Geophysical Research Abstracts
Vol. 19, EGU2017-2563, 2017
EGU General Assembly 2017

Optimal investment and location decisions of a firm in a flood risk area using Impulse Control Theory

Johanna Grames (1,2), Dieter Grass (2), Peter Kort (3), Alexia Prskawetz (2,4)

(1) Centre for Water Resource Systems, TU Wien, Vienna, Austria (johanna.grames@econ.tuwien.ac.at), (2) Institute of Statistics and Mathematical Methods in Economics, TU Wien, Vienna, Austria, (3) Tilburg School of Economics and Management, Tilburg University, Tilburg, The Netherlandds, (4) Wittgenstein Centre (IIASA, VID/ÖAW, WU), Vienna Institute of Demograph, Vienna, Austria

Flooding events can affect businesses close to rivers, lakes or coasts. This paper provides a partial equilibrium model which helps to understand the optimal location choice for a firm in flood risk areas and its investment strategies. How often, when and how much are firms willing to invest in flood risk protection measures? We apply Impulse Control Theory to solve the model analytically and develop a continuation algorithm to solve the model numerically.
Firms always invest in flood defense. The investment increases the higher the flood risk and the more firms also value the future, i.e. the more sustainable they plan. Investments in production capital follow a similar path. Hence, planning in a sustainable way leads to economic growth. Sociohydrological feedbacks are crucial for the location choice of the firm, whereas different economic situations have an impact on investment strategies. If flood defense is already present, e.g. built up by the government, firms move closer to the water and invest less in flood defense, which allows firms to accrue higher expected profits. Firms with a large initial production capital surprisingly try not to keep their market advantage, but rather reduce flood risk by reducing exposed production capital.