Tilting the wrong firms? How inflated ESG ratings negate socially responsible investing under information asymmetries*

Dennis Bams [a,b], Bram van der Kroft [a,b]

[a]Maastricht University

[b]Open University

December 12, 2022

Abstract

This paper uncovers global ESG rating inflation that negates the societal impact of socially responsible investing under information asymmetries. Refinitiv, MSCI IVA, and FTSE ESG ratings are inversely related to sustainable performance because firms' promises of sustainable performance improvements do not realize up to 15 years in the future. Consequently, socially responsible investors accidentally tilt their portfolios toward firms with high ESG ratings but low sustainable performance. We causally show that this provides cost of capital incentives for firms to inflate their ESG rating. Therefore, the portfolios of socially responsible investors are less sustainable than the market.

Key words: Cost of capital, portfolio tilting, socially responsible investing (SRI), promised to realized sustainable performance

JEL codes: G11, M14, Q56

*Contact information: bramvdk@mit.edu; w.bams@maastrichtuniversity.nl. We thank Florian Berg, Natalya Bikmetova, Marco Ceccarelli, Kevin Chuah, Jeroen Derwall, Alex Edmans, Piet Eichholtz, Peter Fiechter, Anand Goel, Andreas Hoepner, Stefanie Kleimeier, Julian Kölbel, Thomas Post, Jan Schneemeier, and David Skandera, as well as seminar participants at Massachusetts Institute of Technology (2022), Stevens Institute of Technology (2021), Maastricht University (2021), and Open University (2021). We also thank the organisers of the American Economic Association (2023), the Financial Management Association (2022), the Academy of Management Annual Meeting (2022), the GRASFI Annual Meeting (2022), the GRONEN Annual Meeting (2022), the JMS Annual Meeting (2022), and the World Finance Conference (2022). We thank RepRisk for data access.

1 Introduction

Nowadays, a third of assets under management considers the environmental, social, and governance (ESG) aspects of firms.[1] This socially responsible investing (SRI) aims at minimizing externalities through reducing environmental pollution and improving social conditions (Riedl and Smeets, 2017; Barber et al., 2021; Bonnefon et al., 2022). In addition to engagement, the recent theoretical literature promotes SRI portfolio tilting as a way to improve aggregate sustainable performance (Broccardo et al., 2022; Oehmke and Opp, 2020). Specifically, it argues that a reallocation of funds from unsustainable to sustainable firms improves their cost of capital and increases the long-term share of sustainable assets in the economy (Edmans et al., 2022). In practice, such portfolio reallocation might be hard to achieve, given that information asymmetries hinder investors in identifying sustainable firms. In a worst-case scenario, SRI could actually harm societal welfare when investors perceive unsustainable firms as sustainable. This raises the question of whether portfolio tiling is welfare-enhancing under information asymmetries.

This paper causally demonstrates that portfolio tilting disadvantages sustainable firms because ESG ratings are inflated. In contrast to the readily-available financial performance information, firms have ample opportunities to conceal their sustainable performance as it is unstandardized, primarily self-reported, and highly diverse in nature (Wu et al., 2020). In the wake of these information asymmetries, responsible investors heavily rely on third-party ESG ratings to shape their portfolios (Hartzmark and Sussman, 2019). As a result, they provide cost of capital benefits for firms with high ESG ratings rather than directly allocating their funds to sustainable firms. This incentivizes firms to increase their ESG ratings without necessarily improving sustainable performance, i.e., inflating their ESG ratings. Consequently, investors that tilt their portfolio using inflated ESG ratings unintentionally divest from sustainable firms, increase their capital cost, and invert SRI's societal benefits.

We examine whether ESG ratings are inflated by considering promised and realized sustainable performance. ESG ratings are forward-looking and reconcile firms' current realizations of sustainable performance with their promised future sustainable performance.[2] Promising future improvements in sustainable performance is inexpensive as it primarily involves writing an ambitious sustainability report that boasts comprehensive ESG policies, activities, and targets. By contrast, realizing these promises is a substantive endeavor because it requires genuine advances in sustainable performance and reductions in ESG controversies. It is not necessarily bad that ESG ratings capture the promised sustainable performance of firms. However, information asymmetries (Hartzmark and Sussman, 2019; Wu et al., 2020), a lack of transparency and comparability among ESG ratings (Berg et al., 2020; Berg, Koelbel and Rigobon, 2022; Christensen et al., 2022), and potential ESG rating provider agency problems (Yang,

[1] https://www.ussif.org/trends

[2] See https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/ESG-scores-methodology.pdf

2022) enable firms to persistently promise future sustainable performance improvements without subsequently realizing them.[3] Given the above, we identify ESG ratings as inflated when they 1) solely capture the promised sustainable performance of firms in a contemporary setting and 2) these promises do not realize intertemporally. In other words, ESG ratings are inflated when they only consider empty promises of future sustainable performance.

We find that Refinitiv, MSCI, and FTSE ESG ratings are inversely related to sustainable performance using this decomposition. We create firm-level promised and realized ESG scores by rank-ordering 169 granular Refinitiv ESG metrics relative to industry peers from 2003 to 2020 for 7,232 firms globally, covering 85% of global market capitalization. In an empirical analysis, we show that ESG ratings primarily capture firms' promised sustainable performance and are often negatively related to realized sustainable performance. This sole reliance on promised sustainable performance is troublesome because firms do not follow through on these promises up to 15 years in the future. Our findings persist across multiple ESG ratings, continents, industries, and periods and when we explicitly match promises to realizations on 14 specific facets of sustainable performance. To clarify, firms can improve their ESG ratings while experiencing additional ESG controversies, polluting more, or exhibiting worse labor conditions and governance structures.

ESG rating inflation tilts the portfolios of socially responsible investors towards unsustainable firms. By analyzing 13F forms, we discover that socially responsible institutional investors signatory to the Principal of Responsible Investing (PRI) hold more firms with higher ESG ratings (Ceccarelli et al., 2021; Gibson Brandon et al., 2021). In economic terms, a one standard deviation increase in the average Refinitiv, MSCI, and FSTE ESG rating of firms increases the share of stocks owned by PRI investors by four percentage points. However, we uncover that these investors only increase their holdings when promised sustainable performance improves. Specifically, socially responsible investors reduce their holdings in firms that improve their realized sustainable performance and attain fewer controversies. Given the above, we uncover a global portfolio misallocation of socially responsible investors toward unsustainable firms.

We causally show that these sizeable portfolio misallocations provide cost of capital incentives for firms to inflate their ESG ratings. In a correlational analysis, we observe that firms with higher ESG ratings pay a lower cost of capital after controlling for common risk factors (similar to Chava, 2014; Berk and van Binsbergen, 2021). A potential endogeneity concern with this analysis is that changes in ESG ratings could accompany shocks to sustainable performance. To combat this concern in a causal way, we analyze the introduction of the Non-Financial Reporting Directive (NFDR) (following Fiechter et al., 2022).[4] This European Commission directive poses an exogenous shock to ESG rating inflation as it requires more extensive sustainable

[3]ESG rating inflation incentives are particularly pronounced for unsustainable firms because ESG reporting does not leak strategic information to competitors and is, therefore, less costly (Ioannou and Serafeim, 2019). Moreover, investors set lower expectations of unsustainable firms, reducing reputational penalties when their promises do not realize (Lyon and Maxwell, 2011).

[4]`https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0095&from=EN`

performance reporting without imposing improvements in sustainable performance. In other words, a change in ratings but not in sustainable performance. Since the European Commission governs a subset of countries in Europe, we attain a quasi-experimental setting of treatment (Germany and Austria) and control (Switzerland) firms with similar past ESG profiles (Dyck et al., 2019). This allocation of treatment and control is random because firms did not shift their headquarters in anticipation of or response to the regulatory change. In a difference-in-differences setting, we find that the augmented ESG rating inflation associated with the NFDR reduces cost of capital by approximately 90 basis points. This reduction persists over time, even after controlling for common risk factors and firm fixed effects.

We replicate five portfolio tilting procedures to quantify the societal impact of portfolio tilting with inflated ESG ratings (similar to Dyck et al., 2019; Gibson Brandon et al., 2021). Contrary to the purpose of SRI portfolio tilting, we observe that more strict ESG-rating-based screening reduces a portfolio's sustainable performance. To illustrate, a portfolio that only captures the 10% best-rated firms in an industry experiences 217% more controversies, 77% worse labor conditions, and 40% increased emissions than the market benchmark. This shows that ESG rating inflation is so prominent that unsustainable firms outperform sustainable firms in the eyes of sustainable investors. Consequently, SRI portfolio tilting under information asymmetries undermines rather than reinforces aggregate sustainable performance.

This paper contributes to the literature on responsible investing by stressing the importance of information asymmetries. Recent theoretical work models the conditions under which portfolio tilting improves aggregate sustainable performance (Davies and Van Wesep, 2018; Berk and van Binsbergen, 2021). For instance, it considers the introduction of non-pecuniary preferences in investment models (Heinkel et al., 2001; Avramov et al., 2022; Pástor et al., 2021; Pedersen et al., 2021), the trade-offs between portfolio tilting and engagement (Broccardo et al., 2022; Oehmke and Opp, 2020), and portfolio tilting under search frictions (Landier and Lovo, 2020). Most related to our work is Edmans et al. (2022), who theorizes that information asymmetries surrounding sustainable performance assessments could reduce the efficacy of portfolio tilting. We empirically show that omitting information asymmetries in these responsible investing models has substantial implications for their estimated societal benefits. Accordingly, we strongly recommend that future SRI research explicitly incorporates information asymmetries and allows for the possibility that not all investors accurately assess which firms are sustainable.

We also contribute to the literature on ESG ratings. Prior ESG rating literature primarily focuses on *whether* and *how* ESG ratings diverge across multiple ESG rating agencies (Berg et al., 2020; Christensen et al., 2022). For instance, Berg, Koelbel and Rigobon (2022) address differences in the methodologies, scope, and weights of ESG ratings. Additionally, Yang (2022) denotes adverse incentives of ESG rating agencies. Further, Berg, Heeb and Kölbel (2022) and Raghunandan and Rajgopal (2022) investigate ESG ratings and sustainable mutual funds. We extend this research by showing *the underlying mechanisms* of the variance in ESG ratings and even uncover an inverse relation between ESG ratings and sustainable performance. This

directional incorrectness of ESG ratings fundamentally differs from the previously observed variance and questions the use of ESG ratings in academic literature and practice altogether.

The remainder of the paper is structured as follows. Section I describes our granular sustainable performance data. Section II introduces the two-step procedure we use to identify inflated ESG ratings. Section III empirically uncovers ESG rating inflation, causally shows its cost of capital implications, and quantifies its importance in SRI portfolio tilting. Section IV concludes and highlights several practical implications to mitigate these concerns.

2 Data

We identify ESG rating inflation by segregating the promises of future sustainable performance improvements from current realizations. To do so, we collect granular information on ESG reporting, policies, activities, targets, controversies, and performance from the Refinitiv ESG database (formerly Asset4 ESG). This database contains 466 ESG variables for a worldwide sample of 7,232 unique listed non-financial companies from 2003 to 2020 with 31,832 firm-year observations. We segregate this detailed ESG information into SASB materiality groups and categorize each variable as ESG reporting, policies, activities, targets, controversies, or performance (see Table 1). Our sample covers an average combined market capitalization of 21.6 trillion USD, with 90.2 trillion USD in 2020, amounting to 85% of worldwide market capitalization.[5]

The firms captured by Refinitiv are diverse in every aspect. They reside in the mining, construction, generic manufacturing, utilities, retail & wholesale, service, health care, ICT, food & beverages, and petrochemical manufacturing industries. Of these firms, 3,123 are domiciled in North America, 1,555 in Eastern Asia, 1,318 in Western Europe, 343 in Oceania, and 676 in Latin America, the Middle East, or Africa.

In addition to granular ESG information, we also collect Refinitiv, MSCI IVA, and FTSE industry-adjusted ESG ratings from Refinitiv and Factset; firm characteristics and accounting information from Compustat US and Compustat Global; stock price information from CRSP and Compustat Global; bond yields from TRACE, Refinitiv and Factset; and issuer Moody's and Fitch credit ratings from Eikon.[6]

To our knowledge, Refinitiv ESG comprises the most comprehensive scope of granular ESG information. The benefit of this dataset is that it enables us to match ESG policies, targets, activities, performance, and controversies on similar aspects of ESG. However, Refinitiv ESG also faces a critique. Berg et al. (2020) argue that Refinitiv ESG *ratings* are unstable and back-filled over time due to adjustments in rating methodologies. Notwithstanding their valid claims,

[5] `https://www.sifma.org/resources/research/fact-book/`

[6] Refinitiv, MSCI IVA, and FTSE ratings are converted to a 0 to 10 scale for which 10 represents AAA, the best possible score, and 0 CCC, the worst possible score. The MSCI IVA ESG ratings that we study are the new ratings of MSCI. These ratings are distinct from KLD strengths and weaknesses which where discontinued in 2014.

our paper is mainly unaffected by this back-filling bias for three reasons. First, whereas Berg et al. (2020) argue that Refinitiv ESG *ratings* are unstable due to methodological changes, we rely on their *granular* underlying ESG information that should be unaffected by methodological changes. Second, we collected our Refinitiv ESG information in May 2021, after Refinitiv's most significant ESG rating methodology change in April 2020. Last, to reduce the potential impact of back-filling in Refinitiv ESG ratings as much as possible, we will separately perform our empirical analyses for Refinitiv, MSCI IVA, and FTSE ESG ratings.

After cleaning the Refinitiv ESG dataset, we retain 169 of the 466 granular ESG variables provided by Refinitiv. Not all information in the Refinitv ESG dataset is immediately useable in empirical applications. For instance, some variables are near empty due to imperfect data coverage or because the information is narrow in scope. In addition, multiple granular Refinitiv ESG variables often overlap and measure the same ESG aspects for different firms. We correct this by removing and merging ESG variables where needed. Finally, our selection procedure of 169 variables is reminiscent of Refinitiv's ESG rating methodology that considers at most 177 variables.[7]

Additionally, we correct for a reporting bias in Refinitiv ESG data. Several self-reported ESG policies, activity, and target variables are partially missing and boolean. Since Refinitiv screens the annual sustainability reports of firms, we presume that they accurately assess whether firms have specific ESG policies, activities, and targets. We view this incomplete ESG policy, activity, and target information in Refinitiv ESG as missing because firms often have incentives to report these positive aspects of sustainable performance. This data interpretation covers approximately 10% of our sample in most cases. We similarly interpret incomplete ESG controversy variables as no controversy since the news outlets screened by Refinitiv have incentives to report on unsustainable behavior when this arises. Due to the sheer quantity of ESG variables in Refinitiv ESG, we provide our exact variable compilation in Online Appendix A.

As the last step, we need to consider firm size. Big firms are more frequently captured in the media, targeted by NGO reports, and regulated by policymakers. Refinitiv ESG partially uses these news outlets to collect ESG controversy and performance information. Therefore, it might be possible that large firms experience differences in their observed realized sustainable performance due to data coverage. In addition, many facets of sustainable performance scale with production. For instance, firms that produce more goods will pollute extensively and experience additional worker accidents solely due to their size, keeping production processes constant. Even though we cannot completely address this potential size bias, we attempt to minimize it in three ways. First, we divide all continuous ESG controversy and performance variables that scale with production by total assets (see Table 1 for the exact variables). Second, we explicitly correct for size in our upcoming regression analyses. Last, we will perform robustness analyses on subsamples of firms who experience different degrees of public scrutiny

[7] `https://www.refinitiv.com/content/dam/marketing/en_us/documents/methodology/ESG-scores-methodology.pdf`.

by industry, continent, and time in Online Appendix C.

3 Method

3.1 Segregating promised and realized sustainable performance

The multidimensionality in granular Refinitiv ESG information enables us to segregate promises of future sustainable performance from realized sustainable performance using the Wittkowski et al. (2004) multi-criteria rank-ordering algorithm. ESG reporting, policies, activities, and targets represent an applicable proxy for promises of sustainable performance. This information is often self-reported by the firm and not necessarily realized due to information asymmetries (Lyon and Maxwell, 2011). ESG reporting primarily captures *whether* and *to what extent* firms report on their sustainable performance. In these reports, firms promise future sustainable performance improvements by upholding ESG policies and activities. These policies and activities are accompanied by targets that display future sustainable performance improvements.

ESG policies capture promises of sustainable performance improvements as they effectively impose forward-looking guidelines on firm behavior. Because it is uncertain whether firms will comply with these guidelines, policies cannot be seen as realized sustainable performance indicators. Similarly, ESG activities need to be considered as promises of sustainable performance because they are often relatively superficial and cheap to implement but have only a limited impact on sustainable performance. Moreover, they are often reported in a boolean way, like policies. For example, a dummy that indicates whether firms have waste reduction initiatives more closely resembles an ESG policy compared to their actual ratio of waste to total assets. A similar line of reasoning holds for whether firms have health safety training and the size-adjusted injury rate, or whether firms have environmental investment initiatives and how much they actually invest therein.[8] Last, ESG targets encapsulate promises of future sustainable performance by definition. Given the above, reporting, policies, activities, and targets provide a comprehensive overview of promised sustainable performance.

ESG controversies and performance information suitably proxy a broad spectrum of realized sustainable performance. This information is often collected from third-party sources like media, NGO reports, and governments and captures both positive and negative realizations. Our segregation of sustainable performance across ESG reporting, policies, activities, targets, controversies, and performance resembles the setup of the Non-Financial Reporting Directive, which requires firms to report on their ESG risks (controversies), their responses to these risks (policies, targets, activities), and the outcomes of these responses (performance).

We rank score relative multivariate firm performance based on weak dominance. As a

[8]To further substantiate our claim, we show that ESG activities and policies scores correlate 70%, while their correlation with controversy scores is -29% in Online Appendix C. Moreover, we split our measure of promised and realized sustainable performance by part and show that activities behave like policies.

first step, we compare the relative sustainable performance, ESG, for all aspects of ESG, x, across firms, f, by industry and year in Equation (1). A firm is superior to another firm in that industry when it is at least strictly better in one aspect of ESG and equal or better in all others. Subsequently, we compute the relative promised and realized ESG scores for each firm individually by subtracting the number of firms for which the firm is inferior from the number of firms for which it is superior, see Equation (2). Therefore, promised and realized ESG scores could be interpreted in a similar way to ESG ratings because they rank order the sustainable performance of firms within the same industry. We report all scores on a 0 (inferior) to 10 (superior) scale to directly match the scale of ESG ratings. To illustrate, firms with controversy and policy scores of 10 have no controversies and report on more policies than all other firms in that year and industry.

$$ESG_f > ESG_{f'} \Leftrightarrow (\forall_{x=1,2,....X} ESG_{fx} \geq ESG_{f'x} \cap \exists_{x=1,2,....X} ESG_{fx} > ESG_{f'x}) \tag{1}$$

$$Rank(ESG_f) = \sum_{f'} I(ESG_f > ESG_{f'}) - \sum_{f'} I(ESG_f < ESG_{f'}) \tag{2}$$

Our non-parametric rank ordering approach has several critical advantages over ESG rating methodologies. First, we solely compare firms within the same industry and year. It would be unrealistic to assume that, for instance, firms in the mining industry are comparable to ICT firms in their sustainable performance. Moreover, sustainable performance can significantly vary over time and often converges within the industry (Ioannou and Serafeim, 2019). Therefore, we compute all scores for every industry and year separately.

Second, in contrast to ESG ratings, a non-parametric method does not rely on arbitrary parametric weighting schemes to determine sustainable performance (Berg, Koelbel and Rigobon, 2022). Our algorithm decides which aspects of sustainable performance are relevant within each industry, given the distribution of granular ESG information. To illustrate, when specific controversies are uncommon, firms that experience these controversies will receive lower realized ESG scores than firms with more common controversies in that industry. Alternatively, when reporting on specific aspects of sustainable performance is an industry norm, firms will be more heavily penalized when they do not comply. To enforce that we solely capture relevant variables in our rank-ordering, we solely consider SASB material information.[9] The following section will use these promised and realized ESG scores to build a method that identifies whether ESG ratings are inflated.

3.2 Identifying inflated ESG ratings

As mentioned in our introduction, we identify ESG ratings as inflated when they 1) solely capture the promised sustainable performance of firms in a contemporary setting and 2) do not

[9] `https://materiality.sasb.org/`

incorporate whether these promises realize intertemporally. To verify the first aspect of rating inflation, we regress the promised ESG and realized ESG scores of firms on Refinitiv, MSCI IVA, and FTSE ESG ratings. In Equation (3), we specify $Rating_{i,t}$ as the ESG rating of firm i in period t, and $ESG_{i,t}^{promised}$ and $ESG_{i,t}^{realized}$ as respectively the promised and realised ESG scores, $\gamma_{i,t}$ as a set of control variables, like firm size, year, industry, country fixed effects, and firm fixed effects, and $\varepsilon_{i,t}$ as error term. We estimate these regressions separately by ESG rating agency for promised and realized ESG scores and ESG reporting, policies, activities, targets, controversies, and performance sub-scores. We estimate these sub-scores similar to the overarching promised and realized ESG scores using Equations (1) and (2) with the categorization of granular sustainable performance indicators displayed in Table 1. This setup allows us to directly test whether ESG ratings capture realized sustainable performance contemporaneously, i.e., whether β_2 is positive.

$$Rating_{i,t} = \alpha + \beta_1 * ESG_{i,t}^{promised} + \beta_2 * ESG_{i,t}^{realized} + \gamma_{i,t} + \varepsilon_{i,t} \tag{3}$$

As a second step, we verify whether promises of sustainable performance realize. In Equation 4, we regress firms' current and future ESG controversy and performance scores on their contemporaneous promised ESG scores. Due to the growing nature of our sample, we estimate this model separately for each lag up to 15 years of future realizations. Moreover, we perform these regressions for 14 SASB materiality categories as robustness check to ensure that we compare promises and realizations on similar facets of sustainable performance. We compute subject-specific promised and realized ESG scores for greenhouse gas emissions, water management, wastewater management, water usage, customer welfare, selling practices, labor practices, employee health safety, employee management, business model resilience, supply chain management, materials source management, business ethics, and legal and regulatory concerns. These regressions enable us to show whether promises of future sustainable performance improvements realize and verify whether ESG ratings are inflated. In Online Appendix B, we assert the accuracy of promised and realized ESG scores, and verify their external validity using RepRisk reputational ESG risk ratings.

$$ESG_{i,t}^{realized} = \alpha + \beta_{k-t+1} * ESG_{i,k}^{promised} + \gamma_{i,t} + \varepsilon_{i,t} \quad ;\forall k \in \{t-15, t-14, ..., t\} \tag{4}$$

4 Results

This section consists of four parts. First, we show that ESG ratings are inflated. Second, we uncover that ESG rating inflation tilts the portfolios of socially responsible investors toward unsustainable firms. Third, we causally show that firms can reduce their cost of capital by inflating their ESG ratings. Last, we quantify the magnitude of portfolio misallocation associated

with inflated ESG ratings for several stylized portfolio tilting strategies.

4.1 ESG rating inflation

ESG ratings solely capture promises of future sustainable performance improvements. In Table 2, we regress promised and realized ESG scores on Refinitiv, MSCI, and FTSE ESG ratings as proposed in Equation 3. For Refinitiv ESG ratings, we observe a positive relationship with promised ESG scores and a negative association with realized ESG scores. In economic terms, a one standard deviation increase in the promised ESG rank of firms enhances their Refinitiv ESG ratings by an average of 0.33 standard deviations. Contrastingly, ESG ratings recede by 0.05 standard deviations for a one standard deviation increase in the realized ESG scores of firms.

These findings are not Refinitiv ESG specific. For MSCI and FTSE ESG ratings, we similarly find a positive relation between promised ESG scores and ESG ratings. Moreover, depending on the specification, we find a negative or insignificant relationship between realized ESG scores and ESG ratings. In other words, Refinitiv, MSCI, and FTSE ESG ratings primarily capture promises of future sustainable performance improvements and are often inversely related to realized sustainable performance. This confirms the first aspect of ESG rating inflation.

These results hold across many robustness specifications. In Online Appendix B, we replicate these findings using the raw Refinitiv ESG data to remove any doubt that our methodological specification of promised and realized ESG scores might potentially drive our results. In Online Appendix C, we show that our findings are robust to a further decomposition of promised and realized ESG across ESG reporting, policy, activity, target, controversy, and performance scores. Here, we further verify that our results persist for multiple periods, industries, and geographic regions.

Aggregate promises of future sustainable performance improvements do not realize up to 15 years in the future. We previously observed that ESG ratings primarily capture promises of future sustainable performance and negatively relate to realized sustainable performance. To validate that ESG ratings are inflated, we need to show that these promises do not realize moving forward. In Table 3, we estimate Equation 4 to establish this relationship. Specifically, we regress the current and past 15 years of promised ESG scores on the current realized ESG score of firms individually and display the respective coefficients in column (1). Here, we observe that the promised future sustainable performance improvements negatively predict the realized sustainable performance of firms. This indicates that ESG ratings are both contemporaneously and intertemporally inflated as firms can improve their ESG ratings by promising future sustainable performance without following through on these promises.

To dig deeper into whether ESG promises realize, we analyze promises and realizations at the SASB level. ESG encompasses many facets of sustainable performance. Even though promises of sustainable performance do not realize in aggregate, it does not necessarily mean

that firms refrain from following through on all aspects of sustainable performance. To investigate whether the promises of sustainable performance realize on similar facets of ESG, we re-estimate SASB-specific promised and realized ESG scores and replicate the previous analysis for 14 SASB materiality groups.

Our SASB-specific analysis generally supports the notion of ESG rating inflation. Specifically, firms do not realize their promises on materials source management, supply chain management, business ethics, customer welfare, legal and regulatory concerns, labor practices, water management, and water usage. However, firms seem to follow through on their promised wastewater management and business model resilience practices. Further, we find no economically significant effect of promised sustainable performance on subsequent realization for employee health safety, employee management, and selling practices.

Among all SASB categories, greenhouse gas emissions stand out. Promises of sustainable performance made 15 to 8 years ago negatively predict realized greenhouse gas emission scores. However, in the most recent five years, the effect inverts and promises positively relate to realized sustainable performance. In other words, firms reduction of greenhouse gas emissions recently entered a transitioning phase. This provides a hopeful glance at the future regarding our fight against climate change. However, the effect sizes are still economically small as a one standard deviation increase in promised greenhouse gas emission scores only increases realized greenhouse gas emissions by 0.04 standard deviations. Given the above, we show that ESG ratings are inflated and that most of the promises on specific aspects of sustainable performance do not realize, even up to 15 years in the future.

4.2 Portfolio tilting with inflated ESG ratings

Are we tilting the wrong firms? This section investigates whether socially responsible investors are misguided by inflated ESG ratings. We analyze this by tracking the combined holdings of institutional investors and institutional investors that are signatory to the United Nation's Principals of Responsible Investing (PRI) using 13F holdings from Refinitiv. Institutional investors tilt their portfolio towards more sustainable firms (Bolton and Kacperczyk, 2021). In addition, PRI signatories make explicit pledges to invest in a responsible manner (Ceccarelli et al., 2021; Gibson Brandon et al., 2021). Therefore, we can directly assess the impact of ESG rating inflation on portfolio tilting by investigating the share of (PRI signatory) institutional investors in firms with inflated ESG ratings.

To attain this share of institutional and PRI signatory holdings, we first merge the PRI signatory dataset with the 13f filling data of Refinitiv.[10] Subsequently, we aggregate the share of institutionally and PRI signatory owned holdings over the last stated holding data in a given year by institutional investor and firm. Since the institutional holdings data originates from mandatory disclosure rules of the SEC, 85% of the sample consists of U.S. and Canadian firms,

[10] `https://www.unpri.org/signatories/signatory-resources/signatory-directory`

and the remaining 15% captures dual listings.

In Table 6, we regress the share of institutional, PRI signatory, and non-PRI signatory investor holdings on the average Refinitiv, MSCI, and FTSE ESG ratings and the promised and realized sustainable performance scores of firms. In aggregate, the share of institutional holdings increases with the ESG ratings of firms. This effect is driven by socially responsible investors that have signed the PRI since non-PRI signatory investors shun firms with higher ESG ratings. In economic terms, the share of PRI signatory investors increases by four percentage points for every standard deviation increase in the average ESG rating of firms. This strong reliance of PRI investors on ESG ratings provides a first indication that ESG rating inflation may affect portfolio tilting.

Socially responsible investors appear unaware of ESG rating inflation when tilting their portfolios. Institutional investors primarily focus on promised sustainable performance when we segregate their preferences toward higher ESG rating firms. Further, they are agnostic about firms' realized sustainable performance. In economic terms, PRI signatory investors will increase their holdings by 4.9 percentage points when firms that do not report on ESG start reporting on all aspects of sustainable performance. In contrast, they will decrease their holdings by 1.4 percentage points when firms shift from underperforming to outperforming all firms in their industry on sustainable performance. This suggests that ESG rating inflation drives their portfolio allocation. Moreover, alternative factors other than ESG rating inflation are unlikely to drive this effect as non-PRI investors do not alter their portfolios based on promised or realized sustainable performance. Given the above, we show that ESG rating inflation tilts the portfolios of socially responsible investors toward unsustainable firms. This represents a global misallocation of capital.

4.3 Cost of capital incentives for ESG rating inflation

In this section, we show that the portfolio misallocation of socially responsible investors under information asymmetries provides firms with cost of capital incentives to inflate their ESG ratings. Initially, we regress the average ESG rating of firms on multiple cost of capital estimates over common risk factors to provide correlational support. Subsequently, we perform a differences-in-differences analysis to ensure causality by exploiting a shock in regulation that increases ESG reporting requirements for Austrian and German companies but not for Swiss companies.

We estimate firms' weighted average cost of capital by averaging six estimates of cost of equity and debt. The empirical cost of capital literature does not provide a universally optimal way to estimate cost of equity due to diverging data requirements and model accuracy. Cost of equity estimates can be categorized into four distinct estimation techniques: factor model-based approaches, firm characteristic-based models, implied cost of capital models, and fitted implied cost of capital models (Lee et al., 2021). We compute one cost of equity estimate

for each category to address their relative strengths and weaknesses and ensure the robustness of our findings. Specifically, we estimate cost of equity using the Fama and French (2015, 2017) international 5-factor model, the Chattopadhyay et al. (2021) firm characteristic based, the Gebhardt et al. (2001) implied cost of capital measure, and the Hou et al. (2012) fitted implied cost of capital model (as suggested by Lee et al., 2021). In our empirical application, we take the average of these cost of equity estimates where data is available. Online Appendix D provides further details on each cost of equity estimate and their respective computation.

In addition to cost of equity, we compute two proxies for cost of debt. First, we follow Flammer (2021) in measuring firm-level average yield to maturity by weighing individual firms' bond yields with their respective amount outstanding. We retrieve bond yield information from TRACE, Refinitiv, and Factset for 32% of the firms in our sample. To extend our coverage, we also approximate the cost of debt with Compustat US and Computat Global data by using the ratio of interest expense over total debt. This approach resembles Van Binsbergen et al. (2010), who use interest expense over total assets, but deviates in the denominator to better accommodate bond yields. In the final step, we compute the weighted average cost of capital by weighting the averages of our four cost of equity and two cost of debt estimates with the book-based leverage ratio of firms.

In Table 4, we regress the average of Refinitiv, MSCI, and FTSE ESG ratings on the weighted average cost of capital, the average cost of equity, and the average cost of debt across multiple specifications. We observe a negative relation between firms' cost of capital and their ESG ratings (similar to Chava, 2014). This effect strengthens after we control for common risk characteristics like firm size, industry, domicile, and even credit ratings or firm fixed effects. In economics terms, a one standard deviation increase in the average ESG rating of a firm decreases its cost of capital by 5 to 24 basis points, depending on the specification. This reduction in cost of capital is mainly attributed to cost of equity as we observe no significant effect of ESG ratings on cost of debt after introducing firm fixed effects. We discover similar results for individual cost of equity or debt measures in Online Appendix D. Therefore, cost of capital is persistently negatively related to improvements in ESG ratings, providing incentives for firms to inflate their ESG ratings.

These cost of capital reductions associated with ESG rating improvements differ in magnitude from the estimates of (Berk and van Binsbergen, 2021). They calibrate the anticipated cost of capital gains related to SRI portfolio tilting by considering the share of socially responsible investors, the percentage of sustainable assets in the economy, and the correlation between sustainable and unsustainable firms. They calibrate cost of capital reductions ranging from 0.35 to 8.5 basis points. These estimates are more conservative than our approximate 5 to 24 basis points reduction for a one standard deviation increase in ESG ratings.

One potential explanation for our larger magnitude is that Berk and van Binsbergen (2021) study portfolio tilting in a U.S. context where our analyses focus on a more socially conscious global and European sample (Krueger et al., 2020). Therefore, a higher share of sustainable in-

vesting might be warranted. In addition, where Berk and van Binsbergen (2021) assume a constant correlation of returns between sustainable and unsustainable firms of 0.97 to 0.80, we find correlations of 0.98 and 0.88 when we compare the returns of the 50% and 10% highest to lowest ESG-rated firms. Since SRI portfolio tilting primarily resolves around promoting the most sustainable firms and punishing the least sustainable firms (Dyck et al., 2019; Gibson Brandon et al., 2021), portfolio returns across tilted and non-tilted samples likely correlate less than the 0.97 proposed by Berk and van Binsbergen (2021). When we re-calibrate the model with our estimated return correlation of 0.98 or 0.88 and follow (Berk and van Binsbergen, 2021, ,p.13) in assuming that a third of assets under management is invested sustainably, we attain cost of capital reductions equal to 6 and 32 basis points.[11] These estimates closely match our 5 to 24 basis point interval and signal that our parameter estimates fall within reasonable boundaries.

4.4 Non-Financial Reporting Directive

We have shown in the previous section that firms face considerable cost of capital incentives to inflate their ESG ratings. However, this correlational analysis does not indicate that ESG rating inflation causes a negative relation between cost of capital and ESG ratings through portfolio tilting. To verify this, we need to rule out the impact of potential changes in sustainable performance on cost of capital by identifying an exogenous shock in promises of future sustainable performance unrelated to realizations of sustainable performance. This shock should also be exogenous of cost of capital except through its impact on promises of future sustainable performance. We consider the introduction of the European Commission Non-Financial Reporting Directive (NFRD) 2014/95/EU as such regulatory shock (following Fiechter et al., 2022).

The NFRD obliges all large public interest companies domiciled in European Union member states to report on their sustainable performance extensively. This directive aims at enhancing social and environmental information transparency by forcing select firms to report more extensively on their sustainable performance. In other words, it heightens firms' promised future sustainable performance improvements without altering their underlying realized sustainable performance. Specifically, Fiechter et al. (2022) find that the directive increases Refinitiv ESG ratings and several promised sustainable performance aspects, while finding only weak evidence in favor of quantitative realized performance improvements. Moreover, this shock is conservative as it simultaneously inflates ESG ratings *and* reduces information asymmetries. Therefore, any observed cost of capital reductions associated with this augmented ESG rating inflation is in excess of the additional information provided to investors on firms' promised and realized sustainable performance.

[11] Berk and van Binsbergen (2021) calibrate the cost of capital effect with the following formula: $MRP * \frac{SociallyConsciousInvestorWealth}{RestofInvestorWealth} * f * (1-\rho^2)$, with MRP representing the market risk premium, f the fraction of sustainable firms in the economy, and ρ the correlation of returns across sustainable and unsustainable firms. In our calibration, we assume a ρ of 0.88 and follow Berk and van Binsbergen (2021) in assuming that MRP equals 6%, f equals 48.5%, and the faction of sustainable funds equates 33%. This results in $6\% * \frac{0.33}{1-0.33} * 0.485 * (1-0.88^2) = 32.33$ basis points.

Since the directive solely affects European Union member states, only some European firms are affected by this regulation. Therefore, we can analyze the introduction of the NFRD in a quasi-experimental difference-in-differences setting for which select treated firms domiciled in European Union member states are forced to report on their sustainable performance . In contrast, other control companies not domiciled in European Union member states are excluded from additional reporting requirements. A difference-in-differences approach is applicable in this setting because the treatment and control group allocation is unrelated to sustainable performance. To elaborate, firms did not reallocate their headquarters to prevent ESG reporting. Further, the NFRD appended a previous European Commission directive from 2013, limiting pre-emptive regulatory compliance before 2014. We consider the implementation year of the NFDR in 2017 as treatment. Additionally, we also allow for the possibility of preemptive compliance after the announcement of the regulation in 2014 by using a structural break model from 2014 onwards (following Fiechter et al., 2022).

Similar to Fiechter et al. (2022), we consider Austrian and German firms as treated and Swiss firms as a control group. Political, social, and cultural factors are critical to companies' sustainable performance. Austria, Germany, and Switzerland are neighboring countries. They are also alike in macroeconomic conditions, political orientation, and even reminiscent of language and cultural perspectives. Further, Dyck et al. (2019) show that Austria, Germany, and Switzerland are comparable in sustainable performance given their environmental performance and employment laws. Therefore, we argue that companies in Austria, Germany, and Switzerland are reminiscent in their sustainable performance reporting before the introduction of the NFRD. Additionally, we observe a parallel trend in terms of their cost of capital before the NFRD was introduced. Due to this comparability, the NFRD provides a credible difference-in-differences setting to investigate whether ESG rating inflation causally reduces cost of capital.

Table 5 displays this difference-in-differences analysis. In columns (1) to (3), we show that the introduction of the NFDR reduces cost of capital in Austrian and German countries by 95 to 103 basis points, depending on the specification. Reminiscent of our results in Table 4, this effect is predominantly driven by a decrease in cost of equity but also present in cost of debt (see columns (4) and (5)). Further, in columns (6) to (8), we observe cost of capital reductions ranging from 90 to 99 basis points when we introduce a structural break difference-in-difference setting and consider all periods after the announcement of the NFDR as treated. Given the above, our difference-in-differences setting establishes that firms face incentives to inflate their ESG ratings because of cost of capital reductions.

4.5 The societal implications of portfolio tilting under ESG rating inflation

In the last sections, we have shown that ESG ratings are inversely related to sustainable performance, that socially responsible investors are unaware of this rating inflation, and that firms

face cost of capital incentives to inflate their ESG ratings. This section quantifies the societal implications of portfolio tilting under ESG rating inflation by constructing hypothetically tilted ESG-rating-based SRI portfolios. We build these portfolios based on negative, positive, integrated (both positive and negative) and best-in-class screening procedures. For these screening procedures, we respectively exclude firms with the 10% lowest ESG ratings, twice overweigh firms with the highest 10% ESG ratings, both exclude low ESG rating firms and overweigh high ESG rating firms, and exclude all but the highest 10% ESG rating firms at the industry-level using the average of industry adjusted Refinitiv, MSCI IVA and FTSE ESG ratings (similar to Dyck et al., 2019; Gibson Brandon et al., 2021). Averaging ESG ratings simultaneously removes a large share of the potential back-filling bias in Refinitiv ESG ratings (Berg et al., 2020). Moreover, we remove all sin stocks in the tobacco, gambling, firearms, and nuclear industries from our SRI portfolios (Hong and Kacperczyk, 2009).

ESG-rating-based SRI portfolio tilting underperforms conventional investing in terms of sustainable performance when ESG ratings are inflated. In Table 7 Panel A, we assess the one-year out-of-sample environmental pollution, labor conditions, and ESG controversies across multiple SRI portfolios as a proxy for respectively environmental, social, and governance sustainable performance (similar to Krueger et al., 2020). Pollution, labor conditions, and ESG controversies worsen with ESG rating screening intensity. For instance, negative, positive, integrated, and best-in-class screened portfolios have, on average, 4.02%, 20.37%, 30.26%, and 216.51% more controversies than the no sin stock benchmark. Additionally, they respectively attain 8.85%, 3.88%, 11.97%, and 39.58% more emissions when comparing the average percentage changes across CO_2, NO_X, VOC, and particulate matter emissions to the no sin stock portfolio. Last, they even uphold respectively 3.17%, 6.49%, 9.97%, and 76.95% worse labor conditions when comparing the average percentage changes across strikes, accidents/assets, and fatalities/assets.[12] Given the above, ESG-rating-based SRI screening deteriorates a portfolio's sustainable performance as it favors unsustainable firms at the expense of sustainable firms. Therefore, portfolio tilting is counter-productive for societal welfare when investors are forced to rely on ESG ratings under information asymmetries.

Our realized ESG scores pose a potential alternative to ESG ratings and enable socially conscious investors to invest responsibly. In Table 7 Panel B, we perform a similar analysis to Panel A using realized ESG scores screened portfolios. In contrast to ESG rating screening, realized ESG score screening intensity positively correlates with out-of-sample sustainable performance. For example, best-in-class screening portfolios based on realized ESG scores have nine times fewer controversies than best-in-class ESG rating screened portfolios. Given the above, we strongly recommend socially responsible investors to focus on realized sustainable performance measures rather than ESG ratings that solely capture promises of sustainable per-

[12] In Online Appendix E, we show that sustainable and financial performance analyses hold for 5% and 25% threshold screening procedures. We observe stronger sustainable performance deterioration when ESG screening is more intense.

formance.[13]

5 Conclusion

This paper shows that portfolio tilting hurts aggregate sustainable performance when investors rely on inflated ESG ratings under information asymmetries. Refinitiv, MSCI, and FTSE ESG ratings are inversely related to sustainable performance. This results in ESG rating inflation since firms do not realize their promises of future sustainable performance improvements now and up to 15 years in the future. Because socially responsible investors face information asymmetries, they tilt their portfolios toward firms with inflated ESG ratings. Therefore, ESG rating inflation causally reduces cost of capital. This negates the aspired impact of socially responsible investors on society and provides cost of capital incentives for firms to reduce their sustainable performance and report more extensively on ESG.

This paper contributes to the responsible investing literature by highlighting the importance of information asymmetries. Prior theoretical work that investigates how investors can promote aggregate sustainable performance implicitly assumes that investors accurately assess which firms are sustainable (Heinkel et al., 2001; Broccardo et al., 2022; Oehmke and Opp, 2020; Berk and van Binsbergen, 2021; Pástor et al., 2021; Pedersen et al., 2021; Edmans et al., 2022). When we relax this assumption, we empirically find the intended improvements in societal welfare associated with portfolio tilting invert when investors face information asymmetries. Therefore, we urge future theoretical and empirical SRI literature to explicitly model how information asymmetries affect societal welfare. Specifically, we would warrant research that simultaneously considers how information asymmetries affect investment decisions (Avramov et al., 2022; Berg, Heeb and Kölbel, 2022; Raghunandan and Rajgopal, 2022), the incentives of ESG rating agencies to provide accurate ratings (Yang, 2022), and firm incentives in creating sustainable assets.

We also contribute to the literature on ESG ratings. The ESG rating literature primarily addresses *that* and *how* ESG ratings diverge across multiple ESG rating agencies (Chatterji et al., 2016; Berg, Koelbel and Rigobon, 2022; Christensen et al., 2022). We append this line of research by showing that ESG ratings are not just volatile but even directional incorrect proxies for sustainable performance. This fundamentally differs from prior literature and questions the use of ESG ratings in both academia and practice. Future ESG research could extend our investigation in inflated ESG ratings by analyzing a "level" ESG rating inflation effect. To elaborate,

[13] In addition to this portfolio tilting based on ESG ratings, investors can acquire sustainable mutual funds to invest responsibly. In untabulated analyses, we find little evidence that these mutual funds are more sustainable when matching pairs of ESG and non-ESG mutual fund with identical issuers and investment scopes. These sustainable mutual funds tend to hold firms that report more strongly on sustainable performance but do not seem to realize these promises. Therefore, also investments with based on sustainable mutual funds are unlikely to improve aggregate sustainable performance due to ESG ratings inflation and information asymmetry. These results resemble Raghunandan and Rajgopal (2022) who analyze Morningstar globe ratings.

when more investors mandate minimum ESG rating requirements but can choose which ESG ratings to adopt, ESG rating agencies can increase their market share by inflating the level of ESG ratings above these requirements. This will also arbitrarily increase the perceived sustainable performance of firms without improvements in realized sustainable performance.

Our findings provide practical implications for investors and policymakers. We argue that the unintentional cost of capital incentives provided by ESG-rating-based portfolio tilting are likely to persist because socially conscious investors experience difficulties uncovering the sustainable performance of firms under information asymmetries (Yang, 2022). We recommend that socially conscious investors rely on realized sustainable performance measures to alleviate these societal concerns. For instance, they could use our realized ESG scores in their SRI screening activities instead of ESG ratings. We empirically document that best-in-class screening procedures based on our realized ESG measure reduce ESG controversies by almost two-thirds while providing fewer emissions and superior labor conditions compared to an unscreened benchmark. This alternative screening could improve aggregate sustainable performance and allocate the intended cost of capital benefits toward more sustainable firms. Moreover, when this shift in portfolios occurs at a large scale, it will remove the incentives to inflate ESG ratings.

From a policymaker's perspective, we stress the need for a global ESG accounting standard. Many socially responsible firms do not report as extensively on their sustainable performance as unsustainable firms. One potential explanation of this phenomenon is that sustainable managers fear that the information leakage of ESG reporting could be more costly than its associated cost of capital reductions (see Ioannou and Serafeim, 2019). Additionally, markets penalize unsustainable firms less when they do not realize their promises because expectations are lower (Lyon and Maxwell, 2011). Therefore, a realized sustainable performance reporting standard might add value to the aggregate economy as it enforces knowledge spill-overs from sustainable firms and reduces information asymmetries. This would enable socially responsible investors to better allocate their capital and promote sustainable firms. It is instrumental that such ESG accounting standard requires firms to separately report on both their promised and realized sustainable performance via ESG policies, activities, targets, performance, and controversies on similar facets of sustainable performance. When only policies, activities, and targets are reported on, ESG rating inflation will likely become more severe.

This paper identifies two limitations. First, we comply with the SRI literature in constructing hypothetically screened SRI portfolios with ESG ratings (Dyck et al., 2019). This assumption is not unreasonable because Hartzmark and Sussman (2019) show that investors and financial intermediaries use ESG ratings in practice to construct their portfolios. However, not all socially responsible investors equally rely on ESG ratings. Notably, some investors can directly assess the sustainable performance of firms without the need for ESG ratings (Barber et al., 2021). In this instance, SRI screening would provide cost of capital incentives to sustainable firms, as predicted by Pástor et al. (2021). In addition, shareholder activism will improve

societal welfare even when it targets firms based on inflated ESG ratings, albeit with diminished efficacy (Dimson et al., 2015). Nevertheless, we deem the impact of ESG-rating-based SRI screening on aggregate sustainable performance substantial because, in practice, 46 out of the 50 largest investors worldwide use MSCI ESG ratings alone to construct their portfolios (Ioannou and Serafeim, 2019). Moreover, the cost of capital reductions we observe are unaffected by this limitation as we still identify significant benefits for firms to inflate their ESG ratings.

Second, we only have access to Refinitiv, MSCI IVA, and FTSE ESG ratings, whereas prior ESG rating literature also considers Sustainalytics, Vigeo-Eiris, or RobecoSAM. Despite the persistence of our findings, it is possible that these alternative ESG ratings are not inflated. However, we deem this improbable because Refinitiv and MSCI IVA ESG ratings are among investors' most commonly used ESG ratings. Moreover, our cost of capital analysis considers the aggregate effect of ESG rating inflation across all ESG ratings because it uses market data to estimate cost of capital.

Bibliography

Avramov, D., Cheng, S., Lioui, A. and Tarelli, A. (2022). Sustainable investing with ESG rating uncertainty, *Journal of Financial Economics* **145**(2): 642–664.

Barber, B. M., Morse, A. and Yasuda, A. (2021). Impact investing, *Journal of Financial Economics* **139**(1): 162–185.

Berg, F., Fabisik, K. and Sautner, Z. (2020). Rewriting history II: The (un) predictable past of ESG ratings, *European Corporate Governance Institute Working Paper* **708/2020**.

Berg, F., Heeb, F. and Kölbel, J. F. (2022). The economic impact of ESG rating changes, *Available at SSRN:* **4088545**.

Berg, F., Koelbel, J. F. and Rigobon, R. (2022). *Aggregate confusion: The divergence of ESG ratings*, Forthcoming Review of Finance.

Berk, J. and van Binsbergen, J. H. (2021). The impact of impact investing, *Available at SSRN:* **3909166**.

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

Bonnefon, J.-F., Landier, A., Sastry, P. and Thesmar, D. (2022). Do investors care about corporate externalities? Experimental evidence, *Available at SSRN:* **3458447**.

Broccardo, E., Hart, O., Zingales, L. et al. (2022). Exit versus voice, *Journal of Political Economy* **130**(12): 3101–3145.

Ceccarelli, M., Glossner, S., Homanen, M. and Schmidt, D. (2021). Which institutional investors drive corporate sustainability?, *Available at SSRN:* **3988058**.

Chatterji, A. K., Durand, R., Levine, D. I. and Touboul, S. (2016). Do ratings of firms converge? Implications for managers, investors and strategy researchers, *Strategic Management Journal* **37**(8): 1597–1614.

Chattopadhyay, A., Lyle, M. R. and Wang, C. C. (2021). Expected stock returns worldwide: A log-linear present-value approach, *Harvard Business School Accounting & Management Unit Working Paper* (18-079).

Chava, S. (2014). Environmental externalities and cost of capital, *Management Science* **60**(9): 2223–2247.

Christensen, D. M., Serafeim, G. and Sikochi, A. (2022). Why is corporate virtue in the eye of the beholder? The case of ESG ratings, *The Accounting Review* **97**(1): 147–175.

Davies, S. W. and Van Wesep, E. D. (2018). The unintended consequences of divestment, *Journal of Financial Economics* **128**(3): 558–575.

Dimson, E., Karakaş, O. and Li, X. (2015). Active ownership, *The Review of Financial Studies* **28**(12): 3225–3268.

Dyck, A., Lins, K. V., Roth, L. and Wagner, H. F. (2019). Do institutional investors drive corporate social responsibility? International evidence, *Journal of Financial Economics* **131**(3): 693–714.

Edmans, A., Levit, D. and Schneemeir, J. (2022). Socially responsible divestment, *Available at SSRN:* **4093518**.

Fama, E. F. and French, K. R. (2015). A five-factor asset pricing model, *Journal of Financial Economics* **116**(1): 1–22.

Fama, E. F. and French, K. R. (2017). International tests of a five-factor asset pricing model, *Journal of Financial Economics* **123**(3): 441–463.

Fiechter, P., Hitz, J.-M. and Lehmann, N. (2022). Real effects of a widespread CSR reporting mandate: Evidence from the European Union's CSR Directive, *Journal of Accounting Research* .

Flammer, C. (2021). Corporate green bonds, *Journal of Financial Economics* **142**(2): 499–516.

Gebhardt, W. R., Lee, C. M. and Swaminathan, B. (2001). Toward an implied cost of capital, *Journal of Accounting Research* **39**(1): 135–176.

Gibson Brandon, R., Glossner, S., Krueger, P., Matos, P. and Steffen, T. (2021). Do responsible investors invest responsibly?, *Review of Finance* .

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

Heinkel, R., Kraus, A. and Zechner, J. (2001). The effect of green investment on corporate behavior, *Journal of Financial and Quantitative Analysis* **36**(4): 431–449.

Hong, H. and Kacperczyk, M. (2009). The price of sin: The effects of social norms on markets, *Journal of Financial Economics* **93**(1): 15–36.

Hou, K., Van Dijk, M. A. and Zhang, Y. (2012). The implied cost of capital: A new approach, *Journal of Accounting and Economics* **53**(3): 504–526.

Ioannou, I. and Serafeim, G. (2019). Corporate sustainability: A strategy?, *Harvard Business School Accounting & Management Unit Working Paper* (19-065).

Krueger, P., Sautner, Z. and Starks, L. T. (2020). The importance of climate risks for institutional investors, *The Review of Financial Studies* **33**(3): 1067–1111.

Landier, A. and Lovo, S. (2020). ESG Investing: How to Optimize Impact?, *HEC Paris Research Paper* **No. FIN-2020-1363**.

Lee, C. M., So, E. C. and Wang, C. C. (2021). Evaluating firm-level expected-return proxies: Implications for estimating treatment effects, *The Review of Financial Studies* **34**(4): 1907–1951.

Lyon, T. P. and Maxwell, J. W. (2011). Greenwash: Corporate environmental disclosure under threat of audit, *Journal of Economics & Management Strategy* **20**(1): 3–41.

Oehmke, M. and Opp, M. M. (2020). A theory of socially responsible investment, *Available at SSRN:* **3467644**.

Pástor, L., Stambaugh, R. F. and Taylor, L. A. (2021). Sustainable investing in equilibrium, *Journal of Financial Economics* **142**(2): 550–571.

Pedersen, L. H., Fitzgibbons, S. and Pomorski, L. (2021). Responsible investing: The ESG-efficient frontier, *Journal of Financial Economics* **142**(2): 572–597.

Raghunandan, A. and Rajgopal, S. (2022). Do esg funds make stakeholder-friendly investments?, *Review of Accounting Studies* **27**(3): 822–863.

Riedl, A. and Smeets, P. (2017). Why do investors hold socially responsible mutual funds?, *Journal of Finance* **72**(6): 2505–2550.

Van Binsbergen, J. H., Graham, J. R. and Yang, J. (2010). The cost of debt, *Journal of Finance* **65**(6): 2089–2136.

Wittkowski, K. M., Lee, E., Nussbaum, R., Chamian, F. N. and Krueger, J. G. (2004). Combining several ordinal measures in clinical studies, *Statistics in Medicine* **23**(10): 1579–1592.

Wu, Y., Zhang, K. and Xie, J. (2020). Bad greenwashing, good greenwashing: Corporate social responsibility and information transparency, *Management Science* **66**(7): 3095–3112.

Yang, R. (2022). What do we learn from ratings about corporate social responsibility? New evidence of uninformative ratings, *Journal of Financial Intermediation* p. 100994.

6 Tables and Figures

Table 1: Summary statistics on granular ESG data

This tables provides summary statistics on granular ESG information in our sample. We report these variables by SASB materiality group as given in Column 1. The categories critical incident management and systemic risk do not strictly follow the SASB definition as they also contain controversy variables. Subsequently, we categorise our data into ESG reporting, policies, activities, targets, controversies and performance in Column 3. Columns (4) to (8) contain summary statistics, respectively the number of observations, mean, standard deviation, minimum, and maximum for all variables in our sample.

SASB materiality group	Variable name	ESG type	N	mean	sd	min	max
Greenhouse gas emissions	Emission policy	Policy	31,832	0.52	0.50	0.00	1.00
	Emission trading	Activity	31,832	0.10	0.30	0.00	1.00
	Emission targets	Target	31,832	0.31	0.46	0.00	1.00
	Emission reduction target (%)	Target	31,832	2.35	10.99	0.00	100.00
	CO_2 Emissions	Performance	26,209	0.00	0.01	0.00	0.65
	Staff transportation impact reduction	Activity	31,832	0.16	0.37	0.00	1.00
Air quality	Ozon-depleting substances	Performance	31,832	0.02	0.14	0.00	1.00
	NO_x and SO_x Emissions	Performance	5,627	0.01	0.14	0.00	5.68
	NO_x and SO_x Emission reduction	Performance	31,832	0.13	0.34	0.00	1.00
	VOC and PM Emissions	Performance	31,832	0.18	0.38	0.00	1.00
	VOC and PM Emission reduction	Performance	29643	0.15	0.36	0.00	1.00
Energy management	Energy efficiency policy	Policy	31,832	0.54	0.50	0.00	1.00
	Energy efficiency targets	Target	31,832	0.22	0.41	0.00	1.00
	Renewable energy ratio	Performance	11,159	0.00	0.05	0.00	0.99
Water and wastewater	Water efficiency policy	Policy	31,832	0.38	0.49	0.00	1.00
	Water technologies	Activity	31,832	0.06	0.24	0.00	1.00
	Water efficiency targets	Target	31,832	0.14	0.34	0.00	1.00
	Water usage / assets	Performance	10,921	1.04	19.20	0.00	1252.88
	Water recycled	Performance	2,567	0.04	0.61	0.00	21.66
	Water pollutant emissions	Performance	2,684	0.00	0.00	0.00	0.02
Waste & hazardous management	Waste reduction initiatives	Activity	31,832	0.52	0.50	0.00	1.00
	Waste / assets	Performance	9,496	0.07	1.54	0.00	88.95
	Waste recycled (%)	Performance	31,832	0.15	0.31	0.00	1.00
	Hazardous waste	Performance	5,461	0.00	0.11	-0.00	5.66
	Toxic chemicals reduction	Performance	31,832	0.14	0.34	0.00	1.00
	Electronic waste reduction	Performance	31,832	0.13	0.34	0.00	1.00
Ecological impact	Environmental restoration initiatives	Activity	31,832	0.21	0.40	0.00	1.00
	Land environmental impact reduction	Policy	31,832	0.09	0.28	0.00	1.00
	Biodiversity impact reduction	Policy	31,832	0.21	0.41	0.00	1.00
Human rights & Community relations	Policy human rights	Policy	31,832	0.46	0.50	0.00	1.00
	Policy Community involvement	Policy	31,832	0.46	0.50	0.00	1.00
	Human rights compliance ILO/UN	Policy	31,832	0.21	0.41	0.00	1.00
	Donations / revenue	Performance	31,832	0.01	0.06	0.00	1.00
Customer privacy	Controversies privacy	Controversy	31,832	0.02	0.44	0.00	54.00
	Policy data privacy	Policy	31,832	0.55	0.50	0.00	1.00
	Whistleblower protection	Policy	31,832	0.56	0.50	0.00	1.00
Data security	HSMS certified percent	Policy	31,832	0.02	0.14	0.00	1.00
Access and affordability	Product discount emerging markets	Activity	9,218	0.03	0.16	0.00	1.00
	Product access low prices	Activity	31,832	0.05	0.21	0.00	1.00
Product quality and safety	Policy customer health safety	Policy	31,832	0.27	0.44	0.00	1.00
	Product recall	Performance	31,832	0.03	0.18	0.00	1.00
Customer welfare	Product responsibility monitoring	Activity	31,832	0.15	0.36	0.00	1.00
	Healthy food/products	Activity	31,832	0.08	0.28	0.00	1.00
Selling practices and product labelling	Controversies consumer complaints	Controversy	31,832	0.02	0.12	0.00	1.00
	Policy responsible marketing	Policy	31,832	0.03	0.18	0.00	1.00
	Policy fair trade	Policy	31,832	0.02	0.13	0.00	1.00
	Retailing responsibilities	Activity	31,832	0.01	0.12	0.00	1.00
	Ethical trading initiatives	Policy	31,832	0.00	0.07	0.00	1.00
	Customer satisfaction	Performance	31,832	0.05	0.21	0.00	1.00
Labor practices	Controversies wages working conditions	Controversy	31,832	0.02	0.15	0.00	1.00
	Policy child labor	Policy	31,832	0.24	0.43	0.00	1.00

Continued

Table 1 – continued

SASB materiality group	Variable name	ESG type	N	mean	sd	min	max
	Policy forced labor	Policy	31,832	0.23	0.42	0.00	1.00
	Policy training and development	Policy	31,832	0.64	0.48	0.00	1.00
	Day care service	Activity	31,832	0.13	0.34	0.00	1.00
	Employee engagement voluntary work	Policy	31,832	0.52	0.50	0.00	1.00
	Training hours / assets	Performance	14,100	15.10	29.93	0.00	901.43
	Employee fatalities / assets	Performance	7,699	1.22	3.88	0.00	60.00
	Flexible working hours	Activity	31,832	0.25	0.43	0.00	1.00
	Employee satisfaction	Performance	2,249	75.85	10.35	0.66	100.00
	Salaries/wages	Performance	3,448	154457.68	189282.94	125.28	995832.56
	Net employment creation / assets	Performance	27,313	4.90	15.05	-20.26	47.31
	Employee turnover	Performance	7,549	12.26	10.45	0.00	96.00
	Strikes	Controversy	31,832	0.02	0.15	0.00	1.00
Employee health and safety	Health safety policy	Policy	31,832	0.71	0.45	0.00	1.00
	Employee health safety team	Activity	31,832	0.43	0.49	0.00	1.00
	Health safety training	Activity	31,832	0.58	0.49	0.00	1.00
	Accidents total/ assets	Performance	8,102	437.30	2653.02	0.00	115500.00
	Injury rate	Performance	8,719	7.23	12.42	0.00	268.57
	Occupational diseases	Performance	2,494	0.67	2.51	0.00	58.80
Employee engagement	Policy board diversity	Policy	31,832	0.41	0.49	0.00	1.00
	Policy diversity and opportunity	Policy	31,832	0.65	0.48	0.00	1.00
	Internal promotion	Activity	31,832	0.29	0.45	0.00	1.00
	HRC corporate equality index	Performance	2,498	72.44	33.53	-25.00	100.00
	Targets diversity and opportunity	Target	26,184	0.14	0.35	0.00	1.00
	Salary gap (%)	Performance	3,442	23.66	40.23	0.00	100.00
	Women employees	Performance	31,832	0.13	0.19	0.00	0.99
	Employees with disabilities	Performance	3,711	2.00	1.52	0.00	15.19
Product design and lifecycle management	Sustainable packaging policy	Policy	31,832	0.16	0.37	0.00	1.00
	Takeback and recycling initiatives	Activity	31,832	0.10	0.30	0.00	1.00
	Environmental material sourcing	Activity	31,832	0.30	0.46	0.00	1.00
	Environmental products	Activity	31,832	0.31	0.46	0.00	1.00
	Eco-design products	Activity	31,832	0.13	0.34	0.00	1.00
	Renewable energy products	Activity	31,832	0.11	0.32	0.00	1.00
	Sustainable building products	Activity	31,832	0.05	0.21	0.00	1.00
	Product impact minimization	Activity	31,832	0.19	0.39	0.00	1.00
	Product environmental responsibilities	Activity	31,832	0.36	0.48	0.00	1.00
Business model resilience	Environment management team	Policy	31,832	0.40	0.49	0.00	1.00
	CSR sustainability committee	Policy	31,832	0.45	0.50	0.00	1.00
	Global compact signatory	Reporting	31,832	0.16	0.37	0.00	1.00
	Sustainability compensation executives	Activity	31,832	0.16	0.37	0.00	1.00
	Integrated strategy in MDA	Policy	31,832	0.15	0.36	0.00	1.00
	Environmental project financing	Activity	31,832	0.00	0.06	0.00	1.00
	Environment management training	Policy	31,832	0.45	0.50	0.00	1.00
	Green buildings	Performance	31,832	0.18	0.38	0.00	1.00
	Environmental investment initiatives	Activity	31,832	0.15	0.36	0.00	1.00
	Six sigma and quality management system	Policy	31,832	0.17	0.37	0.00	1.00
	Environmental provisions / assets	Activity	3,455	0.39	7.53	0.00	319.30
	Environmental expenditures / assets	Performance	6,553	0.20	2.99	0.00	173.43
	Environmental investment expenditures	Performance	31,832	0.25	0.44	0.00	1.00
Supply chain management	Environmental partnership	Activity	31,832	0.35	0.48	0.00	1.00
	Contractor human rights breaches	Performance	31,832	0.14	0.35	0.00	1.00
	Human rights contractors	Activity	31,832	0.33	0.47	0.00	1.00
	Supplier ESG training	Activity	31,832	0.14	0.34	0.00	1.00
	Environmental supply chain policy	Policy	31,832	0.38	0.48	0.00	1.00
	Environmental supply chain management	Policy	31,832	0.39	0.49	0.00	1.00
	Policy supply chain health safety	Policy	31,832	0.22	0.42	0.00	1.00
	Lost time injury rate contractors (%)	Performance	1,421	2.02	3.69	0.00	54.00
Material Sourcing and efficiency	Resource reduction policy	Policy	31,832	0.66	0.47	0.00	1.00
	Organic product initiatives	Activity	31,832	0.04	0.19	0.00	1.00
	Resource reduction targets	Target	31,832	0.25	0.43	0.00	1.00
	Energy usage	Performance	31,832	0.01	0.16	0.00	11.27
	Renewable energy usage	Performance	31,832	0.00	0.00	0.00	0.39

Continued

Table 1 – continued

SASB materiality group	Variable name	ESG type	N	mean	sd	min	max
Physical impact of climate change	Climate change commercial risk	Controversy	31,832	0.34	0.47	0.00	1.00
Business Ethics	Controversies tax fraud	Controversy	31,832	0.01	0.12	0.00	7.00
	Controversies business ethics	Controversy	31,832	0.07	0.55	0.00	46.00
	Controversy bribery corruption and fraud	Controversy	31,832	0.08	0.27	0.00	1.00
	Controversies intellectual property	Controversy	31,832	0.03	0.34	0.00	18.00
	Policy bribery and corruption	Policy	31,832	0.63	0.48	0.00	1.00
	Policy business ethics	Policy	31,832	0.68	0.47	0.00	1.00
	Animal testing	Activity	31,832	0.06	0.24	0.00	1.00
Competitive behavior	Policy fair competition	Policy	31,832	0.52	0.50	0.00	1.00
	Trade union representation	Activity	31,832	0.12	0.26	0.00	1.00
	Poison pill	Controversy	31,832	0.05	0.22	0.00	1.00
Legal & regulatory environment	Quality management systems	Policy	31,832	0.42	0.49	0.00	1.00
	OECD guidelines for multinationals	Policy	31,832	0.06	0.24	0.00	1.00
	Stakeholder engagement	Activity	31,832	0.34	0.48	0.00	1.00
	Real estate sustainability certificate	Policy	31,832	0.01	0.12	0.00	1.00
	Corporate responsibility awards	Performance	31,832	0.35	0.48	0.00	1.00
	Self-reported environmental fines	Performance	31,832	0.00	0.01	0.00	0.71
Critical incident risk management	Accounting controversies	Controversy	31,832	0.00	0.07	0.00	1.00
	Crisis management systems	Policy	31,832	0.38	0.48	0.00	1.00
	Controversies public health	Controversy	31,832	0.01	0.13	0.00	8.00
	Accidental spills	Controversy	1,127	1.00	0.00	1.00	1.00
Systemic risk management	Environmental controversies	Controversy	31,832	0.01	0.10	0.00	1.00
	Controversies anti-competition	Controversy	31,832	0.05	0.22	0.00	1.00
	Controversies responsible marketing	Controversy	31,832	0.07	0.58	0.00	10.00
	Obesity risk	Controversy	31,832	0.01	0.12	0.00	1.00
	Controversies product quality	Controversy	31,832	0.04	0.19	0.00	1.00
	Controversies customer health	Controversy	31,832	0.03	0.53	0.00	65.00
Reporting	ESG reporting scope	Reporting	31,832	0.51	0.50	0.00	1.00
	GRI reporting guidelines	Reporting	31,832	0.31	0.46	0.00	1.00
	Global CSR sustainability report	Reporting	31,832	0.45	0.50	0.00	1.00
	CSR sustainability external audit	Reporting	31,832	0.23	0.42	0.00	1.00
	ESG reporting scope	Reporting	31,832	38.08	46.72	0.00	100.00
	Global compact signatory	Reporting	31,832	0.16	0.37	0.00	1.00

Table 2: The impact of promised and realized sustainable performance on Refinitiv, MSCI, and FTSE ESG ratings

This table regresses the promised and realized ESG scores on the Refinitiv, MSCI, and FTSE ESG rating of firms as given in Equation (3). Columns (1) to (3), (4) to (6), and (7) to (9) use Refinitiv, MSCI, and FTSE ratings as dependent variable respectively. Firm clustered standard errors are given in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

	Refinitiv			MSCI			FTSE		
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Promised	0.45***	0.37***	0.14***	0.25***	0.20***	0.05***	0.28***	0.23***	0.03**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
Realized	-0.04***	-0.06***	-0.06***	-0.02	-0.04***	0.00	0.00	-0.01	-0.03**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
Observations	28,398	28,398	28,398	8,547	8,547	8,547	7,507	7,507	7,507
Adjusted R-squared	0.23	0.34	0.73	0.04	0.14	0.61	0.09	0.20	0.77
Size	NO	YES	YES	NO	YES	YES	NO	YES	YES
Country FE	NO	YES	YES	NO	YES	YES	NO	YES	YES
Firm FE	NO	NO	YES	NO	NO	YES	NO	NO	YES

Table 3: The impact of current promised on future realized sustainable performance

This table regresses the past 15 years and current promised ESG scores on current realized ESG scores. Each regression coefficient represents the parameter estimate of individual regression of current and lagged promised ESG scores on realized ESG scores. Observations and adjusted R^2 represent the average over the 16 regressions in each column. The dependent and independent variables for column (1) are the realized and promised ESG score as before. The dependent and independent variables for the later columns capture the realised and promised ESG scores specific to 14 SASB categories. These capture materials source management (2), supply chain management (3), business ethics (4), customer welfare (5), legal and regulatory concerns (6), labour practices (7), water management (8), water usage (9), wastewater management (10), business model resilience (11), greenhouse gas emissions (12), selling practices (13), employee health safety (14), employee management (15). Firm clustered standard errors are given in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
$Promised_{i,t}$	-0.14***	-0.59***	-0.44***	-0.13***	-0.12***	-0.09***	-0.08***	-0.07***	-0.02***	0.22***	0.03***	0.02***	0.02***	0.01***	0.01***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
$Promised_{i,t-1}$	-0.09***	-0.52***	-0.38***	-0.14***	-0.11***	-0.09***	-0.08***	-0.03***	-0.02***	0.22***	0.04***	0.05***	0.01**	0.01*	0.01***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)
$Promised_{i,t-2}$	-0.09***	-0.50***	-0.37***	-0.13***	-0.11***	-0.10***	-0.08***	-0.03***	-0.03***	0.21***	0.03***	0.06***	0.00	0.00	0.01***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)
$Promised_{i,t-3}$	-0.08***	-0.45***	-0.36***	-0.14***	-0.10***	-0.10***	-0.07***	-0.03***	-0.03***	0.21***	0.04***	0.06***	0.01	0.01	0.01***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)	(0.00)
$Promised_{i,t-4}$	-0.08***	-0.43***	-0.35***	-0.14***	-0.10***	-0.10***	-0.06***	-0.03***	-0.03***	0.20***	0.04***	0.04***	0.00	0.00	0.02***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
$Promised_{i,t-5}$	-0.07***	-0.40***	-0.33***	-0.14***	-0.09***	-0.09***	-0.05***	-0.04***	-0.03***	0.19***	0.04***	0.03***	0.00	0.01	0.01***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
$Promised_{i,t-6}$	-0.08***	-0.37***	-0.32***	-0.13***	-0.09***	-0.09***	-0.05***	-0.04***	-0.04***	0.18***	0.05***	0.01	0.01	0.00	0.01***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
$Promised_{i,t-7}$	-0.05***	-0.36***	-0.31***	-0.14***	-0.08***	-0.10***	-0.04***	-0.04***	-0.04***	0.18***	0.05***	-0.00	0.01	0.00	0.01***
	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)
$Promised_{i,t-8}$	-0.04***	-0.34***	-0.30***	-0.13***	-0.08***	-0.11***	-0.05***	-0.06***	-0.04***	0.18***	0.06***	-0.02**	0.01	0.00	0.01*
	(0.01)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
$Promised_{i,t-9}$	-0.03***	-0.36***	-0.29***	-0.13***	-0.10***	-0.10***	-0.04***	-0.06***	-0.05***	0.18***	0.06***	-0.03***	-0.01	0.00	0.01
	(0.01)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
$Promised_{i,t-10}$	-0.04***	-0.36***	-0.28***	-0.12***	-0.11***	-0.09***	-0.06***	-0.08***	-0.04***	0.15***	0.06***	-0.06***	-0.04**	-0.00	0.01
	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)
$Promised_{i,t-11}$	-0.04***	-0.33***	-0.23***	-0.12***	-0.10***	-0.09***	-0.05***	-0.09***	-0.05***	0.15***	0.06***	-0.08***	-0.04**	0.00	0.01
	(0.01)	(0.02)	(0.03)	(0.03)	(0.02)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)
$Promised_{i,t-12}$	-0.05***	-0.29***	-0.17***	-0.11***	-0.15***	-0.10***	-0.07***	-0.08***	-0.02	0.15***	0.05***	-0.12***	-0.06**	0.01	0.01
	(0.01)	(0.02)	(0.04)	(0.03)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)
$Promised_{i,t-13}$	-0.02*	-0.22***	-0.12***	-0.08**	-0.13***	-0.09***	-0.07***	-0.03	-0.03	0.11***	0.05***	-0.13***	-0.05*	0.01	0.02
	(0.01)	(0.03)	(0.05)	(0.04)	(0.04)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)	(0.03)	(0.01)	(0.01)
$Promised_{i,t-14}$	-0.02	-0.21***	0.01	-0.06	-0.07	-0.13***	-0.08***	-0.01	0.03	0.13***	0.04*	-0.10***	-0.07*	-0.00	0.02
	(0.01)	(0.04)	(0.06)	(0.05)	(0.05)	(0.03)	(0.03)	(0.03)	(0.05)	(0.02)	(0.02)	(0.03)	(0.04)	(0.02)	(0.02)
$Promised_{i,t-15}$	0.02	-0.18***	0.03	-0.01	-0.11	-0.12***	-0.03	0.05	0.02	0.12***	0.03	-0.08**	-0.10**	-0.00	0.04*
	(0.02)	(0.05)	(0.09)	(0.08)	(0.07)	(0.04)	(0.04)	(0.04)	(0.05)	(0.03)	(0.03)	(0.04)	(0.04)	(0.02)	(0.03)
Observations	9,611	9,611	9,611	9,611	9,611	9,611	9,611	9,611	9,611	9,611	9,611	9,611	9,611	9,611	9,611
Adjusted R-squared	0.05	0.23	0.18	0.07	0.08	0.11	0.03	0.23	0.02	0.25	0.14	0.12	0.06	0.13	0.1
Size	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 4: The impact of ESG ratings on cost of capital

This table shows the impact of ESG rating inflation on cost of capital. Specifically, it regresses the weighted average cost of capital of firms, their average cost of equity, and their average cost of debt on the average Refinitiv, MSCI, and FTSE ESG rating of firms. The cost of equity takes the average of Gebhardt et al. (2001), Hou et al. (2012), Chattopadhyay et al. (2021), and Fama and French (2015, 2017) cost of equity estimates where available. Cost of debt captures interest expense and bond yield spread. The weighted average cost of capital weighs cost of equity and cost of debt by the book based leverage ratio. Firm clustered standard errors are given in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

	Cost of Equity			Cost of Debt			WACC		
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ESG rating	0.012	-0.142***	-0.239***	-0.030**	0.004	0.013	-0.024*	-0.056***	-0.116**
	(0.018)	(0.033)	(0.074)	(0.015)	(0.017)	(0.048)	(0.013)	(0.019)	(0.047)
Observations	28,082	28,082	6,088	27,449	27,449	6,049	27,307	27,307	6,022
Adjusted R-squared	0.142	0.389	0.467	0.196	0.661	0.634	0.163	0.489	0.533
Size	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	NO	YES	YES	NO	YES	YES	NO	YES	YES
Credit Rating	NO	NO	YES	NO	NO	YES	NO	NO	YES

Table 5: Difference-in-differences: Non-Financial Reporting Directive

This table performs a difference-in-differences analysis of the Non-Financial Reporting directive on cost of capital measures. The NFDR dummy indicates whether the NFDR is introduced. As indicated by shock and structural break, this dummy is equal to 1 in 2017 for Columns (1) to (5) and equal to 1 in any period after and including 2014 in Columns (6) to (8). Firm clustered standard errors are given in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

	Shock					Early adoption		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	WACC	WACC	WACC	COE	COD	WACC	WACC	WACC
NFRD	0.70**	0.69**	0.80**	1.97***	-0.13	0.77***	0.85***	0.94***
	(0.33)	(0.31)	(0.33)	(0.48)	(0.27)	(0.23)	(0.24)	(0.30)
Treated	-0.09	-0.04	2.29**	2.15	0.43	0.49	0.61*	3.15***
	(0.19)	(0.20)	(0.99)	(3.50)	(0.66)	(0.32)	(0.35)	(1.04)
NFRD*Treated	-0.94***	-0.95***	-1.03***	-1.11*	-0.66**	-0.90***	-0.99***	-0.93**
	(0.36)	(0.33)	(0.37)	(0.58)	(0.31)	(0.32)	(0.32)	(0.37)
Observations	968	968	968	974	968	968	968	968
Adjusted R-squared	0.01	0.05	0.66	0.53	0.72	0.02	0.06	0.67
Size	NO	YES	YES	YES	YES	NO	YES	YES
Industry FE	NO	YES	YES	YES	YES	NO	YES	YES
Firm FE	NO	NO	YES	YES	YES	NO	NO	YES

Table 6: The impact of ESG ratings on cost of capital

This table shows the impact of ESG rating inflation on the portfolio allocation of institutional investors in aggregate and split by institutional PRI signatories. The holdings information is collected from 13F forms from Refinitiv. PRI signatory information is collected from `https://www.unpri.org/signatories/signatory-resources/signatory-directory`. Since PRI was only introduced in 2006 and holdings data starts in 2003, we have slightly less observations in our PRI and non-PRI sample. Results remain unchanged when we only consider 2006 and onwards. The average ESG rating represents the equally-weighted average ESG rating of Refinitiv, MSCI, and FTSE where available. Firm clustered standard errors are given in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

VARIABLES	(1) Institutional (%)	(2) PRI (%)	(3) Non-PRI (%)	(4) Institutional (%)	(5) PRI (%)	(6) Non-PRI (%)
Average ESG rating	1.09***	1.90***	-0.94***			
	(0.17)	(0.10)	(0.18)			
Promised				0.49***	0.37***	0.00
				(0.10)	(0.06)	(0.11)
Realized				0.01	-0.14*	0.06
				(0.13)	(0.08)	(0.13)
Observations	8,148	7,967	7,967	8,148	7,967	7,967
Adjusted R-squared	0.93	0.78	0.89	0.93	0.73	0.89
Size	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES

Table 7: Sustainable performance for multiple SRI screening procedures

Table 7 elaborates on how sustainable performance is affected by ESG-rating-based SRI screening procedures. We collect sustainable performance indicators from Refinitiv ESG. Specifically, NO_X emissions and CO_2 emissions are expressed in tonnes and divided by total assets in millions. Accidents and fatalities are similarly divided by total assets in millions. Alternative sustainable performance indicators are boolean. The screening procedures respectively represent an unscreened portfolio; a portfolio in which sin stocks are excluded; negative screening in which firms with the bottom 10% ESG metrics in each industry are removed; positive screening which twice overweighs the top 10% highest ESG metrics firms within industries; integrative screening that captures both positive and negative screening; and best-in-class screening which solely retains firms in the highest decile of ESG metrics conditional on their industries. *, ** and *** denote significance at the 10%, 5% and 1% level. The table contains two panels, of which Panel A screens based on the average of Refinitiv, MSCI, and FTSE ESG ratings and Panel B based on realized ESG scores.

Panel A: ESG-rating-based SRI

	Unconstrained portfolio		No sin stocks		Negative screening		Positive screening		Integrative screening		Best-in-class screening	
VARIABLES	Mean	SD	Diff (%)	t	Diff (%)	t	Diff (%)	t	Diff (%)	t	Diff (%)	t
Average ESG rating	4.81	0.35	-1.50	-2.15	5.53	7.72	4.55	6.47	11.45	15.85	62.71	59.22
Promised ESG rank	6.56	0.25	-1.42	-3.82	3.64	8.99	1.01	2.66	5.78	13.65	23.70	40.12
Realised ESG rank	4.54	0.30	1.08	1.62	-0.48	-0.77	0.51	0.78	-0.95	-1.53	-4.71	-7.20
$\frac{CO_2 emissions}{assets}$	6,84	12,22	-5.28	-0.29	1.65	0.09	-8.56	-0.49	-2.70	-0.15	-38.95	-2.55
$\frac{NO_X emissions}{assets}$	4.59	8.6	-10.30	-0.54	-0.52	-0.03	-6.10	-0.31	3.03	0.15	30.68	1.22
VOC or PM emissions	0.14	0.03	-2.14	-1.17	7.86	4.20	8.57	4.53	17.86	9.19	109.29	31.72
Strikes	0.03	0.01	-13.26	-3.70	-5.38	-1.46	6.09	1.55	15.41	3.78	195.70	21.21
$\frac{Accidents}{assets}$	0.56	1.40	7.33	0.28	-1.61	-0.07	8.05	0.32	0.00	0.00	32.74	1.05
$\frac{Fatalities}{assets}$	0.00	0.00	-2.82	-0.10	7.75	0.25	-3.42	-0.12	5.74	0.19	-6.34	-0.28
Environmental controversies	0.01	0.01	-13.18	-1.27	-5.80	-0.54	15.91	1.34	25.00	2.01	295.45	9.90
Wages/working condition controversies	0.02	0.02	-13.87	-2.19	-6.72	-1.02	2.52	0.37	10.50	1.46	166.81	11.28
Employ health safety controversies	0.02	0.01	-10.48	-2.10	-2.42	-0.47	4.44	0.83	12.90	2.33	147.98	13.84
Bribery, corruption and fraud controversies	0.10	0.02	-10.36	-6.44	-1.74	-1.05	6.67	4.05	16.92	9.84	173.85	52.31
Intellectual property controversies	0.04	0.04	5.93	0.61	12.67	1.30	21.83	2.13	29.92	2.90	169.54	10.64
Anticompetition controversies	0.06	0.01	-7.30	-3.27	1.49	0.64	13.43	5.46	23.55	9.07	210.12	41.38
Business ethics controversies	0.05	0.01	-12.37	-4.53	-3.56	-1.24	4.82	1.57	14.68	4.50	176.73	19.96
Consumer complaints controversies	0.02	0.01	-4.00	-0.92	6.50	1.38	20.50	4.17	32.50	6.13	257.50	19.39
Product quality controversies	0.04	0.01	0.23	0.07	10.09	3.11	18.81	5.78	29.82	8.71	198.17	25.95
Responsible marketing controversies	0.01	0.01	2.03	0.36	12.84	2.17	31.08	4.92	43.24	6.43	305.41	17.76

continued

Table 7 – continued

Panel B: ESG-score-based SRI

	Negative screening		Positive screening		Integrative screening		Best-in-class screening	
VARIABLES	Diff (%)	t	Diff (%)	t	Diff (%)	t	Diff (%)	t
Average ESG rating	0.23	0.31	-0.69	-0.96	-3.06	-3.90	-19.73	-26.05
Promised ESG rank	-1.22	-3.38	-1.31	-3.63	-3.52	-9.26	-14.35	-27.86
Realised ESG rank	7.20	9.21	3.90	5.46	12.50	14.35	41.15	30.36
$\frac{CO_2 emissions}{assets}$	-10.33	-0.55	-7.59	-0.41	-4.62	-0.23	27.19	1.01
$\frac{NO_X emissions}{assets}$	-2.77	-0.14	-6.75	-0.35	-5.05	-0.25	-18.42	-0.91
VOC or PM emissions	6.43	3.44	1.43	0.77	-6.43	-3.43	-70.29	-42.93
Strikes	-11.83	-3.38	-12.54	-3.55	-20.79	-6.13	-68.64	-20.20
$\frac{Accidents}{assets}$	-14.67	-0.56	-1.79	-0.07	-21.82	-0.87	-64.58	-3.33
$\frac{Fatalities}{assets}$	-8.86	-0.31	-5.64	-0.20	-20.24	-0.77	-86.81	-4.43
Environmental controversies	-7.05	-0.65	-10.34	-0.98	-16.02	-1.54	-75.80	-8.78
Wages/working condition controversies	-10.92	-1.70	-12.61	-1.98	-19.33	-3.11	-72.39	-13.49
Employ health safety controversies	-5.65	-1.11	-8.06	-1.60	-12.90	-2.56	-48.79	-9.87
Bribery, corruption and fraud controversies	-11.38	-7.51	-10.77	-6.99	-21.33	-14.34	-72.00	-48.40
Intellectual property controversies	0.00	0.00	3.23	0.35	-13.48	-1.63	-67.92	-9.38
Anticompetition controversies	-7.63	-3.38	-7.30	-3.29	-18.57	-8.91	-71.31	-34.31
Business ethics controversies	-13.63	-4.54	-13.00	-4.58	-23.06	-8.13	-76.94	-35.76
Consumer complaints controversies	-0.50	-0.11	-2.50	-0.57	-10.00	-2.37	-58.65	-14.69
Product quality controversies	0.00	0.00	0.00	0.00	-10.78	-3.48	-70.18	-23.76
Responsible marketing controversies	3.38	0.57	3.38	0.60	-8.78	-1.53	-74.59	-13.83

Internet Appendix

Appendix A Variable compilation

In this Appendix, we describe how we treat raw Refinitiv ESG data to ensure the replicability of our work. We cannot directly use all granular Refinitiv ESG information because some variables are near empty, and others show overlap for similar data items. As a first step, we remove variables with less than 500 observations (out of our 31,832 firm-year observations sample) to ensure variable relevance. For example, Revinitiv ESG provides both recent and standard ESG controversies. These current controversies often contain less than 50 observations. Therefore, we merge recent controversy data into the matching primary controversy variable regarding the health and safety of customers and customers in general, responsible marketing, product access, business ethics, management team compensation, intellectual property, responsible R&D, anti-competition, wage/working conditions, diversity, privacy, employee health and safety, critical countries, shareholder rights, insider trading, accounting, and tax fraud information.

Second, we also remove select emissions-related variables with less than 50 out of 30k observations, like policies regarding the divestment of fossil fuel, indirect energy use, cement energy use, the supplied renewable energy, cement CO_2 emissions, internal carbon pricing, total hazardous waste revenue, water pollutant emissions revenue, fleet CO_2 emissions, and fuel consumption.

Third, we observe insufficient information regarding revenue from environmental products, equator principals or equator environmental projects, company cross-shareholding, supply chain health and safety impairments, abortifacients, drug delays, FDA warning letters, not approved drug, recent FDA warning letters, product delays, alcohol revenue, gambling revenue, tobacco revenue, armament revenue, employee resource groups, expanded constituency provisions, community lending and investment, the percentage of certified quality management systems and the production of cluster bombs, landmines and firearms, litigation expenses, fair price provision, energy produced directly, unlimited authorised capital, carbon offsetting credits, advance notice period, written consent requirements, $\frac{non-audit}{audit\,fees}$, auditor tenure, golden parachute, water discharged total donations, earning restatement, profit warnings, ESM certificated (%), GMO products, iso 9k, training costs total, and HIV/aids programs.

Fourth, we do not consider shareholder rights in identifying promised ESG and realized ESG because this cannot be allocated to a SASB materiality group and does not fully align with ESG principles. For this reason, we omit shareholder rights policy, policy equal vot-

ing rights, policy shareholder engagement, different voting rights per share, equal shareholder rights, voting cap, voting cap (%), minimum number of shares to vote director election majority requirement, shareholder vote on executive positions, public availability corporate statement, veto power or golden shares, state-owned enterprise identifier, anti-takeover devices larger than two, percentage supermajority vote requirement, limited shareholder rights, elimination of cumulative voting, pre-emptive rights, confidential voting policy, limitation of director liability, shareholder approval significant, rules on the removal of a director, or advance notice for shareholder propositions from our analysis.

Last, we append information on multiple ESG variables that cover distinct parts of the sample for CO_2 emissions, VOC or PM emissions, water revenue/assets, hazardous waste, waste recycling (%), employee turnover, training and development policies, training hours, net employment creation, injury rates (and their attributed lost time), accidents, women employees, board diversity, environmental expenditures, environmental provisions, environmental supply chain management, environmental partnerships, renewable energy, animal testing, business ethics policies, business ethics controversies, and anticompetitive controversies. Using this approach, we retain 169 out of 466 variables; all allocated to SASB materiality groups and reporting, policies, activities, targets, controversies, or performance.

Appendix B Rank ordering robustness checks

This appendix validates our use of a non-parametric rank ordering method in measuring promised and realized sustainable performance. Most of the analyses rely on our ability to identify promises of future sustainable performance improvements and their subsequent realizations. Therefore, the validity of these constructs is paramount. As a first step, we provide summary statistics to show that promised and realized ESG scores have the anticipated properties that such measures should have. Second, we show that our scores strongly correlate to their underlying granular ESG information. Third, we replicate our primary analysis using raw ESG data instead of our ESG score and find similar results.

Table B1 provides summary statistics on our industry-time-specific promised and realized ESG scores as well as its sub-components. As anticipated, both promised and realized ESG scores and sub-scores are relatively normally distributed. Moreover, the promised and realized ESG scores generally have lower variance, indicating that they effectively smooth the multidimentionality of sustainable performance.

Figures B1 and B2 display the density functions of promised and realized ESG scores. Here we see a relatively smooth distribution across firms. Since the current ESG consensus of firms

is primarily on reporting, it is unsurprising that we see higher average promised ESG scores than realized ESG scores. Further, our measures are relatively continuous with the exception of the worst and best possible outcomes, displaying that select firms strongly underperform or outperform across multiple aspects of sustainable performance. This is promising because there is a significantly larger share of firms with minimal self-reported promised ESG scores than firms with minimal third-party reported realized ESG scores, validating the data collection adequacy of Refinitv on third-party information.

Our promised and realized ESG scores accurately capture their respective underlying granular ESG information. Tables B2 and B3 show two correlation matrices of promised and realized ESG scores and the underlying granular sustainable performance indicators. Table B2 shows a persistently positive correlation between our promised ESG scores and its underlying granular ESG variables. This provides the first sign of internal validity. Granular ESG policy information has the most impact on the promised ESG score, followed by reporting, activities, and targets. Furthermore, this granular sustainable performance information is often more closely related to its respective sub-ESG-score than to the overarching promised ESG scores, indicating further internal validity.

In Table B3, we perform a similar analysis for realized ESG scores with similar results. Realized ESG scores are positively related to the societally beneficial underlying granular ESG information and negatively associated with societally harmful activities. To illustrate, realized ESG scores decline with strikes and improve with employee satisfaction. This effect persists across ESG controversies and performance sub-scores. Similar to promises of sustainable performance, controversies and performance variables better explain their sub-scores than realized ESG scores.

In Table B4, we validate our promised and realized ESG score measures using RepRisk ratings. RepRisk is a data provider that analyzes ESG-related reputational risks using primarily third-party news outlets. In our analyses, we rely on our promised and realized ESG scores instead of RepRisk scores as they capture sustainable performance across a more holistic framework than just reputational ESG risks. However, we can use RepRisk ratings to validate our measures. RepRisk's reputational risk ratings should be more strongly related to our controversy and realized ESG scores than to promised ESG scores if our measures are appropriate. This is precisely what we find. In columns (1) to (3), (4) to (6), and (7) to (9), we regress RepRisk ratings on promised, realized, and controversy ESG scores across multiple specifications. As anticipated, we find that RepRisk ratings are negatively related to promised ESG scores and positively associated with realized ESG scores. Moreover, the positive relation between controversy scores and RepRisk ratings is more substantial than the relation between

realized ESG scores and RepRisk ratings. This validates our promised and realized ESG scores using external measures.

We similarly identify inflated ESG ratings without using promised or realized ESG scores. As the last step in validating our promised and realized ESG measures, we show that our main regressions persist when we rely on their underlying granular ESG information. In Table B5, we replicate Table 2 using granular sustainable performance information rather than ESG scores. In all specifications, we find persistently positive coefficients for variables that capture promised sustainable performance, i.e., emission policies and targets, energy efficiency policies, policies for human rights, employee health and safety teams, and employee health safety training. We also observe positive coefficients for VOC and particulate matter emissions, strikes, and multiple controversies. Only in the case of MSCI, some realized sustainable performance improvements do augment sustainable performance. Given the above, we find that having worse sustainable performance often increases ESG ratings when we consider granular ESG information. This appendix validates that our main findings are not driven by our non-parametric rank-ordering method.

Table B1: Summary statistics on ESG scores and ESG sub-scores

This table shows the summary statistics for the Wittkowski et al. (2004) scores and sub-scores as computed in Equations 1 and 2. All scores are industry-year specific and scaled from 0 to 10, for which 0 is inferior and 10 is superior. To elaborate, firms with ESG scores of 10 in controversies and policies have no controversies and superior ESG policies compared to other firm in that industry and year.

VARIABLES	mean	sd	min	p5	p25	p50	p75	p95	max
Reporting	5.13	3.66	0.00	0.00	0.00	6.18	8.06	10.00	10.00
Policy	6.00	2.33	0.00	0.00	5.07	6.32	7.54	9.29	10.00
Target	4.19	4.00	0.00	0.00	0.00	5.35	8.03	10.00	10.00
Activity	6.12	2.67	0.00	0.00	5.57	6.99	7.82	9.14	10.00
Controversy	6.69	3.99	0.00	0.33	2.76	10.00	10.00	10.00	10.00
Performance	4.42	1.79	0.00	1.20	3.58	4.35	5.29	7.95	10.00
Promised ESG	6.93	2.07	0.00	2.01	6.34	7.40	8.19	9.21	10.00
Realised ESG	4.26	1.81	0.00	1.03	3.42	4.19	5.09	7.57	10.00

Figure B1: Density of promised ESG scores

Figure B1 displays the density function of promised ESG scores. The x-axis represents the promised scores of firms as computed in Equations (1) and (2). The y-axis the frequency of firms with such scores.

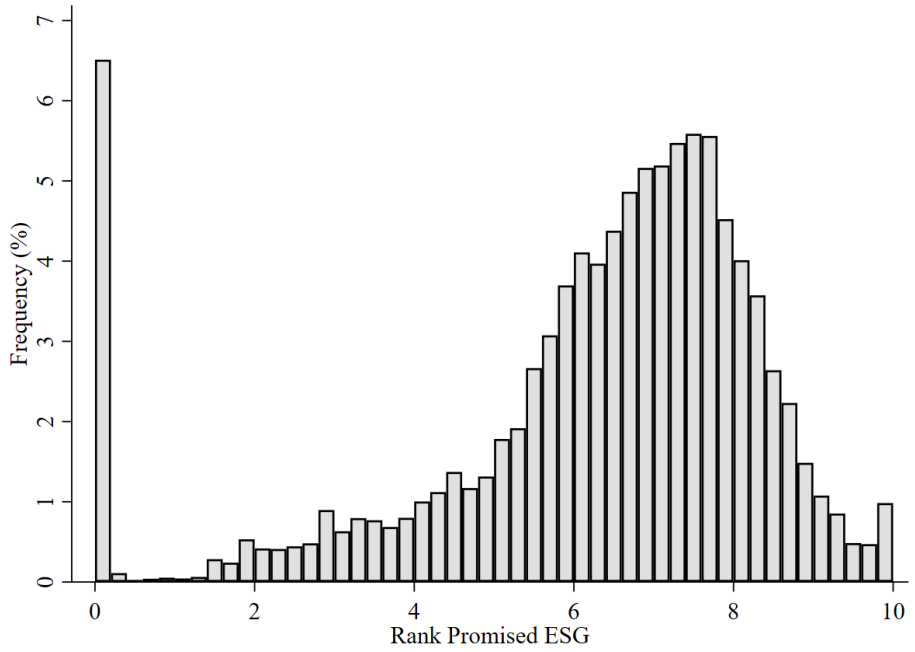

Figure B2: Density of realized ESG scores

Figure B2 displays the density function of realized ESG scores. The x-axis represents the realized scores of firms as computed in Equations (1) and (2). The y-axis the frequency of firms with such scores.

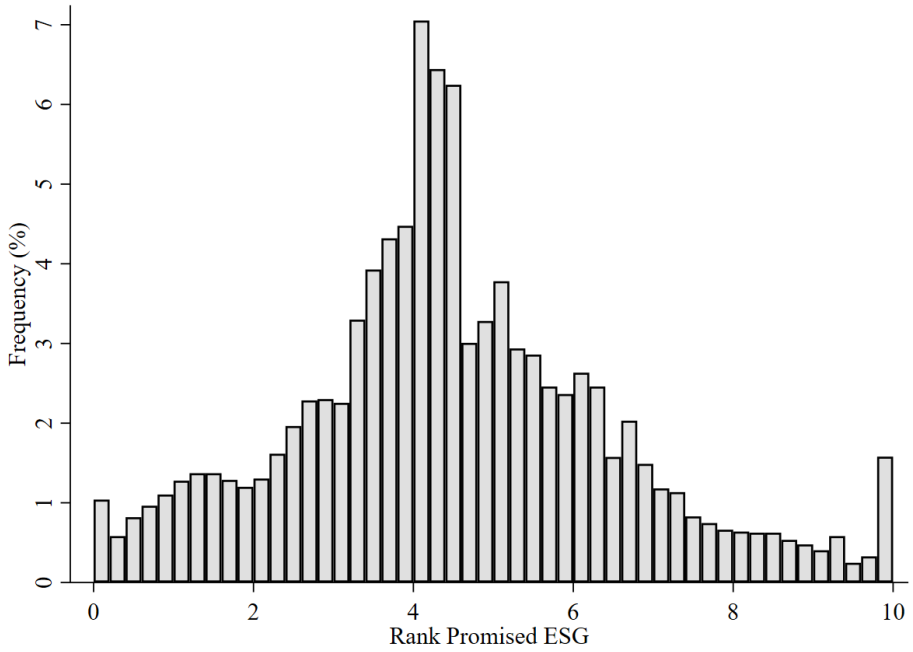

Table B2: Correlation matrix of promised ESG scores to granular ESG variables

This table provides a correlation matrix on the promised ESG scores and ESG reporting, policy, target, and activity sub-scores on granular promised sustainable performance information from Refinitiv ESG. To conserve space, exact p-values have been compressed and only significance 10%, 5% and 1% levels are denoted with respectively *, ** and ***.

Granular ESG variable	Promised ESG	Reporting rank	Policy	Target	Activity
Emission policy	0.515***	0.641***	0.584***	0.538***	0.595***
Emission trading	0.240***	0.326***	0.273***	0.330***	0.291***
Emission targets	0.420***	0.576***	0.482***	0.841***	0.491***
Emission reduction target (%)	0.107***	0.184***	0.140***	0.261***	0.143***
Staff transportation impact reduction	0.254***	0.305***	0.283***	0.257***	0.328***
Energy efficiency policy	0.518***	0.623***	0.596***	0.502***	0.599***
Energy efficiency targets	0.335***	0.465***	0.389***	0.786***	0.393***
Water efficiency policy	0.421***	0.563***	0.523***	0.461***	0.498***
Water technologies	0.148***	0.174***	0.151***	0.180***	0.203***
Water efficiency targets	0.270***	0.382***	0.341***	0.635***	0.324***
Waste reduction initiatives	0.502***	0.603***	0.558***	0.485***	0.620***
Environmental restoration initiatives	0.301***	0.385***	0.331***	0.366***	0.389***
Land environmental impact reduction	0.178***	0.224***	0.205***	0.143***	0.203***
Biodiversity impact reduction	0.330***	0.460***	0.386***	0.393***	0.395***
Policy human rights	0.407***	0.553***	0.498***	0.440***	0.473***
Policy Community involvement	0.510***	0.462***	0.517***	0.325***	0.575***
Human rights compliance ILO/UN	0.321***	0.494***	0.411***	0.416***	0.376***
Policy data privacy	0.243***	0.149***	0.307***	0.128***	0.238***
Whistleblower protection	0.261***	0.102***	0.327***	0.096***	0.203***
HSMS certified	0.075***	0.132***	0.104***	0.102***	0.090***
Product discount emerging markets	0.074***	0.105***	0.101***	0.122***	0.090***
Product access low prices	0.161***	0.207***	0.183***	0.193***	0.188***
Policy customer health safety	0.326***	0.387***	0.419***	0.387***	0.392***
Product responsibility monitoring	0.246***	0.341***	0.306***	0.331***	0.324***
Healthy food/products	0.158***	0.158***	0.178***	0.183***	0.211***
Policy responsible marketing	0.112***	0.140***	0.164***	0.150***	0.123***
Policy fair trade	0.086***	0.101***	0.128***	0.115***	0.103***
Retailing responsibilities	0.056***	0.050***	0.061***	0.042***	0.088***
Ethical trading initiatives	0.056***	0.055***	0.066***	0.053***	0.063***
Policy child labour	0.247***	0.376***	0.354***	0.284***	0.313***
Policy forced labour	0.222***	0.330***	0.326***	0.247***	0.289***
Policy training and development	0.493***	0.510***	0.535***	0.368***	0.508***
Day care service	0.215***	0.280***	0.243***	0.284***	0.306***
Employee engagement voluntary work	0.463***	0.420***	0.476***	0.365***	0.564***
Flexible working hours	0.293***	0.346***	0.322***	0.335***	0.406***
Health safety policy	0.537***	0.457***	0.584***	0.343***	0.539***
Employee health safety team	0.438***	0.538***	0.520***	0.417***	0.495***
Health safety training	0.526***	0.545***	0.570***	0.394***	0.629***
Policy board diversity	0.156***	0.059***	0.224***	0.025***	0.127***
Policy diversity and opportunity	0.445***	0.370***	0.508***	0.301***	0.452***
Internal promotion	0.327***	0.349***	0.347***	0.262***	0.373***
Targets diversity and opportunity	0.228***	0.339***	0.272***	0.432***	0.280***
Sustainable packaging policy	0.238***	0.298***	0.322***	0.335***	0.310***
Takeback and recycling initiatives	0.207***	0.265***	0.251***	0.298***	0.283***
Environment material sourcing	0.375***	0.498***	0.449***	0.492***	0.480***
Environmental products	0.333***	0.388***	0.335***	0.375***	0.447***
Eco-design products	0.219***	0.276***	0.258***	0.329***	0.308***
Renewable energy products	0.211***	0.232***	0.198***	0.218***	0.273***
Sustainable building products	0.141***	0.159***	0.140***	0.172***	0.189***
Product impact minimisation	0.233***	0.232***	0.209***	0.273***	0.330***
Product environmental responsibilities	0.385***	0.432***	0.384***	0.419***	0.500***
Environment management team	0.433***	0.510***	0.504***	0.460***	0.496***
CSR sustainability committee	0.459***	0.597***	0.522***	0.490***	0.527***
Global compact signatory	0.294***	0.565***	0.353***	0.394***	0.336***
Sustainability compensation executives	0.208***	0.166***	0.210***	0.142***	0.218***
Integrated strategy in MDA	0.188***	0.223***	0.222***	0.136***	0.211***

Continues on next page

Table B2 – continued

Granular ESG variable	Promised ESG	Reporting rank	Policy	Target	Activity
environmental project financing	0.044***	0.042***	0.049***	0.042***	0.044***
Environment management training	0.451***	0.505***	0.510***	0.427***	0.524***
Environmental investment initiatives	0.247***	0.361***	0.286***	0.332***	0.314***
Six sigma and quality management system	0.184***	0.193***	0.242***	0.209***	0.203***
Environmental partnership	0.436***	0.509***	0.480***	0.485***	0.524***
Human rights contractors	0.373***	0.492***	0.478***	0.438***	0.450***
Supplier ESG training	0.247***	0.347***	0.328***	0.337***	0.318***
Environmental supply chain policy	0.415***	0.558***	0.521***	0.503***	0.508***
Environmental supply chain management	0.440***	0.574***	0.538***	0.513***	0.529***
Policy supply chain health safety	0.307***	0.397***	0.416***	0.373***	0.364***
Contractor accidents	0.067***	0.106***	0.084***	0.080***	0.076***
Contractor fatalities	0.103***	0.165***	0.127***	0.134***	0.109***
Contractors injury rate (%)	0.072***	0.113***	0.082***	0.077***	0.078***
Contractor lost time working days	0.033***	0.050***	0.037***	0.040***	0.035***
Resource reduction policy	0.552***	0.528***	0.594***	0.412***	0.580***
Organic product initiatives	0.116***	0.130***	0.140***	0.148***	0.151***
Resource reduction targets	0.356***	0.489***	0.408***	0.833***	0.403***
Policy bribery and corruption	0.369***	0.218***	0.456***	0.177***	0.297***
Policy business ethics	0.369***	0.211***	0.440***	0.174***	0.301***
Large or small board size	0.121***	0.157***	0.119***	0.175***	0.134***
Animal testing	0.030***	0.056***	0.091***	0.102***	0.017***
Policy fair competition	0.296***	0.155***	0.380***	0.176***	0.228***
Trade union representation	0.227***	0.377***	0.242***	0.268***	0.256***
Quality management systems	0.279***	0.322***	0.317***	0.275***	0.289***
OECD guidelines for multinationals	0.187***	0.295***	0.242***	0.263***	0.212***
Stakeholder engagement	0.402***	0.633***	0.473***	0.470***	0.484***
Real estate sustainability certificate	0.081***	0.071***	0.063***	0.048***	0.081***
Crisis management systems	0.313***	0.407***	0.375***	0.337***	0.372***
CSR sustainability reporting	0.515***	0.875***	0.558***	0.534***	0.596***
GRI reporting guidelines	0.403***	0.740***	0.473***	0.529***	0.486***
Global CSR sustainability report	0.477***	0.831***	0.517***	0.480***	0.540***
CSR sustainability external audit	0.358***	0.656***	0.423***	0.527***	0.440***
External CSR audit	0.333***	0.626***	0.369***	0.487***	0.392***
ESG reporting scope	0.377***	0.733***	0.386***	0.368***	0.425***

Table B3: Correlation matrix of realised ESG ranks to granular ESG variables

This table provides a correlation matrix on the realized ESG scores and ESG controversy and performance sub-scores on granular realized sustainable performance information from Refinitiv ESG. Often negative coefficients are expected when corporate wrongs are analysed below. To conserve space, exact p-values have been compressed and only significance 10%, 5% and 1% levels are denoted with respectively *, ** and ***.

Granular ESG Variables	Realised ESG	Controversy	Performance
CO_2 Emissions	-0.021***	-0.002	-0.021***
Ozon-depleting substances	-0.003	0.004	-0.003
NO_X & SO_X Emissions	-0.026**	-0.054***	-0.019
VOC and particulate matter Emissions	-0.025***	-0.151***	-0.026***
VOC and particulate matter Emissions reduction	-0.004	-0.132***	-0.006
NO_X & SO_X Emission reduction	0.028***	-0.167***	0.045***
Renewable energy (ratio)	0.023**	0.011	0.037***
Water usage / assets	-0.018*	-0.025***	-0.017*
Water recycled	-0.035*	-0.033*	-0.034*
Water pollutant emissions	-0.062***	-0.044**	-0.060***
Waste / assets	0.006	-0.028***	0.007
Waste recycled	-0.023***	-0.130***	-0.010*
Hazardous waste	-0.034**	-0.047***	-0.039***
Toxic chemicals reduction	-0.092***	-0.135***	-0.088***
Electronic waste reduction	-0.119***	-0.124***	-0.117***
Donations / assets	-0.009	-0.041***	-0.009
Controversies privacy	-0.012**	-0.034***	-0.004
Product recall	-0.050***	-0.178***	-0.055***
Controversies consumer complaints	-0.039***	-0.191***	-0.011**
Customer satisfaction	0.009	-0.087***	0.020***
Controversies wages working conditions	-0.061***	-0.273***	-0.036***
Training hours / employee	0.01	-0.054***	0.021**
Employee fatalities / assets	-0.021*	-0.080***	0.005
Employee satisfaction	0.103***	0.040*	0.102***
Wages/employee	0.043***	0.017	0.048***
Net employment creation / assets	0.003	0.004	-0.001
Employee turnover	-0.028**	0.017	-0.018
Strikes	-0.044***	-0.183***	-0.046***
Accidents total	-0.031***	-0.055***	-0.031***
Injury rate	-0.129***	0.055***	-0.136***
Lost time injury rate	-0.118***	-0.072***	-0.136***
Occupational diseases	-0.005	-0.043**	0.009
HRC corporate equality index	0.120***	-0.235***	0.180***
Salary gap ratio	0.023	0.014	-0.007
Women employees	0.083***	-0.111***	0.104***
Employees with disabilities	-0.087***	-0.121***	-0.098***
Green buildings	-0.071***	-0.194***	-0.047***
Environmental expenditures/ assets	-0.006	-0.029**	-0.005
Environmental investment expenditures	-0.041***	-0.150***	-0.030***
Contractor human rights breaches	-0.117***	-0.149***	-0.118***
Contractor accidents	0.055*	-0.270***	0.033
Contractor fatalities	-0.043**	-0.174***	0
Contractors injury rate (%)	-0.072**	0.011	-0.060**
Contractor lost time injury (%)	-0.113***	-0.081***	-0.107***
Contractor lost time working days	-0.038	-0.116***	-0.055
Energy usage	-0.011*	-0.038***	-0.011*
Renewable energy usage	-0.015**	-0.023***	-0.010*
Climate change commercial risk	-0.162***	-0.405***	-0.077***
Controversies tax fraud	-0.019***	-0.112***	-0.008
Controversies business ethics	-0.025***	-0.205***	-0.006
Controversy bribery corruption and fraud	-0.101***	-0.517***	-0.020***
Controversies intellectual property	-0.034***	-0.170***	0.008
Poison pill	-0.101***	-0.153***	-0.007
Corporate responsibility awards	-0.030***	-0.204***	0.001
Self-reported environmental fines	-0.004	-0.012**	-0.001
Accounting controversies	-0.025***	-0.073***	-0.013**
Controversies public health	-0.012**	-0.131***	0.003
Accidental spills	0.011*	-0.084***	0.021***
Environmental controversies	-0.013**	-0.189***	0.006
Controversies anti-competition	-0.078***	-0.419***	-0.012**
Controversies responsible market	-0.025***	-0.169***	-0.012**
Obesity risk	-0.012**	-0.133***	0.011*
Controversies product quality	-0.052***	-0.270***	-0.025***
Controversies customer health	-0.009	-0.142***	-0.003

Table B4: RepRisk, promised ESG scores, and realized ESG scores

This table regresses the RepRisk risk score on promised, realized, and controversy ESG scores. RepRisk ranks are converted to a numeric value for which AAA=10, AA=9, until D=1. Firm clustered standard errors are given in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

	Promised			Realized			Controversy		
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
RepRisk	-0.14***	-0.20***	-0.05***	0.00	0.08***	0.04***	0.40***	0.57***	0.20***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
Observations	22,410	22,410	22,410	22,410	22,410	22,410	22,410	22,410	22,410
Adjusted R-squared	0.02	0.12	0.48	-0.00	0.05	0.43	0.04	0.11	0.44
Size	NO	YES	YES	NO	YES	YES	NO	YES	YES
Country FE	NO	YES	YES	NO	YES	YES	NO	YES	YES
Firm FE	NO	NO	YES	NO	NO	YES	NO	NO	YES

Table B5: The impact of granular promised and realised ESG variables on Refinitiv ESG ratings

This table verifies the results of Table 2 by using granular ESG data. Specifically, it shows that, without relying on our promised and realized ESG scores, ESG ratings are positively related to promises of sustainable performance and negatively related to realizations of sustainable performance. Refinitiv ESG ratings are the dependent variable. The R^2 is adjusted for non-firm fixed effects models. Firm clustered standard errors are given in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

	Refinitiv			MSCI			FTSE		
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Emission policy	0.25***	0.25***	0.31***	-0.00	0.06	0.23*	-0.00	0.14**	0.23***
	(0.03)	(0.03)	(0.03)	(0.08)	(0.08)	(0.14)	(0.06)	(0.06)	(0.06)
Emission targets	0.93***	0.87***	0.19***	1.06***	0.88***	0.19*	0.74***	0.85***	-0.11*
	(0.02)	(0.02)	(0.03)	(0.07)	(0.07)	(0.11)	(0.05)	(0.05)	(0.06)
Energy efficiency policy	0.57***	0.55***	0.31***	0.17**	0.24***	0.22*	0.21***	0.17***	0.05
	(0.03)	(0.03)	(0.03)	(0.08)	(0.07)	(0.13)	(0.06)	(0.06)	(0.06)
Policy human rights	1.19***	1.12***	0.96***	0.55***	0.57***	0.48***	0.66***	0.68***	0.48***
	(0.02)	(0.02)	(0.02)	(0.06)	(0.06)	(0.09)	(0.05)	(0.05)	(0.04)
Employee health safety team	0.39***	0.40***	0.35***	0.22***	0.17**	0.14	0.20***	0.18***	0.35***
	(0.02)	(0.02)	(0.03)	(0.07)	(0.07)	(0.11)	(0.05)	(0.05)	(0.05)
Health safety training	0.05**	0.04*	0.20***	0.03	0.02	-0.09	0.04	-0.03	0.00
	(0.02)	(0.02)	(0.03)	(0.07)	(0.07)	(0.11)	(0.06)	(0.05)	(0.05)
VOC and PM Emissions	0.40***	0.41***	0.14***	-0.30***	-0.14*	0.02	0.01	0.10*	-0.01
	(0.03)	(0.03)	(0.04)	(0.09)	(0.08)	(0.16)	(0.06)	(0.06)	(0.07)
Strikes	0.62***	0.45***	-0.02	-0.63***	-0.66***	-0.32	0.18	0.02	0.10
	(0.05)	(0.05)	(0.05)	(0.21)	(0.21)	(0.26)	(0.12)	(0.12)	(0.12)
Cont. bribery corruption and fraud	0.54***	0.36***	0.04	-0.33***	-0.33***	-0.28***	0.16***	0.01	0.06
	(0.03)	(0.03)	(0.03)	(0.09)	(0.09)	(0.11)	(0.06)	(0.06)	(0.05)
Cont. product quality	0.52***	0.39***	0.02	-0.27**	-0.21*	-0.45***	0.38***	0.35***	0.07
	(0.05)	(0.04)	(0.04)	(0.11)	(0.11)	(0.13)	(0.07)	(0.07)	(0.07)
Climate change commercial risk	0.62***	0.50***	0.31***	0.25***	0.19***	0.02	0.48***	0.26***	0.07
	(0.02)	(0.02)	(0.03)	(0.07)	(0.06)	(0.10)	(0.05)	(0.05)	(0.05)
Observations	28,398	28,398	28,398	8,547	8,547	8,547	7,507	7,507	7,507
Adjusted R-squared	0.52	0.56	0.82	0.11	0.19	0.63	0.23	0.34	0.80
Size	NO	YES	YES	NO	YES	YES	NO	YES	YES
Country FE	NO	YES	YES	NO	YES	YES	NO	YES	YES
Firm FE	NO	NO	YES	NO	NO	YES	NO	NO	YES

Appendix C Inflated ESG ratings: robustness checks

This appendix provides further evidence that ESG ratings are inflated across multiple specifications and sub-samples to verify robustness. As a first step to uncovering inflated ESG ratings, we compute the Pearson correlation between Refinitiv, MSCI, and FTSE ESG ratings, promised and realized ESG scores, and ESG reporting, policy, activity, target, controversy, and performance sub-scores in Table C1. This preliminary analysis shows that Refinitiv, MSCI, and FTSE ESG ratings are positively correlated to promises of future sustainable performance improvements and negatively related to realized sustainable performance. These findings persist for ESG reporting, policy, activity, target, controversy, and performance sub-scores. These correlations provide a strong indication that ESG ratings are inflated.

In a second step, we verify that our observed ESG rating inflation persists when we use more granular measures of promised and realized sustainable performance. To do so, we replicate our results of Tables 2 and 3 using ESG reporting, policies, activities, targets, controversies, and performance sub-scores. In Table C2, we still observe that ESG ratings positively relate to promises of sustainable performance improvements and negatively relate to realizations. In Table C3, we also confirm that promises of future sustainable performance realizations reduce future sustainable performance.

As a third step, we verify our results across multiple periods, industries, and geographical locations. To perform these analyses, we need to analyze sub-samples of our data and therefore sometimes lose statistical power. In Table C4, we observe that ESG ratings are generally positively related to promises of future sustainable performance and negatively related to subsequent realizations thereof when we analyze sub-samples from 2003 to 2010, 2010 to 2015, and 2015 to 2020.

Subsequently, we show that ESG ratings are inflated across most geographic regions in Table C5. Promised ESG scores remain persistently negatively related across all industries for all ratings using our most stringent specification. For realized ESG scores we observe a negative to insignificant relation in 27 out of 30 specifications. For firms with MSCI ESG ratings in the utility industry and firms with FTSE ESG ratings in the manufacturing and petrochemical industries we observe a positive effect of realized ESG scores on sustainable performance. Promised ESG still overshadows the impact of realized ESG in these specifications.

In Table C6, we analyze ESG rating inflation in North America, Latin America, Western Europe, Eastern Europe, Western Asia, Eastern Asia, the Middle East, Africa, and Oceania. Even though we lose some power in several continents, particularly in Eastern Europe, Africa, and Oceania, we observe a general positive effect of promised ESG scores on Refinitiv, MSCI,

and FTSE ESG ratings and a negative relation for realized ESG scores. Surprisingly, additional promises of sustainable performance in Europe for MSCI ESG ratings seem to reduce ESG ratings. We leave this interpretation for future research.

Table C1: Correlation matrix of ESG ratings and ESG scores

This table provides a correlation matrix of Refinitiv, MSCI and FTSE ESG ratings, and realised and promised ESG scores as well as ESG reporting, policy, target, activity, controversy and performance sub-scores given Equations (1) and (2). All ESG scores, ESG sub-scores, and Refinitiv, MSCI and FTSE ESG ratings are industry specific and scaled from 0 to 10, for which 0 is inferior and 10 is superior. P-values in parentheses. *, ** and *** respectively denote significance at the 10%, 5% and 1% level.

	Refinitiv rating	MSCI rating	FTSE rating	Promised	Realised	Reporting	Policy	Target	Activity	Controversy	Performance
Asset4 rating	1.000										
MSCI rating	0.377***	1.000									
	(0.000)										
FTSE rating	0.585***	0.376***	1.000								
	(0.000)	(0.000)									
Promised	0.465***	0.204***	0.308***	1.000							
	(0.000)	(0.000)	(0.000)								
Realised	-0.091***	-0.035***	-0.026**	-0.138***	1.000						
	(0.000)	(0.004)	(0.032)	(0.000)							
Reporting	0.655***	0.308***	0.477***	0.525***	-0.021*	1.000					
	(0.000)	(0.000)	(0.000)	(0.000)	(0.078)						
Policy	0.557***	0.227***	0.385***	0.842***	-0.128***	0.553***	1.000				
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)					
Target	0.616***	0.302***	0.435***	0.463***	-0.034***	0.580***	0.517***	1.000			
	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)	(0.000)	(0.000)				
Activity	0.559***	0.251***	0.349***	0.802***	-0.123***	0.582***	0.700***	0.518***	1.000		
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)			
Controversy	-0.302***	-0.054***	-0.181***	-0.271***	0.286***	-0.233***	-0.292***	-0.261***	-0.254***	1.000	
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
Performance	-0.067***	-0.029**	0.009	-0.087***	0.848***	-0.012	-0.072***	-0.020	-0.092***	0.054***	1.000
	(0.000)	(0.015)	(0.440)	(0.000)	(0.000)	(0.314)	(0.000)	(0.104)	(0.000)	(0.000)	

Table C2: The impact of promised and realized sustainable performance on Refinitiv, MSCI, and FTSE ESG ratings by part

This table investigates whether ESG ratings capture realized sustainable performance with granular ESG sub-scores. In contrast to Table 2, we here use the ESG sub-scores of controversies and performance for realized ESG and reporting, policies, activities, and targets for promised ESG. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

	Refinitiv			MSCI			FTSE		
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Reporting	0.23***	0.23***	0.16***	0.12***	0.13***	0.07***	0.16***	0.16***	0.09***
	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
Policy	0.12***	0.10***	0.00	0.04**	0.00	-0.05*	0.11***	0.05***	-0.06***
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.03)	(0.01)	(0.01)	(0.01)
Activity	0.08***	0.08***	0.09***	0.05***	0.06***	0.08***	-0.01	0.02*	0.05***
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
Target	0.13***	0.13***	0.07***	0.11***	0.10***	0.06***	0.10***	0.11***	0.03***
	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Controversy	-0.05***	-0.04***	-0.03***	0.03***	0.03***	0.01	-0.02***	-0.01*	-0.01*
	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.00)	(0.00)
Performance	-0.02***	-0.01**	-0.03***	-0.03**	-0.04**	0.02	0.02*	0.02**	-0.04***
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)
Observations	28,398	28,398	28,398	8,547	8,547	8,547	7,507	7,507	7,507
Adjusted R-squared	0.54	0.57	0.79	0.12	0.20	0.63	0.27	0.36	0.79
Size	NO	YES	YES	NO	YES	YES	NO	YES	YES
Country FE	NO	YES	YES	NO	YES	YES	NO	YES	YES
Firm FE	NO	NO	YES	NO	NO	YES	NO	NO	YES

Table C3: The impact of current promised on future realized sustainable performance by part

This table regresses the past 15 years and current ESG reporting, policy, activity, and target sub-scores on current ESG controversy and performance scores. Each regression coefficient represents the parameter estimate of individual regression of current and lagged sub-scores. Adjusted R^2 and number observations represent the average over the 16 regressions in each column. Robust standard errors in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

VARIABLES	Controversy (1)	Performance (2)	VARIABLES	Controversy (3)	Performance (4)	VARIABLES	Controversy (5)	Performance (6)	VARIABLES	Controversy (7)	Performance (8)
$Reporting_{i,t}$	-0.26***	-0.06***	$Policy_{i,t}$	-0.38***	-0.08***	$Activity_{i,t}$	-0.29***	-0.10***	$Target_{i,t}$	-0.23***	-0.04***
	(0.01)	(0.00)		(0.01)	(0.01)		(0.01)	(0.00)		(0.01)	(0.00)
$Reporting_{i,t-1}$	-0.24***	-0.05***	$Policy_{i,t-1}$	-0.34***	-0.07***	$Activity_{i,t-1}$	-0.26***	-0.08***	$Target_{i,t-1}$	-0.21***	-0.04***
	(0.01)	(0.00)		(0.01)	(0.01)		(0.01)	(0.01)		(0.01)	(0.00)
$Reporting_{i,t-2}$	-0.25***	-0.05***	$Policy_{i,t-2}$	-0.32***	-0.06***	$Activity_{i,t-2}$	-0.25***	-0.08***	$Target_{i,t-2}$	-0.20***	-0.04***
	(0.01)	(0.00)		(0.01)	(0.01)		(0.01)	(0.01)		(0.01)	(0.00)
$Reporting_{i,t-3}$	-0.25***	-0.04***	$Policy_{i,t-3}$	-0.33***	-0.06***	$Activity_{i,t-3}$	-0.25***	-0.08***	$Target_{i,t-3}$	-0.21***	-0.03***
	(0.01)	(0.00)		(0.01)	(0.01)		(0.01)	(0.01)		(0.01)	(0.00)
$Reporting_{i,t-4}$	-0.23***	-0.04***	$Policy_{i,t-4}$	-0.32***	-0.05***	$Activity_{i,t-4}$	-0.23***	-0.07***	$Target_{i,t-4}$	-0.21***	-0.03***
	(0.01)	(0.00)		(0.01)	(0.01)		(0.01)	(0.01)		(0.01)	(0.00)
$Reporting_{i,t-5}$	-0.23***	-0.04***	$Policy_{i,t-5}$	-0.31***	-0.05***	$Activity_{i,t-5}$	-0.23***	-0.06***	$Target_{i,t-5}$	-0.21***	-0.02***
	(0.01)	(0.00)		(0.01)	(0.01)		(0.01)	(0.01)		(0.01)	(0.00)
$Reporting_{i,t-6}$	-0.23***	-0.04***	$Policy_{i,t-6}$	-0.31***	-0.04***	$Activity_{i,t-6}$	-0.23***	-0.06***	$Target_{i,t-6}$	-0.20***	-0.02***
	(0.01)	(0.01)		(0.01)	(0.01)		(0.01)	(0.01)		(0.01)	(0.00)
$Reporting_{i,t-7}$	-0.22***	-0.03***	$Policy_{i,t-7}$	-0.29***	-0.03***	$Activity_{i,t-7}$	-0.22***	-0.05***	$Target_{i,t-7}$	-0.19***	-0.02***
	(0.01)	(0.01)		(0.02)	(0.01)		(0.01)	(0.01)		(0.01)	(0.00)
$Reporting_{i,t-1}$	-0.21***	-0.03***	$Policy_{i,t-8}$	-0.28***	-0.02***	$Activity_{i,t-8}$	-0.22***	-0.04***	$Target_{i,t-8}$	-0.20***	-0.01**
	(0.01)	(0.01)		(0.02)	(0.01)		(0.01)	(0.01)		(0.01)	(0.01)
$Reporting_{i,t-9}$	-0.22***	-0.02***	$Policy_{i,t-9}$	-0.26***	-0.01	$Activity_{i,t-9}$	-0.20***	-0.03***	$Target_{i,t-9}$	-0.22***	-0.01
	(0.02)	(0.01)		(0.02)	(0.01)		(0.02)	(0.01)		(0.01)	(0.01)
$Reporting_{i,t-10}$	-0.23***	-0.02***	$Policy_{i,t-10}$	-0.28***	-0.01	$Activity_{i,t-10}$	-0.24***	-0.02***	$Target_{i,t-10}$	-0.24***	-0.00
	(0.02)	(0.01)		(0.02)	(0.01)		(0.02)	(0.01)		(0.02)	(0.01)
$Reporting_{i,t-11}$	-0.22***	-0.03***	$Policy_{i,t-11}$	-0.25***	-0.01	$Activity_{i,t-11}$	-0.25***	-0.03***	$Target_{i,t-11}$	-0.23***	-0.01
	(0.02)	(0.01)		(0.02)	(0.01)		(0.02)	(0.01)		(0.02)	(0.01)
$Reporting_{i,t-12}$	-0.22***	-0.03***	$Policy_{i,t-12}$	-0.25***	-0.01	$Activity_{i,t-12}$	-0.23***	-0.03***	$Target_{i,t-12}$	-0.23***	-0.01
	(0.02)	(0.01)		(0.02)	(0.01)		(0.02)	(0.01)		(0.02)	(0.01)
$Reporting_{i,t-13}$	-0.20***	-0.02*	$Policy_{i,t-13}$	-0.19***	-0.01	$Activity_{i,t-13}$	-0.16***	-0.02*	$Target_{i,t-13}$	-0.23***	-0.01
	(0.03)	(0.01)		(0.03)	(0.01)		(0.03)	(0.01)		(0.03)	(0.01)
$Reporting_{i,t-14}$	-0.21***	-0.00	$Policy_{i,t-14}$	-0.22***	-0.00	$Activity_{i,t-14}$	-0.17***	-0.02	$Target_{i,t-14}$	-0.22***	-0.01
	(0.03)	(0.01)		(0.04)	(0.01)		(0.03)	(0.01)		(0.03)	(0.01)
$Reporting_{i,t-15}$	-0.20***	0.02	$Policy_{i,t-15}$	-0.16***	0.00	$Activity_{i,t-15}$	-0.15***	-0.02	$Target_{i,t-15}$	-0.19***	0.00
	(0.05)	(0.02)		(0.05)	(0.02)		(0.05)	(0.02)		(0.02)	-0.05
Observations	9,398	9,398	Observations	9,398	9,398	Observations	9,398	9,398	Observations	9,398	9,398
R-squared	0.12	0.04	R-squared	0.16	0.03	R-squared	0.12	0.08	R-squared	0.12	0.02
Size	YES	YES	Size	YES	YES	Size	YES	YES	Size	YES	YES
Country FE	YES	YES	Country FE	YES	YES	Country FE	YES	YES	Country FE	YES	YES

Table C4: Inflated ESG ratings across time

This table replicates the most conservative specification in Table 2 for multiple timespans. It regresses the promised and realized ESG scores on Refinitiv, MSCI, and FTSE ESG ratings for the periods 2003 to 2010, 2011 to 2015, and 2016 to 2020. For each rating, the first column represents the first period, the second column the second period, and the third column the last period. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

	Refinitiv			MSCI			FTSE		
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Promised	0.10***	0.14***	0.06***	0.05*	0.05***	0.03	0.01*	0.03***	0.00
	(0.01)	(0.01)	(0.01)	(0.03)	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)
Realised	-0.08***	-0.06***	-0.00	0.06**	0.00	-0.04	-0.01	-0.03***	0.01
	(0.01)	(0.01)	(0.01)	(0.03)	(0.02)	(0.03)	(0.01)	(0.01)	(0.01)
Observations	5,964	28,398	13,444	1,085	8,547	5,236	1,322	7,507	3,982
Adjusted R-squared	0.74	0.73	0.91	0.70	0.61	0.86	0.92	0.77	0.95
Size	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table C5: Inflated ESG ratings across industry

This table replicates the most conservative specification in Table 2 across industries. Columns (1) through (10) respectively represent the mining, construction, generic manufacturing, utilities, retail & wholesale, service, healthcare, ICT, food & beverages, and petrochemical manufacturing industries. Firm clustered standard errors are given in parenthesis. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively. Panels A to C respectively capture ESG ratings of Refinitiv, MSCI, and FTSE as dependent variable.

Panel A: Refinitiv ESG ratings

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Promised	0.20***	0.32***	0.46***	0.34***	0.37***	0.31***	0.24***	0.45***	0.43***	0.36***
	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.03)	(0.02)
Realised	0.03	-0.06**	-0.01	0.02	-0.02	-0.16***	-0.10***	-0.07***	-0.11***	0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.01)	(0.03)	(0.01)	(0.03)	(0.02)
Observations	2,674	1,029	4,186	4,253	3,058	2,270	1,227	4,991	1,238	3,472
Adjusted R-squared	0.81	0.53	0.43	0.41	0.43	0.49	0.42	0.40	0.49	0.50
Size	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Panel B: MSCI ESG ratings

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Promised	0.03	0.08	0.22***	0.22***	0.12***	0.22***	0.07	0.38***	0.34***	0.17***
	(0.08)	(0.06)	(0.06)	(0.03)	(0.04)	(0.05)	(0.07)	(0.04)	(0.06)	(0.05)
Realised	-0.09	-0.26***	0.12*	0.15***	0.02	-0.07**	-0.05	-0.05	0.04	0.04
	(0.09)	(0.07)	(0.06)	(0.04)	(0.04)	(0.04)	(0.07)	(0.04)	(0.06)	(0.05)
Observations	467	275	681	1,305	1,125	753	556	1,793	452	1,140
Adjusted R-squared	0.59	0.42	0.18	0.21	0.18	0.26	0.14	0.19	0.26	0.22
Size	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Panel C: FTSE ESG ratings

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Promised	0.09**	0.22***	0.20***	0.19***	0.31***	0.14***	0.17***	0.36***	0.20***	0.25***
	(0.05)	(0.06)	(0.04)	(0.03)	(0.04)	(0.04)	(0.05)	(0.03)	(0.04)	(0.03)
Realised	-0.02	-0.11	0.15***	0.06*	0.02	-0.10***	-0.09*	-0.01	0.03	0.11**
	(0.04)	(0.07)	(0.04)	(0.03)	(0.03)	(0.03)	(0.05)	(0.03)	(0.04)	(0.04)
Observations	403	202	709	1,217	1,012	465	518	1,497	425	1,059
Adjusted R-squared	0.79	0.41	0.33	0.26	0.33	0.25	0.26	0.29	0.50	0.32
Size	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table C6: Inflated ESG ratings across regions

This table replicates the most conservative specification in Table 2 across regions. Columns (1) through (9) respectively represent firms in North America, Latin America, Western Europe, Eastern Europe, Western Asia, Eastern Asia, the Middle East, Africa, and Oceania. Firm clustered standard errors are given in parenthesis. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively. Panels A to C respectively capture ESG ratings of Refinitiv, MSCI, and FTSE as dependent variable.

Panel A: Refinitiv ESG ratings

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Promised	0.11***	0.19***	0.13***	0.17***	0.03	0.16***	0.16***	0.05	0.22***
	(0.01)	(0.04)	(0.01)	(0.05)	(0.03)	(0.01)	(0.06)	(0.04)	(0.02)
Realised	-0.06***	0.00	-0.08***	-0.07	0.07**	-0.08***	0.12*	-0.02	-0.00
	(0.02)	(0.04)	(0.01)	(0.05)	(0.03)	(0.01)	(0.06)	(0.04)	(0.02)
Observations	7,721	620	7,505	349	725	7,378	244	604	2,245
R-squared	0.81	0.84	0.72	0.76	0.85	0.78	0.86	0.78	0.82
Size	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

Panel B: MSCI ESG ratings

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Promised	0.02	0.32**	0.17	-0.91**	-0.21***	0.12***	-0.46	-0.10	0.06
	(0.02)	(0.13)	(0.11)	(0.32)	(0.06)	(0.04)	(0.00)	(0.12)	(0.07)
Realised	0.04	0.11	-0.06	0.10	0.01	-0.05	-1.34	-0.17*	-0.00
	(0.03)	(0.13)	(0.10)	(0.34)	(0.07)	(0.05)	(0.00)	(0.09)	(0.07)
Observations	4,142	195	897	48	239	1,909	43	226	662
R-squared	0.74	0.81	0.84	0.97	0.83	0.80	1.00	0.67	0.71
Size	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

Panel C: FTSE ESG ratings

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Promised	0.03***	0.02	0.08*	-0.34	0.08*	0.02	-0.07	-0.13**	0.03
	(0.01)	(0.08)	(0.05)	(0.51)	(0.04)	(0.02)	(0.00)	(0.06)	(0.03)
Realised	-0.01	0.03	-0.01	0.03	0.04	-0.11***	-0.07	-0.17***	-0.01
	(0.01)	(0.05)	(0.05)	(0.23)	(0.04)	(0.03)	(0.00)	(0.04)	(0.03)
Observations	3,536	186	696	53	274	1,797	40	225	612
R-squared	0.86	0.74	0.83	0.95	0.85	0.82	1.00	0.87	0.81
Size	YES	YES	YES	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

Appendix D Cost of capital computation

In this appendix, we provide further details on our cost of capital computation. We also analyze the impact of Gebhardt et al. (2001), Hou et al. (2012), Chattopadhyay et al. (2021), and Fama and French (2015, 2017) cost of equity and interest expense and bond yield cost of debt estimates on ESG ratings.

The Gebhardt et al. (2001) model is an implied cost of capital model. Implied cost of capital models generally discount the residual income of firms to create an implied cost of capital measure given current stock prices. The scope of implied cost of capital models is often limited by the coverage of I/B/E/S data that is used to predict future earnings. To replicate the model of Gebhardt et al. (2001), we also collect I/B/E/S one and two years ahead earnings per share (EPS) estimates in addition to stock price information from CRSP, the book value of equity, earnings, dividend, and long-term debt from Compustat US. Since our sample is international and Gebhardt et al. (2001) focuses solely on US firms, we append accounting and stock price information from Compustat Global to our dataset. We estimate the Gebhardt et al. (2001) model using the following formula:

$$P_t = B_t + \frac{FROE_{t+1} - r_e}{(1+r_e)} B_t + \frac{FROE_{t+2} - r_e}{(1+r_e)^2} B_{t+1} + \sum_{i=3}^{11} \frac{FROE_{t+i} - r_e}{(1+r_e)^i} B_{t+i-1} + \frac{FROE_{t+12} - r_e}{r_e(1+r_e)^{11}} B_{t+11} \tag{5}$$

In Equation 5, P_t represents the price of an individual stock of a specific firm extracted from CRSP and Compustat Global. B_t denotes the book value per share from the most recent financial statement divided by the number of shares extracted from I/B/E/S in June. Where information is missing, we use the book value per share in IBES, or information on the number of shares in CRSP, Compustat US, or Compustat Global.

Gebhardt et al. (2001) define $FROE_t + i$ as the forecasted return on assets in period $t+1$. For the first three years, this is estimated using $\frac{FEPS_{t+i}}{B_{t+i-1}}$, for which $FEPS_{t+i}$ represents the mean I/B/E/S EPS forecasted t+i years in advance and B_{t+i-1} the book value per share in year $t-i-1$. For years 4 to 11, the FROE is linearly interpolated from its value in year three to the industry-specific ROE mean estimated using book values on our complete Compustat US and Compustat Global sample. These industry means are corrected for taxes and estimated using a five-year rolling window on profitable firms.

The parameter B_{t+i} equates $B_{t+i-1} + FEPS_{t+i} * (1-k)$, with k denoting the dividend payout ratio. In other words, the current book value of equity per share is the sum of the previous period's book value per share and the current period's earnings minus dividends. k is computed

using the forecasted dividend per share in I/B/E/S where data is available and otherwise distilled from dividend data in CRSP, Compustat US, Compustat Global, or by setting the dividend payout rate to 6% of total assets when earnings are negative in respective order.

We execute this model in an iterative manner for which we first estimate the three years of B_{t+1}, B_{t+2}, $FROE_{t+1}$, $FROE_{t+2}$, and $FROE_{t+3}$ using the given data. Subsequently, we compute B_{t+3} by interpolating the data provided in $FROE_{t+3}$ and the industry mean, which we in turn need to compute $FROE_{t+4}$. This process continues until we reach B_{t+11} and $FROE_{t+12}$.

Once we have all required parameters, we compute the Gebhardt et al. (2001) cost of equity estimate, r_e, by plotting interest rates from 1 basis point to 15000 basis points iteratively. For each firm and cost of equity, we compute the difference in estimated stock price and realized stock price. We observe global optima for 95% of our firm-year observations before our 15% cost of equity boundary.

As the second cost of equity estimate, we replicate the fitted implied cost of capital model of Hou et al. (2012). The Hou et al. (2012) cost of equity estimates repurposes the initial cost of equity models by adjusting the earnings estimates with accounting information to expand the sample beyond an I/B/E/S universe of firms. We follow Lee et al. (2021) and append the Gebhardt et al. (2001) model with augmented earnings estimates. To compute these earnings, we collect income before extraordinary items, total assets, shareholders equity, dividend, and cash flow from operations information from Compustat US and Compustat Global. Furthermore, we collect consensus analyst forecasts and actual earnings from the I/B/E/S summary file. We employ this data in the following regression equation:

$$E_{i,t+\tau} = \alpha_0 + \alpha_1 A_{i,t} + \alpha_2 D_{i,t} + \alpha_3 DD_{i,t} + \alpha_4 E_{i,t} + \alpha_5 NegE_{i,t} + \alpha_6 AC_{i,t} + \varepsilon_{i,t+\tau} \tag{6}$$

In Equation 5, $E_{i,t+\tau}$ denotes the I/B/E/S earnings of firm i at time t τ years ahead. $A_{i,t}$ denotes total assets, $D_{i,t}$ total dividend, $DD_{i,t}$ a dividend dummy, $NegE_{i,t}6$ a negative earnings dummy, and $AC_{i,t}$ accruals. This model is estimated using a pooled cross-sectional regression using a rolling window of up to ten years. Each α coefficient is saved and used to compute the fitted earnings up to three years in the future using firm-level accounting information. Subsequently, we use this adjusted earnings measure in the Gebhardt et al. (2001) model to compute the Hou et al. (2012) cost of equity.

We use Chattopadhyay et al. (2021) to compute our third cost of equity estimate. Chattopadhyay et al. (2021) solely uses stock price and accounting information to estimate the cost of equity. This cost of equity measure is applicable for our international sample as it does not

rely on I/B/E/S data and can therefore be calculated for a larger universe of international firms. To compute the Chattopadhyay et al. (2021) model, we collect daily and monthly market capitalization and total return index information from CRSP and Compustat Global, book value of equity, return on equity, and country of denomination from Compustat US and Compustat Global. As with all our cost of equity estimates, returns and book values are transmuted to USD. We use this information in the following regression model:

$$R_{i,t+1} = \beta_{i,1} + \beta_{i,2} bm_{i,t} + \beta_{i,3} roe_{i,t} + \beta_{i,4} var_{i,t} + \sum_{j=1}^{12} \alpha_{i,j} r_{i,t-j+1} + \zeta_{i,t+1} \tag{7}$$

In Equation 7, $R_{i,t+1}$ represents the one-month-ahead realized returns, $bm_{i,t}$ the book to market ratio, $roe_{i,t}$ return on equity, $var_{i,t}$ the firm specific squared daily log returns in month t, and $r_{i,t-j+1}$ the j month lagged realized total returns. This regression model is estimated for each country specific using a 10 year rolling window where available. The coefficients are saved to compute fitted cost of equity values by multiplying the country-specific coefficients with the firm-level data.

We use Fama and French (2015, 2017) international 5-factor model for our final cost of equity estimate. We collect US, European, Asian-Pacific, Developing, and North American monthly 5-factor returns in USD from Kenneth French's data warehouse.[14] With these factor returns and CRSP and Compustat Global stock returns in USD, we estimate the 5-factor model using three-year rolling window monthly regressions at the firm level to compute the factor loadings on five-year equally weighted smoothed factor returns. This smoothing on factor returns is recommended by Lee et al. (2021) to reduce variance in cost of equity estimates. To calculate the expected cost of equity, we compute the fitted expected returns from the 5-factor model excluding alpha. We multiply the 5% and 95% winsorized firm-level factor loadings by smoothed 5-year factor returns. Because we focus on the factor loadings of firms and omit the alpha, this measure provides a backward-looking cost of equity estimate, not an indication of outperformance.

We trim each cost of equity and cost of debt measure at the 1% and 99% levels to remove outliers from the data. After this cleaning, we compute cost of equity information for 29,352, 25,117, 24,286, 24,408, and 26,822, firm-year observations for our average, Gebhardt et al. (2001), Hou et al. (2012), Chattopadhyay et al. (2021), and Fama and French (2015, 2017) estimates. We have 27,906, 27,335, and 9,001 observations for the average cost of debt, interest expense over total debt, and bond yields. We can compute our weighted average cost of capital for 27,307 observations.

[14] `https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html`.

In Table D1, we display the average cost of equities and costs of debt across each year in our sample. As anticipated, cost of equity is on average higher than cost of debt, with an average weighted average cost of capital, cost of equity, and cost of debt of 3.57%, 4.27%, and 2.87%. Furthermore, cost of equity estimates are significantly more volatile than cost of debt estimates. We find that (fitted) cost of capital models are more stable over time than accounting-based and factor-based models. This is in line with Lee et al. (2021).

In Table D2, we verify our main results of Table 4. We here regress the individual cost of equity and debt estimates on the average Refinitiv, MSCI, and FTSE ESG ratings of firms. We employ our most strict specification with credit rating controls and firm fixed effects and find for all estimates, except Hou et al. (2012), a negative and significant effect of ESG rating improvements on cost of equity and debt. This effect is reminiscent in economic magnitude of our results in Table 4 with the exception of the larger economic magnitude when using Chattopadhyay et al. (2021) cost of equity estimates. Given the above, we argue that our choice of cost of equity and cost of debt estimates does not influence our main findings regarding cost of capital and inflated ESG ratings.

Table D1: Cost of capital summary statistics by year

This table provides the mean of Gebhardt et al. (2001), Hou et al. (2012), Chattopadhyay et al. (2021), Fama and French (2015, 2017) cost of equity estimates, interest expense and bond yield spread debt estimates, and aggregate measure based on these estimates.

Year	Wacc	Cost of Equity	Gebhardt et al. (2001)	Hou et al. (2012)	Chattopadhyay et al. (2021)	Fama and French (2015)	Cost of Debt	Interest Expense	Yield Spread
2003	4.35	5.95	4.84	4.49	6.76	7.32	3.22	2.26	3.69
2004	4.08	4.79	2.53	4.24	5.33	7.06	3.28	2.30	3.30
2005	3.48	4.41	2.50	4.19	4.57	6.46	2.66	1.89	3.19
2006	3.89	5.64	3.44	4.27	4.98	10.43	2.41	1.89	2.47
2007	4.19	6.66	2.73	4.14	4.90	14.07	2.49	1.92	2.36
2008	3.64	4.65	3.59	4.25	-1.01	9.20	2.98	2.05	3.85
2009	3.28	2.82	4.53	4.44	2.96	0.19	3.23	1.96	4.77
2010	2.93	2.26	3.28	4.42	0.49	1.36	3.16	1.95	4.07
2011	2.86	2.19	3.08	4.40	1.17	0.45	3.09	1.96	3.77
2012	2.79	2.04	2.82	4.81	3.92	-3.11	3.02	2.00	3.52
2013	3.18	3.10	2.94	4.49	1.93	2.91	2.97	1.97	3.25
2014	3.89	4.86	3.37	4.48	2.37	8.64	2.84	1.91	2.94
2015	3.75	4.48	3.87	5.06	3.29	5.24	2.91	1.95	2.82
2016	3.31	3.86	3.63	4.82	2.70	4.10	2.68	1.84	2.43
2017	3.90	5.43	3.66	5.07	2.27	9.03	2.66	1.94	2.15
2018	3.47	4.29	3.10	4.94	1.16	6.74	2.71	2.03	2.09
2019	3.08	3.48	3.26	4.90	1.94	3.55	2.66	2.10	1.81
2020	4.16	6.00	3.66	5.15	7.25	6.14	2.66	2.03	1.88
Average	3.57	4.27	3.38	4.59	3.17	5.54	2.87	2.00	3.02

Table D2: Cost of capital and ESG ratings robustness

This model shows the impact of ESG rating inflation on cost of capital for individual cost of equity and cost of debt estimates as a robustness analysis. Firm clustered standard errors are given in parentheses. *, ** and *** denote significance at the 10%, 5% and 1% level, respectively.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Average ESG rating	-0.054*	-0.005	-0.539***	-0.069***	-0.047***	-0.102**
	(0.030)	(0.028)	(0.130)	(0.019)	(0.014)	(0.043)
Observations	5,513	5,420	5,306	5,922	6,023	3,210
Adjusted R-squared	0.696	0.763	0.457	0.266	0.752	0.573
Size	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES
Credit Rating	YES	YES	YES	YES	YES	YES

Appendix E Alternative portfolio screens

This appendix verifies our initial ESG screening procedures at the 5% and 25% levels. It is customary to use an industry-specific 10% ESG screening thresholds in SRI literature (Dyck et al., 2019). However, select papers use multiple screening thresholds at 5% and 25% to verify their results. To comply with these industry norms, we perform two robustness analyses and replicate the results in Table 7 for 5% and 25% thresholds in Table E1 We expect that 25% screening has worse sustainable performance than 5% screening for negative, positive, and integrative screening as more firms are excluded or overweighed. We anticipate worse sustainable performance for best-in-class screening for 5% screening because only the firms with the highest 5% ESG ratings are selected.

In Table E1, we observe a more substantial effect for 5% screening than for the 10% and especially the 25% screening for positive and negative screening. For integrative and best-in-class screening, we observe more robust results for 5% screening. These results mainly align with our predictions (except for integrative screening). Therefore, we verify that the impact of inflated ESG ratings on ESG-rating-based SRI screening persists for 5% and 25% screening. Moreover, we also show that increasingly strict screening procedures attain lower sustainable performance for 5%, 10%, and 25% thresholds within screening procedure.

Table E1: Sustainable performance alternative ESG-rating-based SRI screens

This table analyses the sustainable performance of ESG-rating-based SRI screens similar to 7. As a robustness analysis, we now consider 5% and 25% screening thresholds. *, ** and *** denote significance at the 10%, 5% and 1% level.

Panel A: Sustainable performance

	Negative 5%		Negative 25%		Positive 5%		Positive 25%		Integrative 5%		Integrative 25%		BIC 5%		BIC 25%	
VARIABLES	Diff	t	Diff	t	Diff	t	Diff	t	Diff	t	Diff	t	Diff	t	Diff	t
Average ESG rating	2.41	3.43	14.70	19.16	0.39	0.56	5.40	7.45	23.20	29.07	6.09	8.75	70.11	63.36	48.58	51.33
Promised ESG rank	1.78	4.52	8.04	18.29	0.14	0.36	2.61	6.79	10.93	23.12	3.19	7.83	26.16	44.56	19.48	33.18
Realised ESG rank	0.24	0.37	-1.34	-2.13	0.66	1.00	0.04	0.07	-1.78	-2.81	-0.09	-0.14	-5.06	-7.58	-3.08	-4.50
CO2 emmissions / assets	-0.56	-0.03	8.37	0.44	-2.98	-0.16	0.60	0.03	4.05	0.22	-2.66	-0.15	-37.45	-2.42	-7.35	-0.44
Nox emissions / assets	-5.12	-0.26	13.17	0.61	-7.77	-0.41	-0.13	-0.01	45.74	1.76	-5.64	-0.29	-18.46	-0.88	136.45	3.55
VOC or PM emissions / assets	2.86	1.54	25.00	13.08	0.71	0.39	9.29	4.99	40.00	18.97	9.29	4.95	125.00	31.75	85.00	27.01
Strikes	-8.60	-2.32	10.39	2.55	-11.11	-3.05	-3.23	-0.85	34.77	7.89	4.30	1.12	234.41	24.27	107.53	18.93
Accidents / assets	-6.44	-0.28	12.52	0.50	0.72	0.03	9.30	0.37	9.84	0.40	-1.25	-0.05	106.44	2.12	6.80	0.26
Fatalities / assets	2.72	0.09	24.87	0.74	-0.10	0.00	9.77	0.32	12.79	0.43	1.71	0.06	-6.14	-0.27	-18.83	-0.87
Environmental controversies	-9.66	-0.91	8.86	0.76	-11.48	-1.10	-3.64	-0.33	35.23	2.69	15.91	1.33	485.23	10.90	114.77	6.39
Wages/working condition cont.	-9.24	-1.42	7.98	1.13	-11.76	-1.84	-4.62	-0.70	29.83	3.76	2.52	0.37	223.11	12.46	94.96	8.69
Employ health safety cont.	-5.65	-1.11	11.29	2.00	-8.06	-1.60	-1.21	-0.23	30.65	4.99	6.05	1.12	222.58	14.94	89.11	11.03
Bribery, corruption and fraud cont.	-5.95	-3.68	11.79	6.52	-8.21	-5.10	-0.72	-0.43	32.31	17.71	6.67	3.98	225.13	46.00	92.82	32.35
Intellectual property cont.	8.63	0.90	22.10	2.25	7.28	0.76	12.94	1.33	40.97	3.93	22.37	2.22	247.71	12.72	95.69	7.69
Anticompetition controversies	-2.82	-1.24	15.92	6.17	-5.14	-2.29	2.65	1.12	38.31	14.39	12.60	4.96	273.13	38.64	105.64	31.38
Business ethics controversies	-7.76	-2.77	10.06	3.33	-10.06	-3.64	-2.94	-1.03	31.24	8.50	5.03	1.67	243.82	21.60	96.23	14.98
Consumer complaints controversies	2.00	0.44	21.00	4.18	-1.00	-0.22	6.50	1.40	50.00	8.50	19.50	4.08	344.00	18.42	137.50	14.76
Product quality controversies	5.28	1.67	27.75	8.08	2.52	0.81	11.93	3.71	52.75	13.71	19.72	6.09	260.09	27.29	127.06	22.60
Responsible marketing controversies	7.43	1.30	31.76	5.03	4.73	0.84	14.86	2.53	69.59	9.46	30.41	4.85	414.86	16.60	181.76	16.04