

On the core of many-to-one assignment games

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Many-to-one assignment games are models of two-sided matching markets where agents on one side are allowed to cooperate with more than one agent from the other side up to a given capacity. For example, in a job market situation, firms want to hire many workers, up to each firm's capacity, but each worker can work for only one firm. We assume that firms value groups of workers additively, so the main data of the market is the value that each firm-worker pair can attain when matched. This value can be freely transferred among the agents. The core is the set of those payoff allocations of the maximum total profit attainable in the market which are stable against deviations by any group of agents.

Although it is well-known that the core of this model is non-empty, the structure of the core has not been fully investigated. To the known dissimilarities with the one-to-one assignment game, we add that the bargaining set does not coincide with the core and the kernel may not be included in the core. Besides, not all extreme core allocations can be obtained by means of a lexicographic maximization or a lexicographic minimization procedure, as it is the case in the one-to-one assignment game.

On the positive side, the maximum and minimum core allocations are characterized by means of the longest length paths and the shortest length paths in a given directed graph. Regarding the remaining extreme core allocations of the many-to-one assignment game, we propose a lexicographic procedure that, for each order on the set of workers, sequentially maximizes or minimizes each player's core payoff. This procedure provides all extreme core allocations.