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Rationality versus Irrationality of Auction Bidders – Interdisciplinary Perspective

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Abstract:

The paper discusses the factors determining the decisions made by auction bidders. Special attention is given to auction circumstances creating a specific character of the auction market (auction techniques, access to new information, the influence of the auctioneer on participants' decision making process, the number of auction participants, the techniques of manipulation, buyers' valuation of auctioned items). The paper also presents the strategies of auction participants with respect to auction techniques.

The author proposes an interdisciplinary approach to the matter in question. From the economic point of view (in a traditional sense) the buyer is treated as *homo economicus* intending to buy an item at the lowest price. In this sense it is possible to present an optimal strategy for bidders. Taking into consideration the psychological and sociological concepts, the author discusses other aspects of the auction situation: the personality of bidders, risk aversion, the suffering of defeat in the past, the level of emotional control, selective attention, motivation, etc. Moreover, the paper discusses the rationality and irrationality in the auction decision making process.

Key words: auction, decision making process, cooperative/non-cooperative game, asymmetric information, bidder's strategy, bidder's behaviour, rationality/irrationality

1. Introduction

The issues related to decision making constitute a common area of interest in a number of scientific fields. Philosophy often views a decision as a set of the reasonable actions of human mind which are to achieve a specific objective. Psychology regards decisions to be psychic acts, and research focuses on the laws and mechanisms which govern decision making processes and related behaviour, emotions, cognitive and motivation processes. The psychological decision theory considers the structure of decision tasks as well as the decision maker's characteristics. Sociology focuses on the interaction between the entities in the decision process and the impact of social factors on the decisions made by the individual. The decision making process is also an area of interest of such fields as neurobiology, medicine, cognitive science and socio-cognitive engineering. The problem of selecting optimal decisions is also undertaken by mathematics, statistics as well as economics. The decision theory applies both deterministic methods (in the conditions of certainty) and non-deterministic ones (in the conditions of uncertainty and risk); in both cases, however, decisions are not dependent on the activities of other people.

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The economic sciences treat the term „decision” as a free choice made by the decision maker from the set of available possibilities. In order to make a choice the decision maker evaluates alternative solutions, and the evaluations may be absolute or comparative. The conditions of decision making are widely discussed in professional literature². The conditions of the strategic game, described by the game theory, represent a special case of decision making. Unlike the decision theory, the game theory assumes that decisions made by one participant of the game affect the activities of the other participants. The consequences of the choice made by the decision maker are dependent not only on his/her activities but also on the activities of other players. The auction is an example of a strategic game. This paper discusses the decisions made by auction participants. It describes the factors which affect the decisions made by auction participants with special attention given to their rational or irrational character.

Focusing on the concept of rationality in economic sciences, attention should be given to a number of approaches to the understanding of rationality including the criteria of the rational or irrational character of decisions. A. Smith’s concept of *homo economicus* is based on the concept of rationality. Some economists (Becker, Blaug, Morgestern, Neuman) advocate the traditional theory of rationality which states that rational action is the maximisation of utility functions, or, in the conditions of uncertainty, the maximisation of the expected utility. The validity of the traditional theory of rationality, however, has been questioned by a number of researchers. For example, D. Kahneman and A. Tversky claim that human beings have different assessments of activities depending on the point of reference, treating profits in a different way than losses. Similarly, H. Simon rejected the simplified vision of the rational man and developed the concept of bounded rationality, which leads to the concept of the satisfactory level of achievement for *homo satisfaciens*. According to Simon, people choose a specific activity from the point of view of their aspirations and available information. His concept considers people’s limited potential, time constraints related to decision making and the increasing costs of obtaining additional information. Leibenstein’s theory of selective rationality also refers to the concept of rationality; it states that individuals, to varying degrees, not always to a maximum degree, try to achieve their objectives; individuals give up the benefits if, according to their subjective assessment, the costs exceed the accepted level of effort. The traditional theory of rationality is also criticised by the representatives of Austrian economics (Mises, Hayek, Kirzner), who propose a broader approach referring to the concept of people’s adaptation to the changing realities.

The review of the economists’ outlined views and approaches to rationality, not included in this paper and formulated in different scientific fields, confirms the versatility of approaches to the discussed concept. The assigning of rationality or irrationality to a specific decision may be conditioned by the acceptance of a specific definition of rationality.

2. The factors determining the decisions made by auction participants³

From the economic point of view, in a traditional sense, the objective of the auction game, in the eyes of potential buyers, is to purchase the auctioned item at the lowest possible

² See: Koziński J., *Psychologiczna teoria decyzji*, Wydawnictwo Naukowe PWN, Warszawa 1975; Tyszka T., *Analiza decyzyjna i psychologia decyzji*, Warszawa 1986; Mynarski S., *Badania rynkowe w warunkach konkurencji*, Fogra, Kraków 1995; Kieźel E. (editor), *Decyzje konsumentów i ich determinanty*, Wydawnictwo Uczelniane Akademii Ekonomicznej w Katowicach, Katowice 2001; Kieźel E., *Racjonalność konsumpcji i zachowań konsumentów*, PWE, Warszawa 2004.

³ See: Białynicka-Birula J., *Morfologia rynku aukcyjnego dzieł sztuki*, Zeszyty Naukowe Akademii Ekonomicznej w Krakowie „Prace z zakresu analizy rynku i badań marketingowych” No. 605, Kraków 2002, pp. 43–55; Białynicka-Birula J., *Aukcja jako instytucja rynku formalnego*, Zeszyty Naukowe Akademii Ekonomicznej w Krakowie „Prace z zakresu analizy rynku i badań marketingowych”, No. 659, Kraków 2005, pp. 135-148.

price⁴. The auction game is based on the set of principles accepted by its participants. The players do not have complete information, each of them knows the level of the acceptable price (valuation), but they do not know their competitors' valuations⁵. Therefore, the participant's choice of activity depends of the utility of the offered goods as well as the utility of those goods as viewed by the other participants.

The decisions made by auction participants depend on two groups of factors: those which operate outside the auction, referred to as external factors, and those which operate during the auction, referred to as internal factors. External factors, related to the environment understood in a broad sense, include the following: economic factors (eg income, the prices of similar goods); information factors (eg expert opinions on goods, promotion and advertising); social and cultural factors (eg reference groups, imitation, fashion). Internal factors include:

- factors related to auction participants – personality features, emotional involvement in the purchase of goods, hunger for risk, knowledge, life style, taste, preferences, habits, traditions, likings and dislikings, desires;
- factors related to the auction: the applied auction technique, access to new information, the auctioneer's impact on participants' decisions, the number of auction participants (competitors), the passing of time, interactions between auction participants, manipulation techniques.

Because of the limited framework of this paper further considerations will focus on the internal factors related to the auction conditions which create the specific character of the auction market. The major auction factors include auction techniques – the manner of setting the price (English, Dutch, first-price, Vickrey's second-price techniques).⁶ The adopted auction technique affects the session; consequently, it conditions access to information, defines the auctioneer's position and creates or minimises manipulation possibilities.

The key role in the decision making process, not only related to auction decisions, is played by information. It should be noted that some of the information is generally available, while some of the information is accessible only for the particular auction players. The generally available information includes auction principles, the catalogue description of the offered items, experts' published opinions, transaction settlement methods and conflict settlement procedures, while restricted information may refer to experts' confidential opinions, the auction house, the buyer or seller. The players set their valuations on the basis of the available information, especially private information. In this case auction information is incomplete and asymmetric. Theoretically, access to general information concerning the principles of the auction game and the features of the offered items is identical independently of the adopted auction technique. A special role is played by information obtained by the players in the course of the game (eg related to current price levels or competitors). The particular auction techniques offer different access to new information, reducing the degree of uncertainty. In the case of both English and Dutch techniques the potential buyers gain information on the currently offered price. The participants of the former technique monitor the subsequently called, higher and higher price offers, and they have the possibility of changing (for a higher level) their own submitted tenders by outbidding competitor offers.

⁴ Malawski M., Wieczorek A., Sosnkowska H., *Konkurencja i kooperacja. Teoria gier w ekonomii i naukach społecznych*, Wydawnictwo Naukowe PWN, Warszawa 1997.

⁵ More information on valuations and their role in the auction game: Białynicka-Birula J., *Rola technik aukcyjnych w kształtowaniu cen licytowanych produktów*, Zeszyty Naukowe Akademii Ekonomicznej w Krakowie „Prace z zakresu analizy rynku i badań marketingowych” No. 586, Kraków 2002.

⁶ More on auction techniques see: Białynicka-Birula J., *Podstawowe techniki aukcyjne i kryteria ich wyboru*, Zeszyty Naukowe Akademii Ekonomicznej w Krakowie „Prace z zakresu analizy rynku i badań marketingowych” No. 558, Kraków 2001; Białynicka – Birula J., *Rola technik aukcyjnych w kształtowaniu cen licytowanych produktów*, Zeszyty Naukowe Akademii Ekonomicznej w Krakowie „Prace z zakresu analizy rynku i badań marketingowych” No. 586, Kraków 2002.

New information appears in the course of an auction concerning competitor prices. A decreasing number of active auction participants represents a significant source of information. In the case of the Dutch technique, the buyer is the first person to express his/her will to make a purchase at the currently called price. Consequently, the Dutch technique does not provide the possibility of changing the original bid and outbidding competitors. In the absence of new information on competitor offers, potential buyers face the problem of choosing the moment of submitting their own bid. The two remaining auction techniques – the first-price and Vickrey's second-price technique – do not provide information on the currently called price. Another characteristic of both techniques is the total lack of information on competitor bids and the lack of the possibility of changing the submitted bid.

The participants' decisions may be affected by the auctioneer who is responsible for conducting an auction session. Some countries require that auctioneers meet specific requirements including specialised education⁷. In the course of open auctions (English and Dutch techniques) there is communication between the auctioneer and auction participants. Of vital importance is the auctioneer's personality and behaviour affecting the potential buyers' emotional condition. Presentation skills and creating a "hot" atmosphere during the auction encourage participants to submit higher bids. The auctioneer may also propose a higher level of a reserve price, trying to raise the level of the participants' bids. In the case of closed auctions an important role is played by confidence in the auctioneer, who announces the winner and the price.

One of the factors which may affect the course of an auction game is the number of potential buyers of a given item. The number of participants determines the level of competitiveness. In the absence of competitors the individual buyer makes a purchase at the lowest price. An increasing number of participants results in the probability of higher prices⁸. The number of players is one of the major criteria of classifying and examining games⁹.

Auction participants affect one another's behaviour. The interactions between participants may be viewed, according to E. Goffman, as an exchange of information¹⁰. It should be noted that at open auctions (English and Dutch techniques) there is communication between participants. In the case of closed auctions (bids submitted in writing) there is no communication between auction participants. In view of the classification of strategic games it should be stated that the auction is usually regarded to be an uncooperative game for potential buyers (players). The total lack of communication between participants is not always the right solution. The auction during which potential buyers communicate in order to manipulate price levels may be referred to as a cooperative game. Referring to the achievements of sociology, the term „strategic interaction” might be applied to auction games (partners are regarded to be opponents), or the term „interaction ritual” (partners support one another in achieving their objectives).

The broadly understood „manipulation” techniques are also the factors which affect the decisions made by auction participants. „Manipulations” are understood as the activities which aim to reach high or low price levels. Undoubtedly, the seller, unlike the buyer, is interested in the highest possible price. Auction “manipulations”, depending on whether practiced by sellers, buyers or auctioneers, may have different characteristics. Manipulations may be applied in all the auction techniques, with some of them providing opportunities for

⁷ USA have their own regulation concerning the auctioneer's qualifications. There are special schools: the Auction School and the Auctioneer Academy. In France it is required to be a French citizen (*French: commissaire-priseur*), two years of experience, specialised examinations.

⁸ Mc Affee P., Mc Millan J., *Auctions and Bidding*, Journal of Economic Literature, Number 25/1987, pp. 699-738.

⁹ Drabik E., *Zastosowania teorii gier do inwestowania w papiery wartościowe*, Wydawnictwo Uniwersytetu w Białymstoku, Białystok 2000.

¹⁰ Goffman E., *Interaction Ritual*, Garden City 1967.

cheating and over- or under-estimating prices. The theoretical hierarchy of auction techniques in terms of their sensitivity to buyers' manipulation is as follows: English technique, the uniform price, second price, discriminating, first price, the Dutch technique¹¹. With a view to limiting manipulation, the auctioneer should select the techniques positioned in the lower part of the classification – the Dutch and first-price techniques. English technique, on the other hand, provides the best possibility of lowering the price of the auctioned item. An example of the manipulation technique practiced by potential buyers in order to lower the price is the so called auction ring, in which the participants make a commitment not to outbid the submitted offers (*French: cartel*)¹². It should be noted that manipulations practiced by auction bidders are illegal, and it is very difficult to prove somebody's guilt.

3. Auction bidders' strategies

The winner of the auction is the bidder who submits the highest bid (although it is not always the transaction price). Assuming that the player's activities are economically rational, the choice of a strategy leading to the purchase of the auctioned item at the lowest possible price is conditioned by the quantity and quality of information possessed by the particular players. According to E. Goffman's concept, representing the sociology of interaction, the essence of the strategic interaction lies in the participants' focus on profits and the avoidance of losses. The auction game is won by one participant (assuming that one item is sold by auction) or several participants (in the case of a number of homogenous goods)¹³. The payments for the remaining players, in accordance with the game theory, equal zero (losers in the game). The winning leads to the purchase of the auctioned item by a given participant, which does not imply a profit. Profit in the auction game is generated when the purchase is made at a lower price than the winner's valuation, while losses are suffered in the opposite situation (the final auction price is higher than the winner's valuation).

Depending on the applied auction technique, game participants adopt different strategies. A strategy applied in English technique, when potential buyers have different assessments of the value of the auctioned item, consists in auctioning up to the price level accepted prior to the auction. Buyers should not submit a bid above their estimated value of the item, since even in the case of winning the auction they suffer a loss. The situation in which the player submitting the highest bid realizes that the price level exceeds the item's actual value is referred to as the winner's curse. Such circumstances often result from the player's over-optimism and emotional involvement in the purchase combined with the lack of understanding of financial constraints. The more versatile price offers are, the higher the probability that the winner will pay an excessively high price. A greater number of participants lead to higher price spreads, which often results in the winner's curse situation¹⁴. The potential buyer should not withdraw from the auction before reaching the level of the item's estimated value as it would imply the giving up of profits. Therefore, an optimum strategy consists in auctioning up to the level of the item's estimated value. In conclusion, the player's strategy in the case of English technique is based on the potential buyer's estimation

¹¹ Feldman R., Mehra R., *Auction: A Sampling of Techniques*, Finance and Development 1993.

¹² See more: Rouget B., Sagot-Duvaurox D., 1996. *Economie des art plastiques*, l'Harmattan, Paris; Robinson M., 1985. Collusion and the Choice of Auction, *Rand Journal of Economics*, Vol. 16, No. 1.

¹³ In the case of many homogenous items the discrimination technique may be applied (items are purchased by the participants submitting the highest bids – until supply is exhausted; the purchasers pay the price which they have accepted (different ones); the uniform price (items are purchased by those who submit the highest bids – until supply has been exhausted, but the winners buy items at the same price which equals the highest rejected bid. See more: Białynicka-Birula J., *Podstawowe techniki aukcyjne i kryteria ich wyboru*, Zeszyty Naukowe Akademii Ekonomicznej w Krakowie „Prace z zakresu analizy rynku i badań marketingowych” No. 558, Kraków 2001.

¹⁴ Samuelson W., *Ekonomia menedżerska*, Wydawnictwo Naukowe PWN, Warszawa 1998.

of the auctioned item, the expected value for competitors and the level of the last bid submitted in the course of the auction. In the case of English technique, the auction below the valuation level implies the participant's profit with the loss increasing with the subsequent bids above the valuation level. The winner's profit and loss depend on the difference between the valuation and the hammer price. When the valuation is lower than the call price, the participant does not enter for the auction.

The potential buyer's strategy at the Dutch auction should be the same as in the case of the closed strategy. Choosing the moment for submitting a bid, the auction participant behaves as if he/she had already submitted such a bid in writing¹⁵. The winner is the participant who was the first one to submit the highest bid or to submit the highest bid in writing. Assuming the rational behaviour of the Dutch and first-price technique participants, the results should be identical¹⁶. The participant's strategy in the Dutch technique is based on the item's estimated value and the expected value for competitors. Loss is a rare event in the case of the Dutch technique; as a rule, participants expect that the price will be lowered to the valuation level. They express their willingness to make a purchase or make a risky decision and wait for the subsequent lowering of the price. Each such step (*in minus*) implies the winner's higher profit. Simultaneously, each case of lowering the price increases the probability of losing and the loss of the auctioned item in favour of competitors. The inclination to take risks has a major impact on the participant's decisions in the case of the Dutch technique.

In the case of closed auctions (the first-price technique and Vickrey's technique) the submission of a lower bid increases the winner's profits, but lowers the probability of winning. Also, it is difficult to define a strategy for the participants of the first-price auction. In this case (just like in the case of the Dutch auction) the potential buyer has to consider other participants' alleged bids, and the submitted bid is conditioned by the expected competitor valuations. The first-price technique is profitable for the buyer, if the bid is below the valuation level (assuming that the participant wins and makes a purchase). A higher bid increases the probability of winning, but lowers the winner's profits. When the written bid is overestimated as compared with the valuation, the winner and purchaser suffers a loss.

In the case of applying Vickrey's second-price technique, the prices that potential buyers are inclined to accept are disclosed. Submitting lower bids, they risk that the competitor may make a purchase at a lower price than they are ready to accept; submitting higher bids, on the other hand, they take a risk of making a purchase at an excessively high price (if the second price is higher than the one they are ready to accept). Therefore, the most favourable situation is the one in which a "real" bid is submitted, that is a maximum price that the participant is ready to accept¹⁷. The inventiveness of W. Vickrey's technique lies in the fact that it is in the interest of the potential buyer to disclose information (in this case - valuation), which in the case of other techniques is usually kept secret. The winner's profit equals the difference between his/her bid and the competitor's closest bid.

4. Conclusions

Assuming that potential buyers are driven by the principle of economic rationality, in a traditional sense, it may be stated that the objective of the auction game is to purchase the

¹⁵ *Ibidem*.

¹⁶ See more: Białynicka – Birula J., *Rola technik aukcyjnych w kształtowaniu cen licytowanych produktów*, Zeszyty Naukowe Akademii Ekonomicznej w Krakowie „Prace z zakresu analizy rynku i badań marketingowych” No. 586, Kraków 2002.

¹⁷ Vickrey W., *Counterspeculation, Auctions and Competitive Sealed Tenders*, Journal of Finance, Vol. 16, March 1961, pp. 8-37.

auctioned item at the lowest possible price. Consequently, it is possible, in mathematical terms, to define an optimum strategy for auction participants and compare different techniques from the point of view of the expected gains. An attempt may be made to explain the limited rationality, or the lack of rationality of participants' decisions, referring to specialist research in different scientific fields: attention may be given to such issues as the impact of personality features on decision making, and, in particular, buyers' inclination to take risks, the past experience of defeat, emotional involvement, selective attention, a tendency to manipulate, different levels of emotional control and purchase motivation. Assuming that the auction participant is driven by charitable causes, he/she will not be interested in the lowest price. In the eyes of the smart *homo economicus* such a decision is not rational. If the rationality criterion is the participant's focus on achieving a specific objective realizing some limitations (eg financial ones), a rational auction is up to the valuation level. The participant of a charitable auction should submit bids up to the valuation level (also above a minimum price), which implies the achievement of his/her objective, even considering financial limitations. If financial constraints are not allowed for, the winner's curse situation may occur. In this context submitting bids above the valuation level is not rational. However, according to Weber's concept of rationality it may be regarded to be rational as it leads to the achievement of a specific objective – the purchase of the auctioned item regardless of costs.

From the practical point of view valuation is not a constant quantity – it seems to be an estimated quantity, and, consequently, setting a clear-cut border line between rationality and irrationality may be difficult. Moreover, the particular participants may vary in their views on rationality and irrationality due to different financial limitations. A high price, viewed by most buyers as irrational, is considered to be rational by the person whose objective is not to purchase the item itself but to demonstrate prestige and status according to T. Veblen's effect. In conclusion it may be stated that the issue of rationality and irrationality is still an open question, especially in view of a number of theories in different fields of science.

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