	(3.244)	(3.666)	(5.265)	(3.474)	(3.885)	(5.903)	(3.804)	(4.042)	(6.429)
Leverage	0.267	0.415	0.096	0.493	0.699	0.352	0.355	0.516	0.171
	(0.959)	(1.005)	(1.042)	(1.002)	(1.045)	(1.087)	(1.064)	(1.101)	(1.131)
Log PPE	0.156	0.252	0.437**	0.165	0.246	0.401*	0.180	0.217	0.330
	(0.171)	(0.202)	(0.212)	(0.189)	(0.217)	(0.231)	(0.202)	(0.223)	(0.238)
ROE	−0.003	−0.003	−0.002	−0.001	−0.001	0.000	−0.003	−0.002	−0.001
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)
Sales Growth	−0.013	0.029	0.109	0.078	0.108	0.139*	0.134	−0.031	−0.014
	(0.116)	(0.139)	(0.099)	(0.076)	(0.070)	(0.080)	(0.084)	(0.163)	(0.228)
EPS Growth	0.082**	0.059	0.038	0.021	0.015	0.012	0.047	0.052	0.026
	(0.041)	(0.040)	(0.044)	(0.048)	(0.043)	(0.049)	(0.046)	(0.038)	(0.042)
HHI	0.259	0.730	0.590	0.081	0.526	0.177	−0.148	0.231	−0.237
	(0.641)	(0.726)	(0.851)	(0.650)	(0.745)	(0.871)	(0.658)	(0.716)	(0.838)
R^2	0.345	0.357	0.325	0.350	0.366	0.337	0.350	0.354	0.325
Observations	18,474	16,345	11,423	15,485	13,862	9,594	12,995	11,784	8,112

Table 3: Validating MSCI product safety score: predicting product controversies

The table presents regression results estimating the ability of MSCI social scores to predict product controversies. The dependent variable is Product Controversy a sentiment measure of product-related controversies firm i has in year t across news and social media sources, from Refinitiv MarketPsych. Higher Product Controversy measure corresponds to worse controversies for a firm. The key predictors are Social Score, Human Capital Score, and Product Safety Score. Controls include each firm's log end-of-year market capitalization (Log Size), book-to-market ratio (BM), ratio of capital expenditure to the book value of assets (Investment), ratio of the book value of debt to the book value of assets (Leverage), log value of property, plant and equipment (PPE), ratio of net income to book value (ROE, in %), ratio of change in annual sales to the one-month lagged market capitalization (Sales Growth), change in basic earning per share scaled by the share price (EPS Growth), and the Herfindahl–Hirschman index (HHI) computed using a firm's sales over different business segments. All regressions include industry and year fixed effects. Standard errors in parentheses are clustered by firm. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively. The data are annual and the sample period runs from January 2007 to December 2022.

	1-year forecast			2-year forecast			3-year forecast		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Social Score	−0.3414***			−0.3467**			−0.3316**		
	(0.1244)			(0.1363)			(0.1423)		
Human Capital Score		0.0623			−0.0013			−0.1366	
		(0.1029)			(0.1086)			(0.1239)	
Product Safety Score			−0.3072***			−0.3897***			−0.2418*
			(0.1011)			(0.1139)			(0.1267)
Log Size	−1.103***	−0.7968***	−0.8601***	−1.495***	−1.152***	−1.133***	−1.748***	−1.631***	−1.680***
	(0.2155)	(0.2188)	(0.2450)	(0.2452)	(0.2453)	(0.2811)	(0.2645)	(0.2832)	(0.3103)
BM	0.4101	0.9810	1.174*	−0.2700	0.0097	0.2132	−0.8843	−0.6380	−0.8148
	(0.5784)	(0.6097)	(0.6871)	(0.6315)	(0.6656)	(0.7839)	(0.6863)	(0.7611)	(0.8826)
Investment	−6.997	−2.571	−4.281	−6.988	−1.787	2.362	−8.345	−1.110	4.529
	(6.167)	(6.453)	(7.579)	(6.765)	(7.059)	(9.116)	(7.446)	(7.992)	(10.75)
Leverage	1.448	1.519	1.791*	1.437	1.892*	1.869	1.243	2.012	2.268*
	(1.012)	(1.023)	(1.080)	(1.108)	(1.128)	(1.210)	(1.183)	(1.256)	(1.334)
Log PPE	0.3754*	0.2330	0.0551	0.4393**	0.2318	0.0180	0.5072**	0.3278	0.1949
	(0.1964)	(0.2018)	(0.2117)	(0.2222)	(0.2255)	(0.2497)	(0.2366)	(0.2551)	(0.2741)
ROE	0.0103***	0.0075**	0.0076*	0.0154***	0.0112***	0.0107***	0.0185***	0.0174***	0.0134***
	(0.0037)	(0.0037)	(0.0039)	(0.0039)	(0.0039)	(0.0040)	(0.0041)	(0.0042)	(0.0044)
Sales Growth	0.0723	−0.3419	−0.1163	0.0413	−0.3130	−0.0396	−0.0225	0.1100	−0.2143
	(0.1125)	(0.2371)	(0.2986)	(0.0957)	(0.2046)	(0.2169)	(0.0762)	(0.2009)	(0.2730)
EPS Growth	0.0647	0.0996*	0.1897	0.0020	0.0750	0.0996	0.0246	0.0906	0.0389
	(0.0585)	(0.0598)	(0.1272)	(0.0510)	(0.0509)	(0.1094)	(0.0925)	(0.1124)	(0.1549)
HHI	2.195**	1.758*	2.176**	2.348**	1.904*	2.445**	2.130**	2.273**	2.337*
	(0.8860)	(0.9169)	(1.014)	(0.9623)	(0.9871)	(1.116)	(1.019)	(1.114)	(1.276)
Adjusted R^2	0.137	0.111	0.115	0.149	0.132	0.141	0.145	0.152	0.156
Observations	14,894	12,015	8,411	14,602	11,821	8,200	13,966	11,524	7,934

Table 4: Social scores and stock returns

This table reports pooled OLS regression results estimating the relation between MSCI social scores and stock returns. The dependent variable is the monthly stock return, $r_{i,t}$ (in %), of firm i at time t. All the independent variables are measured at time $t-1$. The key independent variables are Social Score, Human Capital Score, and Product Safety Score. Controls include each firm's log end-of-year market capitalization (Log Size), book-to-market ratio (BM), ratio of capital expenditure to the book value of assets (Investment), ratio of the book value of debt to the book value of assets (Leverage), log value of property, plant and equipment (PPE), ratio of net income to book value (ROE, in %), beta with respect to the aggregate market (Beta), cumulative stock returns over a one-year period from $t-12$ to $t-1$ (Momentum), standard deviation of stock returns over a one-year period from $t-12$ to $t-1$ (Volatility), ratio of change in annual sales to the one-month lagged market capitalization (Sales Growth), change in basic earning per share scaled by the share price (EPS Growth), and the Herfindahl–Hirschman index (HHI) computed using a firm's sales over different business segments. All regressions include industry and year-month fixed effects. Standard errors in parentheses are clustered by firm. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively. The sample period runs from January 2007 to December 2022.

	(1)	(2)	(3)	(4)	(5)	(6)
Social Score	0.0047			−0.0030		
	(0.0163)			(0.0162)		
Human Capital Score		0.0576***			0.0427***	
		(0.0148)			(0.0147)	
Product Safety Score			−0.0561***			−0.0457***
			(0.0154)			(0.0160)
Log Size				−0.2184***	−0.2035***	−0.1366***
				(0.0403)	(0.0432)	(0.0494)
BM				0.0829	0.0704	0.2890**
				(0.1048)	(0.1146)	(0.1355)
Investment				−6.229***	−6.466***	−2.586*
				(0.8699)	(0.9460)	(1.417)
Leverage				−0.2094	−0.0935	−0.0829
				(0.1843)	(0.1994)	(0.2304)
Log PPE				0.2162***	0.2078***	0.1275***
				(0.0352)	(0.0377)	(0.0438)
ROE				0.0035***	0.0026*	0.0038**
				(0.0014)	(0.0015)	(0.0016)
Beta				−0.4094***	−0.5368***	−0.2638**
				(0.1008)	(0.1101)	(0.1338)
Momentum				0.1407*	0.1506*	0.0693
				(0.0741)	(0.0784)	(0.0952)
Volatility				3.407***	3.091***	2.070*
				(0.9388)	(1.021)	(1.174)
Sales Growth				0.0017	0.0145	−0.0456
				(0.1005)	(0.1074)	(0.1625)
EPS Growth				−0.0611	−0.0832	−0.7339***
				(0.0863)	(0.1722)	(0.2244)
HHI				0.0290	−0.0160	0.0179
				(0.0915)	(0.1018)	(0.1197)
Adjusted R^2	0.215	0.207	0.192	0.216	0.208	0.192
Observations	223,678	190,439	134,043	223,678	190,439	134,043
Industry F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Year/month F.E.	Yes	Yes	Yes	Yes	Yes	Yes

Table 5: Social scores and stock returns, controlling for Best Company

This table reports pooled OLS regression results estimating the relation between MSCI social scores and stock returns, controlling for the Best Company indicator. The dependent variable is the monthly stock return, $r_{i,t}$ (in %), of firm i at time t. All the independent variables are measured at time $t-1$. The key independent variables are Social Score, Human Capital Score, Product Safety Score, and the Best Company indicator. The Best Company indicator takes the value of one if a firm is included in Fortune's annual list of "Best Companies to Work For" in a given year, and zero otherwise. Controls include each firm's log end-of-year market capitalization (Log Size), book-to-market ratio (BM), ratio of capital expenditure to the book value of assets (Investment), ratio of the book value of debt to the book value of assets (Leverage), log value of property, plant and equipment (PPE), ratio of net income to book value (ROE, in %), beta with respect to the aggregate market (Beta), cumulative stock returns over a one-year period from $t-12$ to $t-1$ (Momentum), standard deviation of stock returns over a one-year period from $t-12$ to $t-1$ (Volatility), ratio of change in annual sales to the one-month lagged market capitalization (Sales Growth), change in basic earning per share scaled by the share price (EPS Growth), and the Herfindahl–Hirschman index (HHI) computed using a firm's sales over different business segments. All regressions include industry and year-month fixed effects. Standard errors in parentheses are clustered by firm. Statistical significance at the 10%, 5%, and 1% levels is denoted by *, **, and ***, respectively. The sample period runs from January 2007 to December 2022.

	(1)	(2)	(3)	(4)
Best Company	0.2495**	0.2526**	0.1820	0.3003**
	(0.1174)	(0.1174)	(0.1302)	(0.1409)
Social Score		−0.0047		
		(0.0162)		
Human Capital Score			0.0421***	
			(0.0147)	
Product Safety Score				−0.0469***
				(0.0160)
Adjusted R^2	0.216	0.216	0.208	0.192
Observations	223,678	223,678	190,439	134,043
Industry F.E.	Yes	Yes	Yes	Yes
Year/month F.E.	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

Figure 1: Coverage over time

This figure shows the coverage of firms in the MSCI database compared to the CRSP and Compustat merged dataset over time. Panel A displays the number of firms as of December each year, and Panel B displays the firm market capitalization as of December each year. For inclusion in this plot, all firm and stock variables must be non-missing. The sample period is from January 2007 to December 2022.

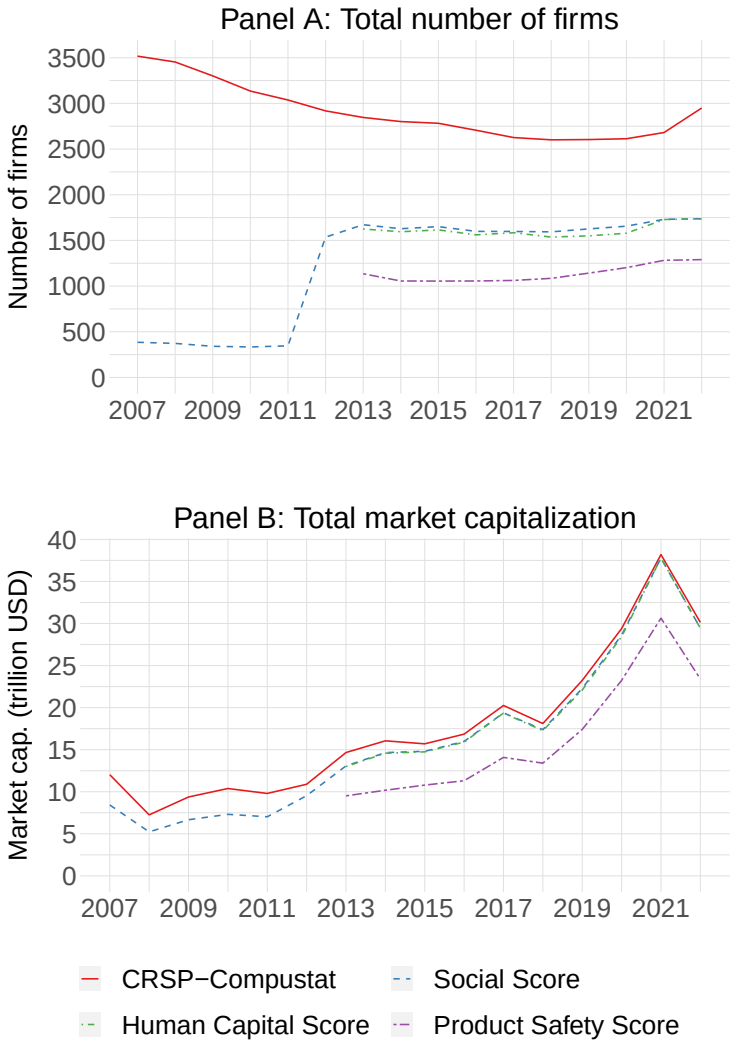

Figure 2: Total number of firms in each market capitalization bucket

This figure shows the total number of the firms that report the MSCI aggregate and sub-component social scores in each market capitalization bucket as of December each year. The breakpoints for constructing these buckets are based on the Kenneth French's market equity 30^{th} and 70^{th} percentiles. For inclusion in this plot, all firm and stock variables must be non-missing. The sample period is from January 2007 to December 2022.

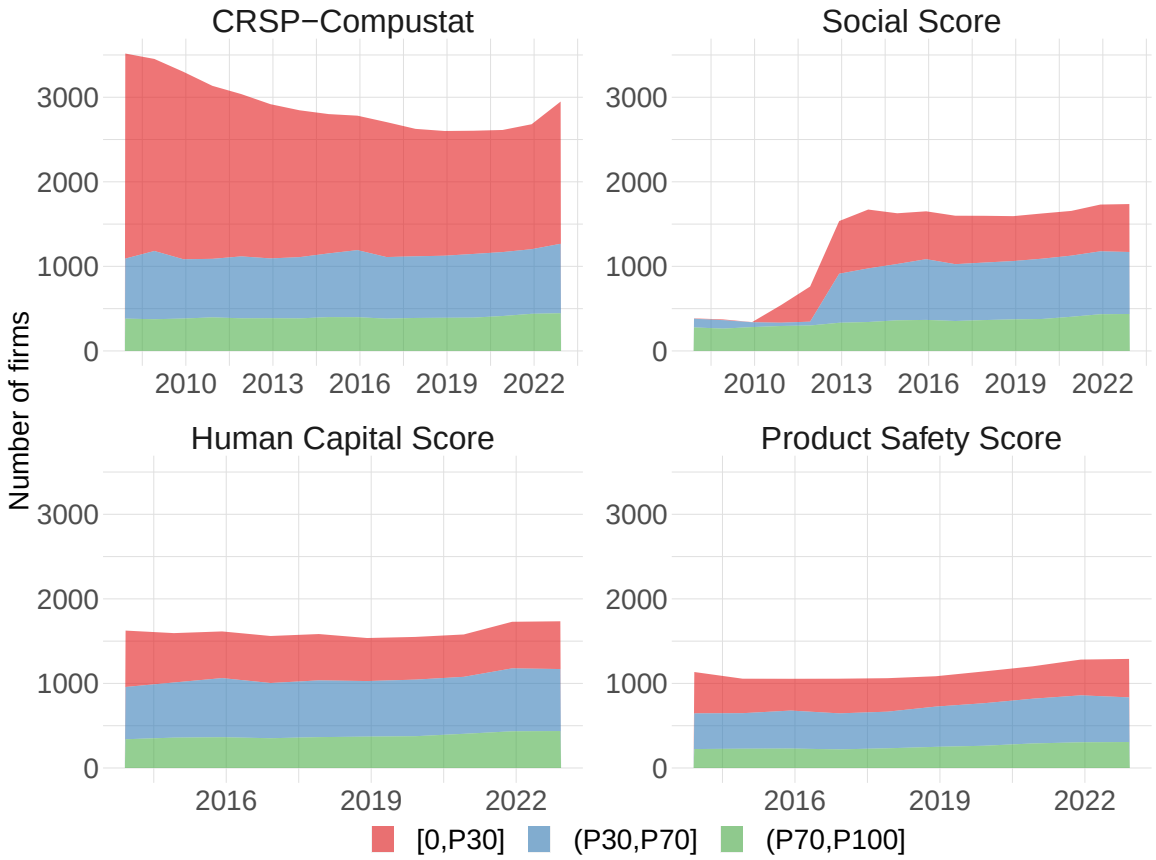

Figure 3: Total market capitalization in each market capitalization bucket

This figure shows the total market capitalization of the firms that report the MSCI aggregate and sub-component social scores in each market capitalization bucket as of December each year. The breakpoints for constructing these buckets are based on the Kenneth French's market equity 30^{th} and 70^{th} percentiles. For inclusion in this plot, all firm and stock variables must be non-missing. The sample period is from January 2007 to December 2022.

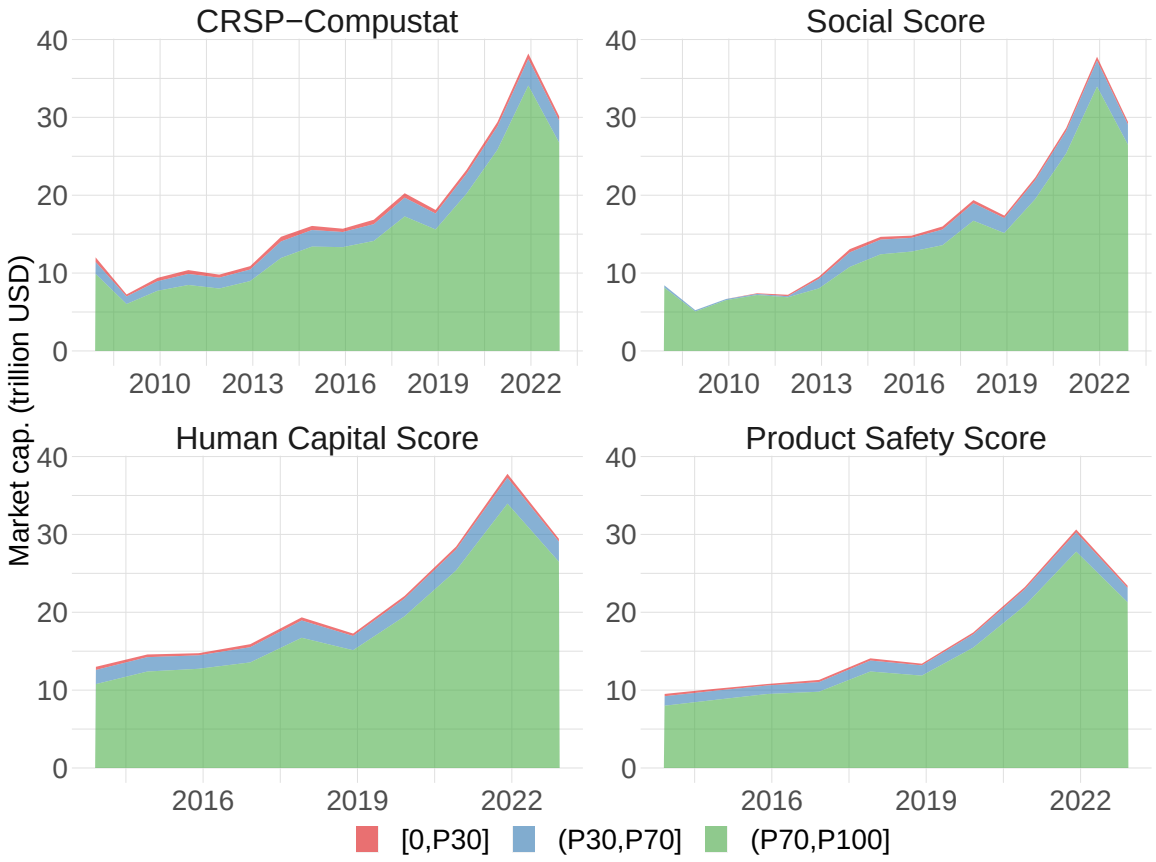

Figure 4: Coverage by industry

This figure displays the number of firms reporting MSCI aggregate and sub-component social scores as of December each year, categorized by GICS 2-digit codes that identify sectors. For inclusion in this plot, all firm and stock variables must be non-missing. The sample period is from January 2007 to December 2022.

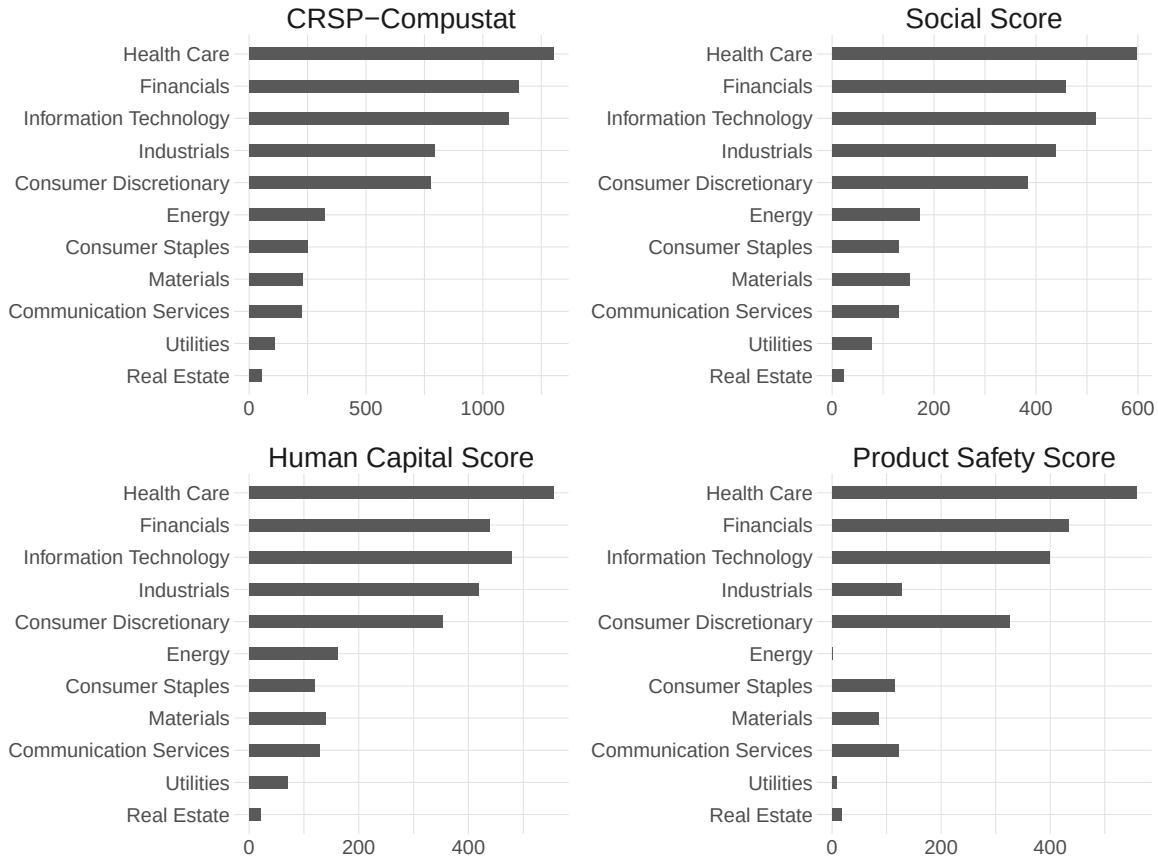

Figure 5: Social premiums over time

This figure displays the cumulative values of social scores premiums estimated from the cross-sectional regressions of monthly returns on lagged standardized Human Capital and Product Safety scores, respectively. The regressions include the same set of controls as in Table 4. The sample period is from January 2013 to December 2022.