Comments on Combinatorial Auctions and Package Bidding

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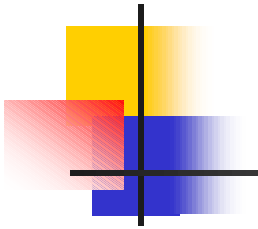
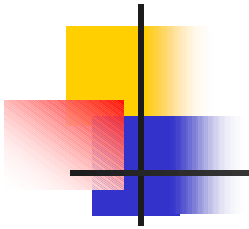


- Combinatorial auctions and package bidding are motivated by synergies (*increasing* returns).

2. Restrict attention to "English-auction-like" combinatorial auction procedures: bids of the form (*S*,*P*) [set–price pairs] are submitted sequentially by bidders; and if such a bid wins, the bidders pays price *P* for set *S*.

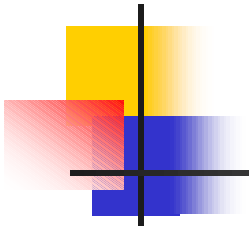
   Ironically, the general environments where there appear to be any hope of theoretical results pointing to efficient outcomes from English- auction-like combinatorial auction procedures are environments of *decreasing* returns.



3. In the absence of any theoretical result for general environments of *increasing* returns, it is likely that the relative performance of different auction mechanisms will be quite sensitive to the particular increasing-returns environment posited.
4. One (somewhat counterintuitive) approach for evaluating different combinatorial and other auction mechanisms is thus to theoretically examine their relative performances in general environments of *decreasing* returns.

5. One example of a specific combinatorial procedure that appears to perform well, in theory, in environments of decreasing returns is:

- Bids consist of pairs (S,P), where $S \subset \Omega$ and $P \in \Re_+$,
- Each bidder i ($i = 1,...,n$) iteratively submits menu (S_i^1,P_i^1) , ... , (S_i^K,P_i^K) of bids
- In addition, the zero bid $(S_i^0,P_i^0) \equiv (\varnothing,0)$ is always taken as one of bidder i's bids,
- The winning bids are determined by solving the problem of maximizing auction revenues: find an n-tuple $\{(S_1,P_1)$, ... , $(S_n,P_n)\}$ of bids, *one from each bidder i* , which maximizes the sum $P_1 + ... + P_n$, subject to the constraint that the S_i are disjoint subsets of Ω,
- If the maximization problem has solution $\{(S_1,P_1), ..., (S_n,P_n)\}$, then each bidder i receives the subset S_i and makes the payment P_i .



(Half-proved in “On Generalizing the English Auction,” downloadable from my web site.)

6. This seems to be one plausible theoretical standard to apply to other proposed combinatorial auction procedures.