

Analyzing the prices of the most expensive sheet iron all over the world: Modeling, prediction and regime change

Fu-Tie Song, Wei-Xing Zhou (ECUST)

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The private car license plates issued in Shanghai are bestowed the title of "the most expensive sheet iron all over the world", more expensive than gold. A citizen has to bid in an monthly auction to obtain a license plate for his new private car. We perform statistical analysis to investigate the influence of the minimal price P_{\min} of the bidding winners, the quota N_{quota} of private car license plates, the number N_{bidder} of bidders, as well as two external shocks including the legality debate of the auction in 2004 and the auction regime reform in January 2008 on the average price P_{mean} of all bidding winners. It is found that the legality debate of the auction had marginal transient impact on the average price in a short time period. In contrast, the change of the auction rules has significant permanent influence on the average price, which reduces the price by about 3020 yuan Renminbi. It means that the average price exhibits nonlinear behaviors with a regime change. The evolution of the average price is independent of the number N_{bidder} of bidders in both regimes. In the early regime before January 2008, the average price P_{mean} was influenced only by the minimal price P_{\min} in the preceding month with a positive correlation. In the current regime since January 2008, the average price is positively correlated with the minimal price and the quota in the preceding month and negatively correlated with the quota in the same month. We test the predictive power of the two models using 2-year and 3-year moving windows and find that the latter outperforms the former. It seems that the auction market becomes more efficient after the auction reform since the prediction error increases.

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