Systems Research Institute, Polish Academy of Sciences

Preprints

TRANSITION TO ADVANCED MARKET ECONOMIES

Abstracts

of papers prepared for the IFORS Specialized Conference

June 22-25, 1992, Warsaw, Poland

Edited by

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SESSION 12

CONFLICTS, GAMES AND SHARING

Part 12A

EXPERIMENTAL ECONOMICS, O.R. AND MARKET DESIGN FOR DEREGULATED NETWORK INDUSTRIES

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The deregulation and privatization movement has motivated the experimental study of auction markets designed for independent network industries such as natural gas pipelines or electric power systems. Decentralized agents submit bids to buy commodity, and offers to sell transportation and commodity to a computerized dispatch center. Computer algorithms determine prices and allocations that maximize the gains from exchange in the system relative to the submitted bids and offers. Economic principles provide guidelines for ownership structure and auction design. Operations research provides optimization methods based on bid/offer data from profit motivated competing agents. The problem is important because traditionally the scale and coordination economies in such industries were thought to require regulation or state ownership. Laboratory experiments are used to study feasibility, limitations, incentives and performance of proposed market designs.

THE PRINCIPAL-AGENT-CONTROLLER MODEL: PLANNING AND NON-COOPERATIVE SOLUTIONS

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This paper analyses anti-pollution policies in the three-person sequential game which consists of a principal (planner), a controller (police), and an agent (polluter). The decision situation of the controller and the agent reduces to a 2-by-2 non-cooperative matrix game in which the principal can manipulate the payoffs of the controller. We show that the efficiency of the principal's plan depends on whether the players of the 2-by-2 game choose Nash equilibrium strategies or whether they prefer maximin. Arguments are given which suggest that the players will prefer maximin for a substantial class of payoff profiles.

FAIRNESS WITH EXTERNALITIES

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Consider the problem of trading among a fixed number of agents. Each agent is assumed to be endowed with consumption goods and their preferences over allocations of consumption goods displays externalities but are known. If, in a given allocation, agent i prefers the bundle of agent j to his own, we will say i envies j. If there are no envious agents at an allocation, we will say that the allocation is equitable. If an allocation is both equitable and efficient in myopic sense, we will say that the allocation is fair.

In this paper we examine these definitions, study the relationships between envy and efficiency and establish some quite general results concerning fair allocations. Finally we extend the concept of equity where we allow comparisons to be made between coalitions of agents.

KNOWLEDGE AND BEST RESPONSES IN GAMES

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Let us start with the problems we are going to deal with. What is player's knowledge? How does this knowledge influence decision of the player? Undoubtedly, in games, the relevant knowledge includes knowledge about the game played, about the bevaviors of the players. It semms that so called mutual knowledge, i.e. knowledge about knowledge of the opponent, knowledge about knowledge about knowledge, ... and so on, may also be of importance at least up to some stage of the iteration. The importance of the knowledge means that it influence the player's decision. This influence however, is a big problem. In fact, player's knowledge is rather empty notion unless it is shown how the player uses it, i.e. unless behavior of the player is specified. To illustrate the problem let us present a story by Professor Jerzy Łoś. Two warships, say A and B, were righting each other. Each of the captains of the ships (for short, captain A and captain B) had a spy on shore, and paid him $ 1000 for any information of any importance to the right. By coincidence, not so rare in reality, it happened that the two spies were one and the same person. It also happened that the radar of ship A was out of order. The spy got to know so and immediately sent to the captain A the following message: captain B knows that your radar is out of order. Soon afterwards he sent to captain B: captain A knows that you know that his radar is out of order. And so on. The problem is how much money could the spy get?

Let us note that the problem is illposed until the war game and behaviors of the captains are specified.

In our opinion behavior plays here crucial role, that is, in order to show how player uses his knowledge we have to know his behavior. Hence, we have to answer the following question first: what is behavior of a rational player? By rational player we mean a person who wants to maximize his utility.

To sum up, we are looking for transformation, say Φ, such that given game to be played, say G, knowledge of the player, say K, and player's behavior, say B, this transformation Φ conveys them into another game, say $G^* = \Phi(G,K,B)$, which is the result of using the knowledge by the player. So that player's behavior is an important factor here. Hence, we must know what is player's behavior in general.

DESIGNING VIABLE POLITICAL INSTITUTIONS: PERSPECTIVES FROM SOCIAL CHOICE THEORY

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The plethora of negative results obtained by social choice theorists teaches us to be cautious about claiming that optimal social choice procedure exists. On the other hand, a closer inspection of those results reveals that the context in which the procedures are aimed to be used may render some results less relevant. The task of the applied choice theorists is thus to determine under which conditions various methods of opinion aggregation may be used with minimum risk of anomalous outcomes.The paper makes some general observations about persistence of various types of theoretical results to voting institutions and outlines the requirements that an adequate collective decision support system should satisfy.

SOME CONCEPTS OF NON-MYOPIC EQUILIBRIA IN GAMES WITH FINITE STRATEGY SETS AND THEIR PREFERENCES

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The paper presents special class of equilibria in finite strategy noncooperative games, which are extensions of the traditional Nash equilibrium solution. Underlying role in these equilibria is played by the assumed extended models of players' rationality principles which admit their non-myopic behaviour. The crucial idea is that players possessing some information about their opponents and the game itself can forecast the consequences of their choices by analyzing the possible sequences of "move-countermove"and accordingly predict the stability of game outcomes.

The class of discussed equilibria besides the classical Nash equilibrium includes all solutions considered in metagame and hypergame theories, and its determinants allow useful characterisation for new potential equilibria concepts in modelled real-life conflicts.

For specific equilibrium concepts, their individual properties are discussed and some analytical characterizations are provided.

LINEAR WHOLESALE MARKETS

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The mathematical models of wholesale markets having various configuration are considered. A wholesale market is an economic system in which several participants interact being a consumer and a producer at the same time. Each participant as an element of the system pursues its own interests indepedently of others. Each participant is described by a linear programming problem. Besides local constraints imposed on the participants there are global limitations on the system as a whole.

Since each participant is a consumer as well as producer, there are two sets of prices reflecting the preferences of producers and consumers correspondingly. In the process of interactions consumer and producer have to come to an agreement about their interests and to reach the equilibrium prices, which ensure maximum of profit for each participant and total balance of production and consumption.

Wholesale markets are considered with various configurations of participant interactions: conveyor, centralized, matrix; methods of equilibrium price computation are suggested.