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Effects of climate uncertainties on welfare optimal investment streams into mitigation technologies

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We discuss a stylised portfolio of climate change mitigation options and ask the following question: what is the intertemporally optimal mix of these options under the boundary condition of a climate guardrail and uncertainty about the temperature response to rising carbon dioxide concentrations? We impose a guardrail that requires the increase of global mean temperature T to be limited to 2K with at least a minimum probability P (e.g., P=0.75). The uncertainty about the temperature response is captured by a PDF for climate sensitivity and ocean heat uptake. For economic optimisation, we use an ensemble-version of the growth model MIND [1]. As a key results we show that robust climate protection paths will require aggressive mitigation measures [2]. In this context it is also possible to ask for the economic potential of reducing uncertainty in climate sensitivity [3] and ocean heat uptake [4] that is generically by orders of magnitude larger than the costs induced by the related research programmes.

References

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