

Chapter 8

The Relationship Between Climate Change and Financial Stability

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ABSTRACT

Climate change is the greatest challenge of the modern day with the capacity to destabilize global financial systems and socioeconomic welfare. This chapter explores the uncertainties posed by climate change, its effects on the economy, the risks associated with the phenomenon, and approaches to manage them through risk management. Using documented evidence, climate change is shown to result in gross domestic product reductions; physical, transition, and liability risks that result to systemic financial problems characterized by liquidation of companies, losses for, and closure of financial firms and their intermediaries; and inability of investors to pay debts. Climate risk management is proposed as a solution to adapt to climate change and reduce its associated risks.

INTRODUCTION

The disturbance in the long-term of normally perceived weather patterns resulting from global warming is commonly referred to as climate change. According to Nyika (2020), the phenomenon is a great impediment to sustainable growth globally. The situation is of great concern among developing countries since their vulnerability is high and their resilience and preparedness are limited due to financial constraints and high poverty levels (Nyika, 2021). According to the Intergovernmental Panel on Climate Change (IPCC) (2018), anthropogenic-based activities have resulted in the warming of planet earth by 1°C above the pre-industrial levels. Consequently, storms, wildfires, droughts, and floods with catastrophic consequences are becoming regular occurrences. Current projections also show that these changes will have dire economic, environmental, and social impacts. A study by Kompas, Pham and Che (2018), for instance, suggested that if temperatures rise 4°C higher compared to pre-industrial levels in the next 8

DOI: 10.4018/978-1-7998-7967-1.ch008

decades, economic losses around the globe will rise to \$ 23 trillion every year and this would result in a crisis worse than the 2007-2008 financial crises globally. The magnitude and speed at which actions are taken to reduce greenhouse gas emissions will influence how much of the impacts of climate change can be overcome in the coming decades if sustainability is to be realized.

Climate change worsens pre-existent risks in addition to creating new ones for human and natural systems (IPCC, 2014). Global risks associated with climate change are highlighted by the World Economic Forum's Global Risk Report (World Economic Forum, WEF, 2016). In specific, the lax and inability to mitigate and adapt to climate change is ranked in the top five considering that the adverse effects of the phenomenon are systemic and pervasive (Zhao, Yan, Wang, Tang, Wu, Ding & Song, 2018). Besides, they affect all economies, industries, and classes of assets and people resulting in a negative impact on the financial system.

Climate change has severe consequences on financial stability as established in the literature (Aglietta & Espagne, 2016; Batten Sowerbutts & Tanaka, 2016; Scott van Huizen & Jung, 2017; Dafermos, Nikolaidi & Galanis, 2017, 2018). Notable cases that were linked to climate change effects include the bankruptcy of Pacific Gas and Electric (PG and E), which was California's largest electricity producer. In this case, climate change resulted in consumption and production disruptions as well as a reduction of the company's asset value (MacWilliams, LaMonaca & Kobus, 2019). Similarly, the former governor of the Bank of England, Mark Carney suggested that with ample evidence on the threatening nature of climate change, the phenomenon is likely to influence financial stability in the long term (Carney, 2015).

The risks associated with climate change can be categorized into two: 1) transition risks and 2) physical risks according to Dafermos et al. (2017, 2018). Physical risks are associated with economic damages resultant from extreme climate events while transition risks focus on the reassessment of carbon-intensive items and the consequences of shifting to a greener economy with low-carbon production. The majority of existent studies have focused on transition risks (Battiston, Mandel, Monasterolo, Schütze & Visentin, 2017; Stolbova, Monasterolo & Battiston, 2018; Trinks, Scholtens, Mulder & Dam, 2018) and only limited research is done on the physical risks (Dietz, Bowen, Dixon, & Gradwell, 2016; Bovari, Giraud & Mc Isaac, 2018). Gelzinis and Steele (2019) also identify the physical and transition risks as the results of climate change. In addition to these two risk categories, the Financial Stability Board, FSB (2020) introduces the liability risk as a result of climate change. Liability risks occur once parties are held responsible for losses affiliated with environmental destruction resulting from errors of omission or their actions. These forms of risks are discussed in more in this chapter. Assessing these risks irrespective of their type is crucial since it informs on the costs, environmental and ecosystem damages of inaction to climate change over the next generations, and economic development and sustainability. According to Oguntuase (2020), assessing the uncertainties associated with climate change to explain its risks and their financial implications is important following the precognition that the phenomenon is one of the modern day's global challenges. This book chapter will explore the uncertainties of climate change in relation to the outlined risks, the economic consequences of the phenomenon, and its impacts on financial stability in an intensive examination of the literature.

SCIENTIFIC UNCERTAINTY IN RELATION TO CLIMATE CHANGE

Since the confirmation of the role of carbon dioxide (CO₂) in climate change by Arrhenius (1896), many scientific authors have agreed that the phenomenon resulting in global temperature rises is manmade

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