

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

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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 and develop a continuation algorithm to solve the model numerically.

We find that, the higher the flood risk and the more the firm values the future, i.e. the more sustainable the firm plans, the more the firm will invest in flood defense. Investments in productive 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 settings 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 productive capital surprisingly try not to keep their market advantage, but rather reduce flood risk by reducing exposed productive capital.