

Empirical Analyses of Disaster Risk Reduction: Economic Impact, Adaptation, and Preparedness

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論 文 内 容 の 要 旨

Disasters have resulted in significant economic and human losses for millennia in human history. Recent notable events have brought the large human and material costs of these crises to the forefront of public attention worldwide. There is growing recognition by governments and organizations that building resilient communities and reducing disaster risk is a core initiative.

In September 2015, the Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development adopted by world leaders, and officially came into force since 2016. According to the United Nations Office for Disaster Risk Reduction (UNISDR), sustainable development cannot be achieved unless disaster risk is reduced. In terms of advancing these agendas, disaster risk reduction can play an important role.

This dissertation consists of five chapters including three main chapters studying the disaster impact on economic activity, death reduction and preparedness for future disasters.

The first chapter provides research background, an overview of previous disaster empirical research in the context of the economics literature, and the composition of the dissertation.

The second chapter examines the effects of natural disasters on economic growth across income levels in three dimensions: time frames, disaster severity, and disaster types. I use global disaster data from 1960-2010. The results show that the economic impact of a disaster event varies depending on the three dimensions and income levels that I have considered. While some types of less severe natural disasters have positive impacts, severe disasters have negative, long term impacts on economic growth. I also find for some disaster types that the magnitude of negative impact in the long run is larger than that of the short- and mid-run. My empirical evidence suggests the importance of long-term governmental and international assistance/support, especially in the case of a catastrophic disasters.

The third chapter analyses the effects of a country's own and nearby countries' past disaster experiences on subsequent disaster damage. I use global disaster data from 1990-2010, which include disaster-related death tolls for both natural and technological disasters that are further

divided into sub-categories. Overall, I find evidence that experience with past disaster damage leads to reductions in future disaster damage. More detailed analyses show that these reductions are apparent among certain combinations of disaster types and levels of economic development. For natural disasters, the results show that a country's own experiences reduce future damage but that the marginal effect is larger for lower-income countries. On the other hand, experiences with technological disasters have robust impacts in higher-income countries only. Regarding the disaster experiences of nearby countries, only experiences with natural disasters affect future damage reductions in higher-income countries.

The fourth chapter explores the impact of disaster experience on household preparation of emergency supplies for natural disasters. The data was collected from an original questionnaire in 2013. It covers more than 20,000 households throughout Japan, including those in areas with recent disaster experiences as well as those in areas with low disaster risks. Using data on household preparation of nine emergency items, I generate indices for three categories of preparedness: Basic Preparedness (BP), Energy/Heat Preparedness (EHP), and Evacuation Preparedness (EP). I use regression analyses to measure the effect of disaster experiences on the preparation of categories of emergency supplies. The results show that experience with disaster damage increases preparedness, but the magnitude of the impact varies among the item categories. Additionally, evacuation experience has a positive impact on the preparation of items from the BP and EP categories. Moreover, the people who experienced damage from the Great East Japan Earthquake (GEJE) in 2011 are relatively more prepared, but evacuation experience in the GEJE does not have a significant impact on preparedness. Furthermore, I find that some regions with higher future risk of large-scale earthquakes are less prepared compared to other regions. This result suggests the importance of policy makers' efforts to raise awareness of disaster risks and to combat insufficient preparedness to reduce future disaster damages.

Finally, the last chapter concludes and comments on future research directions suggested by this dissertation.