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Threshold Effects on Climate Change Policy

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THE UNIVERSITY OF WESTERN AUSTRALIA

Introduction:

Climate scientists have expressed concerns about possible sudden changes due to crossing a which there is a 10% loss in GDP due to sea level raise. In temperature threshold. For example, above a certain one scenario we assume this threshold occurs at 2°C. The temperature level, we may face melting of the ice other, has a probability distribution for the threshold, with sheets of Greenland and west Antarctica –events that mean 2°C would have large economic consequences due to rising sea levels (Yohe and Schlesinger 1998).



Although we suspect there may be a threshold temperature for this melting, there is high uncertainty about it. We study the economic consequences and policy implications of this uncertainty.

Research question:

How is optimal pricing of carbon emissions affected by uncertainty about the temperature threshold for major sea-level rise?



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Model:







We use the DICE model (Dynamic Integrated model of Climate and the Economy) developed by Nordhaus (2009) to test the effect of certain and uncertain thresholds.



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Results and conclusions

Results show the following:



DICE2007.htm). Theory, 14, 221–244. 447-472.

If there is a substantial increase in damage above a threshold temperature, the optimal carbon price is higher than for a scenario without such a threshold. • After about 50 years, the carbon price given a certain threshold becomes much greater than under an uncertain threshold.

• The optimal strategy under a certain threshold keeps the temperature just below the threshold, whereas the optimal strategy for an uncertain threshold does not prevent the temperature rising substantially.

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Yohe, G. W., and Schlesinger, M. E. 1998. Sea-level change: the expected economic cost of protection or abandonment in the United States. Climatic Change, 38(4),