Anna Sabak
Warsaw School of Economics

Solutions of selected games with large and small players

The topic of the presentation is cooperative games where the set of players consists of a finite number of individuals (called "large" players) and continuum of indistinguishable players (called "small" or "oceanic"). Small players are divided into a finite number of types. A coalition consists of a number of large players and a fraction of each type of small players. Basic concepts of cooperative game theory are introduced, i.e. imputation, dominance, core, strategic equivalence of games.

The generalized "glove game" is investigated in this setup, with large players and types of small players. To each large player and each type the number is assigned, called its "volume". The payoff for the coalition is the minimum of the volumes brought by large players who are in the coalition and the volumes brought by the fractions of types of small players. Basic properties of such games are investigated. The Shapley value for this kind of games is defined as a limit of the sequence of Shapley values for games with constant number of large players and increasing number of small players of each type. It is shown that such a limit exists for games with one large player and one type of small players, and that it is different from a vector assigning all to the player or type with smaller volume. Industrial interpretation of such games is presented – payoff represents minimum production function for a venture with one large participant (for example, the owner of machines) and a lot of suppliers delivering the same type of raw material.