Discussion of “Buy-it-now or Take-a-chance: A New Pricing Mechanism for Online Advertising”

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Online advertising is becoming more and more targeted ⇒ polarized advertisers’ willingness to pay for a particular ad slot

Consequence 1:

- Regularity condition—increasing $x - \frac{1 - F(x)}{f(x)}$—often fails to hold
- Then SPA is no longer optimal; optimal auction mechanism involves ironing and is complicated (Myerson, 1981)

Consequence 2:

- Thin market for each ad slot, and a typical situation is: one bidder has a high valuation but others have low valuations
- Insufficient competition may lead to low revenue

Aim: approximately (and simple) optimal auction mechanism

Practically interesting and important question
Proposed new mechanism: **Buy-it-now or Take-a-chance**

- Buy-it-now price $p$
- If more than one bidder BIN, SPA with reserve $p$
- If no one BIN, TAC auction with reserve $r$: one of the top $d$ bidders win randomly and pay the $(d + 1)_{th}$ bid

Nice idea: use TAC auction to incentivize the high-valuation bidder to pay a relatively high BIN price
Main Results and Comments I

- **Theorem 1**: Equilibrium bidding behavior under BIN-TAC
  - Bidding strategy is still simple and intuitively appealing
- **Theorem 2**: Optimal BIN-TAC
  - Two solutions? Optimal $d$ for $r_2^*$?
  - How do the optimal $p$, $d$, and $r$ vary with the primitive parameters such as $n$ and $\alpha$?
- **Comparison 1**: Optimal BIN-TAC (weakly) dominates optimal SPA
  - A nice property: SPA is a special case of BIN-TAC
**Comparison 2** (simulation result): Optimal BIN-TAC is close to OPT and much better than optimal SPA

- Based on limited simulations: $F_L \sim U[0, 1]$ and $F_H \sim U[3, 4]$; $F_L$ and $F_H$ are assumed to be normal or lognormal (with mean 1 and variance 0.5)
- Try more families of distributions?
- Further theoretical exploration: e.g., a lower bound for $R_{BIN-TAC} / R_{OPT}^*$?

**Comparison 3** (empirical result): BIN-TAC generates 11% more revenue than optimal SPA for the AdECN data

- Optimal BIN-TAC requires three product-dependent parameters
- Practically, use sub-optimal BIN-TAC with uniform parameters across products
Targeting or no targeting?

- Theorem 3 shows that in the binary distribution case optimal BIN-TAC dominates optimal SPA without targeting.
- More exploration beyond the binary distribution case?
- What about optimal SPA with targeting vs optimal SPA without targeting?

Targeting plus bundling can restore a “thick” market?

- More general non-regular distributions without gaps (e.g., U-shape density)?
- “Approximately” optimal mechanism design is often context dependent.