

***Business Adaptation to Climate Change*, by Jorge E. Rivera, Chang Hoon Oh, Jennifer Oetzel, and Viviane Clement. Cambridge: Cambridge University Press, 2022. 284 pp.**

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Climate change brings with it a set of decisions that are unique to each firm on account of each firm's combination of business model, goods and services, capabilities, assets, liabilities, locations and climate, relationships with surrounding communities, governance of markets in which it operates, and other important considerations. As decisions about climate change continue making their way into managerial decision-making and strategizing, and as firms realize they can negotiate with people but not with nature, decisions surrounding climate change adaptation are quickly rising in importance.

Against this backdrop, the 2022 book by Jorge E. Rivera, Chang Hoon Oh, Jennifer Oetzel, and Viviane Clement, *Business Adaptation to Climate Change*, plays a vital role in helping fill the chasm in management research, where, still, few climate change articles are published relative to the salience of challenges it presents, including in business ethics. Climate change was highlighted as an area garnering "surprisingly little attention from business ethicists" more than a decade ago (Arnold, Audi, and Zwolinski 2010, 574). Although the body of work around "the ethics of who bears the cost of climate change, market solutions, and geoengineering and non-market solutions" (Bridge 2022, 2651) has grown, there has been less done on climate adaptation, perhaps because it involves adaptation to nonhuman forces; however, climate change adaptation decision-making and the impacts of adaptation measures should be of interest to ethicists.

Rivera et al. contribute important insights about how businesses adapt to climate change through two overarching research questions: "How do businesses adapt to chronic slow-onset nature adversity conditions linked to climate change?" and "How do firms adapt to weather-related natural disasters exacerbated by climate change?" The book is organized into four parts over nine chapters. Part I introduces and sets the scene for the questions, contains initial definitions, and reviews literature on corporate adaptation to climate change, whereas part II develops the conceptual framing and propositions for later empirical work. Part III houses empirical studies, and part IV brings everything together, lays out conclusions, and suggests future research topics. In particular, parts II and III contain chapters that pair up to provide three studies of business adaptation to climate change in two contexts: the US ski resort industry and foreign investment by multinationals.

Rivera et al. aim to expand on theories of resilience to develop a conceptual framework to understand firms' reactions to sudden climate disasters, as well as chronic climate change events the authors call "slow-onset adversity conditions," and evaluate this framework with empirical studies. A convincing *overarching*

integrative conceptual framework of business adaptation to climate change that brings all three studies together is lacking—though this would have been a challenge given the empirical foci. In lieu of an overarching framework, the book presents three frameworks that conceptualize and examine how businesses adapt to slow-onset climate change, how they adapt foreign subsidiary investment in response to natural disasters, and how the intensity of climate change can affect and limit adaptation. These are all important aspects of how climate change affects climate change adaptation decision-making, and these remain important contributions to management scholarship.

Aside from this, Rivera et al. make other contributions to the practice of conducting climate change research in management. The book provides much-needed larger-*N* studies of the role climate change plays in decision-making, and it does so in innovative ways that complement climatic data with firm-level data. The authors also show widespread climate change effects and adaptive responses at the sector level (in this case, the ski industry) and by firm type (here, multinationals) that will help take forward our knowledge of both how firms adapt to climate change and how to undertake such research. More generally, they do an admirable job of summarizing their main findings to make them accessible to policy makers and professionals, who could find them useful for planning, while also providing in-depth details of methods and results for those wanting more granularity. The three studies are reviewed in the following paragraphs.

Chapter 3 pairs with chapter 6 to investigate firm adaptation to the intensity of climatic conditions and its relationship to “protective adaptation,” defined as adjustments made to preserve or extend business operations. In chapter 3, Rivera et al. review organizational adaptation and strategic management literatures to theorize whether unfavorable natural conditions evoke higher or lower levels of protective adaptation, arguing that whether adaptation is framed as beneficial versus constrained can help explain variance in protective adaptation activity. The authors develop five propositions that are assessed in chapter 6 using regression of longitudinal panel data that complement firm-level data from western US ski resorts with climatic data. Ski resorts are currently adapting to increasing temperatures as a chronic and increasingly intense climatic condition affecting snowfall. The dependent variable—protective adaptation—tracks yearly acres of slope expansion and snowmaking as ski resorts’ main ways to counter decreasing snowfall. Independent variables demonstrate how to complement firm-level and climatic data by measuring adversity intensity through daily temperatures, snowfall, temperatures over several specific thresholds, and the average temperature over the ski season.

Results indicate that adversity intensity has an inverted U-shaped relationship to protective adaptation, with resorts adapting less at lower intensity levels, activating more as adversity intensity reaches medium levels, then dropping again at higher levels. The authors argue that the inverted U-shaped relationship could be due to organizational inertia at lower levels of adversity intensity, which gives way to more adaptation as managers develop opportunities and capabilities at medium levels, whereas at elevated levels, nature begins to impose limits that make protective adaptation less viable. It has been argued for well over twenty

years that nature imposes limits on management, with publications like Hart's (1995) *A Natural Resource-Based View of the Firm* playing leading roles in these enquiries; Rivera et al. contribute important analysis suggesting that this may be the case at higher levels of adversity intensity, while pointing to avenues for future research about the role of inertia and capability building at lower levels of intensity.

Chapter 4 pairs with chapter 7 to investigate how natural disasters affect multinational foreign direct investment, comparing natural disaster impact on subsidiary investment to the impact of industrial disasters and terrorist attacks. In chapter 4, Rivera et al. review literature on country governance context and its relationship to investment decisions and literature on responses to external risk, primarily proposing that investment will drop more after technological disasters and terrorist attacks than for natural disasters and that investment will decrease in response to deadlier events of any type. Chapter 7 investigates these propositions using negative binomial regression of 31,285 subsidiary observations of 71 European firms in the Fortune Global 500. In another good example of melding firm-level data with climatic data, the dependent variable—subsidiary investment—tracked each firm's foreign subsidiaries, while independent variables primarily measured the severity of natural disasters (earthquakes, volcanic eruptions, water surges, extreme temperatures, floods, windstorms, droughts, wildfires, and landslides), industrial disasters, and terrorist attacks.

As proposed, results indicate that foreign direct investment decreased more for terrorist attacks and technological disasters compared to natural disasters, despite natural disasters typically occurring more often and being more costly and deadly. Two exceptions were windstorms and water surges, which had the most fatalities and led to disinvestment. The authors conclude that risks appear exaggerated for terrorist attacks and industrial accidents, whereas natural disasters may be excused as anomalous “acts of God,” despite their impacts often being more severe. This conclusion is plausible, though a competing explanation could be that decision-making is more severely affected for industrial and terrorist events because humans directly cause these, whereas for natural disasters, the link is indirect, via increased carbon emissions and their impact on climate.

Chapter 5 pairs with chapter 8 to examine whether multinationals are able to develop advantages from natural disaster experiences and how this compares to experience gained through managing technological disasters and terrorist attacks. Chapter 5 extends the literature on foreign investment risk responses, which has often studied responses to chronic risks like corruption and has attended less to episodic risks like natural disasters. Rivera et al. propose that experience managing natural disasters would lead firms to enter and expand in markets facing similar disasters and that experience responding to higher-impact disasters would lead firms to enter or expand into markets with similar risks. Then, in chapter 8, using 57,500 observations from 106 European multinationals and their subsidiaries, Rivera et al. again meld firm and subsidiary data with climatic data, using regression to examine the impact of type and number of disasters, their duration, fatalities, and subsidiary locations impacted on investment decisions. Findings reveal that experience gained

from all types of high-impact disasters led firms to expand their subsidiaries in countries in which they were already present but did not lead firms to enter new countries. One plausible explanation the authors offer is that firms may be able to identify postdisaster opportunities in existing host countries because the country context is understood, whereas this may be missing when evaluating postdisaster entry opportunities.

Through these three studies, Rivera et al. demonstrate how climatic data and sector-level, firm-level, and subsidiary-level data can be complemented to provide important insights into how firms adapt to climate change. The book also underscores how natural disasters that may in the past have been downplayed as anomalous “acts of God” are becoming increasingly more difficult to see as such and shows that firms are learning from experiences with such events by expanding within current markets rather than entering new markets. In the closing chapter, the authors also set out potential avenues of future research to continue building the body of knowledge about the interdependence between organizational and ecosystem resilience.

In the end, complementing climatic data with firm-level data is the scholarly future if we are to understand how firms can play a positive and resilient role in a climate-changed future. In their book *Business Adaptation to Climate Change*, Rivera et al. make an important step in this direction by reminding firms and scholars that “we are not free from nature, we are part of it, and our well-being is inseparable from the health of ecosystems” (225).

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