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The stock price of European insurance companies: What is the role of ESG factors?

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ABSTRACT

The study investigates the effect of environmental, social, and governance (ESG) ratings on the stock price of European insurance companies using the event study methodology. ESG ratings play an important role in the pricing of insurance firms, and an upgrade results in a stock price increase, while a downgrade leads to a decrease. The market is particularly responsive to ESG rating upgrades and downgrades during the Pre-Paris period, suggesting that ESG ratings can have a significant impact on the equilibrium and efficiency of the stock market. ESG factors are important in investment decision-making and in promoting sustainable business practices.

1. Introduction

Integrating ESG factors is essential for insurance companies to demonstrate their commitment to sustainability and attract socially responsible investors (PRI, 2020). The authorities are introducing new regulations to promote ESG practices (e. g. SFDR-Regulation 2019/2088 and Regulation 2020/852), and stakeholders are demanding more responsible behavior (Su et al., 2020). By prioritizing ESG considerations, insurance companies can improve their financial performance, reputation, and access to capital, as investors are focusing on companies that demonstrate strong ESG credentials (Dimson et al., 2020).

The literature on the impact of ESG factors on insurance stock prices is still relatively limited (Colquitt et al., 2006; Thistlethwaite and Wood, 2018; Thomä et al., 2021; Stechemesser et al., 2015). A recent review by Broccardo (forthcoming) highlights the gap in academic studies on environmental disclosures in financial institutions, including the insurance sector. This study aims to fill this gap by analysing the effect of ESG ratings on the value of insurance firms using cumulative abnormal returns (CAR) as a proxy for corporate value.

We focus on the insurance industry for two main reasons. First, because this sector plays a key-role in the transition to a low-carbon economy and transition risks could create financial risks for lenders and investors. Insurance companies (together with other financial institutions, such as banks) are relevant actors in achieving sustainability goals because they allocate a huge amount of financial resources: they can exacerbate climate-related risks if they support (investments and underwriting) brown activities; they can promote the transition to a low-carbon economy if they take into account the potential climate change impact of their investments, loans, and insurance contracts. Second, the physical risks related to global warming can have a direct impact on the insurance industry due to their special activity (Wang and Kutan, 2013; Ferreira and Karali, 2015). Exposure to physical climate change risks is more relevant for non-life companies and derives from both extreme weather events and gradual global warming (EIOPA, 2022). While the relationship

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Table 1

Distribution of ESG rating announcements by country. The table reports the distribution of ESG rating announcements divided by country and type of announcements (upgrades and downgrades).

Country	Insurance companies	Announcements	Upgrades	Downgrades
Austria	2	5	4	1
Belgium	1	10	6	4
Denmark	3	6	5	1
Finland	1	7	5	2
France	3	12	7	5
Germany	6	19	11	8
Italy	5	21	14	7
Netherlands	3	16	11	5
Norway	3	9	7	2
Poland	1	9	7	2
South Africa	1	6	4	2
Spain	2	10	7	3
Switzerland	5	22	13	9
Turkey	4	4	3	1
United Kingdom	16	54	34	20
Total	56	210	138	72

between the insurance industry and environmental risks is clear and relevant, there appears to be more work to be done to manage these risks. [EIOPA \(2022\)](#) highlights some critical issues in European insurance companies related to the absence of analyses on climate change and the limitations in providing both a qualitative assessment of global developments and data and evaluations at a level of granularity necessary for an in-depth evaluation of such risks. Understanding the impact of ESG ratings on insurance companies is essential for managing these risks and promoting sustainable investment practices, and for providing valuable insights into how ESG factors impact insurance companies, their customers, and the wider society. It can also help to identify best practices for managing ESG risks and opportunities and to develop new tools for measuring and reporting on ESG performance.

The study is relevant to the broader literature on ESG issues and financial institutions as it focuses on the impact of ESG factors on insurance companies. The research extends the previous papers that have focused on sustainability in banks (e.g. [Di Tommaso and Thornton, 2020](#) and [Galletta et al., 2022](#)) and provides insights into the importance and reliability of ESG ratings (e.g. [Berg et al., 2022](#); [Drago et al., 2019](#) and [Hartzmark and Sussmann, 2019](#)). This research can shed light on the importance and reliability of ESG ratings and it provides important insights into the impact of ESG ratings on the value of insurance companies which is an important factor for the investor's decision-making process. By shedding light on the impact of ESG ratings on the value of insurance companies, this research has the potential to inform investors and policymakers about the importance of ESG considerations in the insurance sector.

2. Methodology

To measure the stock market's reaction to the upgrade or downgrade announcements, we apply an event study methodology ([MacKinlay, 1997](#)). We define the announcement of the ESG rating upgrade or downgrade as the "event" and we estimate the market model based on daily stock returns in several event windows.¹ To avoid that other events may affect the reaction of the stock market, we check whether in the 10 days preceding and succeeding the upgrade or downgrade there are other announcements related to the insurance companies. To calculate the daily stock returns we use the following market model:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt}) \quad (1)$$

where AR_{it} is the abnormal stock return that is the difference between the observed returns and the expected returns for each insurance company over the different event windows, R_{it} is the observed stock return, and $(\alpha_i + \beta_i R_{mt})$ is the expected stock and CDS return estimated for each event. To estimate the market return, R_{mt} , we use the Europe Insurance stock index provided by Datastream. The event study is performed over an estimated window of 120 trading days, i.e. $[-150; -30]$ where $t = 0$ is the event day. For each event window, we carry out OLS estimates of daily abnormal returns and aggregate them to estimate the cumulative abnormal returns (CAR) in each event window.

To verify whether an upgrade or downgrade on ESG rating in insurance companies has a significant impact on the stock price and, on average, it is significantly different from zero, we carry out two different non-parametric tests: bootstrapped standard errors and the Wilcoxon test. In addition, we also evaluate the sign of the CAR.

A negative response of the stock market to a downgrade and, vice versa, a positive response to an upgrade would imply that the ESG rating announcements are value-enhancing for insurance companies. Under this view, investors consider companies with higher ESG ratings to be more profitable than companies with lower ESG ratings. This effect might be due to a reputation effect achieved by companies greater involved in ESG activities.

¹ $[-5, +5]$, $[-3, +3]$, $[-1, +1]$ and $[0, +1]$.

Table 2

Event study: reaction of the stock market to ESG rating announcements. The table reports the CARs in the stock market (in%) in response to the announcements of an ESG rating announcement. Panel A reports the reaction of the stock price to ESG rating upgrade announcements. Panel B reports the reaction of the stock price to ESG rating downgrade announcements. Significance is tested according to two non-parametric tests: bootstrapped standard errors and the Wilcoxon test. We report the p-value of the two tests.

Event window (days)	[-5, +5]	[-3, +3]	[-1,+1]	[0,+1]
Panel A: Reaction of the stock market to ESG rating upgrade				
CAR (%)	0.068	0.137	0.060	0.094
Bootstrap (p-value)	(0.0000)***	(0.0000)***	(0.0025)***	(0.0000)***
Wilcoxon test (p-value)	(0.0007)***	(0.0000)***	(0.0000)***	(0.0000)***
Panel B: Reaction of the stock market to ESG rating downgrade				
CAR (%)	-2.221	-1.616	-0.615	-0.870
Bootstrap (p-value)	(0.0000)***	(0.0000)***	(0.0000)***	(0.0003)***
Wilcoxon test (p-value)	(0.0000)***	(0.0000)***	(0.0128)**	(0.0013)***

***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

3. Data

To construct the data set, we first identify all insurance companies included in Refinitiv ESG Europe. We extract the daily time series of ESG ratings from Refinitiv ESG Europe from 2011 to 2021. For each insurance company, we retrieved the corresponding stock daily price denominated in euros from Datastream. Our final dataset is composed of 56 insurance companies located in 15 countries.² We identify 210 ESG rating announcements divided into 72 downgrades and 138 upgrades. Most of the announcements are related to insurance companies located in the UK, Switzerland, Italy, and Germany. Specifically, as reported in Table 1, 25.71% of ESG rating announcements are related to insurance companies located in the UK, 10.48% in Switzerland, 10.00% in Italy, and 9.00% in Germany. A detailed distribution of ESG rating announcements by country and types of announcements is reported in Table 1.

4. Empirical results

The results, reported in Table 2, show the reaction of the stock market to the ESG rating upgrade (Panel A) and downgrade (Panel B) announcements separately. We report the average CAR coefficient, bootstrapped standard errors and Wilcoxon for each event type.

The results are consistent with those emerging from the (ongoing) debate on whether ESG significantly impacts the value and risk of the company (Drago et al., 2019; Di Tommaso and Thornton, 2020; Shanaev and Ghimire, 2022). Our findings indicate that ESG rating upgrades lead to an increase in stock price, signaling that insurance companies benefit from an improvement in ESG rating. This positive impact is lower than 1% in all event windows. In contrast, the announcement of a downgrade in ESG rating leads to a decline in stock price. The negative announcement reduces the stock price by more than 1% in the event windows [-5, +5] and [-3, +3], and the reaction subsides in subsequent event windows.

The asymmetric response of the stock market to ESG rating upgrades and downgrades could have significant implications in terms of incentives for companies to take action on ESG issues. In line with Shanaev and Ghimire (2022), the market's reaction is more pronounced in the case of downgrades, which could incentivize insurance companies to focus on maintaining their ESG compliance based on past actions and strategies. However, the minor relevance of upgrades may represent a weaker incentive for companies to innovate and do better in achieving ESG goals.

One possible explanation for this asymmetric response could be that investors tend to focus more on negative news or risks. Moreover, a downgrade in ESG ratings could signal higher risks, potential regulatory action, and reputational damage, which could have significant implications for a company's financial performance. On the other hand, upgrades may not receive as much attention since they may not signal as much risk or potential downside. Overall, this asymmetric response underscores the importance of maintaining and improving ESG performance over time, as well as the need to prioritize addressing ESG risks and weaknesses before they result in downgrades and negative market reactions.

As a result, it may be necessary for investors and regulators to consider alternative ways to incentivize companies to improve their ESG performance continually. According to a provocative view, our findings signal the potential arising of a distortive incentive. It highlights that, in the next future, ratings need to further focus on forward-looking rather than backward-looking measures.³

To further investigate the reaction of the ESG rating announcements on the stock market in relation to political actions and regulations, we split our sample into different sub-samples in relation to the period in which the announcements are made. Specifically, we identify four relevant periods from 2011 to 2021: (1) the *Brown period* from 30 June 2011 to 12 December 2015 (signature of the Paris Agreement); (2) the *Pre-Paris period* from 13 December 2015 to 3 November 2016 (the Paris Agreement comes into force); (3) *Paris period* from 4 November 2016 to 11 December 2019 (Announcement of EU Green Deal); (4) *Green deal period* from 12 December

² Austria, Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Poland, South Africa, Spain, Switzerland, Turkey, United Kingdom.

³ As robustness, we run the analysis by excluding the non-European countries, as they are subject to different ESG regulations. The results, reported in Table A1 in the appendix, are qualitatively similar to the main results.

Table 3

Event study: reaction of the stock market to ESG rating upgrade by period. The table reports the CARs in the stock market (in%) in response to the announcements of an ESG rating announcement. Panel A reports the reaction of the stock price to ESG rating upgrade announcements during the Brown period (30/06/2011 to 12/12/2015). Panel B reports the reaction of the stock price to ESG rating upgrade announcements during the Pre-Paris period (13/12/2015 to 03/11/2016). Panel C reports the reaction of the stock price to ESG rating upgrade announcements during the Paris period (04/11/2016 to 11/12/2019). Panel D reports the reaction of the stock price to ESG rating upgrade announcements during the Green deal period (12/12/2019 to 31/12/2021).

Event window (days)	[-5, +5]	[-3, +3]	[-1,+1]	[0,+1]
Panel A: Brown period				
CAR (%)	0.166	0.166	0.020	0.062
Bootstrap (p-value)	(0.0000)***	(0.0000)***	(0.8496)	(0.0141)**
Wilcoxon test (p-value)	(0.0007)***	(0.0000)***	(0.4691)	(0.0090)***
Panel B: Pre-Paris period				
CAR (%)	0.457	0.413	0.257	0.255
Bootstrap (p-value)	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Wilcoxon test (p-value)	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Panel C: Paris agreement period				
CAR (%)	0.014	0.072	0.054	0.104
Bootstrap (p-value)	(0.0002)***	(0.0068)***	(0.8740)	(0.0001)***
Wilcoxon test (p-value)	(0.0030)***	(0.0002)***	(0.0063)***	(0.0000)***
Panel D: Green deal Period				
CAR (%)	0.030	0.118	0.049	0.065
Bootstrap (p-value)	(0.6612)	(0.0000)***	(0.4478)	(0.0651)*
Wilcoxon test (p-value)	(0.0055)***	(0.0000)***	(0.0601)*	(0.0016)***

Significance is tested according to two non-parametric tests: bootstrapped standard errors and the Wilcoxon test. We report the p-value of the two tests.

***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Table 4

Event study: reaction of the stock market to ESG rating downgrade by period. The table reports the CARs in the stock market (in%) in response to the announcements of an ESG rating announcement. Panel A reports the reaction of the stock price to ESG rating downgrade announcements during the Brown period (30/06/2011 to 12/12/2015). Panel B reports the reaction of the stock price to ESG rating downgrade announcements during the Pre-Paris period (13/12/2015 to 03/11/2016). Panel C reports the reaction of the stock price to ESG rating downgrade announcements during the Paris period (04/11/2016 to 11/12/2019). Panel D reports the reaction of the stock price to ESG rating downgrade announcements during the Green deal period (12/12/2019 to 31/12/2021).

Event window (days)	[-5, +5]	[-3, +3]	[-1,+1]	[0,+1]
Panel A: Brown period				
CAR (%)	-3.259	-1.645	0.614	0.054
Bootstrap (p-value)	(0.0000)***	(0.0003)***	(0.5469)	(0.5573)
Wilcoxon test (p-value)	(0.0007)***	(0.0000)***	(0.3380)	(0.5656)
Panel B: Pre-Paris period				
CAR (%)	-7.116	-4.845	-3.561	-3.184
Bootstrap (p-value)	(0.0000)***	(0.0000)***	(0.0000)***	(0.0004)***
Wilcoxon test (p-value)	(0.0000)***	(0.0000)***	(0.0000)***	(0.0008)***
Panel C: Paris agreement period				
CAR (%)	-0.308	-0.508	-0.902	-1.215
Bootstrap (p-value)	(0.0022)***	(0.1915)	(0.0016)***	(0.0114)**
Wilcoxon test (p-value)	(0.3424)	(0.1714)	(0.0192)**	(0.0030)***
Panel D: Green deal Period				
CAR (%)	-0.232	-1.113	-0.178	-0.276
Bootstrap (p-value)	(0.0249)**	(0.0052)***	(0.0357)**	(0.0987)*
Wilcoxon test (p-value)	(0.5140)	(0.0010)***	(0.4065)	(0.4906)

Significance is tested according to two non-parametric tests: bootstrapped standard errors and the Wilcoxon test. We report the p-value of the two tests.

***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

2019 to 31 December 2021.

Table 3 reports the results for the ESG rating upgrade divided by periods. The reaction of the stock market to ESG rating announcements depends on the period in which the announcement is made. In general, the stock market has had a positive and statistically significant reaction to an announcement of an ESG rating upgrade. However, the reaction is more evident if the announcement is made during the *Pre-Paris period* (around 0.4% in the event windows [-5, +5] and [-3, +3] and 0.2% in the event windows [-1, +1] and [0, +1]). In all other periods, the reaction of the stock market is lower.

Table 4 reports the reaction of the stock market to the ESG rating downgrade divided by periods. The stock market reacts to the announcement of a downgrade in all periods. However, the reaction of the stock market is greater for announcements made during the *Pre-Paris period* in which the announcement of an ESG rating downgrade declines the stock market from 7.1% (in the event windows

Table 5

Event study: reaction of the stock market to E, S, and G rating announcements. The table reports the CARs in the stock market (in%) in response to the announcements of an E rating announcement. Panels A, C, and E report the reaction of the stock price to E, S, and G rating upgrade announcements, respectively. Panels B, D, and F report the reaction of the stock price to E, S, and G rating downgrade announcements, respectively. Significance is tested according to two non-parametric tests: bootstrapped standard errors and the Wilcoxon test. We report the p-value of the two tests.

Event window (days)	[-5, +5]	[-3, +3]	[-1,+1]	[0,+1]
Panel A: Reaction of the stock market to E rating upgrade				
CAR (%)	0.023	0.0322	0.026	0.028
Bootstrap (p-value)	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Wilcoxon test (p-value)	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Panel B: Reaction of the stock market to E rating downgrade				
CAR (%)	-0.602	-1.174	-1.171	-0.294
Bootstrap (p-value)	(0.0000)***	(0.0000)***	(0.0000)***	(0.0694)*
Wilcoxon test (p-value)	(0.0000)***	(0.0000)***	(0.0000)***	(0.1532)
Panel C: Reaction of the stock market to S rating upgrade				
CAR (%)	0.094	0.212	0.112	0.126
Bootstrap (p-value)	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Wilcoxon test (p-value)	(0.0001)***	(0.0000)***	(0.0000)***	(0.0000)***
Panel D: Reaction of the stock market to S rating downgrade				
CAR (%)	0.624	0.6487	-0.017	0.464
Bootstrap (p-value)	(0.9950)	(0.2403)	(0.3807)	(0.1921)
Wilcoxon test (p-value)	(0.9416)	(0.5139)	(0.7475)	(0.1240)
Panel E: Reaction of the stock market to G rating upgrade				
CAR (%)	0.025	0.099	0.061	0.065
Bootstrap (p-value)	(0.0130)**	(0.0000)***	(0.0000)***	(0.0000)***
Wilcoxon test (p-value)	(0.0679)*	(0.0000)***	(0.0000)***	(0.0000)***
Panel F: Reaction of the stock market to G rating downgrade				
CAR (%)	-1.025	-0.619	-0.147	0.216
Bootstrap (p-value)	(0.9164)	(0.0281)**	(0.0000)***	(0.9488)
Wilcoxon test (p-value)	(0.0590)*	(0.0000)***	(0.0000)***	(0.1418)

***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

[-5, +5]) to 3.1% (in the event windows [0, +1]).

The different reactions of the stock market in the identified periods signal that the market is more sensitive to the announcement of ESG rating upgrades and downgrades during the period from 2015 to 2016.

These results could have several motivations. First, the study's findings suggest that the market may have a self-responsibility approach towards ESG issues, as seen by the more intense market reaction before 2015. This contradicts the idea that investors only care about financial returns and may signal a need for specific regulation. With reference to the periods after 2015, the smaller reactivity of the markets could signal that they are confident in the regulation and in the new attention by (supranational and national) governments towards ESG issues and that they can ultimately use less attention and fewer reactions. Second, as underlined by [Galletta et al. \(2022\)](#) was the key year for ESG issues. People, government and policy authorities became aware that there was no more time to curb climate change. The policy authorities have started to be wondering about the link between climate change and financial stability. Specifically, the Bank for International Settlements (BIS) in the 'Green Swan' report underlines how climate change might be a new form of systemic financial risk. This has contributed to turning the spotlight on the importance of ESG rating in financial firms. In the period in which the policy authorities have started to raise attention on the environmental, social and governance issues by providing several actions to accelerate the process to reduce greenhouse gas emissions and create a low-carbon and climate-resilient economy, ESG rating upgrades and downgrades have become more relevant to price the insurance companies.

Third, the most intense effect in the pre-Paris period could be attributed specifically to ESG ratings. The information content of the ratings and the attitude and practices of companies and the methods of computing ratings changed after 2015. The latter consideration relating to how the rating is measured requires an ongoing debate relating to the divergence of ESG ratings. The debate that must be taken into consideration, but which does not represent an object of specific interest for this work.

To conclude, it should be noted that it would be interesting to understand whether the effects of downgrades and upgrades on the value of insurance companies are transitory or permanent, and therefore to observe the phenomenon also in the years to come.

4.1. Further analysis

To further investigate the effect of upgrade and downgrade on the insurance stock market, we split the upgrade and downgrade announcements of the three different components of ESG factors.

[Table 5](#) reports the reaction of the stock market to an upgrade/downgrade in the Environment, Social and Governance Pillar Score. The results highlight the significance of the environment pillar score, which showed a greater impact on stock prices in response to a downgrade compared to the social or governance pillars. The results indicated that a downgrade in the environment pillar score can lead to a decline in stock prices by more than 1% within a window of [-3,+3] and [-1,+1]. Investors tend to pay more attention to the social pillar score in cases of an upgrade, as it can signal positive developments in employee relations, diversity and inclusion, and community involvement, which can enhance a company's reputation. However, the downgrade in the social pillar score may not have

the same impact as an environmental or governance downgrade, as investors may prioritize financial performance and other material factors over social concerns.

For insurance companies, the environment pillar score of ESG ratings is particularly crucial, given their high vulnerability to environmental risks. Environmental factors, such as climate change, can increase physical risks, including natural disasters, while transition risks, such as regulatory changes and shifting consumer behavior, can affect investment portfolios. Therefore, a strong environment pillar score can signal a commitment to managing these risks and may be viewed positively by investors and other stakeholders. On the other hand, insurance companies that consistently demonstrate strong social performance can build long-term trust and loyalty among their stakeholders, which can ultimately benefit their financial performance as well (Brogi et al. (2022)).

5. Conclusions

This paper provides empirical evidence of the impact of ESG rating announcements, divided into upgrades and downgrades, on insurance companies' stock prices. The research contributes to shed light on the importance of integrating ESG factors in the investment decision-making process and in the underwriting activity of insurance companies.

The study of ESG rating announcements on insurance companies' stock prices shows that the market's sensitivity to these announcements varies over time. The market was more sensitive to ESG rating upgrades and downgrades during the *Pre-Paris period*, from 2015 to 2016. This result has relevant implications for policymakers as it highlights the significance of the Paris Agreement in shaping investors' perceptions of the companies' sustainability performance. It also underscores the importance of considering the broader socio-political context in which ESG rating announcements are made, as this can significantly impact their market sensitivity and subsequent effects on corporate value.

The study shows that the environmental pillar score is the most important factor for investors, with a greater reaction to a downgrade in this score than to the social or governance pillars. Information about the social pillar score is important for investors in cases of an upgraded score, but investors may not react as strongly to a downgrade in the social pillar score. Insurance companies are particularly sensitive to climate risks, which makes the environment pillar score of ESG ratings crucial for them.

The findings of this analysis could have several implications for the insurance industry. They could help raise insurers' awareness of the need to manage climate-related risks, strategically and from a disclosure perspective. For example, they must adjust their business strategies to improve their ability to offer financial protection against these risks. This awareness is the key driver of a relevant transition to a climate risk strategy, which we envision as an approach rather than a summation of individual adaptation actions. We may think, for example, of a selection process capable of incorporating green factors rather than a (passive) increase in premiums due to the increase in climate risks. A simple increase in risk premiums could have a substantial negative impact in terms of insurability and social affordability (EIOPA, 2022), while an approach that considers green factors and incorporates them into the premium could improve the quality and effectiveness of the underwriting activity of insurance companies. Furthermore, focusing on the disclosure perspective, the results demonstrate the presence and functioning of the market discipline desired by the regulators. This discipline is capable of sanctioning or rewarding insurance companies, also in the context of climate risk management.

Our findings have important implications for rating agencies, policymakers, and market participants. Rating agencies should carefully review and update their methodologies to account for the potential distorting effect of downgrades, as our results show that downgrades have a greater impact on the market than upgrades. Additionally, rating agencies should take into consideration the specificities of the industries when attributing ESG ratings and communicate to the market how they deal with them. These actions may increase the credibility and transparency of ESG ratings, which is essential for promoting the efficient mobilization of capital to support climate-related objectives (OECD, 2022). Our results also support policymakers and financial authorities in their efforts to improve market efficiency by confirming the effectiveness of public intervention mechanisms. It is crucial to continue promoting concrete strategies and actions to promote ESG culture and objectives. Market participants should take into consideration the potential impact of ESG rating announcements on the value of insurance companies and use this information in their investment decisions.

To address the limitation of the analysis, future research could use alternative measures of ESG ratings and examine a longer time period to investigate the permanent or transitory nature of the impact of ESG ratings on the value of insurance companies. Finally, it would be interesting to investigate the role of other stakeholders, such as customers and employees, in the relationship between ESG factors and corporate value in the insurance sector.

CRediT authorship contribution statement

Caterina Di Tommaso: Conceptualization, Investigation, Data curation, Methodology, Formal analysis, Writing – original draft, Writing – review & editing. **Maria Mazzuca:** Conceptualization, Investigation, Data curation, Methodology, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

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

Table A1

European event study: reaction of the stock market to ESG rating announcements.

The table reports the CARs in the stock market (in %) in response to the announcements of an ESG rating announcement. Panel A reports the reaction of the stock price to ESG rating upgrade announcements. Panel B reports the reaction of the stock price to ESG rating downgrade announcements. Significance is tested according to two non-parametric tests: bootstrapped standard errors and the Wilcoxon test. We report the p-value of the two tests.

Event window (days)	[-5, +5]	[-3, +3]	[-1,+1]	[0,+1]
<i>Panel A: Reaction of the stock market to ESG rating upgrade</i>				
CAR (%)	0.0084	0.056	0.023	0.028
Bootstrap (p-value)	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
Wilcoxon test (p-value)	(0.0000)***	(0.0004)***	(0.0000)***	(0.0000)***
<i>Panel B: Reaction of the stock market to ESG rating downgrade</i>				
CAR (%)	-0.061	-0.043	-0.167	-0.025
Bootstrap (p-value)	(0.0000)***	(0.0000)***	(0.0010)***	(0.0000)***
Wilcoxon test (p-value)	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***

***, **, and * indicate statistical significance at the 1%, 5% and 10% levels, respectively.

Data availability

Data will be made available on request.

Appendix

Table A1.

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