Optimal disaster-preventing expenditure in a dynamic and stochastic model

Takumi Motoyama *
Graduate School of Economics, Osaka University

Abstract

The purpose of this paper is to present an analytical framework for an optimal disaster-preventing expenditure paid by a government. In this paper, we examine an optimal policy combination of tax rate, preventive expenditure for capital and infrastructure, and infrastructure investment in the neoclassical growth model where disasters occur stochastically and destroy an existing capital and infrastructure partially. First, we present a general model and consider the determination of optimal policy. Next, by using a specific functional form, we can obtain the unique optimal policy. Based on this model, we can show that the larger value of preventive expenditure can deter a capital accumulation. Also, under the optimal policy, an inverse-U shape relationship between the expected growth rate and the disaster probability is derived.

Keywords: Natural disasters, Disaster-preventing, Public capital
JEL Classification Numbers: E13; H54; Q54

*Graduate School of Economics, Osaka university, Address: 1-7 Machikaneyama, Toyonaka, Osaka 560-0043, Japan. E-mail: pge028mt@student.econ.osaka-u.ac.jp.