

## (NON-)CONVERGENCE IN COALITION FORMATION GAMES

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In models of multi-agent interactions, deviations by coalitions of agents from one outcome to another may lead to situations in which a stable solution cannot be reached. This problem becomes especially significant when convergence to efficient markets is at stake. If a market is efficient and agents' preferences clear the market, there is no need for intervention. By contrast, when preferences are unable to clear an efficient market an arbitrator, perhaps using an algorithmic technique, is required for the efficient solution to be implemented. Hence, it is essential to distinguish in which of these two situations a market may be.

In searches for stability in coalition formation games there are many studies that restrict the domain of preference profiles by skipping circularity among coalitions (rings): See for instance Chun (2000), Pycia (2012), and Inal (2015). However, there are coalition formation games with rings coexisting with stable partitions and it is precisely in such situations that our research question becomes relevant, i.e. what coalition formation games induce convergence to stability.

As we show in this paper, rings are the only source that precludes convergence to stability but their mere presence is not sufficient to generate lack of convergence to stability, so our study focuses analyzing preferences with rings in order to discern which ones perform this task. The rings that preclude convergence to stability are called effective.

Our approach to the study of convergence comes from the observation that in coalition formation games stable partitions and dead-end cycles (absorbing sets) of partitions coexist, and such coexistence is what precludes convergence to stability. In this paper, we show that the existence of an effective ring is a necessary and sufficient condition to induce an absorbing set of cardinality of 3 or more. In turn, this absorbing set generates rotations among coalitions in such a way that convergence to stability is impeded. To illustrate the importance of our results we present several economic examples in which convergence to stability is not possible and therefore there is a need for an arbitrator if a stable solution is the goal to be achieved.