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The Role of Bioenergy and Carbon Capture and Storage (BECCS) in the Case of Delayed Climate Policy – Insights from Cost-Risk Analysis

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Cost-Risk Analysis (CRA), a hybrid of Cost-Effectiveness Analysis (CEA) and Cost-Benefit Analysis (CBA), has been proposed as an alternative to CEA as a decision criterion for evaluating climate policy. It weighs mitigation costs against associated risks of violating a predefined temperature guardrail, thereby enabling an analysis of otherwise infeasible temperature targets. Under CEA, delaying climate policy causes infeasibility of temperature targets which was resolved by the assessment under CRA. Indeed, CRA enables a quantitative evaluation of any delay scenario, thereby yielding information of the severeness of postponing climate policy. Alternatively, negative emission technologies have been included in CEA to enlarge the leeway in decision making and postpone infeasibility. This study closes the loop by evaluating the impact of the technology option BECCS (Bioenergy and Carbon Capture and Storage) in light of delayed climate policy under CRA. The work is conducted using the Integrated Assessment Model MIND (Model of Investment and Technological Development). This interplay creates the following insights: An inclusion of BECCS avoids corner solutions that were previously identified for delay scenarios, yielding a larger window of opportunity for action to mitigate climate change. Moreover, it postpones mitigation efforts into the future and removes the pressure to shut down fossil fuel use immediately. Thereby, mitigation-induced welfare losses are reduced substantially. BECSS, when evaluated under CRA, has confirmed well-known results from CEA. However, in contrast to results derived from CEA, mitigation-induced welfare losses decline with delay, while climate risk-induced welfare losses increase with delay by approximately the same magnitude. Hence within CRA, BECCS reduces the welfare effect of delayed climate policy by an order of magnitude. This underlines the crucial role of BECCS for the case of delay, even if one changes the decision-analytic framework from CEA to CRA and thereby softened the temperature target.