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# LINKING SUSTAINABLE ENERGY CONSUMPTION AND ADAPTATION POLICIES AGAINST FLOODS

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## BACKGROUND AND CONTEXT

Under future climate change, floods are expected to be more frequent and the use of public funds to cover the damage will increase the pressure on public finances. The Organization for Economic Cooperation and Development has suggested establishing a budget to cover the cost of future extreme weather-related events. Countries such as Armenia, Indonesia, Japan, the Philippines and South Africa have set aside public funds to cover the cost of extreme events that range from 0.4% to 5% of central government expenditure.

Diverting public resources from education, health, etc. to these funds can translate into reductions in non-cash benefits that can increase inequality. Using taxes to finance funds against extreme events has already been implemented in some countries. The Austrian disaster fund is financed by 1.1% of federal income taxes, taxes on capital yield, and corporate taxes. There are also proposals to link sustainable consumption and adaptation policies. For instance, using revenues from carbon taxes to finance an international adaptation fund has been proposed in the literature. In addition, creating a climate liability market where liable polluters pay, as climate harm materializes, has also been suggested. However, energy taxes will also create a larger burden on low income households. In order to increase the social acceptability of this policy instrument, re-allocation of the revenue has been suggested.

The insights provided by this paper are threefold. First, a data-driven evaluation of the distributional effects of floods across different household types and income levels is provided. Second, the distributional effects of providing relief, and funding it through different tax mechanisms, are analyzed. Finally, the distributional effects of households covering the cost of a flood by themselves and getting government transfers that reward investments in risk reduction are analyzed.

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<sup>1</sup> This Bulletin summarizes the findings from: Tovar Reaños, M.A. (2021), "Floods, flood policies and changes in welfare and inequality: evidence from Germany", Ecological Economics.

## RESULTS

Using German data and a model of household consumption, it is found that economic losses after floods disproportionately harm low income households. In addition, income inequality, estimated at 0.11 with the Atkinson index, increases 0.14 percentage points after experiencing flood losses. Economic damages are computed by combining information on the past damages reported by the German insurance association and the probabilities of: living in a flood-prone area, living on a ground floor, investing in insurance and investing in flood mitigation. The average damage per household is found to be around €60 per year. Low income households are less likely to invest in insurance and flood mitigation and face the largest expected losses, expressed as a proportion of income.

The research shows that families with children and households with a head at retirement age are the most affected in terms of reduced consumption. Funding the relief from additional income taxes, real estate and carbon taxes can reduce the inequality caused by floods. When revenues from energy taxes are jointly used to compensate households for the regressive nature of the tax and to incentivise investment in risk reduction, further reductions in inequality can be achieved.

## POLICY DISCUSSIONS

In this paper, using German data it is found that the expected flood damage will disproportionately hurt low income households. The European Environmental Agency estimates that 95% of Irish territory is flood-prone as opposed to 9% of German territory. Consequently, the economic effects of floods in Ireland can be far greater than in Germany. According to the Environmental Protection Agency (EPA) in Ireland, flooding in the winter of 2015-16 superseded the worst floods in recorded history, in terms of economic losses. The EPA suggested that changing the division of responsibilities between the public and private sectors is key to the development of a more efficient societal response to increased climate change risks. In this article, it is shown that providing transfers from the additional carbon taxes in proportion to the investment in mitigation can reduce inequality. In Ireland, carbon taxation on energy consumption will play an important role in shaping the transition towards a more sustainable society. Consequently, as argued in this article, it is important to design policies where sustainable consumption and mitigation policies can be addressed jointly.

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