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Price taking equilibrium in economies with multiple memberships in clubs and unbounded club sizes☆

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Abstract

We model an economy with clubs (or jurisdictions) where individuals may belong to multiple clubs and where clubs sizes are arbitrary—clubs may be restricted to consist of only one or two persons, or as large as the entire economy, or anything in-between. Notions of price-taking equilibrium and the core, both with communication costs, are introduced. These notions take into account that there is a small communication cost of deviating from a given outcome. We demonstrate that, given communication costs, for all sufficiently large economies the core is nonempty and the set of price-taking equilibrium outcomes is equivalent to the core.

JEL classification: C71; C62; D71; D46; H41; D41

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1. Motivation

Gains to cooperation by large groups of individuals may be substantial. For example, in economies with public goods, coordination of activities and decreasing per capita costs of providing public goods may yield increasing benefits to ever larger organizations. Consider questions of global pollution, global harmonization of productive activities and memberships in networks. If we wish a model to describe organizations such as the World Trade Organization, the United Nations, the World Environmental Organization, or religions that wish to embrace all people, then a model with bounded club sizes, where clubs become infinitesimal in large economies, is not appropriate. However, much economic activity is carried out within small clubs—marriages, small firms, and swimming pool clubs, for example; thus small clubs should also be permitted. Moreover, a general model should also allow overlapping clubs so that a participant may belong, for example, to a two-person partnership, a dance club, and a world-wide social movement.

Recent literature suggests that whenever almost all gains to collective activities can be realized by relatively small groups of participants then, when there are many participants, diverse economies resemble markets. This includes economies with indivisibilities, nonconvexities, local public goods, and club economies with multiple memberships. In particular, under apparently mild conditions—essential superadditivity, boundedness of feasible average or per capita utilities, and thickness of the total set of consumers [1] —approximate cores are nonempty, approximate cores treat similar people similarly and economies modeled as games with side payments generate market games. In addition, analogues of the Laws of Demand and Supply hold. [2] Except for situations where the "commodities" to be priced are the consumers themselves, models of games with many consumers, however, cannot treat the properties of price-taking economic equilibrium. To obtain richer results on price-taking equilibrium, more detailed economic models are required. Our primary focus is the extent to which increasing returns to club formation in larger and larger economies is consistent with existence of price-taking equilibrium and equivalence of the outcomes of price-taking equilibrium with cooperative outcomes.

In this paper we explore the boundaries of price-taking equilibrium in club economies where clubs may overlap and also are unrestricted in size and composition. Providing most consumers have many close substitutes, if an economy is sufficiently large then an equilibrium with communication costs and possibly some frictions, captured by the presence of an exceptional set of consumers, exists and is in the core. Communication costs are parameterized by a non-negative real number ε and ε can be allowed to tend to zero as the economy becomes large. An interesting feature of our model is that, depending on the affordability of coalition formation costs for potentially improving coalitions, equilibrium may or may not have similar individuals paying similar costs to belong to a club. If communication costs are affordable, in a sense made precise in the paper, then most similar consumers must be treated approximately equally.

Our research grows out of the seminal works of Tiebout [34] and Buchanan [6]. Tiebout conjectured that, in economies with sufficient diversity of communities in terms of their local public good offerings, competitive forces would lead to a "market-like outcome." Buchanan stressed that

[1] Essential superadditivity captures the idea that an option open to a group of consumers is to realize the outcomes achievable by coalitions in a partition of the group; boundedness of feasible average or per capita utilities implies that there is a uniform upper bound on per capita utilities; and thickness of the total consumer set implies that there are many close substitutes for most consumers.

[2] See Wooders [40] for market games and Kovalenkov and Wooders [23,26] for the most recent results treating cores of games with many players and discussion of related literature.