



The economic-wide consequences of large-scale floods. How resilient is the European economy?

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For a successful adaptation strategy, it is necessary to have an in-depth understanding of the economic consequences of a flood. To assess the economic consequences of large-scale river floods in Europe, we introduce an integrated direct and indirect risk model for the European economy as a whole. The proposed methodology consists of multiple steps. First, a direct loss assessment is conducted for the 50 largest river basin districts in Europe, based on simulated floods for several return periods. Second, the direct losses in capital and labour are translated into the loss in production per sector. Third, the recovery of this production shock is modelled using a hybrid interregional input-output model, combining non-linear programming and input-output modelling. This combination makes it possible to find (1) the possible production losses in the affected regions and other European regions, (2) the required production in Europe to satisfy additional reconstruction demands from the affected regions and (3) the required production in other regions that is necessary to take over lost production in the affected region. Consequently, when knowing how much production is lost (or gained) in each region, the economic consequences can be assessed. Finally, the model outcome is loss estimation expressed in terms of expected annual damage. To assess these consequences, interregional supply and use tables are used, consisting of 256 different European NUTS2 regions. This data makes it possible to model the indirect losses for both the affected regions and the rest of Europe in detail. By combining the outcomes of all floods in all the river basin districts, it is possible to determine the flood risk of each region in Europe, even when a region is not directly hit by a flood. Consequently, the overall consequences for the European Union are found to be positive for small-scale floods and negative for large-scale floods.