EXPERIMENTS AS A TOOL OF VERIFYING EFFICIENCY OF IMPLICITLY AGREED-UPON MARKET ORGANIZATIONS

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We analyse the possibility of an experimental study of the efficiency of market institutional structures. In the paper "On the new institutionalism of markets: the market as an organization" by R. Richter, the implicitly agreed upon market organization is regarded as a Nash equilibrium of a game between potential market participants. The solution of such coordination problem is not necessarily Pareto-efficient but could be efficient given assumptions of New Institutional Economics (i. e. could be NIE-efficient). This framework can be very helpful as a descriptive tool used to explain the persistence or transition of market institutions, but in can be difficult to be verified empirically.

Economic experiments have been successfully applied to analyse market institutions and to compare their efficiency. In the paper, we demonstrate how this methodology could be used to analyse the "spontaneous" market organizations reached as a tacit agreement in a coordination problem. We also advocate that economic experiments can be a very useful tool to verify the efficiency of such institutions.

Keywords: New Institutional Economics, experimental economics, NIE-efficiency, market organization

Introduction

The classical theory of economics was built on the assumptions of perfect rationality, perfect information and the lack of any transaction costs. In such an economy, there is not much need for any institutionalized markets. There is no need for the firms specializing in trade or for the firms specializing in the processing of information because perfectly informed and perfectly rational economic agents know perfectly well what the optimal choices are. There is no need for the existence of various market structures in the form of a stock exchange or an auction for example. In such an economy, the role of real social entities as "markets" was very limited[1]; according to the classical theory of economics, all

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[1] Which is a reason for a remark of Coase that "although economists claim to study the working of the market, in modern economic theory the market itself has an even more shadowy role than the firm" (Coase 1988, p. 7).

the market institutions existing in the real world seem to be useless.

Of course, there are many reasons for which there exist market institutions. In real economy, there are no perfectly informed and rational agents and there are transactions costs. Because of that, markets have to be institutionally organized to be more efficient for their participants. Modern economics has to analyse how such market institutions are created and what their efficiency is.

Market organization according to New Institutional Economics

The New Institutional Economics of Markets (Richter, 2007; Guerdjikova, 2007) views the effects of market coordination as a result of a complex interaction of economic institutions[2]. In this approach, markets are defined (in place of neoclassical "market ether") as social arrangements facilitating repeated exchange among a plurality of actors (Furubotn, Richter, 2005, p. 314). The transactions costs resulting from basic exchange activities (such as search, bargaining, contracts execution, etc.) can be reduced by creating specific technical and institutional market structures (like stock exchange or an open Internet trading platform, e.g. eBay). The New Institutional Economics of Markets focuses on two basic problems: how specific market institutions are created and what the economic efficiency of the given market institutions is.

Markets can be institutionalized by a court or juridical ordering made by the law creators (for economic or other reasons, e. g. so-

cial justice), or by private ordering made by market participants for maximizing their profits (utility). Buyers and sellers can exchange goods more profitably, if they reduce the costs of private transactions. To achieve that, they can try to create new economic institutions or improve the already existing ones to make the market organization[3] more efficient. The result of such decisions[4] and activities can be considered as a coordination problem and can be modeled as a game among the potential market participants.

Institution as an equilibrium of the game

R. Richter in his paper (Richter, 2007) analyses market institutions using a game theoretic approach. Imagine a market in which a group of economic agents operates. Each of the agents has to make various decisions concerning price policy, quality policy, information policy and so on, which are made repeatedly in all subsequent periods. Using a game theoretic approach, we can look at those agents as players in a supergame consisting of the underlying repeatedly played games. The strategy of a player in such a game is a rule which states how to act in each of the subsequent subgames. By a Nash equilibrium of such a game we understand a set of strategies of all players, with such a property that none

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[2] Institutions are structures and mechanisms of social order governing the behaviour of a set of individuals.

[3] An institution (or a set of institutions) plus market agents using it (Richter, 2007, p. 486).

[4] (Richter, 2007, p. 487) shows three basic kinds of decisions of potential traders which influence the shape of market organizations: (1) to trade on an already existing type of market organization; (2) to establish a completely new type of market organization; (3) to participate in an already existing type of market organization with the intention to reorganize it.

of the players has an incentive to change his strategy regarding the strategies of all the other players.

Using this approach, we can look at market organizations as an equilibrium of the game. Such "institution-as-an-equilibrium-of-the-game approach"[5] can be used to explain the emergence of a given market organization (Richter, 2007) as a consequence of decisions made independently by many economic agents. But the crucial point here is that such games might contain many equilibria. Consider a simple example. Suppose that each firm operating in a market was to choose a strategy concerning the price policy. The "high-prices strategy" could look like that: "I keep my prices at a high level as long as all the other companies keep the prices at a high level. If any of the other companies lowers the price, I lower the price as well". And the "low-prices strategy" is even simpler: "Keep the prices low". In this an extremely simplified situation, both situations (using the "high price-strategy" by all firms and using the "low-prices strategy" by all firms produce) the Nash equilibria in this market[6]. Naturally, in the real-life markets the set of possible issues on which a decision has to be made is much richer and so the number of possible Nash equilibria is larger.

If there are many equilibria in the game, then how the players are supposed to know how to play the game, i.e. which strategy to choose[7]? Because the decisions made by the economic agents are independent, this is an example of the coordination game – a game in which players have to agree upon one of the equilibria, given a long list to choose from. By agreement here we do not understand an explicit agreement in which the players discuss and agree upon some solution[8], but rather a tacit one; a solution which all the players independently decide to choose. Such solutions are called the focal points of the game and were described as "each person's expectation of what the other expects him to expect to be expected to do" (Schelling, 1960, p. 57). In a classical example by Shelling, two strangers were to meet one day in New York, but neither of them knew the time or the place, so they had to decide independently where and when to go. In such a coordination problem, any time and place can be an equilibrium. Schelling asked students and found the focal point to be "noon (at the information booth) at the Grand Central Station".

In case of markets, the agreed upon institutions should be then understood as such focal points, "self-sustaining systems of shared beliefs about a salient way in which a specific game is repeatedly played" (Aoki, 2001, p. 10).

Efficiency of implicitly agreed-upon institutions

Once the institution-as-an-equilibrium-of-a-game approach has been explained, we can move on to the question of the efficiency of such solutions. The first question to ask would be: are the market institutions Pareto-

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[5] See, for example, (Schotter, 1981) or Aoki (2001).

[6] In the first case, none of the firms has an incentive to lower the price because if it does so, all the other firms will respond with lowering the prices as well. In the second case, it does not pay to increase the price if all the other firms keep the prices low.

[7] Compare (Kreps, 1990).

[8] Which could be impossible for both technical and legal reasons.

efficient? The answer to such question seems to be straightforward: they needn't to. Under assumptions of NIE, the economic agents are no longer perfectly rational, neither do they have a perfect knowledge, so they won't necessarily choose the optimal solutions. For these reasons, Richter (2007) defines a NIE-efficiency by which he understands a boundedly rational[9] version of the Pareto efficiency. The paper (Richter, 2007) doesn't give a formal definition of such NIE-efficiency. But from what the author writes about it, it seems that the NIE-efficient allocation (or system) should be understood as a solution in which the situation of none of the agents can be improved (without making any other agent worse off), given the agents' knowledge and rationality.

But the markets needn't even be NIE-efficient. This results clearly from game theory which demonstrates that Nash equilibria do not always have to be Pareto-efficient[10]. The other reasons for which a market organization might not be NIE-efficient are pointed out by Guerdjikova (2007). One of them is that in a dynamic framework there are often changes concerning the information, transaction costs or preferences. An equilibrium which was efficient under the old conditions might become suboptimal under the new ones. The transition to a new equilibrium becomes a new coordination problem which might not be easily solved for many reasons.

One of the potential problems is that market institutions can be understood as a form of a public good. Once they are created, everybody benefits from them. Now imagine

that due to some changes in the environment or consumers' preferences, the existing market organization becomes inefficient. Suppose that every market participant is aware of the inefficiency and that there exists a Pareto improvement, i.e. a market organization in which every market participant is better off. But if there are some costs which have to be incurred, the market participants might have problems with shifting to a new equilibrium. A classical free-riding problem arises; some market participants might be unwilling to incur the costs as they know that once a new market institution is created, they might be able to avail themselves of it anyway. This situation is even more probable than in the typical public good problems as we're analysing here a tacit agreement in which any form of communication might be impossible.

This shows that there is an important role that the authorities (government) might play even in the case of such implicitly agreed-upon market organizations. In case of free-riding, the market participants might be unable to shift the market to an efficient equilibrium, and so a government's intervention might increase the effectiveness of those institutions.

Using experiments to verify the efficiency of market organizations

There is a long list of experiments which were constructed and carried out in order to analyse the functioning and effectiveness of market institutions. Some examples may be found in (Handbook..., pp. 360–390). But in this part we'd like to demonstrate the possibility of using experiments as a tool to study the effectiveness of institutions (market organizations) which emerge as an effect of "the invisible hand" mechanism.

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[9] See, for example, (Simon, 1957).
[10] The most obvious example is a Nash equilibrium in a Prisoner's Dilemma game.

One example is given by the experiment (constructed and carried out by one of the authors) which concerned the effectiveness of the real estate market, and more specifically the implicitly agreed-upon system of agents' commissions. There are two ways in which real-estate agents can obtain their commission: in one system, commission is only paid by the sellers, and in the other it is paid by both sides of the transaction. The first system seems to be in accordance with the assumptions of agency theory; the agent's goal is to maximize the seller's (the principal's) profit by searching and bargaining for the highest possible price. In this system, the agents' goal is in accordance with his principal's goal because the higher the price the higher agent's commission. The second system, of dual agency, may seem a bit controversial because the agent obtains a commission proportional to the price from both the seller (whose goal is to sell at the highest possible price) and the buyer (whose goal is to buy the property at the lowest possible price). In this case, the goal of the agent seems to be opposite to the goal of the buyer. In Poland, an agreed-upon system is to obtain the commission from both sides of the transaction. This rule was reached rather spontaneously and is universally accepted (by a lot of the market participants), and so it is a good example of an institution which can be understood as a Nash equilibrium of the coordination game.

However, bearing in mind the controversial aspects of the conflict of interest in the case of the dual agency system, the question of efficiency of this equilibrium arises. The paper of Gaweł et al. (2008) presents a construction and some initial results of an experiment in which a real-estate market was simulated and the effectiveness of the institutional market organization was studied. It was

observed that the system of a single agency led to substantially higher prices and transaction costs (agents' commissions) than the dual agency. The dual agency system is more effective as the utilities of the market participants are higher: buyers and sellers benefit from lower transaction costs, whereas agents benefit from the fact that transactions are made faster[11].

As another example we'll demonstrate how the experimental framework could be used to analyse the situation of the price leadership cum advertising competition observable in the American cigarette industry between the two World Wars as analysed in (Richter, 2007)[12]. In the experiment[13], there are two groups of participants: students playing the roles of cigarette producers and students playing the role of consumers. Producers try to maximize their profits by setting the price and the quality level, whereas consumers try to maximize their utility[14]. Producing goods of a higher quality yields higher costs, but at the same time high-quality

[11] Even though the agents' profits from single transactions are lower, they need less time to reach them, which enables them to invest the money faster or start working on a new transaction.

[12] (Richer, 2007) analyses the situation in this market as an example of the implicitly agreed-upon equilibrium. The three main cigarette producers tacitly agreed not to involve in the price competition and to keep the high quality of their products. They followed a price leader and competed only through advertisements. Richter advocates that this was an example of a NIE-efficient, implicitly reached equilibrium.

[13] The results of this experiment will be presented in a separate paper. A similar experiment (but concerning a market with a problem of the asymmetry of information) is described in (Kuśmierczyk, 2005).

[14] Students' final payoffs are the higher the higher profits and utilities they achieve.

producers can count on a higher demand for their products as a higher quality increases consumers' utility levels. Producers also have to decide how much money to spend on advertising. Just as in the market analysed by (Richter, 2007), consumers can either buy products from the leading producers or from their competitors offering lower quality products.

Using such experiments, it is possible to test how different elements influence the market organization (the solution of the game): how the latter changes with increasing the number of producers, how relevant the information about the quality is or what the role of the price leader is. It can be also analysed whether the participants of the market are able to create NIE-efficient institutions.

Conclusions

The New Institutional Economics shows that markets are more than just buyers, sellers and transactions between them. The way the markets are organized is a result of many factors: economic, political, cultural, technological. Changes in the environment, changes in the preferences, changes of technologies (e.g. the Internet) influence the market organization. The New Institutional Economics gives us tools, one of which being a game theoretic approach, to understand the processes by which market institutions emerge; we can analyse and compare their efficiency or predict their changes in response to different factors.

"Spontaneously" created market institutions emerge as an outcome of the game played by all the market participants. Using the traditional approach, it could be difficult, if not impossible, to analyse the efficiency of those institutions, but once we look at the market organizations as equilibria of the games, we can use all the standard methods which have been successfully adapted to analyse the efficiency in game theory.

Those methods were developed by experimental economics and have become the most powerful tools in to predicting the equilibria in games and analysing their stability. We believe that these tools might be especially useful when analysing the markets in Eastern Europe because so many of them are still emerging, i. e. shifting towards efficient equilibria.

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