

Water Insecurity and Climate Risk: Investment Impact of Floods and Droughts

Quintin Rayer^{1,1}, Karsten Haustein^{2,2}, and Peter Walton^{2,2}

¹P1 Investment Management Ltd, Coventry University

²University of Oxford

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Abstract

Concerns about water security often inform climate risk-related decisions made by environmentally focused investors (Porritt, 2001; Stern, 2006). Yet, potential liabilities for damage caused by extreme flood and drought events linked to global warming present risks that are not always reflected in share prices (Krosinsky et al., 2012). Considering the highly destructive nature of such events, we query whether companies, or specific sectors, could and should be held at least partially liable for their emission-releasing business activities. Recent articles (Rayer & Millar, 2018; Rayer et al., 2020) estimate that under a hypothetical climate liability regime, North Atlantic hurricane seasons might increasingly generate 1-2% losses on market capitalizations (or share prices) for the top seven carbon-emitting, publicly listed companies. In this paper, we extend the concept of the climate liability regime to estimate the impact of global flood- and drought-related damages on the share prices of nine fossil-fuel firms (including the seven mentioned by Rayer et al. (2020)). Following Rayer et al. (2020), we use incremental climate impacts and historical corporate emissions to estimate that climate change-related global flood and drought damages for the period of 2012 to 2016 amount to approximately 2-3% of the top nine carbon-emitting companies' market capitalizations. We also include a discussion of moral responsibility and the proportion of obligations between producers and users. Quantifying impacts from extreme weather events increases salience and serves as an example of how science can identify and address the important business questions, pertinent to both investors and companies, that arise from a changing climate. References Krosinsky, C., Robins, N., & Viederman, S. (2012). *Evolutions in sustainable investing*. John Wiley & Sons. Porritt, J. (2001). *The world in context*. HRH The Prince of Wales' Business and the Environment Programme, Cambridge. Rayer, Q. G., & Millar, R. J. (2018). Investing in Extreme Weather Conditions. *Citywire Wealth Manager*®, (429) 36. Rayer, Q., Pfeleiderer, P., & Haustein, K. (2020). *Global Warming and Extreme Weather Investment Risks*. Palgrave Macmillan. https://doi.org/10.1007/978-3-030-38858-4_3 Stern, N. (2006). *Stern Review executive summary*. London.

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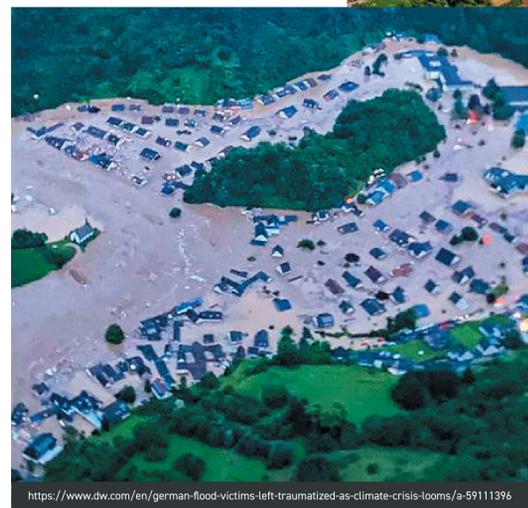
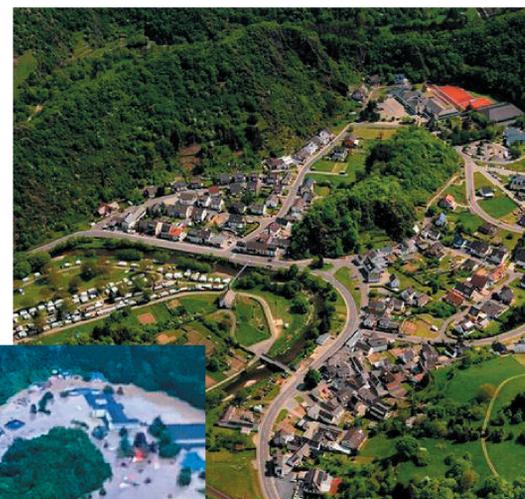
1. Head of Research & Ethical Investing, P1 Investment Management, Centre for Financial and Corporate Integrity, Coventry University ✉
2. Climate Service Center Germany (GERICS), Helmholtz-Zentrum hereon GmbH, 20095 Hamburg, Germany
3. UK Climate Impacts Programme (UKCIP), University of Oxford, Oxford, UK

Main Finding: Damages caused by global warming related extreme weather events can be linked to corporate emissions

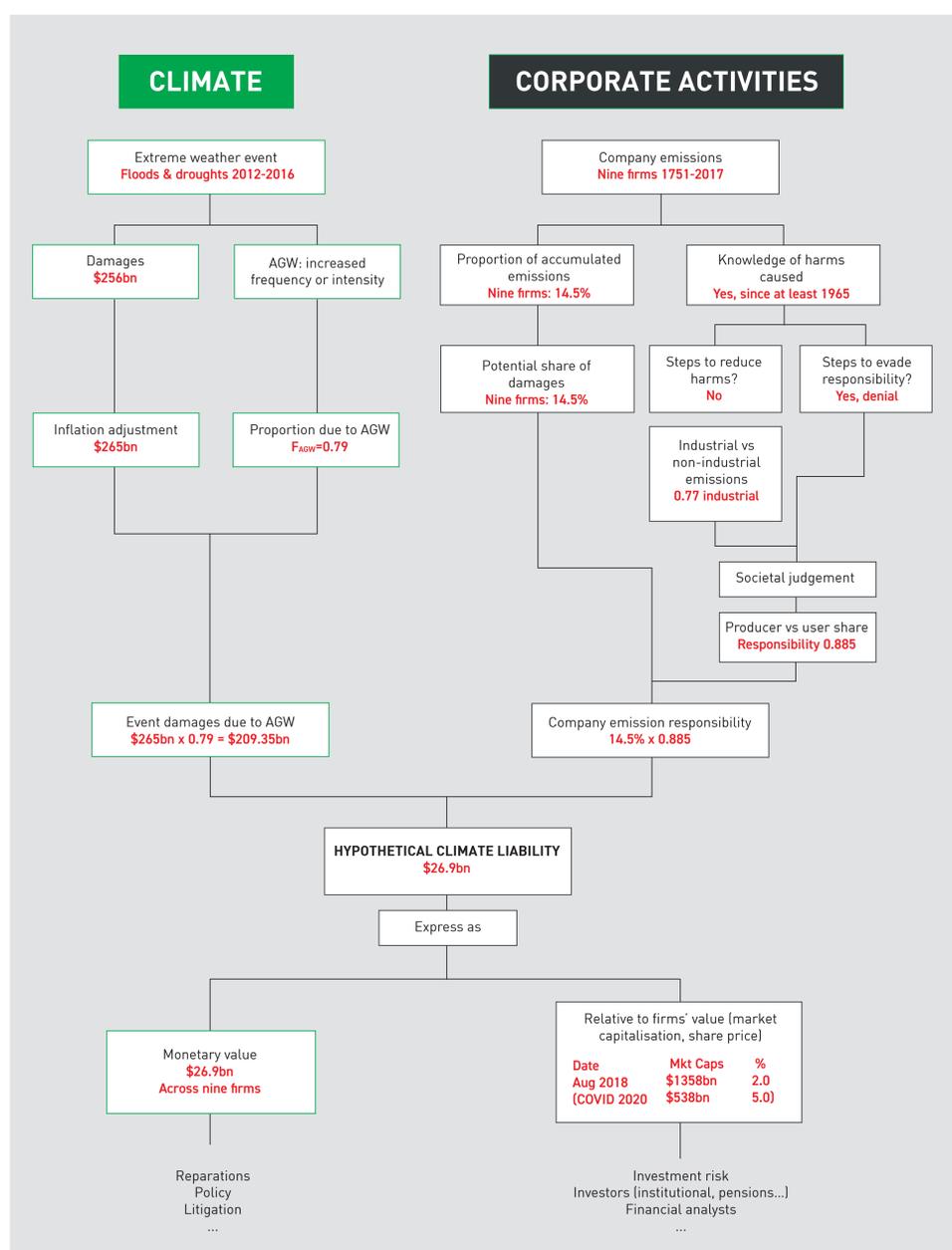
Investors should be concerned about climate risks. Potential liabilities for extreme flood and drought events linked to global warming may not be reflected in the share prices of high-emitting companies. Should high-emitting firms be held (at least partially) to account?

Hypothetical climate liability regime

Presenting impacts from extreme weather events in terms of emitting companies' values makes it easier to appreciate how climate damages relate to the share prices of emitters. This provides context for investors considering climate related risks as well as for corporate policy decisions.



<https://www.dw.com/en/german-flood-victims-left-traumatized-as-climate-crisis-looms/a-59111396>



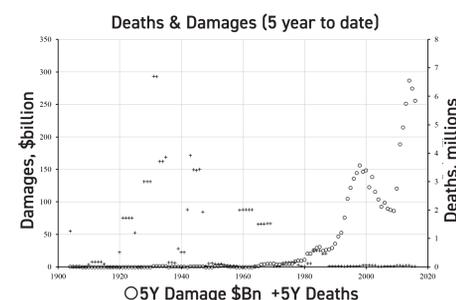
Extreme weather event attribution

A warmer atmosphere results in an intensified water cycle. Increased floods and more frequent droughts, can both occur. Case studies were used to estimate proportion due to AGW.

- 2017 Hurricane Harvey: event frequency increased at least three-fold.
- 2011 Thailand flooding: highest rainfall in the 61-year record.
- 2015-2017 South Africa, worst drought since 1904. Over 3x more likely.

Damages associated with floods and droughts

2012-2016: \$256bn damages globally
1985-1989: \$29bn damages globally
(Data from EM-DAT).



The emitters

Nine publicly listed firms were responsible for 14.5% scope 1 and 3 emissions between 1751-2017.

Who is responsible? Factors include: industrial versus non-industrial emissions, availability of products, and moral responsibility. Once dangerous climate consequences were known, did suppliers take steps to reduce harms?

Results

For the nine firms, estimates suggest a hypothetical climate liability equivalent to between 2% and 3% in share price terms for global floods and droughts over 2012-2016.

✉ Contact: Quintin Rayer quintinrayer@p1-im.co.uk

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