ESMA TRV Risk Analysis   Sustainable Finance

The financial impact of greenwashing controversies

ESMA Report on Trends, Risks and Vulnerabilities Risk Analysis

Sustainable Finance

The financial impact of greenwashing controversies

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Summary

The transition to a low-carbon economy requires trust in the commitment and ability of companies to adapt their business operations to help deliver climate-related objectives. However, greenwashing risks undermining this trust by sapping consumer and investor confidence, underlining the importance of monitoring and tackling the problem. This article explores the role that ESG controversies can play in supporting these efforts. While greenwashing-related controversies do not provide accurate information on the scale or frequency of greenwashing occurrences, they are important from an investor protection angle since they reflect public perceptions of greenwashing, which may lead to reputational issues for the firms involved. We document that the number of greenwashing controversies involving large European firms increased between 2020 and 2021 and tended to be concentrated within a few firms belonging to three main sectors, including the financial sector. We also investigate the impact of greenwashing controversies on firms' stock returns and valuation and find no systematic evidence of a relationship between the two. The results suggest that greenwashing allegations did not have a clear financial impact on firms and highlight the absence of an effective market-based mechanism to help prevent potential greenwashing behaviour. This underscores the importance of clear policy guidance by regulators and efforts by supervisors to ensure the credibility of sustainability-related claims.

ESG controversies and greenwashing

The corporate sector has a key role to play in supporting the transition to a low-carbon economy, including by adapting its activities in such a way that they are compatible with the Paris Agreement objectives of holding the global average temperature increase this century to well below 2°C above pre-industrial levels. At the same time, investors are increasingly concerned about climate change and social issues, such as growing levels of inequality (Brou et al., 2021), which increases pressure on firms to account for their impact on the environment and society (Cadez et al. 2018; Raimo et al. 2021).

Consequently, firms are now increasingly putting forward pledges to improve their environmental and social performance, for example, by committing to cut greenhouse gas emissions or to implement social safeguards throughout their supply chains.[2] Sustainability-related corporate communication can take various forms, including the publication of non-financial statements,[3] or in the financial sector the inclusion of ESG-related terms in financial product names (Amzallag et al., 2023). Meanwhile, public concern is rising over companies engaging in selective disclosure while possibly glossing over their true ESG performance (Marquis et al., 2016). This is leading consumers, investors and regulators/supervisors to take a growing interest in understanding if companies' sustainability commitments, objectives and statements are mirrored by their actions.

Responding to the appetite for sustainability-related information from independent sources, ESG data providers collect information on a variety of environmental and social controversies – such as modern slavery, pollution and oil spills – and sell it to investors to support their investment decisions, including through ESG

ratings and scores. *ESG controversies* are allegations put forward by stakeholders and shared via local or international media, singling out individual firms or whole sectors with regard to their potential negative impact on environmental and social factors. This includes greenwashing controversies, which can be broadly defined as allegations put forward by stakeholders of perceived misalignment between sustainability-related communications and corporate actions.

Concrete evidence on the financial impact of greenwashing remains limited for now. Du (2015) looks at the impact of greenwashing incidents on firms' cumulative abnormal returns in China between 2011 and 2012 and finds strong evidence of a negative relationship around the time of the incident exposure. Ghitti et al. (2023) confirm the existence of a negative relationship between various measures of potential greenwashing, and firm value, measured using Tobin's Q ratio.[4]

One obstacle to the study of greenwashing is the absence of a universally accepted definition in terms of scope, intentionality or degree of falsehood (Gatti et al., 2019). In light of the European Commission's request to provide advice on greenwashing risks and supervision,[5] the European Supervisory Authorities (ESAs) have set out a high-level common understanding of greenwashing: *'a practice where sustainability-related statements, declarations, actions, or communications do not clearly and fairly reflect the underlying sustainability profile of an entity, a financial product, or financial services. This practice may be misleading to consumers, investors, or other market participants'* (ESMA, 2023).

Against this background, and in line with the European Commission request to monitor potential greenwashing and the potential impacts

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[2] See McKinsey Sustainability: Does ESG really matter – and why? and Harvard Business Review: Why Companies aren't living up to their climate pledges.

[3] See Governance Accountability Institute, Inc.: 2021 Sustainability Reporting in Focus.

[4] Calculated as the sum of market value of equity and book value of liabilities, divided by the sum of book value of equity and book value of liabilities. See Brainard and Tobin (1968); Lewellen and Badrinath (1977).

[5] See European Commission: Request for input to the [European Supervisory Authorities] related to greenwashing risks and supervision of sustainable finance policies.

from greenwashing-related risks, [6] this article takes a deep dive into the role that ESG controversies can play to detect potential greenwashing. Controversies can be useful to monitor reputational risks stemming from greenwashing allegations. However, they provide information on greenwashing *perceptions*, which is not the same as greenwashing *occurrences* – reflecting the fact that greenwashing is mainly '*a phenomenon in the eye of the beholder*' (Seele and Gatti, 2017) – and introduces a subjective dimension. Since perceptions can, to some extent, drive investment decisions, we also explore the relationship between greenwashing controversies and key financial metrics such as stock returns and firm valuation and find no clear evidence of an effect. Our findings highlight the absence of an effective market-based mechanism to help prevent greenwashing behaviour. This underscores the importance of clear policy guidance by regulators and efforts by supervisors to ensure the credibility of sustainability-related claims.

Identification and monitoring

Although they only constitute one possible source of information, resources open to the wider public such as reports, (social) media platforms and public investigations can provide an indication of how prevalent greenwashing concerns are. Indeed, information shared by the media can play a decisive role in reducing information asymmetry and creating new information available to a wide audience (Du, 2015). Controversies stemming

from media attention can thus serve as a useful signal of broader public attention. Reflecting the potential influence that controversies can exert on investor allocations, some industry bodies have recently called for controversy data to be brought into the scope of EU regulation to increase transparency.[7]

We leverage RepRisk data, which screens a wide array of news sources in 23 languages on a daily basis for ESG-related incidents, or controversies, which can have a negative reputational or financial impact on a company.[8] These incidents are mapped to 28 ESG issues, including 'misleading communication incidents' which closely mirror existing definitions of greenwashing. [9] As a first step, we collect granular data on 933 misleading communication incidents between 1 January 2020 and 31 December 2021 involving European firms from the STOXX Europe 600 index (as of July 2022). RepRisk provides additional details on the sector the firm operates in, the severity of the incident and the reach of the medium, as along with a detailed description of the incident and a link to the original source.[10]

Recent evidence shows that the number of misleading communication incidents has increased in the EU since 2012 across sectors (EBA, 2023). However, misleading communication is not synonymous with greenwashing. Therefore, as a second step, we aim to identify which misleading communication incidents specifically relate to potential corporate greenwashing practices. [11]

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[6]   *Ibid*.

[7]   See Responsible Investor: Corporate groups raise concerns about controversy scores in ESG ratings, 14 September 2023.

[8]   For further details, see: RepRisk methodology overview.

[9]   RepRisk defines misleading communication incidents as situations '*when a company manipulates the truth to present itself in a positive light, but contradicts this image through its actions, or misleads consumers about its products and services*'.

[10]   RepRisk defines severity as '*a function of three dimensions: firstly, what are the consequences of the risk incident (e.g. with health and safety: no further consequences, injury, death); secondly, what is the extent of the impact (e.g. one person, a group of people, a large number of people); and thirdly, was the risk incident*

caused by an accident, by negligence, or intent, or even in a systematic way. There are three levels of severity: low severity, medium severity, and high severity." Reach of the information sources is defined as "*the influence based on readership/circulation as well as by its importance in a specific country, according to RepRisk's own rating. All sources are pre-classified by reach: limited reach, medium reach, and high reach. Limited reach sources would include local media, smaller NGOs, local governmental bodies, and social media. Medium reach sources include most national and regional media, international NGOs, and state, national, and international governmental bodies. High reach sources are the few truly global media outlets.*'

[11]   As an illustration, a company accused of misleading consumers by advertising its plant-based product as

To do so, we rely on two methods: first, we identify through text-based search all incidents that contain the word 'greenwashing' in their title or description. However, this approach builds on the RepRisk definition of greenwashing, which is limited to incidents linked to environmental issues. It also introduces a dependency on the writing style of the specific media outlets, leading to variability in the identification of greenwashing-related incidents which we cannot control for.

Under a second approach, we manually tag incidents that are aligned with the ESA's common high-level understanding of greenwashing (ESMA, 2023). This definition is not limited specifically to environmental issues but also covers social and broader sustainability-related and impact claims. It also provides for a broader scope, including the absence of intentionality and the possibility of incidents occurring at different stages of the product or service lifecycle (e.g. manufacturing, delivery, etc.). [12] While this identification method also involves a degree of subjectivity, it allows us to assess the scale of potential greenwashing perceptions in line with the ESA's common understanding.

Between 1 January 2020 and 31 December 2021, 191 companies (i.e. 32% of the STOXX Europe 600 constituents) were involved in a total of 933 misleading communication incidents. We find that 70% of these incidents relate to greenwashing, but the share of incidents identified as greenwashing controversies varies greatly based on the identification method. While the word 'greenwashing' appears in 257 misleading communication incidents (28%), the manual approach leads to the identification of 630 greenwashing-related controversies (68%; Chart 1). This difference derives mainly from the fact that the manual approach captures all misleading sustainability claims (i.e. not only environmental ones but also misleading social or impact claims) and highlights the importance of convergence in definitions and scope of greenwashing for supervisory monitoring

purposes. However it also underscores the need for careful evaluation of the data and the importance of adopting reliable assessment methods when using ESG controversy reports.

Chart 1
Greenwashing in misleading communication incidents
Identification varies according to definition
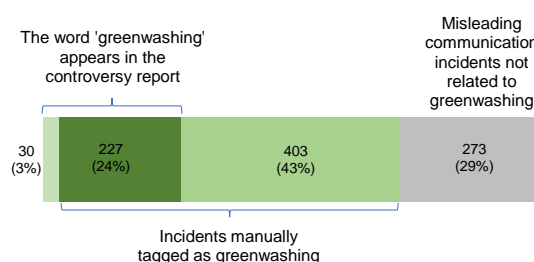
Note: Number and % share of misleading communication incidents related to potential greenwashing between 1 January 2020 and 31 December 2021, involving the constituents of the STOXX Europe 600 index (composition as of July 2022).
Sources: RepRisk, ESMA.

We further observe a growing trend in the frequency of greenwashing controversies (Chart 2), regardless of the identification method. However, in line with EBA (2023), it is not clear whether this reflects growing public attention to sustainability issues, in an effort to enhance transparency for consumers and public authorities and to hold firms' accountable for their activities, or an increase in the number of actual greenwashing occurrences. Yet, the growing flow of greenwashing-related news confirms the relevance of the topic from a risk perspective.

'steak' qualifies as a misleading communication incident but is not greenwashing.

[12] To establish a clear link between greenwashing controversies and individual firms, cases where the incident did not directly involve the firm but only other

firms within the same sector or region of operations have been excluded.

Monthly number of greenwashing controversies
Growing frequency

Note: Monthly count of greenwashing controversies involving STOXX Europe 600 firms. Dotted lines are linear trends.
Sources: RepRisk, ESMA.

environmental and a social component (32%), e.g. when a firm' disposes chemical waste in the environment which subsequently causes health issues in the local community.[14]

Greenwashing controversies by type
Environmental controversies dominate
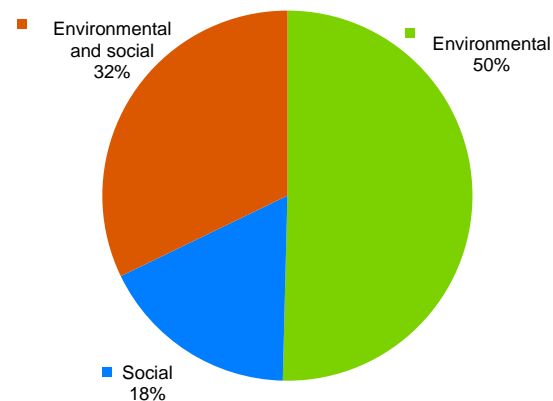
Note: Share of environmental, social and environmental and social greenwashing controversies (n=625) involving STOXX Europe 600 firms in 2020 and 2021.
Sources: RepRisk, ESMA.

Relying on the ESAs' broader common understanding further allows us to categorise greenwashing controversies as environmental, social or both. We observe that just half of greenwashing controversies relate to purely environmental issues (Chart 3). [13] One of the most typical cases pertains to firms claiming to act as environmentally responsible while increasing their greenhouse gas emissions or becoming involved in highly polluting activities. In contrast, only 18% of greenwashing controversies refer to purely social issues, for example human rights abuses. This difference may reflect a growing focus on climate-related issues following the Paris Agreement in 2015 and the increasingly tangible effects of climate change. It may also be driven by the comparably more developed understanding of environmental aspects in ESG investing, which supports the ability of stakeholders to assess and verify firms' environmental claims. Yet, incidents are not always clear-cut and often contain both an

When categorising greenwashing controversies based on the main sector in which the companies operate, [15] a significant clustering can be observed within the oil and gas sector, followed by the financial sector [16] and the food and beverage sector (Chart 4). Collectively, these three sectors account for over half of all greenwashing controversies. Additionally, more than one quarter (28%) of all greenwashing risk incidents relate to only five firms in our sample (with four out of these five firms from the oil and gas sector), implying that the same firms tend to be the target of multiple greenwashing allegations. The partial correlation we observe between firm size and the number of greenwashing controversies reinforces the view that public scrutiny – which is presumably greater

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[13] The analysis focuses on environmental and social aspects due to the highly cross-cutting nature of governance factors: many environmental and/or social incidents also contain an element of governance, e.g. failure to adhere to internal policies, or omission of information.

[14] While we account for these interlinkages, we are also mindful of the fact that almost all environmental issues can have a potential effect on social aspects, thus our

approach only contains those incidents where the social component was explicitly mentioned in the incident description.

[15] Firms can operate in multiple sectors. However, to avoid double counting, we only consider the main sector each firm is operating in.

[16] For banks, incidents relate either to the actions of the banks themselves or to the firms they were lending to.

for larger firms – is an important factor behind the emergence of controversies.

Greenwashing controversies by sector
Controversies concentrated in three sectors
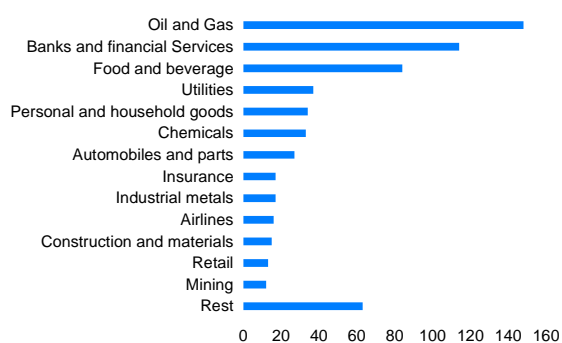
Note: Number of greenwashing controversies grouped by sector.
Sources: RepRisk, ESMA.

Our findings highlight some of the challenges involved in using ESG controversies data for greenwashing monitoring purposes. Nonetheless, there are two important takeaways for financial supervisors: the frequency of greenwashing controversies has increased in recent years, and controversies are significantly concentrated within three sectors, including the financial sector. A growing greenwashing-related news flow involving financial sector firms warrants monitoring to ensure that public trust in the ability and willingness of the financial sector to finance the low-carbon transition remains.

Financial impact

A question of particular interest to financial supervisors is whether there is any financial impact from greenwashing controversies. Greenwashing-related financial risks can stem from the materialisation of reputational risk or legal risk (ESMA, 2023). Reputational issues from greenwashing allegations can harm a firm's credibility and trigger further risks to its financial standing. Reputational and litigation risks can exist on their own but also mutually reinforce each other.[17]

As discussed above, greenwashing controversies are not synonymous with greenwashing occurrences. The absence of a universal definition introduces an additional degree of subjectivity. This matters when it comes to the public perception of greenwashing behaviour and may dilute the financial impact of greenwashing controversies.[18]

To explore these questions, we run an event study to assess whether the observed stock returns of companies involved in greenwashing controversies deviate from the expected returns. We also complement this with a multivariate time-series analysis to investigate whether greenwashing controversies help explain stock returns. Finally, we run a cross-sectional regression to test the relationship between greenwashing controversies and firm valuation.[19]

Impact on stock returns

While stock prices increased overall during the sample period, they fell sharply around the COVID-19-induced market turmoil in early 2020 before turning positive across sectors (Chart 5).[20] The sector split further highlights divergences in the timing and extent of this recovery, with for example firms operating in the oil and gas sector recording a steeper initial decline than peers in other sectors.

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[17] For example, legal fees can negatively impact a firms' financial standing and further tarnish its reputation.

[18] In this section we mainly rely on the manual identification of greenwashing controversies explained in the previous section. Results based on the keyword identification yielded similar overall findings.

[19] To do this, we enrich the dataset on greenwashing controversies with daily closing share prices and monthly

price-earnings ratios from Refinitiv Eikon between January 2020 and December 2021.

[20] We perform two robustness checks to control for the potential impact of this exogenous market shock: i) splitting the dataset into different time periods around COVID-19; ii) introducing a dummy variable during the March to mid-April 2020 market turmoil.

STOXX 600 Europe stock prices by sector

Positive returns despite COVID-19 turmoil
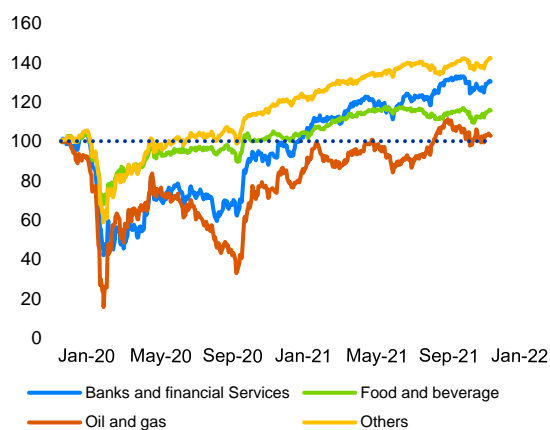
Note: Average daily stockreturns by sector, indexed 1 January 2020=100.
Sources: Refinitiv EIKON, ESMA

We start by assessing whether stock returns deviate from their expected value around greenwashing controversies by comparing a company's actual returns to its expected returns. The resulting cumulative abnormal returns (CARs) allow us to isolate the impact of an event beyond what can be explained by general market movements (Kolari and Pynnonen, 2010).[21]

Table A.1 in Annex presents the resulting CARs across a selected number of event windows,[22] together with the results of a one-sample *t*-test assessing whether abnormal returns significantly deviate from zero. CARs are on average positive during the first 10 days following a greenwashing

controversy before turning negative for longer event windows. However, the *t*-test shows that all the results are statistically non-significant, highlighting the absence of conclusive evidence to support the notion that greenwashing controversies have an impact on stock returns. These results are robust to various checks based on the severity of the controversies and reach of the medium (i.e. focusing on the most widely read news outlet).[23] This suggests that greenwashing controversies only have a very limited impact on the overall reputation of the firms involved.

A relevant question is whether stock returns react differently to event-specific characteristics. We observe positive, statistically significant CARs during the 10 days that follow environmental greenwashing controversies, before turning negative and non-significant beyond 10-day windows (Table A.2 in Annex). These results appear mainly driven by the large, positive CARs of a few firms operating in the oil and gas sector.[24] In contrast, greenwashing controversies with a social dimension exhibit negative but statistically non-significant CARs.

Additionally, we check whether greenwashing controversies have a different impact when they originate from non-governmental organisations (NGOs). NGOs are very active in the sustainable investment sphere (with 50% of greenwashing controversies in our sample originating from them) and are perceived as a credible source of information due to their political and economic independence. However, CARs following NGO-originated controversies remain non-significantly

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[21] To estimate the expected returns of each company, we regress firm-specific returns on market returns following the Capital Asset Pricing Model (Sharpe, 1964):

$$r_{it} - r_t^f = \alpha_i + \beta_i[r_t^m - r_t^f] + \varepsilon_{it}$$

where r_{it} is the log returns of firm I on day t, r_t^f is the daily risk-free rate, r_t^m is the daily log returns of the STOXX 600 Europe index. Expected returns are then computed as $E[r_{it}] = \widehat{\alpha}_i + \widehat{\beta}_i E[r_t^m - r_t^f]$ from which we obtain CARs of company i from $t1$ to $t2$:

$$CAR_{i,[t1,t2]} = \sum_{t=t1}^{t2}(r_{it} - r_t^f - E[r_{it}])$$

In our baseline model, the estimation window for expected returns runs from 1 January 2020 until December 2021. To avoid overlap between the event and estimation windows, all results are checked using alternative estimates of *alpha* and *beta* based on daily returns from 2019, and 10 to 20-day windows before each controversy.

[22] In line with the literature (e.g. Du, 2015), our event windows start from t-1 (i.e. the day before the publication of the controversy) to control for the possible effects of trading on insider information. We investigated multiple time windows, ranging from one day (t+1) up to ninety days (t+90) after the first publication of the greenwashing controversy (when the information became public).

[23] We split the sample into (i) controversies with low reach vs. those with medium or high reach to assess if the impact differed depending on the breadth of the potential audience; and into (ii) controversies categorised by RepRisk as not severe vs. those categorised as severe or very severe to assess if the impact changed depending on the provider's own assessment of the incident.

[24] One possible explanation is that some greenwashing allegations were made in reaction to the announcement of new business ventures in the oil and gas sector, to which stock markets may react positively.

different from zero, possibly because some NGO reports focus on indirect controversies (e.g. those related to a firm's supply chain) or concern only a small or remote part of a group's broader operations – with a limited impact on the financial standing of the group. Lastly, we identify greenwashing controversies where the controversy report includes at least one legal keyword (26% of our sample).[25] CARs following greenwashing controversies with a potential legal risk remain non-statistically different from zero, confirming the absence of any clear impact from greenwashing allegations on stock returns, even in the presence of a potential legal risk.

To complement the event study, we run a multivariate panel regression examining the relationship between greenwashing controversies and daily stock returns.[26] In line with the event study, we run separate regressions where the greenwashing variable captures controversies with an environmental dimension only, with a social dimension only, and with both an environmental and a social dimension. Beyond the sign and statistical significance of the greenwashing variable, the value of the R-squared is of particular interest to understand whether greenwashing controversies help explain stock returns.

The results of the regressions are displayed in Table A.3 in Annex. None of the results are statistically significant, confirming the findings from the event study, and the R-squared does not change across the various sub-samples, confirming that greenwashing controversies do not help explain daily stock returns.[27]

Impact on firm valuation

Next, we assess the value-relevance of greenwashing controversies by employing a cross-sectional regression analysis, using as the dependent variable price-to-earnings (PE) ratios averaged from 1 January 2020 to 31 December 2021.[28] Keeping everything else equal, if greenwashing controversies were priced in as a potential risk factor, a firm heavily involved in greenwashing controversies should display a lower PE ratio relative to other firms with similar characteristics.

As illustrated in Chart 6, there is no clear correlation between the number of controversies and PE ratios. The aim is to confirm this formally using statistical analysis.[29]

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[25] The list of keywords consists of 'litigation', 'lawsuit', 'fine(d)', 'sue(d)', 'attorney', 'judge', 'lawyers', 'barrister', 'trial', 'court', 'legal', 'prosecuted/tion'.

[26] The model is specified as follows:

$$r_{it} - r_t^f = \beta^0 + \beta^1 Greenwashing_{it} + \beta^2 X_{it}^{firm} + \beta^3 X_i^{country} + \beta^4 X_i^{sector} + \beta^5 X_t^{market} + \varepsilon_{it}$$

where $r_{it} - r_t^f$ is the daily log returns of firm *I* on day *t* minus the risk free rate; $Greenwashing_{it}$ is a dummy variable taking the value 1 on the day before, the day of and the day after the publication of a controversy involving firm *i* on day *t*; and X_{it}^{firm} is a vector of firm-specific controls which includes (i) daily implied volatility (VSTOXX), (ii) size (logarithm of firms' market capitalisation) (iii) leverage (ratio of total debt to total assets), (iv) liquidity (ratio of total trading volumes to shares outstanding), (v) profitability (return on assets), (vi) valuation (price-to-book value), and (vii) firms' exposure to ESG risk factors (ESG scores). We further include time-varying controls: market returns (STOXX Europe 600) and credit risk (3-month Euribor-OIS spread); and control for country and sector fixed effects.

[27] To ensure the robustness of our findings, we tested for multicollinearity between control variables, and whether the results changed based on the *severity* of the incident or the *reach* of the source (in line with Koelbel et al., 2017) or by excluding sectors with the highest count of

controversies. Additionally, we ran the same regression using a greenwashing dummy variable taking the value 1 on the day of and the day after the publication (but not the day before). We further ran an auto-regressive model, regressing returns on lagged returns, a greenwashing dummy variable taking the value 1 on the incident date, and market controls. This alternative model yielded the same results.

[28] We use averages rather than point-in-time observations to remove some of the noise behind the PE ratio estimates (e.g. negative ratios due to losses in a given quarter). We remove negative values and values above 1,000, leaving us with a final dataset of 439 observations after excluding firms with missing data points.

[29] The model to test the impact of greenwashing on PE values is specified as follows:

$$PE = \beta^0 + \beta^1 Greenwashing + \beta^2 X^{firm} + \beta^3 X^{country} + \beta^4 X^{sector} + \varepsilon$$

where $Greenwashing$ is either (i) a dummy variable taking the value 1 if a firm was involved in a greenwashing controversies during the sample period (Model 1) or (ii) the log value of the total count of greenwashing controversies involving a firm during the sample period (Model 2). The first model allows us to test whether

Chart 6

Greenwashing controversies and PE values
No clear correlation
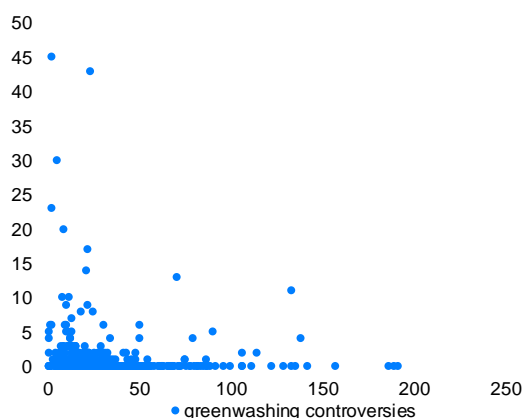
Note: Greenwashing controversies recorded between January 2020 and December 2021 (y-axis), and PE value (x-axis) per firm for STOXX Europe 600 firms. PE value as average between January 2020 and December 2021. Sources: RepRisk, Refinitiv Datastream, ESMA.

One drawback of PE ratios is their lagging nature, since corporate earnings are based on the previous accounting period while stock prices integrate all available information to date. Therefore, as an additional step, we run a similar regression using forward PE ratios. [30] The hypothesis tested here is that greenwashing controversies reduce future earnings if investors penalised firms involved in such controversies. All other things equal, this should lead to a higher forward-PE ratios relative to other firms with similar characteristics.

The results of the regressions are displayed in Table A.4 in Annex. In Model 1 and Model 2 (PE ratios), the coefficients of the greenwashing variables are negative (as expected), however they remain consistently statistically non-significant. In Model 3 and Model 4 (forward PE ratios), while the coefficient for the log count of greenwashing controversies is positive as

expected, the greenwashing dummy variable coefficient is negative. Here again, both results are statistically non-significant, confirming that greenwashing controversies do not appear to be value-relevant for firms during the period analysed.

Overall, our findings suggest that investors and markets did not pay close attention to greenwashing-related controversies in 2020 and 2021. While there is anecdotal evidence that, in specific instances, markets did react to greenwashing-related financial news flow, [31] this does not appear to have been the case in most cases. However, the subjective dimension of ESG controversies and a divergent understanding of what greenwashing stands for imply that these findings should be interpreted with caution.

Conclusion

In this article, we explore the role that ESG controversies can play in supporting efforts to address potential greenwashing. This analysis contributes to ESMA's mandate to ensure financial market stability and investor protection in response to the European Commission request for input on greenwashing risks.

First, we look into the possible use of greenwashing controversies for monitoring purposes. The identification of greenwashing-related controversies is not straightforward since greenwashing tends to mean different things to different stakeholders. Moreover, ESG controversies provide information on greenwashing *perceptions*, which are not the same as greenwashing *occurrences,* adding to the subjectivity. This means ESG controversies do not necessarily provide reliable information on the scale of greenwashing taking place. At the

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investors react in general to firms' involvement in any greenwashing controversy. With the second model we check if investors penalise firms for being repeatedly involved in greenwashing controversies. X^{firm}, $X^{country}$ and X^{sector} are firm, country and sector-specific controls as in the multivariate regression, averaged from 1 January 2020 to 31 December 2021.

[30] Forward PE ratios are calculated by dividing average share prices by the one-year forecast earnings per share

as of December 2021 (from Refinitiv Datastream). This forward-looking measure thus allows us to test for the potential impact of greenwashing allegations on expected earnings (Model 3 and Model 4), using the same greenwashing variables as in Models 1 and 2 (binary value and log count).

[31] See Financial Times: DWS shares slide after greenwashing claims prompt BaFin investigation, 26 August 2021.

same time, greenwashing-related controversies are important from an investor-protection perspective as they reflect public perceptions of greenwashing, which may lead to reputational issues for the firms involved and influence investor portfolio allocations.

We document that the frequency of greenwashing controversies involving European firms increased between 2020 and 2021. The allegations tend to be concentrated within a few firms belonging to three main sectors, including the financial sector. A growing greenwashing-related news flow highlights the increasing relevance of the topic which warrants future monitoring, in particular in the financial sector, to ensure that public trust in the ability and willingness of the financial sector to finance the low-carbon transition remains.

The growing coverage of greenwashing in the media raises further questions about the potential financial impact on firms. This is important from an investor protection angle, and in line with ESMA's strategic priority to address the potential risks to markets and investors from greenwashing. To explore this, we look specifically at stock returns and valuation metrics. Overall, the results of our analysis show that greenwashing controversies did not have a clear, systematic negative financial impact on firms in 2020 and 2021, suggesting that investors and markets did not pay close attention to greenwashing-related controversies. However, the subjective dimension of ESG controversies and the absence of a common definition for greenwashing imply that these findings should be interpreted with caution. Growing levels of public scrutiny on sustainability-related claims also highlight that investor and market reactions to greenwashing controversies may well change in the future. Overall, our findings highlight the absence of an effective market-based mechanism to help prevent potential greenwashing behaviour. This underscores the importance of clear policy guidance by regulators and efforts by supervisors to ensure the credibility of sustainability-related claims.

Related reading

Amzallag, A., Mazzacurati, J. and Mosson, N. 2023: "ESG names and claims in the EU fund industry." ESMA TRV Risk Article, 2 October 2023.

Brainard, W.C. and Tobin, J. 1968: "Pitfalls in Financial Model Building." The American Economic Review, Vol. 58, No 2, pp. 99-122.

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Annex

CARs around greenwashing controversies
No significant impact on stock returns

	N	Average	p-value
CAR [-1: 1]	542	0.1259	0.4757
CAR [-1: 2]	541	0.2207	0.3336
CAR [-1: 3]	535	0.1880	0.5131
CAR [-1: 4]	530	0.2183	0.4727
CAR [-1: 5]	529	0.1824	0.5997
CAR [-1: 6]	527	0.1683	0.6900
CAR [-1: 7]	524	0.0858	0.8532
CAR [-1: 8]	520	0.0224	0.9637
CAR [-1: 9]	519	-0.1374	0.7989
CAR [-1: 10]	515	-0.2770	0.6313
CAR [-1: 15]	504	-0.2834	0.7039
CAR [-1: 20]	496	-0.1656	0.8353
CAR [-1: 25]	484	-0.2435	0.7609
CAR [-1: 30]	466	-0.4605	0.5859

Note: Cumulative abnormal returns (CARs) for STOXX 600 Europe firms involved in greenwashing controversies (n=542) between 1 January 2020 and 31 December 2021 across different event windows.
Sources: RepRisk, Refinitiv EIKON, ESMA.

CARs around greenwashing controversies, environmental vs. social
Positive impact for environmental greenwashing controversies

	Environmental			Environmental + Social			Social		
	N	Avg	p-value	N	Avg	p-value	N	Avg	p-value
CAR [-1: 1]	213	0.732	0.035	219	-0.266	0.166	104	-0.239	0.358
CAR [-1: 5]	209	0.904	0.002	210	-0.323	0.258	104	-0.191	0.609
CAR [-1: 10]	206	0.236	0.572	201	-0.760	0.056	102	-0.307	0.621
CAR [-1: 15]	200	-0.133	0.793	197	-0.457	0.345	101	-0.174	0.802
CAR [-1: 20]	197	-0.227	0.669	194	-0.097	0.865	99	-0.095	0.894
CAR [-1: 25]	196	-0.328	0.552	185	-0.240	0.688	97	0.089	0.904
CAR [-1: 30]	188	-0.607	0.344	177	-0.333	0.629	95	-0.232	0.775

Note: Cumulative abnormal returns (n=542) for STOXX 600 Europe firms involved in environmental, environmental and social, and social greenwashing controversies between 1 January 2020 and 31 December 2021 across different event windows.
Sources: RepRisk, Refinitiv EIKON, ESMA.

Table A.3
Panel regression analysis results
Greenwashing controversies not a significant driver of returns

GW	0.0003			
GW_ES		0.091		
GW_E			-0.097	
GW_S				-0.173
Market returns	1.044***	1.044***	1.044***	1.044***
Volatility	-0.004***	-0.004***	-0.004***	-0.004***
Bank risk	0.644***	0.644***	0.644***	0.644***
Size	0.017*	0.018*	0.018	0.018
Liquidity	0.008	0.008	0.008	0.008
Leverage	-0.051**	-0.051**	-0.050**	-0.050*
Profitability	0.001	0.001	0.001	0.001
Valuation	0.001	0.001	0.001	0.001
ESG score	-0.001***	-0.001***	-0.001***	-0.001***
Country fixed effects	Yes	Yes	Yes	Yes
Sector fixed effects	Yes	Yes	Yes	Yes
Intercept	0.012	0.012	0.009	0.009
Adjusted R^2	*0.337*	*0.337*	*0.337*	*0.337*
Observations		284,224		

Note: Panel regression of daily stock returns on greenwashing controversies involving STOXX Europe 600 firms, from 1 January 2020 to 31 December 2021. GW = dummy variable taking the value 1 on the day before, the day of and the day after a greenwashing controversy; GW_ES = dummy variable for greenwashing controversies with an environmental and social dimension; GW_E = dummy variable for greenwashing controversies with an environmental dimension only; GW_S = dummy variable for greenwashing controversies with a social dimension only. *=90% confidence level, **=95% confidence level, ***=99% confidence level.
Sources: Refinitiv EIKON, RepRisk, ESMA.

Table A.4
Cross-sectional regression analysis results
Impact of greenwashing controversies on valuation is not significant

	PE ratio		Forward PE ratio	
	Model 1	Model 2	Model 3	Model 4
GW_dummy	-2.06		-2.92	
Log(GW)		-1.33		0.94
Size	4.81**	4.52	-1.43	-2.48
Liquidity	3.19	3.12	1.13	0.94
Leverage	-22.4***	-22.6***	-29.6***	-30.4***
Profitability	-1.46***	-1.45***	-1.09***	-1.11***
Valuation	2.97***	2.97***	2.47***	2.51***
ESG score	-0.18**	-0.19*	-0.06	-0.06
Country FE	Yes	Yes	Yes	Yes
Sector FE	Yes	Yes	Yes	Yes
Intercept	-3.89	-1.25	62.8***	72.3***
Adjusted R^2	*0.40*	*0.40*	*0.49*	*0.49*
Observations	*439*	*439*	*447*	*447*

Note: Cross sectional regressions of (i) price-earnings ratio (averaged from 1 January 2020 to 31 December 2021) on two different greenwashing variables and (ii) forward price-earnings ratio as of December 2021. In Model 1 and Model 3 greenwashing is a dummy variable taking the value 1 when the firm has been involved in at least one greenwashing controversy during the sample period. In Model 2 and Model 4 greenwashing is the log count of greenwashing controversies in which the firm has been involved over the sample period. *=90% confidence level, **=95% confidence level, ***=99% confidence level.
Sources: Refinitiv EIKON, RepRisk, ESMA.