

# Theoretical and Experimental Analysis of Multikeyword Sponsored Search Auctions with Grouping

Ayano Nakagawa\*      Yukihiro Funaki†

## Abstract

This research aims to examine how grouping multiple search terms affects the equilibrium of the multikeyword sponsored search auction, and to verify whether subjects follow the theoretical results and whether grouping affects the subjects' bids in a laboratory experiment.

The equilibrium analysis in this study was limited to a situation in which all search terms were grouped into one or two keywords and there were two bidders in the auction. The results show that bidding the weighted average of the bidders' valuations (WAV) is the dominant strategy when all search terms are grouped into one keyword. When all search terms are grouped into two keywords, we found that WAV is a necessary condition and a sufficient condition for a particular equilibrium, and the strategy of bidding WAV is a weak dominant strategy in some cases. Thus, the theoretical analysis shows that WAV plays a key role in this auction.

In the laboratory experiments in this study, in addition to the case in which all search terms were grouped into one group (Case 1) and two groups (Case 2), we also conducted an experiment in which the search terms were auctioned individually without grouping them (Case 3). The experimental results showed that the subject's profit in Case 2 was lower than in the other two cases, and that the subject tended to bid higher than the WAV in both Case 2 and Case 3.

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\*Waseda University, E-mail : ayano.nakagawa.5335@gmail.com

†Waseda University, E-mail: funaki@waseda.jp