The Uncertainty Premium of Climate Tipping Points *

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Abstract

Climate tipping points are shifts in the climate system that could lock the world into a higher-temperature regime. Many tipping points are characterised by Knightian uncertainty, that is, it is difficult to assign prior probabilities to their occurrence. This paper examines the economic costs of this Knightian uncertainty. To do so, I first derive optimal abatement policies for different tipping point scenarios using an integrated assessment model that includes temperature feedback effects. Then, I develop and compute a tipping point uncertainty premium on the social cost of carbon, as a function of different tipping point scenarios. I find that this premium on the social cost of carbon is between 12%-50% relative to complete-information scenarios. For tipping points triggered below 2.5° above pre-industrial levels, this uncertainty increases the social cost of carbon by between 20 and 40 US$ per tonne of carbon equivalent. Finally, I show that early discovery reduces the premium by 9%. This result illustrates that emission abatement policies in the coming decades are crucial in limiting tipping point risk, as early discovery might only offer moderate mitigation to the cost of uncertainty around tipping points.