

## Two-Stage Bargaining with Reversible Coalitions: the Case of Apex Games

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### ABSTRACT

Apex games are a particular class of majority games with one distinguished player (the apex player) and  $n-1$  minor players. A winning coalition can be formed by the apex player together with at least one of the minor players, or by all the minor players together.

This paper studies coalition formation and payoff division in apex games under the following assumptions: first, payoff division can only be agreed upon after the coalition has formed (two-stage bargaining); second, negotiations in the coalition can break down, in which case a new coalition may be formed (reversible coalitions). These two assumptions seem reasonable in the context of government formation.

Compared with one-mailstage models with simultaneous coalition formation and payoff division, two-stage models may seem to protect the minor players. After all, once a minor player forms a coalition with the apex player the two players seem to be in a more symmetric position, and if coalitions were irreversible one would expect the two players to divide the payoff equally. However, when coalitions are reversible the minor players are actually worse-off in the two-stage model. I argue that insights and solution concepts from cooperative game theory like the nucleolus and the per capita nucleolus can help to understand this seemingly paradoxical result.

