

SUMMARY: Can the seller Benefit from an Insider in Common-Value Auction? (Campbell & Levin)

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<The Model>

Campbell and Levin consider a two-bidder model of a pure common-value first-price auction. In that environment, there are three random variables of interest: V (the common value of the single object), and two informative signals (X_1, X_2). Each of these variables takes on a realization of either 0 or 1. The two signals are independent conditional on the realization of V . The joint probability distribution function is given as a function of a parameter, α . And α is a parameter lying $[1/2, 1]$ that can be used as a measure of the degree of affiliation between the signals

They consider 7 specifications: (1) both bidders observe the realization of X_1 ; (2) both bidders observe the unordered realization of X_1 and X_2 ; (3) both bidders observe the ordered realization of (X_1, X_2) ; (4) bidder 1 observes the unordered realization of X_1 and X_2 , bidder 2 observes the ordered realization (X_1, X_2) ; (5) bidder 1 observes the realization of X_1 , bidder 2 observes the realization of X_2 ; (6) bidder 1 observes the realization of X_1 , bidder 2 observes the ordered realization of (X_1, X_2) ; (7) bidder 1 observes the realization of X_1 , bidder 2 observes the unordered realization of X_1 and X_2 .

In first four cases, the bidders have no uncertainty about each other's willingness-to-pay, so the best-reply to any shading strategy must ensure that shading yields zero-rent. But in the remaining 3 cases, there is uncertainty about each other's willingness-to-pay.

< Revenue Ranking among 3 cases>

Campbell and Levin show the comparison between environments (5), (6) and (7). They interpret the strict dominance of environment (6) within this set as a validation of Milgrom and Weber (1982, *Econometrica*)'s result on the positive revenue effects of increased bidder information. Milgrom and Weber show that when bidders are ex-ante homogeneous and play a symmetric equilibrium, if their information is affiliated then a public release of information that preserves bidder homogeneity must raise expected revenues in the new symmetric equilibrium. A change from environment (5) to environment (6) may be interpreted as a public release of information (viz., bidder 1's signal) that does not preserve bidder homogeneity; nevertheless, expected revenue increases as a result of the new information just as in the homogeneous environment. Similarly, a change from environment (7) to environment (6) may be interpreted as a public announcement of bidder 1's signal, but in this instance the environment is not homogeneous before or after the announcement; the salutary effect on revenue obtains here as well.

They provide an additional remark on environments (5) and (6). The revenue dominance of environment (6) suggests that conclusions about the general revenue effects of heterogeneous bidder information are quite sensitive to the homogeneous benchmark used. Revenues in environment (6) are always lower than in the environments with no private information, but always higher than in environment (5) when bidders have identically distributed private information. Even as α approaches 0.5 or 1, in which case environment (5) is converging to

one of purely public information, revenue in environment (6) continues to lie strictly between revenues in the two homogeneous environments.

The final revenue comparison made is between environments (5) and (7). Although bidder 2 has information in environment (7) that is strictly better than his information in environment (5) for the purpose of predicting V , environment (7) cannot be interpreted as the result of information release into environment (5), since there are states of the world between which bidder 2 can distinguish in environment (5) ((1, 0) and (0, 1)) that he cannot distinguish between in environment (7).

Indeed, the revenue ranking between these two environments depends on the parameter α .

As α approaches 1, the ratio of bidder 2's rents in environment (6) to his rents in environment (7) converges to $2/3$, and the ratio of bidder 1's rent in environment (7) to bidder 2's rent in environment (7) converges to $1/3$. Thus, the ratio of bidder rents in environment (6) to bidder rents in environment (7) converges to $1/2$ as α approaches 1. Since the ratio of bidder rents in environments (5) and (6) converges to 1 as α approaches 1, this shows that environment (5) and (6) converges to 1 as α approaches 1, this shows that environment (5) must yield greater expected revenue than environment (7) for large α .

Alternatively, as α approaches $1/2$, the ratio of bidder 2's rent in environment (6) to his rent in environment (7) approaches a number between .75 and .8, but now the ratio of bidder rents in environment (7) to bidder rents in environment (5) converges to $1/2$. That is, heterogeneous information is of a greater disadvantage to bidders when α is small.

Specifically, for small α expected revenue is higher in the heterogeneous environment, and for large α expected revenue is higher in the homogeneous environment.

<Implications>

First, there is no general relationship between seller revenues and whether bidders are homogeneously or heterogeneously informed.

Second, the basic forces that deliver Milgrom and Weber(1982)'s result on the beneficial revenue effects on more public information appear also to be present when heterogeneity between bidders is allowed for, yielding the same conclusion about revenues.

Thirdly, because of the strategic interaction inherent in auctions, additional information may actually have negative value to an individual bidder, even if the information refines only that bidder's knowledge.

Fourth, in the benchmark first-price models uninformed bidders earn zero expected rents in both the homogeneous and heterogeneous cases, a result consistent with previous results for second-price auctions when less informed bidders have private but "garbled" information. But it is not extended generally to heterogeneous first-price auctions, even when garbling obtains, because in a first-price auction, a well-informed bidder has an incentive to shade his bid that is absent in second-price auctions.