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Measuring Firm-Level Climate Change Exposure with social network and semantic analysis

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In this study, we create a new measure of climate change exposure using the Semantic Brand Score (SBS) by analyzing conference calls transcripts. SBS is a measure of brand importance calculated on text data, which combines methods of social network and semantic analysis. Specifically, we first construct climate-related dictionary from Intergovernmental Panel on Climate Change (IPCC) reports using a keyword extraction technique that leverages BERT embeddings. We have then expanded our dictionary with a measure of similarity derived from the analysis of conference calls' transcripts. Finally, we have measured the importance of climate change topics in each document, using our dictionary, to retrieve a unique measure of climate change exposure at the firm level. We demonstrate the superiority of our model compared to past literature. Additionally, by using the SBS, we can gather information about the sentiment in climate change discourse and the type of climate change exposure. Finally, we conclude our study by highlighting how this measure can be used to estimate the impact of climate policy uncertainty on the equity market. The main contribution of this study addresses a central problem in climate finance finding a firm-level measure to properly quantify risk and opportunities deriving from climate change. Numerous evidence suggest that the effects derived by future regulation and physical events are currently underestimated by market participants, leading to a potential mispricing of asset prices. Providing investors and regulators with a new measure can mitigate the potential negative effect of such mispricing.

Keywords

Climate change, Semantic Brand Score, Network analysis, Semantic analysis

Topics

- Applications of network analysis in multidisciplinary fields

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