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Tohoku Gakuin University Shuetsu TAKAHASHI

The Great East Japan Earthquake (GEJE), which struck on March 11, 2011, had a massive economic impact, primarily on the affected areas in Japan. The Indian Ocean Tsunami hit Aceh and Nias, Indonesia, on December 26, 2004. This book examines the economic and human damage inflicted by megathrust earthquakes and tsunamis and analyzes the economic effects of policies for reconstruction and regional renewal after such catastrophes, using spatial economic models.

Fiscal reconstruction measures and new industry cluster formation give a light of hope to the disaster-affected region. Alfred Marshall's word "cool head but warm heart" are still said to be the ideal attitude for economists and regional scientists. This book analyzes the economic impact on the affected region by building some spatial economic models with the mind of a "cool head", and it presents the plans for reconstruction and regional revitalization with the mind of a "warm heart".

The contents of this book are as follows : Part I, Impacts of the Great East Japan Earthquake, is composed of three chapters that form a foundation on which further research on the economic impacts of earthquakes can be based. Part II, Reconstruction and Regional Renewal after the Great East Japan Earthquake, focuses on reconstruction and regional renewal after the GEJE given a declining Japanese population, using reconstruction budgets and industrial clusters. Part III analyzes the impact and reconstruction after the GEJE, in a depopulating society, as summarized in Parts I and II. Part III evaluates regional impacts of megathrust earthquakes and tsunamis such as the GEJE.

This book also asks five questions. First, what is the impact of the massive economic damage resulting from the GEJE and the industrial and fiscal reconstruction measures executed after this earthquake for a society with a declining population? To answer this question, an inter-regional social account matrix (SAM), an input-output (I-O) table, a geographically weighted regression (GWR) model and a two-region computable general equilibrium (2SCGE) model are used to empirically explain the economic impact of the GEJE in the afflicted and non-afflicted regions in Chapters 2 and 3. Chapter 4 examines supply chain disruptions from the GEJE in the automotive and electronic parts and devices industries.

The second question is whether fiscal reconstruction measures or regional industrial reconstruction policies are effective given a declining population. Using a dynamic two-region computable general equilibrium model (D2SCGE) assuming a declining population, Chapter 5 measures the economic impact of a reconstruction budget. Chapter 6 analyzes the effect of new industry cluster policies, based on a New Economic Geography (NEG) model incorporating the effects of regional and industrial reconstruction policies on the regional economies in the disaster-affected region assuming a declining population. The supposition of Chapter 6 is that in addition to agglomeration within the same industry, it is essential to form "new industry clusters" using innovation to promote agglomeration across different industries (co-agglomeration). By using a D2SCGE model, this chapter examines the role the formation of new industry clusters play in reconstruction and regional revitalization after an earthquake. Three policy instruments for promoting the formation of new

industry clusters are discussed: (1) subsidies and tax reduction policies, (2) a commodity-grade scenario with products (particularly intermediate goods) that have varying levels of inter-regional elasticity of substitution, and (3) a scenario with innovative TFP improvement. A dynamic computable general equilibrium (DCGE) model that assesses production recoveries after the disaster in the fishing and seafood industries is analyzed in Chapter 7. Using an I-O table, the process of reconstruction after the disaster, in the construction of a biogas electric power plant, is analyzed in Chapter 8.

The third question examines the impacts of an earthquake and of population migration given a declining population in a regional economy. Because the aforementioned D2SCGE model does not incorporate an explicit inter-regional population migration, and the first part of this question is answered by analyzing the impact of further population declines due to a major earthquake using an I-O table of Japan's 47 prefectures in Chapter 9. The second part of the question is answered using a NEG model that studies migrations caused by the GEJE and a Nankai Trough Earthquake in Chapter 10.

The fourth question asks whether, in the event of a major earthquake, advance measures impact the recovery process. This question is answered using a forward-looking, dynamic inter-regional CGE model, which analyzes different post-disaster recoveries for a Tokai Earthquake in Chapter 11.

The Indian Ocean Tsunami that occurred after the Sumatra Earthquake in December 2004 is used as a successful example of reconstruction after a major tsunami. The fifth question asks how central and local governments, NPOs, and the international community should contribute to the reconstruction effort after a major natural disaster. Chapter 12 proposes a set of policies that respond to damages caused by major natural disasters that are likely to occur in Asia in the future. It also analyzes the Sumatra Earthquake's impact on the Indonesian state of Aceh and its surrounding regions and conducts a time-series analysis of the reconstruction policies implemented after a large natural disaster and for regional revitalization.

In sum, each chapter of this book is worth reading as an individual research paper. This book, taken as a whole, is well organized to achieve its objectives. The appendix is very useful for readers who need to know the basic structure of the static and dynamic 2SCGE model.

This book is probably the most important regional science/economics book ever written in the sense that it offers spatial economic modelling of megathrust earthquakes.