

CENTRALIZED PRODUCTION AND LIBERTY: AN AXIOMATIC ANALYSIS OF  
CLUB GOODS

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EXTENDED ABSTRACT

We suppose that members of a society collectively own a technology for converting a homogeneous and infinitely divisible input into a club good. Could a government successfully produce and allocate the club good while respecting individual liberty through a direct mechanism? We argue that the answer depends on the production technology. If no agents can be served for free and if there is some group of agents that can be served for less than the cost of serving its members individually, then *non-monetary efficiency*, *strategy-proofness*, and *voluntarism* are incompatible. We view this as a strong form of the free-rider problem: if the production technology involves anything resembling increasing returns to scale, then the government is unable to provide incentives for honesty even when it can threaten to exclude those who do not contribute.

But if costs are symmetric and convex, then these objectives are together compatible with *no-envy*. We characterize the rich class of auction-like rules satisfying the four axioms, whose members use the same *price function* to offer a price to each agent by processing the bids of his peers anonymously. Each rule additionally has its own *price-consolation schedule*, which offers each agent a consolation award of money determined solely by his price. Strategically, each agent either (i) loses with this award, which is the outcome when he bids less than his price, or (ii) wins for this award minus his price, which is the outcome when he bids more than his price. Moreover, the price-consolation schedule is a nondecreasing Lipschitz-continuous function of price, and the slope between any two points on its curve is at most 1. A rule in our class is *voluntary* precisely when the consolation award for the minimum price is zero, and its only member when the divisible input is leisure is the analogue of the familiar *Vickrey rule*.

The rules in our class select competitive equilibria: each agent selects his most-preferred bundle from the communal budget set, which is bounded above by the winning bundle and the losing bundle. In this sense, were the government to institutionalize a rule from our class—say by computer—production and allocation would be guided by a Walrasian auctioneer with the ‘invisible hand’ made visible.

We further characterize the set of feasible and Pareto undominated price-compensation schedules. These schedules are uniquely characterized by the values taken at the marginal costs for each number of users. In each interval between two adjacent marginal costs, the schedule has a slope of one until we reach the value of the following marginal cost. To obtain the extreme points in the set, we take an ordering of the potential numbers of users and lexicographically maximize the compensation at the corresponding marginal costs, according to that order.