

Overcoming the threshold problem in ascending combinatorial auctions

Bart Vangerven

KU Leuven, Faculty of Economics and Business

e-mail: bart.vangerven@kuleuven.be

Dries Goossens

Ghent University, Faculty of Economics and Business Administration

e-mail: dries.goossens@ugent.be

Frits Spieksma

KU Leuven, Faculty of Economics and Business

e-mail: frits.spieksma@kuleuven.be

Combinatorial auctions are auctions that sell multiple items simultaneously and allow bidders to bid on packages (sometimes called combinations or bundles) of items. We refer to de Vries and Vohra (2003), Abrache et al. (2007), and Cramton et al. (2006) for a survey of general combinatorial auction literature. Allowing bidders to create custom packages potentially increases economic efficiency and seller revenues. Indeed, when package bids are allowed, the exposure problem is avoided. However, economic efficiency is still hampered by the presence of the so-called threshold problem. The phenomenon that multiple “small” bidders (i.e. bidders on sets of items with small cardinality) appear not capable of jointly outbidding a “large” bidder, although the valuation of the bidders would allow the small bidders to do so. This effect is partly attributed to the fact that the small bidders are unaware of each other’s presence, and therefore experience no incentive to keep bidding in an ascending combinatorial auction.

We study bidding behavior in ascending combinatorial auctions with threshold problems, using different levels of feedback. We do this in an experimental setting using human bidders. We vary feedback from very basic information about provisionally winning bids and their prices, to more advanced concepts as winning and deadness levels (see e.g. Adomavicius and Gupta (2005) and Adomavicius et al. (2012)), and even so-called coalitional feedback, aimed at helping bidders to overcome potential threshold problems. Hence, the main question we address is the following: “Does additional feedback help bidders overcome threshold problems in ascending combinatorial auctions?” We test this in different auction environments, varying the number of items and bidders as well as the severity of the threshold problem. To relate decision making in our experimental setting to individual differences, we create a personality profile for each bidder using the Big-Five Trait Taxonomy.

References

- Abrache, J., Crainic, T. G., Gendreau, M., Rekik, M., 2007. Combinatorial auctions. *Annals of Operations Research* 153 (1), 131–164.
- Adomavicius, G., Curley, S. P., Gupta, A., Sanyal, P., 2012. Effect of Information Feedback on Bidder Behavior in Continuous Combinatorial Auctions. *Management Science* 58 (4), 811–830.
- Adomavicius, G., Gupta, A., 2005. Toward Comprehensive Real-Time Bidder Support in Iterative Combinatorial Auctions. *Information Systems Research* 16 (2), 169–185.
- Cramton, P., Shoham, Y., Steinberg, R., 2006. *Combinatorial auctions*. MIT Press.
- de Vries, S., Vohra, R. V., 2003. Combinatorial Auctions: A Survey. *INFORMS Journal on Computing* 15 (3), 284–309.