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SOCIAL STATUS AND INFORMATION TRANSMISSION IN EXPERIMENTAL GAMES

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Research Problem

A substantial share of social and economic interactions takes place between people of different social status: bosses and employees, parents and children, etc. Social status can be defined as prominence and respect that individuals enjoy in the eyes of other group members [Anderson et al., 2006], influence exerted on other people [Ridgeway, Correll, 2006]. Indicators of social status include education, wealth [Diemer et al., 2013] and even social popularity [Glaeser et al., 2000].

An important research issue is to what extent one's social status affects social learning, or an individual consults different sources of information such as friends and colleagues, media and opinion leaders to arrive at a decision in almost any area – from buying goods and opening a bank deposit to voting [d'Adda, 2012; Bursztyn et al., 2014; Nair et al, 2010; Weeks et al, 2017].

The existence of relationship between social status and social learning is based on psychologic, sociologic and economic research. Since primeval times, people have benefited from copying high-rank group members [Henrich, Gil-White, 2001]. Low-status individuals show more empathy and are more attuned to other people than their high-status counterparts [Stellar et al., 2012; Varnum et al., 2015; Kraus et al, 2010]. Lower social class is associated with stronger response to others' pain and sufferings [Stellar et al., 2012; Varnum et al., 2015], to social stress and rejection [Muscatell et al., 2016]. Individuals of higher economic status, defined in terms of educational attainment and occupational prestige, are worse at judging the emotions of others [Kraus et al, 2010].

A possible explanation to such differences was proposed by Kraus et al, 2012. Life circumstances of low-status individuals are more likely to be influenced, or be perceived to be influenced, by forces outside of their control. As a result, these people tend to adapt to their environment and react to external constraints and threats. On the contrary, high-status individuals enjoy more independence, greater perception of control and greater attendance to their own state [Piff et al, 2018].

Object of Research

The object of research is the interaction between individuals of asymmetric social status. The subject of research is the process of social learning.

Research Objectives

The aim of the work is analysis of the effect of social status on social learning.

The study includes the following steps:

— Systematization of theoretical and empirical research on social interactions including asymmetrical interactions between influential individuals and other agents;

— Development of the way to impose asymmetrical social status on agents and its evaluation in a laboratory experiment;

— Development of the game-theoretic model for the experiment on social learning;

— Development of the survey-based social status indicator;

— Development of the leadership and social capital indicators;

— Formulation of several hypotheses on the relationship of social status and weights placed on private information and on the action of the other player;

— Estimation of the econometric model describing the dependence of agent's actions on the private signal, action of the other player and their interaction with social status, cognitive and non-cognitive personal characteristics.

Literature review

This work is related to several strands of literature.

1. Social learning models studying information dissemination between naïve and Bayesian rational agents. These models usually imply a large number of agents connected into a social network. Agents receive a noisy private signal about a certain variable (state of the world) and observe information signals or actions of other players. Agents update their beliefs according to the Bayes rule or a simple

fixed rule [DeGroot, 1974; DeMarzo et al, 2003; Golub, Jackson, 2010; Acemoglu et al, 2010]. The aim of the social learning is finding out the true state of the world by all agents. This process is called information aggregation [Acemoglu et al, 2011].

Some individuals can exert more influence on their neighbors. The presence of such agents in the economic environment can disrupt or slow down information aggregation, for example, cause herd behavior [Banerjee, 1992; Bikhchandani et al, 1992; Acemoglu et al, 2010]. High social status can provide a behavioral foundation for such asymmetry - private information signals of such individuals will have greater weight. Position on the top of the hierarchy and a large number of contacts result in excessive influence of high-status individuals on other people. According to theoretical models, the presence of high-status individuals in a social network impedes learning even among Bayesian-rational agents [Acemoglu et al, 2010; Golub, Jackson, 2010].

2. Peer effect in laboratory and empirical studies. Peer effect is observed when an individuals tends to change their behavior following the group they belong to. For example, [Burztyn et al, 2014] show in the field experiment that investment decisions of financial market professionals are subject to two channels of influence: social learning from other's experience and imitating other's behavior. The effect of social learning is higher if the subject has more developed financial literacy skills.

3. Coordination games. In these games players win only if they choose similar strategies (coordinate). If otherwise, they get nothing. In a network with a large number of agents the player's payoff depends on whether his or her neighbors choose the same strategy. Then it is more likely that the individual follows the choice of the group. In [Cornand, Heinemann, 2014] more weight is attributed to public information, if the coordination component in the utility function is high.

4. Conformism in social networks. In theoretical models of conformity agents may care about impression they create because the society punishes

members who deviate from the social norms. Approval or denunciation takes the form of the parameter which describes the weight of others' attitude, and the individual has a choice to deviate or not. If the society's approval is important for the individual, he or she will share the social norms because in the opposite case, his or her utility will be lower [Bernheim, 1995; Liu et al, 2014; Patachini, Zenou, 2012; De Marti, Zenou, 2015].

5. Experimental research on effect of status on altruism, trust, cooperation, unethical behavior, willingness to share resources. In such works status can be imposed by different methods: randomly appointed, merit-based (for instance, earned by players during a task) or based on real characteristics, e.g. prestigious school or caste. For example, in [D'adda, 2012] social status is based on real characteristics. Participants interact in dyads, and information on leader's contribution to the public good affects contributions of other participants. In [Ball, Eckel, 1996; 1998] status is allocated based on quiz results. Higher status participants enjoy better conditions both as sellers and buyers.

Methodological basis of the work for the formulation of hypotheses is the social learning theory with Bayesian rational agents. The design of the game is based on previous laboratory experiments in social learning [Anderson, Holt, 1997; Celen, Kariv, 2004; Corazzinni et al, 2012]. At the beginning of each round the subject receives a noisy private signal about the state of the world, and has two attempts to guess it. The more precise is the guess, the higher is the payoff. At the first attempt the subject relies only on his or her private signal. Then he/she observes the choice of the partner and has the second attempt to guess the state of the world.

The social status indicator is calculated based on two groups of questions. The first group of questions consists of seven semantic differential scales [Ridgeway et al, 1998]. The subject has to appoint himself/herself closer to the one or the other end where opposite characteristics associated with position in the social hierarchy are present. The second group is the question on the position on

the social ladder widely used in sociology [The MacArthur Scale of Subjective Social Status, Adler et al, 2000; РМЭЗ, 2015].

Leadership qualities are measured by nine questions about how often subjects took part in activities associated with responsibility, initiative, not yielding to authority, etc. [International Personality Item Pool (IPIP); Kuhn, Weinberger, 2002]. Cognitive skills are measured by three standard questions [Frederick, 2005].

Social capital is defined as the number and frequency of social connections, and popularity and influence among peers and is based on the methodology of [Glaeser et al, 2000]. Additionally, subjects answer a standard question about trust – whether they think people can be trusted.

All experimental sessions were held in the International Laboratory for Experimental and Behavioral Economics at the National University Higher School of Economics in Moscow using Z-tree [Fischbacher, 2007].

The tools for testing hypothesis are methods of econometric modeling. The main research model is the least square regression with clustered errors.

Main findings

Several hypotheses were put forward and tested. For testing hypotheses 1–2 the research "Measurement of social status in experimental games" [Bondarenko, Zakharov, 2018] was conducted. 6 experimental sessions with 68 participants were carried out in 2016.

The first hypothesis is that asymmetric subjective social status can be imposed by the dictator game.

The second hypothesis is that subjective social status depends on characteristics associated with socioeconomic status – employment, family income, change in income and personal characteristics – leadership qualities, extraversion, etc.

Experiment design

Subjects were randomly allocated into pairs and played games of various degrees of asymmetry: dictator game, trust game and labor market game. In the dictator game the allocator is asked to divide a fixed budget between

herself/himself and the receiver. The receiver's role is passive – he or she accepts the allocator's choice and cannot affect either his/her or the other's payoff. In the trust game the investor decides how to allocate a fixed budget between himself/herself and the other subject (trustee). The amount allocated to the trustee is tripled, and the trustee can return any part of that sum to the investor. In the labor market game the manager is allocated capital and decides on the amount of wage to be paid to the worker. The worker chooses the effort level which involves different costs. Higher effort results in higher manager's revenue but lower worker's payoff. Pairs are shuffled after five rounds of each game.

At the end of each game subjects completed a questionnaire, where their own subjective social status, and then the subjective status of the game partner (the other player) were measured. After that subjects completed another questionnaire on socio-demographic and personal characteristics: wealth, confident behavior and positive/negative affect, social norms, trust, active membership in organizations.

Main findings

The first hypothesis is confirmed. For the dictator game, the difference between own subjective status and partner's subjective status (relative status) is significantly higher for allocators than for receivers. In the trust game and the labor market game such difference was not observed. This result did not depend on the game order.

The second hypothesis is confirmed. Personal characteristics of subjects affect both absolute and relative social status indicators. Confident behavior and extraversion positively correlate with the subjective status. Subjects with greater wealth have higher subjective social status; the same result was obtained for subjects with active membership in organizations and with high extraversion level (positive affect). Males score higher on the social status indicator than women, which stays in line with previous research [Bleidorn et al, 2016]. Family structure also matters: if the subjects are youngest children in the family, their absolute and relative social status indicators are lower. A possible explanation for this is that in families with several children, younger children are allocated less financial and

moral parents' resources than elder children [Chen, Liu, 2014; Keister, 2003]. Additionally, subjects who are part- or fulltime employed and subjects with higher family income have higher subjective social status.

For testing hypotheses 3–5 the research "Social status and social learning" [Zakharov, Bondarenko, 2020] was conducted. 9 experimental sessions with 114 participants were carried out.

The third hypothesis is that the dictator game can be used to create asymmetric subjective social status – higher subjective status by subjects who played allocators compared to subjects who played receivers.

The fourth hypothesis is that subjects with higher subjective status place more weight on private signal than on the partner's action when making a decision.

The fifth hypothesis is that personal characteristics – leadership qualities, risk aversion, social capital, emotional state and other characteristics significantly affect social learning.

Experiment design

At the beginning of the experiment subjects complete a questionnaire. After that they play five rounds of the dictator game. Next, subjects answer questions on their and their partner's subjective status. Then, in the same pairs, subjects play ten rounds of the social learning game. At the next stage, subjects play a standard risk lottery measuring risk attitude [Holt, Laury, 2002]. After the lottery they complete a questionnaire: standard socio-demographic questions, measurement of socio-economic status, leadership qualities, social capital and cognitive skills.

Main findings

The third hypothesis is not confirmed. The subjective social status indicator is higher for allocators than for receivers, but the difference is not significant. Apart from that, the role of the allocator did not affect the weight the subjects placed on the private signal or on partner's action.

The fourth hypothesis is confirmed. Individuals with higher subjective status place more weight on the private signal and less weight on partner's first period action when they make the second attempt to guess the state of the world. This

effect persisted for the first round as well as for all ten rounds of the social learning game.

The fifth hypothesis is confirmed. Risk-averse individuals place more weight on partner's first-period actions and less weight on the private signal, and this effect is more pronounced in men. Individuals with higher leadership qualities rely more on the private signal than on the partner's action while making the decision. The possible reason for it may be that leadership qualities correlate with higher self-confidence and extraversion [Bono, Judge, 2004; McCormick, 2001]. At the same time, various components of the social capital, trust, for example, negatively correlate with social learning. Individuals with more developed cognitive skills place more weight on the first-period partner's actions than on the private signal. A possible explanation may be that all subjects, in general, place less weight on partner's actions than fully Bayesian rational individuals would. On the other side, previous research shows that cognitive skills correlate with more rational behavior in experimental games [Cason, Mui, 2019; Duffy et al, 2019]. Indicators of objective social status (family income, parents' education, employment) do not affect social learning.

The implications of the work are as follows:

— This work is the first to analyze the relationship between social status and social learning in a laboratory experiment. Thus, it proved patterns observed in previous research;

— The effect of the social status itself was isolated from the effect of asymmetry in knowledge and asymmetry in the level of social capital. This is an important issue because competency and the number and the frequency of social contacts correlate with status. People have different levels of knowledge and tend to rely on experts' opinion when making a decision in a certain area. Regarding social capital, high-status individual will be more likely included in the reference group of the low-status individual than vice versa;

— A new measure of subjective social status based on the survey was developed;

— Effect of cognitive and non-cognitive characteristics on social learning was analyzed;

— Effect of behavior and role in the experimental game on subjective status was analyzed.

The obtained results contribute to the theoretical and empirical literature analyzing spreading and aggregation of information in social networks. High-status individuals place less weight on information signals from other agents. As a result, information cascades decreasing social welfare will be more likely to happen.

Results obtained in this dissertation can be used in constructing any hierarchical structure, from the firm to the government authority, to avoid distortion of information flows between superiors and subordinates and avoid making non-optimal decisions.

Approbation of research results

The findings of this dissertation were presented at the following conferences:

— XX International Academic Conference on Economic and Social Development, April 9–12, 2019, Moscow

— XXV International student, postgraduate and young scientist conference “Lomonosov”, MSU, Moscow. April 10–15, 2018, Moscow

— IV International Academic and Research student and postgraduate conference “Welt und Wissenschaft”, National Research University - Higher School of Economics, April 19, 2018, Moscow

— XVIII International Academic Conference on Economic and Social Development, April 11–14, 2017, Moscow

— Regular seminar of the Ronald F. Inglehart Laboratory for Comparative Social Research, September 28, 2017, Moscow

— Research seminar in neuroeconomics of the International Laboratory for Experimental and Behavioural Economics and the Centre for Cognition & Decision Making, October 21, 2016, Moscow.

The results of the dissertation were also reported at scientific seminars of the Doctoral School of Economics, National Research University - Higher School of Economics.

Publications

The main results of the dissertation research were published in three works with a total volume of 6,82 author's sheets; the personal contribution of the author is 4,17 author's sheets:

- Alexei Zakharov, Oxana Bondarenko (2020) Social status and social learning. Journal of Behavioral and Experimental Economics, 90 (in print). – 2,1 author's sheets (personal contribution –1 author's sheet)
- Oxana Bondarenko (2018) Influential Individuals: Approach to Modeling. Voprosy Ekonomiki, 9, 114-131. [In Russian]. –1,57 author's sheets
- Oxana Bondarenko, Alexei Zakharov (2018). Measurement of Social Status in Experimental Games, Journal of the New Economic Association, 2 (38), 6–37. [In Russian]. –3,15 author's sheets (personal contribution –1,6 author's sheets).