# Summary for Auction Workshop

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Efficiency in auctions is argued to be the most important concern in privatization because in this case the seller, the government, is the agent of the taxpayers (potential bidders). Any revenue generated by the auctions will be redistributed to the taxpayers, given all bidders. Therefore, revenue maximizing is no longer a major issue. By applying the results in Maskin (1992b), this paper analyzed the performance in terms of ensuring efficiency among high-bid auction (HA), second-bid auction (SA), and English auction (EA) in both the case of private value and the case of common value.

In the case of private value, efficiency is much easier to be achieved. SA is essentially equivalent to EA, and both of them are efficient no matter what (Prop. 1). However, HA is efficient only if the following assumptions hold (Prop. 2):

(A1)    F, the distribution functions of the bidders' value, $v_i$, are all the same.
(A2)    F is common knowledge.
(A3)    Bidders' utility functions are all the same.

In addition to these three assumptions, HA, SA, and EA will be revenue maximizing given the following assumption hold (Myerson (1981) and Riley and Samuelson (1981)):

(A4)    $v_i$ are independently distributed. Bidders are risk-neutral.

 Although it has been pointed out by Graham and Marshall (1987), Robinson (1985), and Alexander (1991) that SA and EA are more susceptible to collusion among bidders than in HA, this will only affect the revenue these auctions generated but not the efficiency of them.

In the case of common values, efficiency is hard to obtain. Suppose $s_i$ stands for the signal about the value, $\phi_i$, of the good to bidder i. When $s_i$ is one-dimensional, HA, SA, and EA are efficient if $\phi_i$ are symmetric (footnote 21) and (A1)~(A3) and the following assumption hold (Prop. 3):

(A5)    $\dfrac{\partial f_i}{\partial s_i} > 0.$

(A6)    $\dfrac{\partial f_i}{\partial s_i} \geq \left| \dfrac{\partial f_j}{\partial s_i} \right|$ for all j and i.

With common value, the equivalence between SA and EA failed when there are more than 2 bidders. In particular, EA is efficient, but SA is not because EA enables bidders to make inferences about other bidders' signal when they drop out. (Here, EA refers to the

open-exit version of English Auction. See footnote 12 for the definition of it.) This information helps the remaining bidder make a better estimation to the true value of the good and bid according, which help EA make efficient allocation. When $s_i$ is one-dimensional, given the equilibrium exist, and if (A5) and (A6) hold, EA is efficient. SA is efficient when there are two bidders (Prop. 4).

When the signal $s_i$ is multi-dimensional, efficiency crucially depends on whether $s_i$ can be summarized by some one-dimensional real-valued function $\chi_i(s_i)$. Intuitively, this implies the price (1-dimentional) of auction can be used to transmit information between bidders. And the elimination of information asymmetric promotes efficiency as the same way stated in previous paragraph. In fact, if $\phi_i$ are symmetric (footnote 21), distribution of $v_{-i}$ conditional on $s_i$ is the same as that conditional on $\chi_i(s_i)$, and (A1)~(A3) hold then HA, SA, and EA are equally efficient.

The effect of uncertainty associated with each $v_i$ on efficiency is also analyzed in the case of private value auction. When $v_i$ is random, the more risk-adverse the bidders are, the lower their bids are. Efficiency will break down if some bidder i happen to be very risk-adverse but with highest expectation of $v_i$ because bidder might well loss the auction. Efficiency still can be obtained by using some tax/subside scheme (Prop. 9). The purpose of taxing or subsiding is trying to replace random $v_i$ with the mean of it for the risk-adverse bidder. For this scheme to work perfectly, it requires the tax authority be able to observe the winner's net return from winning, the gross return net all the cost of inputs. If any of the input is not observable to the tax authority, there will be a moral hazard problem because the winner will try to reduce the unobservable input. It is also suggested that if the uncertainty associated with $v_i$ can be expected to resolve in the short period of time, the privatization should be postponed until the uncertainty resolved.

If the $s_i$'s are not given exogeneously but can be obtain by paying some cost, there will be problems of over-investment or under-investment in information gathering. When the private gain of investing in information gathering exceeds the social gain of it, there will be over-investment. When the private gain of investing in information gathering is lower than the social gain of it, there will be under-investment (Prop. 10).

When there are multiple goods to sell and some of them complementary in the future production process, it is suggested that those complementary goods should be auctioned simultaneously to ensure efficiency. An efficient scheme for auctioning multiple complementary goods is proposed but might compromise effective competition, which is another possible goal of privatization.

**REFERENCE:**

For the limit of space the reference is omitted. Please refer to the reference in the original paper.