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**DESIGN OF MULTIUNIT AUCTIONS AND SOCIAL WELFARE:**

**EXPERIMENTAL RESEARCH**

**OF THE ACCESS PLACES DISTRIBUTION IN RESERVES**

Multiunit auctions are tenders where many identical objects are offered, and participants can buy several or even many of them at once. Such auctions can sell blocks of government securities or companies shares during initial public offering, permits for the customer service (for example, access places to reserves), electricity at the day-ahead market, contextual advertising, and many other things. As with auctions that sell single unique lots, there are many formats for multiunit auctions. The simplest of them is the generalized first-price auction (called also pay-as-bid auction), in which winners pay their own bids for each unit of the good. Obviously, there is a huge incentive for participants to decrease their bids. At the same time, bids strongly depend on the participants’ beliefs about rivals’ strategies. And here there is a very high chance to fail, especially if we take into account the irrational behavior and difficulties in finding the optimal strategy.

There is also the Vickrey-Clark-Groves mechanism (and its open version – the Ausubel auction), in which the problem of demand reduction is solved, and the dominant strategy for each participant is to submit their true values as bids (as in the single-object second price auction). The VCG mechanism is efficient, dynamically stable (after the auction, nobody wants to change the strategy), and identifies true values of agents. However, its practical application is limited by a number of serious disadvantages. In addition to the problems of collusion, distrust in the auctioneer, and fictitious bids that have already arisen in single-object auctions, several more problems arise. First, the significant difference between the object value and the contract price can raise questions. The problem is aggravated by non-trivial price calculation, which is perceived by most people as a black box, and its possible non-monotony. In particular, sometimes the participant with lower values pays significantly more than the participant whose values are much higher. And it’s very difficult to explain this paradox. It is also difficult to explain that the best strategy for each participant is to show the true value. It means that in practice the bids will continue to be reduced, the auctioneer will receive less money, but the players realized their irrationality won’t be able to fix anything after the auction – the bids have been made and are no longer accepted.

The paper, using a series of laboratory experiments, analyses the impact of auction design on public welfare on the problem of access places distribution in reserves [1]. It is shown that, on the one hand, the current historical distribution of quotas in conditions of excess demand over supply creates too high barriers for new tour operators willing to enter the market, and also does not allow reserves to receive so essential funding for both scientific research, and new routes and, in general, new tourism products creation. On the other hand, the implementation into practice of access places distribution the elements of the auction sometimes leads to different and much worse results than economic theory predicts. The reasons are the participants’ irrationality, their inability to carry out non-trivial calculations, to adapt in difficult situations and to correctly respond to the irrationality of others.

At the same time, it was shown that, in comparison with the following two extremes – the generalized first-price auction and based on the externalities analysis Vickrey-Clark-Groves mechanism, the uniform (*n*+1)-price auction proved to be quite good, though it is much simpler and clearer. than VCG, but does not have an incentive to reduce bids as the GFP auction. Also we can say that with a large number of tour operators and access place distributed among them, the traditional Vickrey auction problems – participants’ collusion and auctioneer opportunism may disappear. Moreover, even the irrational behavior of the participants (both the excessive competition and low willingness to pay for obtaining quotas) observed in some experiments did not lead to a significant decrease in social welfare, but only to its redistribution between the agents.

In Tables 1-3 we aggregate information about the agents’ profits based on the results of 3 experiments carried out both with students of master's programs at FEFU, and with representatives of tour operators, participants of the International tourism forum. The tables compare 4 options - the fixed distribution of access places between the 4 largest tour operators in the ratio of 40%, 30%, 20% and 10%, the uniform (*n*+1)-price auction with realized in practice inefficiency, the optimum participants’ behavior during the second phase of setting retail prices, and completely optimum behavior during both phases, where participants should gradually come via learning process.

**Table 1**

Comparison of different models according to the received profits. Experiment 1

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Operators** | **Reserve** | **Total** |
| **Auction, optimum behavior** | 7273 | 5506 | 12779 |
| **Auction, optimum pricing** | 4342 | 7000 | 11342 |
| **Auction, real behavior** | 3173 | 7000 | 10173 |
| **No auction, optimum pricing** | 6561 | 0 | 6561 |

**Table 2**

Comparison of different models according to the received profits. Experiment 2

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Operators** | **Reserve** | **Total** |
| **Auction, optimum behavior** | 7273 | 5506 | 12779 |
| **Auction, optimum pricing** | 6282 | 2500 | 8782 |
| **Auction, real behavior** | 5226 | 2500 | 7726 |
| **No auction, optimum pricing** | 6561 | 0 | 6561 |

**Table 3**

Comparison of different models according to the received profits. Experiment 3

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Operators** | **Reserve** | **Total** |
| **Auction, optimum behavior** | 7273 | 5506 | 12779 |
| **Auction, optimum pricing** | 8714 | 1 | 8715 |
| **Auction, real behavior** | 7306 | 1 | 7307 |
| **No auction, optimum pricing** | 6561 | 0 | 6561 |

**Bibliography:**

1. Avdeeva D.V., Filatov A.Yu. Auction of access places in reserves: Theoretical and experimental research // «The Bulletin of FEFU. Economics and Management», 2019, №4, p.136-151.