Reserve Prices in Internet Advertising Auctions: A Field Experiment*

[Working Paper Abstract]†

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ABSTRACT

We present the results of a large field experiment on setting reserve prices in auctions for online advertisements, guided by the theory of optimal auction design suitably adapted to the sponsored search setting. Consistent with the theory, following the introduction of new reserve prices revenues in these auctions have increased substantially.

Categories and Subject Descriptors

J.4 [**Social and Behavioral Sciences**]: Economics

General Terms

Economics, Experimentation

1. INTRODUCTION

Auctions are used to sell a wide variety of objects, ranging from flowers, paintings, and used cars to electromagnetic spectrum and Internet advertisements. One of the most natural questions about the design of an auction is revenue maximization: How should an auction be designed to generate the highest expected payoff to the seller? This question was answered by Myerson (1981) and Riley and Samuelson (1981) for the setting with one object for sale and independently distributed private bidder values. For the case with symmetric bidders, the answer is particularly elegant: the optimal mechanism can be implemented by a second-price auction with an appropriately chosen reserve price.

In this paper, we study the effects of applying a suitable modification of this theoretical result in practice. Specifically, we present the results of a large-scale field experiment on reserve prices in a particular setting: "sponsored search" auctions conducted by Yahoo! to sell advertisements (Edelman, Ostrovsky, and Schwarz, 2007; Varian, 2007). The scale of the experiment is substantially larger than that in the previous studies of the effects of reserve prices in practice (Reiley, 2006; Walsh et al., 2008; Brown and Morgan, 2009), and there are several other important differences.

In the experiment, reserve prices in the randomly selected "treatment" group were set based on the guidance provided by the theory of optimal auctions, while in the "control" group they were left at the old level of 10 cents per click. The revenues in the treatment group have increased substantially relative to the control group: our conservative estimate is that the impact of reserve prices was equal to additional 2.7% of revenues. This shows that suitably chosen reserve prices in auctions can in fact play an important role in increasing revenues, and that theory provides a useful guide for setting them. We also study the effects of reserve prices on revenues in various subgroups of keywords, and find that the increase is especially pronounced for keywords with relatively high search volumes, for keywords in which the theoretically optimal reserve price is relatively high, and for keywords with a relatively small number of bidders.

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