

Title: **The Effects of the Length of the Period of Commitment on the Size of Stable International Environmental Agreement**

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Abstract

This paper examines how the length of the period for which the signatories of an International Environmental Agreement have to commit affects the size of self-enforcing agreements and their pattern over time. Previous literature on the subject has assumed either a single period of commitment of infinite length in a continuous time framework, or, in discrete time, a period of commitment of length fixed to one. This paper adopts an infinite horizon continuous time framework, but treats the length of the period of commitment as a parameter that can take any strictly positive value. It is thus possible to study the effect of exogenously varying the length of the period of commitment on the equilibrium size of the stable coalition and stock of pollution, as well as on their pattern of behavior over time. Except for the extreme case of a single period of commitment of infinite length, there will be an infinite number of periods of commitment, the length of which is exogenously given at the outset. At the begin of every period of commitment, each country decides whether or not to adhere to the agreement. The signatories then jointly decide on their emission rate for the period of commitment, while the non-signatories make that decision unilaterally. Using numerical simulations, it is shown that the length of the period of commitment can have a very significant effect on the equilibrium. Two distinct intervals for the length of the period of commitment can be identified, across which the equilibrium and its dynamic behavior differ considerably. It also appears that the length of the period of commitment that generates the lowest aggregate emissions is greater than that which generates the most partial gain from cooperation to the signatories and to the non-signatories, and that the non-signatories gain more than the signatories.

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