ESG and Aggregate Disagreement

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Abstract

This paper investigates the role of aggregate disagreement in the relationship between environmental, social, and governance (*ESG*) scores and future stock returns in the United States (US), European Union (EU), and United Kingdom (UK). We find that firms with high *ESG* scores are likely to have higher exposure to aggregate disagreement than firms with low *ESG* scores because of the divergence of opinions about long-term earnings growth. Consistent with our conjecture, the results suggest that when aggregate disagreement is high, a profitable trading strategy is to long firms with low *ESG* scores and to short those with higher *ESG* scores. Our results have clear implications for the growing debate over *ESG* investment strategies.

JEL classification: G12; G14; G30

Keywords: ESG; Stock returns; Aggregate disagreement

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1 Introduction

The environmental, social, and governance (ESG) literature indicates that stocks with low *ESG* scores earn higher expected returns than stocks with high *ESG* scores (Hong and Kacperczyk, 2009; Bolton and Kacperczyk, 2021; Pedersen et al., 2021). An emerging debate in the literature (Heinkel et al., 2001; Luo and Balvers, 2017; Zerbib, 2020; Pedersen et al., 2021) extends Merton (1987) seminal work to interpret the *ESG* premium. Chava (2014) and Chen et al. (2020), among others, find that both institutional and individual investors are more willing to hold firms with high *ESG* scores than those with low *ESG* scores. This result suggests that stocks with low *ESG* scores could be similar to "neglected stocks" under Merton (1987) framework; hence, low *ESG* stocks yield higher expected returns than high *ESG* stocks.

On the other hand, prior studies (Yu, 2011; Hong and Sraer, 2016) highlight the importance of aggregate disagreement in analysts' forecasts on asset pricing. Disagreements on market earnings exhibit time-varying properties (Kandel and Pearson, 1995; Hong et al., 2000; Lamont, 2002). Investors may have difficulty processing firms' *ESG* information, which leads to mispricing of firms' stock performance (Fombrun et al., 2000; Surroca et al., 2010; Luo et al., 2015). However, analysts are better informed when processing and understanding firms' *ESG* information (Ivković and Jegadeesh, 2004; Luo et al., 2015). Thus, their forecasts can mediate the effects of *ESG* on stock returns. In this paper, we examine whether aggregate disagreement helps explain the relationship between *ESG* and stock returns.

Using stock price data on US, EU, and UK stocks from 2003 to 2020, we find that when aggregate disagreement on the long-term growth of earnings per share (EPS) is high, stocks with high *ESG* scores are likely to be overpriced compared to those with low *ESG* scores. Additionally, the opinions on long-term growth perceptions diverge more for stocks with high *ESG* scores than for those with low *ESG* scores. This is mainly due to the high uncertainty in growth opportunities for firms with high *ESG* scores.

Specifically, when aggregate disagreement is high, firms with low *ESG* scores significantly outperform those with high *ESG* scores by 0.537%, 0.705%, and 0.997% per month for value-weighted returns of the Standard and Poor's (S&P) 500, STOXX Europe 600, and Financial Times Stock Exchange (FTSE) All-Shares indices, respectively. Our results also show that the *ESG* premium is unexplained by the momentum-extended Fama and French (1993) three-factor model (FF3FM) (Carhart, 1997) and Fama and French (2015) five-factor model (FF5FM). Conversely, the variation in returns between firms in the low and high *ESG* quintiles is insignificant when aggregate disagreement is low. Our results are largely consistent for each of the three pillars of *ESG*: Environment (*Env*), Social (*Soc*), and Governance (*Gov*).

Moreover, following Brennan et al. (1998), we run the Fama and MacBeth (1973) regression using risk-adjusted returns to simultaneously control for *ESG* and firm characteristics such as size, book-to-market, and momentum. The results show that *ESG* scores are significantly associated with stock returns when aggregate disagreement is high but become insignificant when aggregate disagreement is low.

The economic rationale for our empirical prediction is that assets are likely to be overpriced in the presence of divergent opinions and high short-selling costs (Miller, 1977). Institutional investors tend to hold stocks with high *ESG* scores (Chava, 2014; Chen et al., 2020). However, retail mutual funds are constrained by short-selling costs (Koski and Pontiff, 1999; Almazan et al., 2004). Therefore, when disagreement is high, stocks with high *ESG* scores are more likely to be overpriced. Arbitrageurs are unlikely to rectify such mispricing because of their constraints on engaging in short-selling (Hong and Sraer, 2016).

Our study makes several contributions to existing literature. First, we contribute to the debate on the role of aggregate disagreement in asset pricing (Yu, 2011; Hong and Sraer, 2016; Atmaz and Basak, 2018). We provide a novel interpretation of the *ESG* premium based on recent studies by Hong and Kacperczyk (2009), Edmans (2011), Nagy et al. (2016), and Pedersen et al. (2021). Specifically, the literature shows that portfolios formed by *ESG* scores can earn abnormal returns because of investor preferences (Hong and Kacperczyk, 2009; Fama, 2021; Pástor et al., 2021; Pedersen et al., 2021). Our findings suggest that *ESG* premiums can be attributed to aggregate disagreements among financial analysts. Furthermore, while Bansal et al. (2022) show that socially responsible investment (SRI) returns vary under good and bad market conditions, we investigate the time-varying *ESG* premiums during low and high levels of aggregate disagreement. Second, while prior studies show that *ESG* is related to firms' market value in Europe and the UK (Humphrey et al., 2012; Qiu et al., 2016; Li et al., 2018; Haque and Ntim, 2020; Luo, 2022), we delve deeper to explore how aggregate disagreement contributes to the relationship between *ESG* and stock returns in the US, Europe, and the UK. Finally, our work relates to prior studies on the importance of analyst forecasts for *ESG* performance (Dhaliwal et al., 2012; Bernardi and Stark, 2018; Muslu et al., 2019; Schiemann and Tietmeyer, 2022).

The remainder of the paper is organized as follows. Section 2 presents empirical predictions of the relationship between *ESG* and stock returns. Section 3 describes the data and sample. Section 4 presents the empirical results, and Section 5 concludes the paper.

2 Empirical prediction

Recent studies extend Merton (1987) work to explain the association between *ESG* and stock returns. Under Merton's framework, certain securities may be unknown to investors because of incomplete information. Due to the shadow costs of incomplete information, the expected returns of stocks thinly held by investors are higher than those of stocks frequently held by investors. However, the relationship between investors' holdings and *ESG* scores remains ambiguous. On the one hand, investors are more willing to hold firms with high *ESG* scores than those with low *ESG* scores. For example, institutional investors may have mandates to hold firms with high *ESG* scores (Chava, 2014) and aim to incorporate *ESG* into their investment strategies (Chen et al., 2020). Individual investors, particularly younger generations, are generally reluctant to invest in sin stocks and those that pollute the environment (Chen et al., 2020). Hong and Kacperczyk (2009), Dyck et al. (2019), and Nofsinger et al. (2019) find that institutional investors are less likely to hold firms with low environmental and social scores. By contrast, Gillan et al. (2010) and Borghesi et al. (2014) find a negative relationship between institutional ownership and *ESG* scores. Fernando et al. (2017) show that the relationship between institutional ownership and *ESG* scores is non-linear. Firms with high and low environmental scores have lower institutional ownership than those with median environmental scores.

Some institutional investors (e.g., retail mutual funds) are subject to short-sales constraints (Koski and Pontiff, 1999; Almazan et al., 2004). Indeed, prior studies report that institutional investor ownership is associated with the cost of short selling (Asquith et al., 2005; Daniel et al., 2022). When investors have different opinions and incur high costs from short selling, assets are likely to be overpriced (Miller, 1977). Owing to the constraints on institutional investors' short selling and their holdings of *ESG* stocks, we conjecture that stocks with high *ESG* scores are more likely to be overpriced when aggregate disagreement is high. In the presence of high short-selling costs, asset prices are predominantly influenced by the beliefs of optimistic investors, while arbitrageurs have difficulty rectifying mispricing because of their limited ability to engage in short selling (Hong and Sraer, 2016).

While classic asset pricing models, such as the capital asset pricing model (CAPM) of Sharpe (1964) and Lintner (1965), assume complete agreement, disagreement in financial analysts' forecasting plays an important role in asset pricing (Diether et al., 2002; Fama and French, 2007; Yu, 2011; Carlin et al., 2014; Hong and Sraer, 2016; Atmaz and Basak, 2018). Specifically, in the spirit of Hong and Sraer (2016), where aggregate disagreement about the characteristics of firms' earnings is high, stocks with high *ESG* scores are more likely to be overpriced than stocks with low *ESG* scores. If investors disagree about earnings factors, the predicted earnings of stocks with high *ESG* scores are likely to deviate more from those with low *ESG* scores. We posit that stocks with high *ESG* scores are primarily held by optimistic investors, whereas short-selling constraints, such as those imposed by certain institutional investors, tend to sideline pessimistic investors within the market equilibrium.

Divergent opinions can lead to the overpricing of stocks with high *ESG* scores (Miller, 1977; Chen et al., 2002; Hong and Sraer, 2016). For example, institutional investors' commitment to *ESG* investments could discourage short-selling of stocks with high *ESG* scores. When aggregate disagreement is low, investors are more likely to take long positions because short-selling constraints are not restrictive (Hong and Sraer, 2016). Thus, we predict that the relationship between *ESG* scores and returns becomes insignificant when aggregate disagreement is low.

Disagreements can be estimated using the standard deviation of analysts' forecasts of long-term growth of EPS (Diether et al., 2002; Moeller et al., 2007; Yu, 2011; Hong and Sraer, 2016). Stock analysts with expertise in sophisticated industries can hold private information, making them more capable of processing firms' *ESG* information because they can be opaque and mispriced by public investors (Fombrun et al., 2000; Ivković and Jegadeesh, 2004; Surroca et al., 2010; Luo et al., 2015). Thus, analysts can serve as informational intermediaries between a firm's stocks and *ESG* performance. When divergence among analysts' opinions is high, the mispricing effect of *ESG* information on stock returns tends to be more pronounced.

Goh and Ederington (1993) also provide evidence of the influence of analysts' forecasts on the relationship between bond ratings and asset pricing. Financial analysts may possess private information about a firm's operations, expansion strategies, and financing plans. Moreover, divergent opinions tend to influence market expectations (Fried and Givoly, 1982). This finding contributes to the essential role of forecasts in explaining the relationship between bond ratings and returns. Similarly, financial analysts' forecasts may influence the relationship between *ESG* ratings and returns. Based on the above discussion, we formulate the following hypothesis:

H1: *The ESG premium is more pronounced when aggregate disagreement is high.*

3 Data and sample

We collect data on the stock returns of the S&P 500, STOXX Europe 600, and FTSE All-Share indexes from Refinitiv Eikon. Each has a large market capitalization and comprehensive coverage of *ESG* ratings. Moreover, policymakers in these countries emphasized the importance of *ESG* regulations. For instance, following the Securities and Exchange Commission (SEC) guidance regarding disclosure related to climate change on *ESG* in 2010, 86% of S&P 500 firms released sustainability reports in 2018, according to the Governance & Accountability Institute.[1] In the same year, the EU established a sustainable finance action plan to inform global sustainability policies. A key strategy in this plan is to improve transparency and disclosure in *ESG* investing. Furthermore, UK regulators place significant emphasis on the importance of *ESG* disclosure.

We obtain the *ESG* combined score and its three pillars, Environment (*Env*), Social (*Soc*), and Governance (*Gov*), from Refinitiv Eikon (available from 2002). Refinitiv defines the *ESG* combined score as a holistic assessment of a company's *ESG* performance, including data from the Environment (*Env*), Social (*Soc*), and Governance (*Gov*) pillars. This score is further influenced by the *ESG* controversy score derived from media coverage.[2] Our sample period is from July 2003 to December 2020 based on the availability of Refinitiv Eikon *ESG* data, which has a more extensive coverage since 2002. We construct portfolios based on *ESG* scores from the previous year such that *ESG* information is available during portfolio formation, in the spirit of Fama and French (1993, 2015). A company's ESG combined score shows a decline in the presence of adverse media reports.[3] We collect data on monthly EU and UK excess market return, size, book-to-market, and momentum factors (Asness et al., 2013) from the AQR website.[4] We also obtain the monthly US excess market return, size, book-to-market, and momentum factors, along with the Treasury bill rate from Kenneth French's website.[5]

[1]https://www.ga-institute.com/storage/press-releases/article/flash-report-86-of-sp-500-indexR-companies-publish-sustainability-responsibility-reports-in-20.html

[2]Recent studies (Bang et al., 2023) indicate the important role of ESG controversy in asset pricing.

[3]See https://www.refinitiv.com/en/sustainable-finance/esg-scores

[4]See https://www.aqr.com/Insights/Datasets

[5]See http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/.

Following Diether et al. (2002), Moeller et al. (2007), Yu (2011), and Hong and Sraer (2016), we measure disagreement as the standard deviation of analysts' forecasts of long-term growth in EPS from the Institutional Brokers' Estimate System (I/B/E/S) database. The aggregate disagreement measure is defined as the average of the individual stock disagreements for all stocks in our sample, weighted by their respective market capitalizations. We identify periods of high (low) aggregate disagreement as those above (below) the median aggregate disagreement.

Table 1 reports the descriptive statistics of *ESG*, *Env*, *Soc*, *Gov*, *MV*, and *B/M* for the S&P 500, STOXX Europe 600, and FTSE All-Shares indices in Panels A, B, and C, respectively. Table 1 shows that stocks in the STOXX Europe 600 index have higher *ESG* ratings than those in the S&P 500 and FTSE All-Shares indices. The combined *ESG* score has an average of 51.27, 57.93, and 49.79 for the S&P 500, STOXX Europe 600, and FTSE All-Shares indices, respectively.

[Table 1 about here]

4 Empirical results

4.1 Results on portfolio sorts

We sort stocks based on their *ESG* combined scores for each of their three pillar scores. We then form portfolios and maintain them over the subsequent twelve months. Following Liu and Strong (2008), we use the decomposed buy-and-hold method to compute monthly portfolio returns during the holding period:[6]

$$R_{p,\tau} = \sum_{i=1}^{N} \frac{w_i \prod_{t=1}^{\tau-1}(1 + R_{i,t})}{\sum_{j=1}^{N} w_j \prod_{t=1}^{\tau-1}(1 + R_{j,t})} R_{i,\tau}, \quad \tau = 2, \ldots, 12; \quad R_{p,1} = \sum_{i=1}^{N} w_i R_{i,1}, \tag{1}$$

[6] Portfolio weight rebalancing is not required in the decomposed buy-and-hold method in Eq. (1).

where $R_{p,\tau}$ is the return of the portfolio in month τ during the holding period, $R_{i,t}$ is stock i's return in month τ, N is the number of stocks in the portfolio, and w_i is stock i's portfolio.

We also evaluate portfolio performance using Carhart (1997) momentum-extended FF3FM. Specifically, we run the following time-series regression:

$$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}, \quad (2)$$

where $R_{i,t}$ represents portfolio i's monthly returns, $R_{f,t}$ represents the risk-free rate, $f_{MKT,t}$ represents the monthly market factor, and $f_{SMB,t}$, $f_{HML,t}$, and $f_{WML,t}$ represent the monthly Fama and French size, value, and momentum factors, respectively.

Panels A and B of Table 2 report the results for the value-weighted portfolios formed by S&P 500 stocks when aggregate disagreement is low and high, respectively. The results show that when aggregate disagreement is low (Panel A), stocks in the low- and high-*ESG* quintiles earn average excess returns (before risk adjustment) of 1.304% and 1.129% per month, respectively. The difference between the low- and high-*ESG* quintiles is insignificant, at 0.175% per month. After adjusting for the momentum-extended FF3FM, the *ESG* premium remains insignificant at 0.221% ($t = 0.81$) per month.

When aggregate disagreement is high (Panel B), we observe economically and statistically significant *ESG* premiums. Excess returns decrease monotonically from the low- to high-*ESG* portfolios. Stocks in the low- and high-*ESG* quintiles earn average excess returns (before risk adjustment) of 1.018% and 0.482% per month, respectively, generating a spread of 0.537% ($t = 2.43$) per month. After adjusting for the momentum-extended FF3FM, the *ESG* premium is 0.453% ($t = 1.97$) per month. This estimated *ESG* premium is consistent with Hong and

Kacperczyk (2009), Bolton and Kacperczyk (2021), and Pedersen et al. (2021). The results show that *ESG* premiums are conditional on aggregate disagreement. Our findings are consistent with Bansal et al. (2022), who find that the performance of stocks with high and low SRI ratings varies with economic conditions.

The results are consistent with our conjecture that the relationship between *ESG* scores and returns could become insignificant when aggregate disagreement is low. This is because divergent opinions can lead to the overvaluation of high *ESG* stocks. For instance, institutional investors may be discouraged from shorting stocks due to their commitment to *ESG* investments. When aggregate disagreement is low, investors are more likely to take long positions because short-selling constraints are less restrictive (Hong and Sraer, 2016).

Conversely, when aggregate disagreement is high, stocks with high *ESG* scores are predominantly held by optimistic investors, while constraints on short selling, such as those enforced by specific institutional investors, tend to relegate pessimistic investors to the sidelines within the market equilibrium. These stocks are more likely to be overpriced than stocks with low *ESG* scores (Miller, 1977; Chen et al., 2002). Arbitrageurs are unlikely to correct this potential misvaluation because of their restricted short-selling capacity (Hong and Sraer, 2016). Thus, the relationship between *ESG* scores and returns tend to be more pronounced when aggregate disagreement is high.

As a robustness test, Table A.1 in the Appendix reports the S&P 500 results using data from the Center for Research in Security Prices (CRSP). These results closely align with those presented in Table 2. Recent studies (Chatterji et al., 2016; Berg et al., 2022) highlight that different rating agencies use different *ESG* rating standards. Gibson Brandon et al. (2021), Avramov et al.

(2022), and Serafeim and Yoon (2022) find that disparities in *ESG* ratings significantly influence asset pricing. Following this strand of literature and to check the consistency of our results, we use an alternative proxy for *ESG*, namely, climate change risk, following Sautner et al. (2023). This measure uses a machine learning technique to capture firm-level climate change risks from earnings conference calls. The results in Table A.2 in the Appendix show that our results still hold. Finally, we examine the performance of value-weighted portfolios under the Fama and French (2015) five-factor model (FF5FM). Appendix Table A.3 shows that our results remain consistent.

[Table 2 about here]

Next, we examine the performance of the value-weighted portfolio formed by STOXX Europe 600 equities. The results in Table 3 are similar to those presented in Table 2. For example, the difference between the low- and high-*ESG* quintiles (0.263% per month) is insignificant at times of low aggregate disagreement (Panel A). However, at times of high aggregate disagreement (Panel B), we observe an economically and statistically significant *ESG* premium. Specifically, excess returns largely decrease from low- to high-*ESG* portfolios. Stocks in the low- and high-*ESG* quintiles exhibit average excess returns (before risk adjustment) of 1.842% and 1.137% per month, respectively. This leads to a spread of 0.705% ($t = 3.47$) per month. The *ESG* premium remains significant at 0.693% ($t = 3.09$) per month after adjusting for the momentum-extended FF3FM. Furthermore, the *ESG* premiums, both before and after risk adjustments, are highly significant, with t-statistics higher than 3, (as suggested by Harvey et al., 2016).[7] The results are consistent with Luo (2022).

[7] Harvey et al. (2016) suggest a t-statistic higher than 3 for a new asset pricing factor. Hou et al. (2020) replicate a large number of asset pricing anomalies and suggest a t-statistic of 2.78 to increase the bar of anomaly significance.

We also find that the expected returns tend to be greater under a higher level of aggregate disagreement, which is consistent with prior studies. For example, Varian (1985, 1989) shows a positive relationship between the level of disagreement and risk premium. Abel (1989) also demonstrates that the equity premium increases when beliefs become more heterogeneous; hence, investors require higher returns to bear the risk (David, 2008; Carlin et al., 2014).

[Table 3 about here]

Finally, we investigate the performance of the value-weighted portfolios formed by FTSE All-Shares equities. The results presented in Table 4 are consistent with those in Tables 2 and 3. Specifically, the *ESG* premium (-0.133% per month) is insignificant during periods of low aggregate disagreement (Panel A). However, it becomes significant at 0.997% (t = 2.46) per month before the risk adjustment during periods of high aggregate disagreement (Panel B). The results for the *ESG* premium of the FTSE All Shares equities are consistent with Luo (2022). Consistent with Table 3, we also find that expected returns are higher during periods of high aggregate disagreement.[8]

[Table 4 about here]

We further unpack the *ESG* score into its three pillars: environment (*Env*), social (*Soc*), and governance (*Gov*) and examine the relationship between the portfolio performance of each pillar and stock returns. While earlier studies demonstrate the influence of governance and social factors on returns (Gompers et al., 2003; Hong and Kacperczyk, 2009), recent research focuses more on the effect of environmental factors on returns (Pástor et al., 2021; Pedersen et al., 2021;

[8]We also examine the performance of value-weighted portfolios under the Fama and French (2015) five-factor model. Appendix Table A.3 shows that our results remain consistent.

Bansal et al., 2022). Furthermore, growing evidence indicates that investors tend to prioritize environmental over social and governance factors (Hartzmark and Sussman, 2019; Benuzzi et al., 2022). This suggests that each dimension of *ESG* may play a distinct role in influencing returns. Thus, we examine whether the relationship between each factor and returns varies during periods of high and low aggregate disagreement. Panels A and B of Table 5 report the performance of the S&P 500 portfolios sorted by *Env* under low and high aggregate disagreement, respectively. The results show that when aggregate disagreement is low (Panel A), the *Env* premium is insignificant under the momentum-extended FF3FM.

However, when aggregate disagreement is high (Panel B), raw returns decrease monotonically from low- to high-*Env* portfolios. The low-*Env* firms earn an average return of 0.906% per month, while the high-*Env* firms earn 0.463% per month, leading to an economically and statistically significant premium of 0.444% ($t = 2.28$) per month. After adjusting for the momentum-extended FF3FM, the *Env* premium remains significant at 0.432% ($t = 2.10$) per month. The results for the *Env* premium are consistent with Pedersen et al. (2021).

The performance of *Soc*-sorted portfolios (Panels C and D) shows a pattern similar to that of the *Env*-sorted portfolios. Specifically, when aggregate disagreement is low (Panel C), the *Soc* premium is insignificant. However, when aggregate disagreement is high (Panel D), the *Soc* premium is significant at 0.470% ($t = 2.40$) per month. After adjusting for the momentum-extended FF3FM, the *Soc* premium remains significant at 0.403% ($t = 2.06$) per month.

By contrast, the *Gov* premium is insignificant during periods of both low and high aggregate disagreements. The weak relationship between the *Gov* pillar and returns is similar to findings in the literature (McWilliams and Siegel, 2001; Surroca et al., 2010; Ng and Rezaee, 2015; Breuer et al., 2018; Bansal et al., 2022). For example, Breuer et al. (2018) show that corporate social responsibility is negatively related to the cost of capital in the presence of strong investor protection. Bansal et al. (2022) also find that abnormal returns on high-minus-low socially responsible portfolios are insignificant. Overall, the findings related to *Env*, *Soc*, and *Gov* premiums imply that *Env* and *Soc* carry more significant weight in influencing returns than *Gov*, in a spirit similar to Hartzmark and Sussman (2019) and Benuzzi et al. (2022).

[Table 5 about here]

Next, for the performance of the STOXX Europe 600 portfolios, Panels A and B of Table 6 show that the *Env* premium is largely significant at times of both low and high aggregate disagreement. Panels C and D report the *Soc*-sorted portfolio performance. The results show that, at times of low aggregate disagreement (Panel C), the *Soc* premium is insignificant. However, at times of high aggregate disagreement (Panel D), the *Soc* premium is significant at 0.593% (t = 2.75) and 0.532% (t = 2.38) per month before and after adjusting for the momentum-extended FF3FM, respectively. We find consistent results for the *Gov*-sorted portfolios. Specifically, at times of low aggregate disagreement (Panel E), the *Gov* premium is insignificant. However, at times of high aggregate disagreement (Panel F), the *Gov* premium is significant at 0.529% (t = 2.40) and 0.660% (t = 2.66) per month before and after adjusting for the momentum-extended FF3FM, respectively.

[Table 6 about here]

Finally, for the *Env* portfolios based on the FTSE All-Shares equities (Panels A and B of Table 7), we find that during periods of low aggregate disagreement (Panel A), the *Env* premium is insignificant. However, during periods of high aggregate disagreement (Panel B), the *Env* premium is significant at 0.863% ($t = 2.75$), and remains significant at 0.916% ($t = 2.44$) per month after adjusting for the momentum-extended FF3FM. The results for the *Soc*-sorted portfolios (Panels C and D) are consistent with those in Panels A and B. Specifically, during periods of low aggregate disagreement (Panel C), the *Soc* premium is insignificant. However, during periods of high aggregate disagreement (Panel D), the *Soc* premium is significant at 1.154% ($t = 3.41$) per month and remains significant at 1.196% ($t = 3.52$) per month after adjusting for the momentum-extended FF3FM. Panels E and F again show that the *Gov* premium is insignificant during periods of low and high aggregate disagreement, respectively.

[Table 7 about here]

Overall, our results are consistent with the prediction that *ESG* premiums are more prevalent when aggregate disagreement is high, suggesting that variations in market participants' behavior play an important role in asset pricing (Yu, 2011; Hong and Sraer, 2016; Atmaz and Basak, 2018). Our findings confirm the role of analysts' forecasts in *ESG* performance (Dhaliwal et al., 2012; Bernardi and Stark, 2018; Muslu et al., 2019; Schiemann and Tietmeyer, 2022).

To test the robustness of our results, we re-estimate our regressions excluding major events such as the global financial crisis, Brexit, and the COVID-19 pandemic (i.e., 2008, 2016, and 2020). Panels A-F of Table 8 present the performance of the value-weighted quintile portfolios, excluding major events for the S&P 500, STOXX Europe 600, and FTSE All-Shares equities during periods of low and high aggregate disagreement. Consistent with our main results, we find that the *ESG* premium is significant only during periods of high aggregate disagreement.

[Table 8 about here]

4.2 Results on Fama–MacBeth (1973) regressions

In this subsection, we further test the return predictability of the *ESG* using a Fama and MacBeth (1973) regression

$$
\begin{aligned}
R_{i,t+m} - R_{f,t+m} \;=\; & \gamma_0 + \gamma_1 ESG_{i,t} + \gamma_2 Env_{i,t} + \gamma_3 Soc_{i,t} + \gamma_4 Gov_{i,t} \\
+ \; & \gamma_5 MV_{i,t} + \gamma_6 B/M_{i,t} + \gamma_7 MOM_{i,t} + \epsilon_{i,t+m}, \qquad (3)
\end{aligned}
$$

where $R_{i,t+m}$ represents the return of stock i in month $t+m$ $(m = 1, 2, ..., 12)$; $ESG_{i,t}$ represents the *ESG* combined score or *Env*, *Soc*, and *Gov* pillar score of firm i at the end of June of each year; $MV_{i,t}$ represents the market value of stock i at the end of June of each year; $B/M_{i,t}$ represents the book-to-market ratio of stock i at the end of June of each year; and $MOM_{i,t}$ represents the momentum of stock i over month $t-6$ to month $t-1$.

Errors arising from the estimated factor loadings may affect the statistical inference of the standard Fama and MacBeth (1973) approach in Eq. (3) (Brennan et al., 1998). Using risk-adjusted returns as the dependent variable helps alleviate such errors. To compute the risk-adjusted returns, we estimate Eq. (4) following Chordia et al. (2009):

$$
R^*_{i,t} = R_{i,t} - R_{f,t} - \beta_{i,m} f_{MKT,t} - \beta_{i,s} f_{SMB,t} - \beta_{i,h} f_{HML,t} - \beta_{i,w} f_{WML,t}, \qquad (4)
$$

where $R^*_{i,t}$ denotes the monthly risk-adjusted returns between July of year t and June of year $t+1$. Using the Fama and French (1993) three-factor model, we estimate the risk-adjusted returns as the sum of the constant terms ($\alpha_{i,t}$) and the residuals ($\varepsilon_{i,t}$) from regressing excess returns against the FF3FM with a 36-month rolling window. Then, we use the risk-adjusted returns $R^*_{i,t}$ as the dependent variable to run the Fama–MacBeth regression in Eq. (3).

Panels A-F of Table 9 present the Fama–MacBeth regression results during periods of low and high aggregate disagreement for S&P 500, STOXX Europe 600, and FTSE All-Shares, respectively. After controlling for key firm characteristics, namely size, book-to-market, and momentum, the predictive power of *ESG*, *Env*, *Soc*, and *Gov*, is largely significant during high disagreement periods but insignificant during low disagreement periods. For example, the *ESG* coefficient is -0.125 ($t = -2.88$) when aggregate disagreement is high, while it is -0.055 ($t = -1.10$) when aggregate disagreement is low for S&P 500 equities. Specifically, as the *ESG* coefficient is below -0.10 in all three markets and the standard deviation of *ESG* is approximately 17, a one-standard-deviation change in *ESG* leads to an average 1.7% change in returns when aggregate disagreement is high. The economic significance of *Env* and *Soc* coefficients is relatively high because the standard deviations of *Env* and *Soc* are above 20. Overall, the Fama–MacBeth regression results provide further support for aggregate disagreement, which plays a role in *ESG* premiums.

[Table 9 about here]

5 Conclusion

Socially responsible investments are playing an increasingly important role in asset allocation in international financial markets. In this paper, we investigate the nexus between aggregate disagreements on long-term growth and returns on *ESG* portfolios from the S&P 500, STOXX

Europe 600, and FTSE All-Shares equities from 2013 to 2020. We find a significant relationship between *ESG* combined scores and stock returns when aggregate disagreement is high. Additionally, firms with low *ESG* scores earn significantly higher returns than those with high *ESG* scores when aggregate disagreement is high. Our results show that the momentum-extended Fama–French three-factor model does not explain the estimated *ESG* premiums. Furthermore, we examine the performance of portfolios formed by each of the three pillars of *ESG*; i.e., environment (*Env*), social (*Soc*), and governance (*Gov*). Our results remain largely consistent. Moreover, our cross-sectional regression results confirm the relationship between *ESG* and stock returns when aggregate disagreement is high.

Our study has important implications for investors and policymakers as SRI continues to gain momentum globally. Our results underscore the role of aggregate disagreement in explaining the nexus between *ESG* performance and stock returns. We demonstrate that investors can benefit from *ESG* premiums by strategically timing their investments based on the aggregate disagreements. Overall, our results provide insights for market participants; for instance, investors can improve their understanding of the performance of *ESG* portfolios as more information on *ESG* becomes publicly available. However, accurately predicting aggregate disagreement trends can be challenging. Future studies could usefully delve deeper into these issues and explore how other factors can influence *ESG* investment performance.

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Table 1 Summary statistics

This table reports the mean, standard deviation, Q1 (bottom 25%), median, and Q3 (top 25%) for S&P 500, STOXX Europe 600, and FTSE All Shares stocks, in Panels A, B, and C, respectively. *ESG* represents the environment, social, and governance combined score. *Env* represents the environment pillar score. *Soc* represents the social pillar score. *Gov* represents the governance pillar score. $MV(\$m)$ represents the market capitalization. *B/M* represents the book-to-market ratio.

	ESG	*Env*	*Soc*	*Gov*	$MV(\$m)$	*B/M*
Panel A: Descriptive statistics of S&P 500 stocks						
Mean	51.27	46.57	57.36	57.70	38214.02	0.37
Stdev	17.57	28.62	20.32	20.76	68080.01	0.62
Q1	38.71	21.98	41.95	42.83	9305.60	0.17
Median	51.19	51.26	58.15	60.20	16971.09	0.31
Q3	64.79	71.32	73.42	73.91	35800.33	0.51
Panel B: Descriptive statistics of STOXX Europe 600 stocks						
Mean	57.93	60.27	64.49	58.08	26557.54	0.59
Stdev	17.63	25.73	21.94	21.95	53419.11	0.50
Q1	46.05	43.10	49.61	41.52	3932.42	0.26
Median	59.09	65.47	69.07	60.86	9189.50	0.44
Q3	71.79	81.69	82.36	76.07	25900.38	0.81
Panel C: Descriptive statistics of FTSE all shares stocks						
Mean	49.79	45.87	53.12	56.45	6410.07	4.47
Stdev	16.89	25.46	21.18	21.22	14954.45	44.01
Q1	38.37	25.34	36.65	40.47	675.00	1.25
Median	49.43	44.27	53.47	57.43	1503.58	2.21
Q3	60.61	66.54	69.44	73.36	4653.17	4.10

Table 2

S&P 500 *ESG* quintile portfolios and aggregate disagreement

We sort stocks into quintile value-weighted portfolios at the end of June each year with a holding period of twelve months . *Ex*-Ret is the mean of monthly returns in excess of the risk-free rate. $R_{i,t}$ represents portfolio i's monthly returns, $R_{f,t}$ represents the risk-free rate, $f_{MKT,t}$ represents the monthly market factor, $f_{SMB,t}$ represents the monthly Fama and French size factor, $f_{HML,t}$ represents the monthly Fama and French value factor, and $f_{WML,t}$ represents the monthly momentum factor. The sample includes the S&P 500 stocks between July 2003 and December 2020. The numbers in parentheses are t-statistics obtained from the heteroskedasticity-consistent standard errors of White (1980).

	Low-ESG	*Q2*	*Q3*	*Q4*	*High-ESG*	*L−H*
	Panel A: Low aggregate disagreement					
Ex-Ret (%)	1.304	1.022	1.002	1.226	1.129	0.175
	(3.72)	(3.56)	(3.19)	(4.10)	(3.85)	(0.75)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.829	0.648	0.567	0.813	0.608	0.221
	(2.08)	(2.02)	(1.55)	(2.39)	(1.77)	(0.81)
	Panel B: High aggregate disagreement					
Ex-Ret (%)	1.018	0.855	0.567	0.489	0.482	0.537
	(1.84)	(1.73)	(1.13)	(1.03)	(1.01)	(2.43)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.644	0.520	0.266	0.210	0.191	0.453
	(1.15)	(1.07)	(0.55)	(0.46)	(0.43)	(1.97)

Table 3

STOXX Europe 600 *ESG* quintile portfolios and aggregate disagreement

We sort stocks into quintile value-weighted portfolios at the end of June each year with a holding period of twelve months . *Ex*-Ret represents the mean of monthly returns in excess of the risk-free rate. $R_{i,t}$ represents portfolio i's monthly returns, $R_{f,t}$ represents the risk-free rate, $f_{MKT,t}$ represents the monthly market factor, $f_{SMB,t}$ represents the monthly Fama and French size factor, $f_{HML,t}$ represents the monthly Fama and French value factor, and $f_{WML,t}$ represents the monthly momentum factor. The sample includes the STOXX Europe 600 stocks between July 2003 and December 2020. The numbers in parentheses are t-statistics (in parentheses) are obtained from the heteroskedasticity-consistent standard errors of White (1980).

	Low-*ESG*	*Q*2	*Q*3	*Q*4	*H*igh-*ESG*	*L*−*H*
	Panel A: Low aggregate disagreement					
Ex-Ret (%)	0.643	0.554	0.338	0.451	0.380	0.263
	(1.05)	(0.98)	(0.62)	(0.89)	(0.73)	(1.17)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.487	0.247	0.216	0.343	0.204	0.283
	(0.89)	(0.51)	(0.41)	(0.70)	(0.39)	(1.39)
	Panel B: High aggregate disagreement					
Ex-Ret (%)	1.842	1.190	1.232	1.147	1.137	0.705
	(3.88)	(2.74)	(2.49)	(2.43)	(2.36)	(3.47)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	1.162	0.676	0.783	0.429	0.469	0.693
	(2.42)	(1.42)	(1.60)	(0.89)	(1.01)	(3.09)

Table 4

FTSE All-Shares *ESG* quintile portfolios

We sort stocks into quintile value-weighted portfolios at the end of June each year with a holding period of twelve months . *Ex*-Ret represents the mean of monthly returns in excess of the risk-free rate. $R_{i,t}$ represents portfolio i's monthly returns, $R_{f,t}$ represents the risk-free rate, $f_{MKT,t}$ represents the monthly market factor, $f_{SMB,t}$ represents the monthly Fama and French size factor, $f_{HML,t}$ represents the monthly Fama and French value factor, and $f_{WML,t}$ represents the monthly momentum factor. The sample includes the FTSE All-Shares stocks between July 2003 and December 2020. The numbers in parentheses are t-statistics obtained from the heteroskedasticity-consistent standard errors of White (1980).

	Low-*ESG*	*Q*2	*Q*3	*Q*4	*H*igh-*ESG*	*L*−*H*
	Panel A: Low aggregate disagreement					
Ex-Ret (%)	0.607	0.214	0.337	0.132	0.740	-0.133
	(0.95)	(0.37)	(0.61)	(0.24)	(1.75)	(-0.32)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.270	0.030	0.119	-0.233	0.527	-0.256
	(0.40)	(0.05)	(0.19)	(-0.41)	(1.14)	(-0.66)
	Panel B: High aggregate disagreement					
Ex-Ret (%)	2.133	1.302	1.347	1.040	1.136	0.997
	(3.95)	(2.67)	(2.64)	(2.21)	(2.96)	(2.64)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	1.988	1.007	1.198	0.770	0.909	1.079
	(3.75)	(2.00)	(2.15)	(1.50)	(2.10)	(2.85)

Table 5

S&P 500 environment, social, and governance pillar score (*Env*, *Soc*, and *Gov*) quintile portfolios and aggregate disagreement

We sort stocks into quintile value-weighted portfolios at the end of June each year with a holding period of twelve months . *Ex*-Ret represents the mean of monthly returns in excess of the risk-free rate. $R_{i,t}$ represents portfolio i's monthly returns, $R_{f,t}$ represents the risk-free rate, $f_{MKT,t}$ represents the monthly market factor, $f_{SMB,t}$ represents the monthly Fama and French size factor, $f_{HML,t}$ represents the monthly Fama and French value factor, and $f_{WML,t}$ represents the monthly momentum factor. The sample includes the S&P 500 stocks between July 2003 and December 2020. The numbers in parentheses are t-statistics obtained from the heteroskedasticity-consistent standard errors of White (1980).

	Low-*Env*	*Q*2	*Q*3	*Q*4	*H*igh-*Env*	*L*−*H*
	Panel A: *Env* quintile portfolios under low aggregate disagreement					
Ex-Ret (%)	1.373	1.855	1.401	1.176	0.991	0.382
	(4.34)	(3.50)	(2.92)	(4.29)	(3.39)	(2.18)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.840	1.563	0.958	0.697	0.564	0.276
	(2.38)	(2.14)	(1.77)	(2.33)	(1.62)	(1.52)
	Panel B: *Env* quintile portfolios under high aggregate disagreement					
Ex-Ret (%)	0.906	0.924	0.754	0.810	0.463	0.444
	(1.77)	(1.48)	(1.25)	(1.66)	(1.03)	(2.28)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.614	0.476	0.350	0.502	0.182	0.432
	(1.22)	(0.76)	(0.61)	(1.07)	(0.43)	(2.10)
	Low-*Soc*	*Q*2	*Q*3	*Q*4	*H*igh-*Soc*	*L*−*H*
	Panel C: *Soc* quintile portfolios under Low aggregate disagreement					
Ex-Ret (%)	1.406	1.167	1.152	1.122	1.169	0.237
	(4.27)	(3.53)	(3.76)	(3.90)	(4.01)	(1.28)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.872	0.724	0.732	0.673	0.732	0.140
	(2.43)	(1.81)	(2.08)	(2.16)	(2.14)	(0.68)

(continued)

Panel D: *Soc* quintile portfolios under High aggregate disagreement						
Ex-Ret (%)	0.997	0.684	0.966	0.602	0.527	0.470
	(1.88)	(1.24)	(1.86)	(1.16)	(1.16)	(2.40)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.653	0.281	0.581	0.312	0.249	0.403
	(1.23)	(0.51)	(1.19)	(0.63)	(0.58)	(2.06)
	Low-*Gov*	*Q*2	*Q*3	*Q*4	*H*igh-*Gov*	*L*−*H*
Panel E: *Gov* quintile portfolios under low aggregate disagreement						
Ex-Ret (%)	1.228	0.920	1.151	1.085	1.356	-0.128
	(3.80)	(2.86)	(4.06)	(3.32)	(4.80)	(-0.63)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.719	0.536	0.752	0.471	0.983	-0.264
	(1.86)	(1.45)	(2.37)	(1.28)	(3.07)	(-1.11)
Panel F: *Gov* quintile portfolios under high aggregate disagreement						
Ex-Ret (%)	0.696	0.618	0.732	0.546	0.759	-0.063
	(1.28)	(1.20)	(1.45)	(1.14)	(1.56)	(-0.33)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.339	0.279	0.419	0.246	0.451	-0.112
	(0.62)	(0.56)	(0.86)	(0.53)	(1.00)	(-0.53)

Table 6

STOXX Europe 600 environment, social, and governance pillar score (*Env*, *Soc*, and *Gov*) quintile portfolios and aggregate disagreement

We sort stocks into quintile value-weighted portfolios at the end of June each year with a holding period of twelve months . *Ex*-Ret represents the mean of monthly returns in excess of the risk-free rate. $R_{i,t}$ represents portfolio i's monthly returns, $R_{f,t}$ represents the risk-free rate, $f_{MKT,t}$ represents the monthly market factor, $f_{SMB,t}$ represents the monthly Fama and French size factor, $f_{HML,t}$ represents the monthly Fama and French value factor, and $f_{WML,t}$ represents the monthly momentum factor. The sample includes the STOXX Europe 600 stocks between July 2003 and December 2020. The numbers in parentheses are t-statistics obtained from the heteroskedasticity-consistent standard errors of White (1980).

	Low-*Env*	$Q2$	$Q3$	$Q4$	High-*Env*	$L-H$
	Panel A: *Env* quintile portfolios under low aggregate disagreement					
Ex-Ret (%)	0.729	0.501	0.626	0.395	0.270	0.460
	(1.24)	(0.96)	(1.17)	(0.76)	(0.49)	(1.70)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.688	0.292	0.403	0.287	0.136	0.552
	(1.21)	(0.61)	(0.81)	(0.56)	(0.27)	(2.38)
	Panel B: *Env* quintile portfolios under high aggregate disagreement					
Ex-Ret (%)	1.716	1.408	1.242	1.163	1.020	0.696
	(3.36)	(2.92)	(2.64)	(2.60)	(2.16)	(3.24)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	1.106	0.728	0.599	0.633	0.394	0.711
	(2.16)	(1.47)	(1.16)	(1.39)	(0.85)	(2.86)
	Low-*Soc*	$Q2$	$Q3$	$Q4$	High-*Soc*	$L-H$
	Panel C: *Soc* quintile portfolios under low aggregate disagreement					
Ex-Ret (%)	0.737	0.510	0.317	0.403	0.431	0.306
	(1.21)	(0.91)	(0.58)	(0.73)	(0.87)	(1.27)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.529	0.460	0.098	0.322	0.250	0.279
	(0.97)	(0.88)	(0.19)	(0.63)	(0.51)	(1.35)

(continued)

Panel D: *Soc* quintile portfolios under high aggregate disagreement						
Ex-Ret (%)	1.750	1.424	1.244	1.050	1.157	0.593
	(3.81)	(2.86)	(2.48)	(2.31)	(2.55)	(2.75)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	1.095	0.899	0.570	0.452	0.562	0.532
	(2.40)	(1.87)	(1.17)	(0.92)	(1.24)	(2.38)
	Low-*Gov*	$Q2$	$Q3$	$Q4$	*H*igh-*Gov*	$L-H$
Panel E: *Gov* quintile portfolios under low aggregate disagreement						
Ex-Ret (%)	0.514	0.614	0.622	0.532	0.186	0.329
	(0.88)	(1.11)	(1.15)	(1.06)	(0.35)	(1.53)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.375	0.540	0.360	0.314	0.091	0.284
	(0.72)	(1.04)	(0.66)	(0.70)	(0.18)	(1.29)
Panel F: *Gov* quintile portfolios under high aggregate disagreement						
Ex-Ret (%)	1.481	1.365	1.250	1.354	0.952	0.529
	(3.00)	(3.03)	(2.79)	(2.87)	(1.97)	(2.40)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.944	0.803	0.718	0.669	0.284	0.660
	(1.72)	(1.80)	(1.47)	(1.39)	(0.63)	(2.66)

Table 7

FTSE All-Shares environment, social, and governance pillar score (*Env*, *Soc*, and *Gov*) quintile portfolios and aggregate disagreement

We sort stocks into quintile value-weighted portfolios at the end of June each year with a holding period of twelve months . *Ex*-Ret represents the mean of monthly returns in excess of the risk-free rate. $R_{i,t}$ represents portfolio i's monthly returns, $R_{f,t}$ represents the risk-free rate, $f_{MKT,t}$ represents the monthly market factor, $f_{SMB,t}$ represents the monthly Fama and French size factor, $f_{HML,t}$ represents the monthly Fama and French value factor, and $f_{WML,t}$ represents the monthly momentum factor. The sample includes the FTSE All-Shares stocks between July 2003 and December 2020. The numbers in parentheses are t-statistics obtained from the heteroskedasticity-consistent standard errors of White (1980).

	Low-*Env*	*Q*2	*Q*3	*Q*4	*H*igh-*Env*	*L*−*H*
	Panel A: *Env* quintile portfolios under low aggregate disagreement					
Ex-Ret (%)	0.819	1.142	0.435	0.461	0.427	0.391
	(1.39)	(2.14)	(0.68)	(0.95)	(0.97)	(1.01)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.560	1.025	0.235	0.228	0.078	0.482
	(0.92)	(1.70)	(0.32)	(0.41)	(0.17)	(1.25)
	Panel B: *Env* quintile portfolios under high aggregate disagreement					
Ex-Ret (%)	1.906	1.804	1.323	1.232	1.071	0.836
	(3.75)	(4.12)	(2.59)	(3.01)	(2.45)	(2.31)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	1.745	1.575	1.078	0.999	0.829	0.916
	(3.36)	(3.56)	(1.88)	(2.33)	(1.71)	(2.44)
	Low-*Soc*	*Q*2	*Q*3	*Q*4	*H*igh-*Soc*	*L*−*H*
	Panel C: *Soc* quintile portfolios under low aggregate disagreement					
Ex-Ret (%)	0.695	0.565	0.281	0.977	0.328	0.367
	(1.20)	(1.00)	(0.53)	(1.93)	(0.73)	(1.04)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.462	0.438	0.119	0.555	0.046	0.416
	(0.70)	(0.69)	(0.20)	(0.92)	(0.10)	(1.06)

(continued)

Panel D: *Soc* quintile portfolios under high aggregate disagreement						
Ex-Ret (%)	2.135	1.597	1.625	1.135	0.981	1.154
	(4.29)	(3.29)	(4.06)	(2.21)	(2.31)	(3.41)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	1.923	1.361	1.372	0.938	0.727	1.196
	(4.04)	(2.63)	(3.13)	(1.57)	(1.59)	(3.52)
	Low-*Gov*	*Q*2	*Q*3	*Q*4	*H*igh-*Gov*	*L*−*H*
Panel E: *Gov* quintile portfolios under low aggregate disagreement						
Ex-Ret (%)	0.665	0.678	0.355	0.646	0.352	0.313
	(1.12)	(1.37)	(0.62)	(1.31)	(0.77)	(0.75)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.303	0.501	-0.037	0.452	0.064	0.239
	(0.45)	(0.87)	(-0.06)	(0.81)	(0.14)	(0.52)
Panel F: *Gov* quintile portfolios under high aggregate disagreement						
Ex-Ret (%)	1.457	0.980	1.707	1.085	1.155	0.302
	(3.11)	(2.29)	(3.50)	(2.21)	(2.73)	(1.11)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	1.180	0.687	1.509	0.817	0.944	0.237
	(2.43)	(1.45)	(3.05)	(1.51)	(2.03)	(0.88)

Table 8

***ESG* quintile portfolios and aggregate disagreement: excluding major events**

We sort stocks into quintile value-weighted portfolios at the end of June each year with a holding period of twelve months . *Ex*-Ret is the mean of monthly returns in excess of the risk-free rate. $R_{i,t}$ represents portfolio i's monthly returns, $R_{f,t}$ represents the risk-free rate, $f_{MKT,t}$ represents the monthly market factor, $f_{SMB,t}$ represents the monthly Fama and French size factor, $f_{HML,t}$ represents the monthly Fama and French value factor, and $f_{WML,t}$ represents the monthly momentum factor. The sample includes the S&P 500, STOXX Europe 600, and FTSE All-Shares equities, excluding major events such as the global financial crisis, Brexit, and Covid pandemic (i.e., 2008, 2016, and 2020). The numbers in parentheses are t-statistics obtained from the heteroskedasticity-consistent standard errors of White (1980).

	Low-*ESG*	*Q*2	*Q*3	*Q*4	High-*ESG*	*L*−*H*
	Panel A: S&P 500 stocks under low aggregate disagreement					
Ex-Ret (%)	1.304	1.022	1.002	1.226	1.129	0.175
	(3.72)	(3.56)	(3.19)	(4.10)	(3.85)	(0.75)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.829	0.648	0.567	0.813	0.608	0.221
	(2.08)	(2.02)	(1.55)	(2.39)	(1.77)	(0.81)
	Panel B: S&P 500 stocks under high aggregate disagreement					
Ex-Ret (%)	1.471	1.257	1.034	0.840	0.849	0.622
	(2.57)	(2.53)	(1.95)	(1.61)	(1.65)	(2.74)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	1.246	0.973	0.862	0.602	0.658	0.588
	(2.00)	(1.93)	(1.62)	(1.16)	(1.34)	(2.21)
	Panel C: STOXX Europe 600 stocks under low aggregate disagreement					
Ex-Ret (%)	1.128	1.056	0.950	0.917	0.903	0.225
	(2.56)	(2.63)	(2.58)	(2.60)	(2.54)	(1.04)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.788	0.441	0.541	0.636	0.566	0.222
	(1.83)	(1.11)	(1.63)	(1.72)	(1.58)	(0.91)

(continued)

Panel D: STOXX Europe 600 stocks under high aggregate disagreement						
Ex-Ret (%)	1.644	1.046	1.037	1.079	0.961	0.683
	(3.25)	(2.10)	(2.05)	(2.01)	(1.80)	(3.31)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	1.099	0.701	0.696	0.640	0.500	0.599
	(1.72)	(1.09)	(1.12)	(1.01)	(0.80)	(2.30)
Panel E: FTSE All-Shares under low aggregate disagreement						
Ex-Ret (%)	1.702	0.840	1.070	1.058	1.160	0.542
	(3.55)	(1.75)	(2.86)	(2.49)	(3.04)	(1.55)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	1.082	0.263	0.940	0.709	1.046	0.036
	(1.79)	(0.45)	(2.02)	(1.22)	(2.11)	(0.10)
Panel F: FTSE All-Shares under high aggregate disagreement						
Ex-Ret (%)	2.299	1.352	1.146	1.024	1.118	1.182
	(4.06)	(2.57)	(2.09)	(2.00)	(2.72)	(3.18)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	2.091	1.099	1.077	0.713	0.899	1.193
	(3.87)	(1.97)	(1.77)	(1.24)	(1.87)	(3.15)

Table 9

Cross-sectional regressions

We run the following Fama-MacBeth (1973) regressions:

$$R^*_{i,t+m} = \gamma_0 + \gamma_1 ESG_{i,t} + \gamma_2 MV_{i,t} + \gamma_3 B/M_{i,t} + \gamma_4 MOM_{i,t} + \epsilon_{i,t+m},$$

where $R^*_{i,t+m}$ represents the risk-adjusted return of stock i in month $t+m$ ($m = 1, 2, ..., 12$), $ESG_{i,t}$ represents the ESG combined score or environment, social, governance pillar score of firm i available at the end of June of each year, $MV_{i,t}$ represents the market value of stock i at the end of June of each year, $B/M_{i,t}$ represents the book-to-market ratio of stock i at the end of June of each year, and $MOM_{i,t}$ represents the momentum of stock i over month $t-6$ to month $t-1$. The symbol $\hat{\gamma}_{ESG}$ is the slope estimate on the ESG, and similarly for others. We transfer each regressor to have a mean of one and a standard deviation of one. t-statistics are in parentheses.

$\hat{\gamma}_{ESG}$	$\hat{\gamma}_{Env}$	$\hat{\gamma}_{Soc}$	$\hat{\gamma}_{Gov}$	$\hat{\gamma}_{MV}$	$\hat{\gamma}_{B/M}$	$\hat{\gamma}_{MOM}$
Panel A: S&P 500 stocks under low aggregate disagreement						
-0.055				-0.087	0.003	-0.030
(-1.10)				(-2.14)	(0.05)	(-0.25)
	0.022			-0.091	0.005	-0.020
	(0.43)			(-2.12)	(0.08)	(-0.16)
		-0.066		-0.064	0.001	-0.025
		(-1.43)		(-1.51)	(0.02)	(-0.21)
			0.021	-0.082	0.009	-0.029
			(0.46)	(-1.95)	(0.15)	(-0.24)
Panel B: S&P 500 stocks under high aggregate disagreement						
-0.125				-0.116	-0.171	-0.048
(-2.88)				(-2.59)	(-2.32)	(-0.33)
	-0.133			-0.078	-0.170	-0.051
	(-2.58)			(-1.68)	(-2.30)	(-0.35)
		-0.123		-0.085	-0.171	-0.053
		(-3.17)		(-1.77)	(-2.31)	(-0.36)
			-0.012	-0.124	-0.169	-0.035
			(-0.27)	(-2.76)	(-2.32)	(-0.24)
Panel C: STOXX Europe 600 stocks under low aggregate disagreement						
-0.087				-0.097	-0.052	-0.174
(-1.58)				(-2.04)	(-0.63)	(-1.49)
	-0.106			-0.090	-0.029	-0.176
	(-1.86)			(-1.87)	(-0.37)	(-1.51)
		-0.087		-0.091	-0.043	-0.176
		(-1.63)		(-1.97)	(-0.53)	(-1.49)
			-0.056	-0.103	-0.046	-0.174
			(-1.20)	(-2.22)	(-0.56)	(-1.49)

(continued)

$\hat{\gamma}_{ESG}$	$\hat{\gamma}_{Env}$	$\hat{\gamma}_{Soc}$	$\hat{\gamma}_{Gov}$	$\hat{\gamma}_{MV}$	$\hat{\gamma}_{B/M}$	$\hat{\gamma}_{MOM}$
Panel D: STOXX Europe 600 stocks under high aggregate disagreement						
-0.126				-0.114	-0.002	0.140
(-2.93)				(-2.65)	(-0.03)	(1.20)
	-0.119			-0.110	0.005	0.145
	(-2.38)			(-2.54)	(0.06)	(1.24)
		-0.132		-0.102	-0.003	0.142
		(-2.62)		(-2.37)	(-0.04)	(1.22)
			-0.114	-0.113	0.002	0.140
			(-2.74)	(-2.58)	(0.02)	(1.20)
Panel E: FTSE All-Shares under low aggregate disagreement						
0.039				-0.197	0.084	-0.137
(0.53)				(-2.30)	(1.47)	(-0.79)
	0.018			-0.190	0.085	-0.148
	(0.21)			(-2.13)	(1.52)	(-0.85)
		0.013		-0.195	0.087	-0.148
		(0.18)		(-2.21)	(1.54)	(-0.85)
			0.002	-0.185	0.086	-0.157
			(0.03)	(-2.32)	(1.52)	(-0.91)
Panel F: FTSE All-Shares under high aggregate disagreement						
-0.105				-0.199	0.055	0.024
(-1.72)				(-3.27)	(1.27)	(0.18)
	-0.077			-0.191	0.051	0.020
	(-1.15)			(-2.93)	(1.20)	(0.15)
		-0.114		-0.174	0.049	0.020
		(-1.82)		(-3.04)	(1.16)	(0.15)
			-0.007	-0.228	0.047	0.031
			(-0.12)	(-3.68)	(1.08)	(0.24)

Appendix

Table A.1
S&P 500 *ESG* quintile portfolios with CRSP data and aggregate disagreement

We sort stocks into quintile value-weighted portfolios at the end of June each year with a holding period of twelve months . *Ex*-Ret represents the mean of monthly returns in excess of the risk-free rate. $R_{i,t}$ represents portfolio i's monthly returns, $R_{f,t}$ represents the risk-free rate, $f_{MKT,t}$ represents the monthly market factor, $f_{SMB,t}$ represents the monthly Fama and French size factor, $f_{HML,t}$ represents the monthly Fama and French value factor, and $f_{WML,t}$ represents the monthly momentum factor. The sample includes the S&P 500 stocks between July 2003 and December 2020. The numbers in parentheses are t-statistics obtained from the heteroskedasticity-consistent standard errors of White (1980).

	Low-*ESG*	*Q*2	*Q*3	*Q*4	*H*igh-*ESG*	*L*−*H*
	Panel A: Low aggregate disagreement					
Ex-Ret (%)	1.585	1.006	1.103	1.254	1.215	0.370
	(4.95)	(3.48)	(3.68)	(4.72)	(4.18)	(1.68)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.393	-0.053	-0.027	0.163	-0.041	0.434
	(2.03)	(-0.40)	(-0.20)	(1.61)	(-0.34)	(1.65)
	Panel B: High aggregate disagreement					
Ex-Ret (%)	0.949	0.663	0.518	0.453	0.383	0.566
	(1.83)	(1.46)	(1.14)	(1.04)	(0.87)	(2.64)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$					
$\alpha_{i,t}$	0.265	0.155	0.109	-0.009	-0.097	0.362
	(1.89)	(1.11)	(1.05)	(-0.11)	(-0.91)	(1.87)

Table A.2

S&P 500 climate change risk portfolios and aggregate disagreement

We sort stocks into two value-weighted portfolios at the end of June each year with a holding period of twelve months . *Ex*-Ret is the mean of monthly returns in excess of the risk-free rate. $R_{i,t}$ represents portfolio i's monthly returns, $R_{f,t}$ represents the risk-free rate, $f_{MKT,t}$ represents the monthly market factor, $f_{SMB,t}$ represents the monthly Fama and French size factor, $f_{HML,t}$ represents the monthly Fama and French value factor, and $f_{WML,t}$ represents the monthly momentum factor. The sample includes the S&P 500 stocks between July 2003 and December 2020. The numbers in parentheses are t-statistics obtained from the heteroskedasticity-consistent standard errors of White (1980).

	Low-ESG	High-ESG	$L-H$
Panel A: Low aggregate disagreement			
Ex-Ret (%)	0.756	0.418	0.339
	(1.58)	(0.78)	(2.24)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$		
$\alpha_{i,t}$	0.425	0.139	0.285
	(0.92)	(0.28)	(2.01)
Panel B: High aggregate disagreement			
Ex-Ret (%)	1.089	0.819	0.270
	(3.00)	(2.38)	(1.00)
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,w} f_{WML,t} + \varepsilon_{i,t}$		
$\alpha_{i,t}$	0.855	0.557	0.299
	(2.27)	(1.50)	(0.86)

Table A.3

ESG **quintile portfolios and aggregate disagreement: Fama–French (2015) five-factor model**

We sort stocks into quintile value-weighted portfolios at the end of June each year with a holding period of twelve months . *Ex*-Ret is the mean of monthly returns in excess of the risk-free rate. $R_{i,t}$ represents portfolio i's monthly returns, $R_{f,t}$ represents the risk-free rate, $f_{MKT,t}$ represents the monthly market factor, $f_{SMB,t}$ represents the monthly Fama and French size factor, $f_{HML,t}$ represents the monthly Fama and French value factor, $f_{RMW,t}$ represents the monthly profitaiblity factor, and $f_{CMA,t}$ represents the monthly investment factor. The sample includes the S&P 500, or the STOXX Europe 600, or the FTSE All-Shares between July 2003 and December 2020. The numbers in parentheses are t-statistics obtained from the heteroskedasticity-consistent standard errors of White (1980).

	Low-*ESG*	*Q2*	*Q3*	*Q4*	High-*ESG*	*L−H*
	$R_{i,t} - R_{f,t} = \alpha_i + \beta_{i,m} f_{MKT,t} + \beta_{i,s} f_{SMB,t} + \beta_{i,h} f_{HML,t} + \beta_{i,r} f_{RMW,t} + \beta_{i,c} f_{CMA,t} + \varepsilon_{i,t}$					
Panel A: S&P 500 stocks under low aggregate disagreement						
$\alpha_{i,t}$	1.005	0.749	0.614	0.955	0.787	0.217
	(2.65)	(2.43)	(1.71)	(2.88)	(2.40)	(0.85)
Panel B: S&P 500 stocks under high aggregate disagreement						
$\alpha_{i,t}$	0.671	0.547	0.308	0.242	0.232	0.440
	(1.18)	(1.11)	(0.61)	(0.52)	(0.50)	(1.91)
Panel C: STOXX Europe 600 stocks under low aggregate disagreement						
$\alpha_{i,t}$	0.470	0.469	0.229	0.306	0.246	0.224
	(1.06)	(1.12)	(0.54)	(0.78)	(0.59)	(1.14)
Panel D: STOXX Europe 600 stocks under high aggregate disagreement						
$\alpha_{i,t}$	0.833	0.520	0.490	0.518	0.302	0.531
	(1.62)	(1.05)	(0.89)	(0.99)	(0.52)	(2.22)
Panel E: FTSE All-Shares under low aggregate disagreement						
$\alpha_{i,t}$	0.673	0.123	0.318	0.046	0.528	0.145
	(1.10)	(0.23)	(0.58)	(0.09)	(1.22)	(0.39)
Panel F: FTSE All-Shares under high aggregate disagreement						
$\alpha_{i,t}$	1.657	1.185	1.035	0.699	0.806	0.851
	(3.21)	(2.17)	(2.08)	(1.54)	(2.08)	(2.39)