

# Multi-object Auction Design with Multidimensional Types: Revenue Maximization and Efficiency

(Preliminary and Incomplete)

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## Abstract

This study considers revenue-optimal auction design for two commonly ranked goods. Agents have a two-dimensional type regarding a valuation for the superior good and a discount rate of the normal good for the superior. We show that an auction mechanism is dominant-strategy incentive compatible if and only if it satisfies the “law of one price,” which requires that agents’ payments are independent of their own discount rate. The simple “virtually efficient mechanism,” which maximizes the unconstrained virtual surplus, is not incentive compatible for any type distribution if the discount-rate-type space includes at least two interior values. Otherwise, if the discount-rate-type space includes at most a single interior value, there exists a type distribution such that the virtually efficient mechanism is incentive compatible and therefore optimal. However, the existence of such distributions is non-generic except for the case of binary discount rates of  $\{0, 1\}$ .

*Keywords:* multi-object auction, revenue maximization, multidimensional type, law of one price

*JEL Classification Codes:* D82, D44

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