Modelling "race to the bottom" effect on the self-regulated markets

Kolesnik, Georgiy

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MODELLING «RACE TO THE BOTTOM» EFFECT ON THE SELF-REGULATED MARKETS

Abstract. The effect of the competition among self-regulatory organizations (SROs) on the efficiency of the corresponding goods and services markets is studied. It is shown that under certain conditions the competition among SROs worsens the quality of the goods and services and leads to decreasing consumers' welfare. Moreover, the distinctive feature of the competition among SROs in comparison with other types of regulatory competition is that even introduction of the alternative state control does not improve the situation.

The proposals are formulated for self-regulatory markets' structure and conditions change in order to reduce the negative effects of the SROs' competition.

Keywords: self-regulation, race to the bottom, regulatory competition, state control, hierarchical system, non-cooperative game.

1. INTRODUCTION

One of the directions of the modern Russian economy liberalization is partial delegation of the state functions of supervision over certain fields of the professional activity to the associations of the subjects of these activities - self-regulatory organizations (SRO). The number and the scope of such associations in each field are determined by the corresponding legislation and the market's participants preferences. The state retains the functions of the institutional framework creation and maintenance to support these organizations activity.

The proponents of self-regulation argue that SRO is an effective tool of market regulation, transparent and fully regulated by the law, with clearly defined objectives and requirements, provided by the direct participation of the highly qualified professionals, their personal liabilities, as well as by the supervision of the state [25].

The mechanism of self-regulation is long and widely used in the European countries and the USA to regulate such specific fields of the professional knowledge as securities market, legal activities, corporate management, medicine and some other. The operation of the SROs is regulated by the separate laws, specific to the professional field of activity [20].

In the Russian Federation where the self-regulation was introduced in the late 1990s, this process, on the one hand, grows rapidly, covering new areas of economic activity. On the other hand, it is still far from the complete harmonization of the operation of the parties involved in this interaction that gives rise, in some cases, to inefficiencies in its implementation.

The concept of a SRO first appeared in the Russian legislation in 1995 in the document named «Provisional regulations for keeping the register of owners of registered securities» [18]. A SRO was defined there as «a voluntary non-profit organization, created by professional participants of the securities market and exist in accordance with the requirements of the legislation of the Russian Federation on securities» (Art. 2.1). The main tasks of a SRO were to develop mandatory standards of its members' activities and to request the Federal Commission on Securities and Stock Markets to issue the licenses for the right of professional activity for its members.

Only in 2007 the Federal law «On self-regulatory organizations» [30] was adopted which defined the general principles of creation and operation of the SRO, the subject and the scope of self-regulation. With the adoption of this Federal law, as well as a number of special laws regulating the activity of the SROs in the specific sectors of the economy, an intensive introduction of self-regulation in various fields of professional activity began. In 2008 the self-regulation of the appraisal activity was introduced, in 2009 - in the fields of construction, design, engineering survey, energy survey and audit. Currently the mandatory membership in a SRO is provided for ten areas and the voluntary membership is provided for another seven areas [25].

Despite the widespread usage of the self-regulation on various markets its efficiency in comparison with the state regulation is still a subject of the extensive discussion in scientific and expert community.

The professionalism of the participants of this process is called as the main advantage of self-regulation. It ensures the implementation of the regulation with minimal costs, and the ability to respond rapidly to changes in the industry and market conditions [1, 4, 10, 19]. At the same time, the self-regulating markets often face the problem of affiliation, when a group of formally independent entities actually forms a network structure, artificially limiting the competition and giving the opportunity to its participants to gain monopolistic rents [13, 16].

A number of the self-regulation failures is well known. In particular, in the UK, Germany, the USA and some other countries self-regulation in corporate governance has been replaced by the government regulation [20].

The United Kingdom, one of the leading countries in the field of quality regulation, refused from the use of self-regulation of the financial services markets. Self-regulatory organizations in this field, created in accordance with The Financial Services Act (1986), were recognized as incapable to prevent massive violations of the investors' rights. As a result, in 1997 a single regulator in the field of securities market was created on the basis of the Securities and Investments Board (SIB) - the Financial Services Authority (FSA), accountable to the Ministry of Finance and the Parliament. The self-regulatory organizations were deprived of the official status and continued to work as professional associations [23].

Another example is Germany, where the efficiency of self-regulation mechanisms in the field of corporate governance was questioned twice, and in both cases the voluntary codes (The Insider Trading Code and The Takeover Code) were replaced by the relevant legislation (Securities Trading Act and Takeover Act) providing mandatory sanctions [9].

In the United States due to the lack of confidence to disciplinary procedures performed by the advocates in accordance with The Sarbanes-Oxley Act of 2002 Section 307, the regulation of these activities was assigned to the Securities and Exchange Commission (SEC) [20].

These examples show that the introduction of self-regulation does not always lead to certainly positive effect on the quality of the market operation. Hence, the relevant scientific and practical problem is to find more effective regulatory mechanisms, based on a rational combination of public and private regulation that motivate private companies to achieve the goals defined by the authorities.

One of the proposed ways of improving the efficiency of self-regulation is the introduction of competition at the level of SRO [5, 11, 12]. Its proponents expect that it hinder the formation of network structures, facilitate the entrance into the industry and lead to the selection of the most efficient for the consumers standards of behavior.

However, the empirical observation of the SRO activities in different fields shows that in most cases the competition among them even more aggravates the situation on the market. For example, the report on the development of self-regulation prepared by the Ministry of economic development of Russia [25], indicates a lack of quality control of the SROs. It is noted that audits performed by SROs are often formal and that most of the SROs standards are of a low quality and essentially mimic the federal legislation.

As it is noted in [17], a common practice for the SROs in the area of construction which operate under intense competition is to reduce the size of entrance and membership fees down to the values that cannot ensure their normal functioning. This leads to decrease in the quality of SROs regulatory functions and to the use of various informal schemes of funds extortion from their members. Similar short-comings are noted in the activity of the SROs in the fields of auditing and appraisal services.

To the author's knowledge, currently there are no papers devoted to formal analysis of the impact of SROs competition on the markets efficiency. The existing models of self-regulation [1, 4, 6, 10, 14] consider as a rule a system containing a single SRO. The papers [3, 10] analyze bilateral regulation of the market both by the SRO, and the state. They show that the presence of an opportunity of state control leads to the increase in the efficiency of self-regulation.

The evidence of the efficiency of SROs' competition is based on the well-known results of regulatory competition theory models, which confirm the consumers' welfare improvement in the presence of the competition in standards [12]. However, they neglect the fact that the «consumers» of the SROs' services are the sellers in the regulated market, which are not interested to improve the quality and reduce prices for their production. As a result the competition among SROs leads to the negative changes in the final consumers' welfare.

In this paper the issue of the impact of the SROs' competition on the market efficiency is investigated in the context of vertical effects in the socio-economic hierarchical systems. The model of a self-regulated market is formulated and investigated. It is shown that SROs' competition reduces the incentives for the agents on this market to improve the quality of their products/services.

2. THE MODEL

As a basis for further analysis we will use the model of a self-regulated market presented in [3]. This paper addresses the case of monopoly regulation of the market by a single SRO maximizing the welfare of its members. Two main results received are that SRO regulation policy in this case is much softer than the optimal one for the client, and that the availability of the alternative state regulation leads to its significant improvement which allows to achieve the second-best solution.

It should be noted that the assumption made in this paper that SRO maximizes the welfare of its members contradicts the idea of the self-regulation as a mechanism of ensuring the socially effective functioning of the market. Since the SROs are imparted a portion of the state power to establish «rules of the game» on the market the effective regulation is possible only in the case when the goals of the SROs take into account consumers' interests.

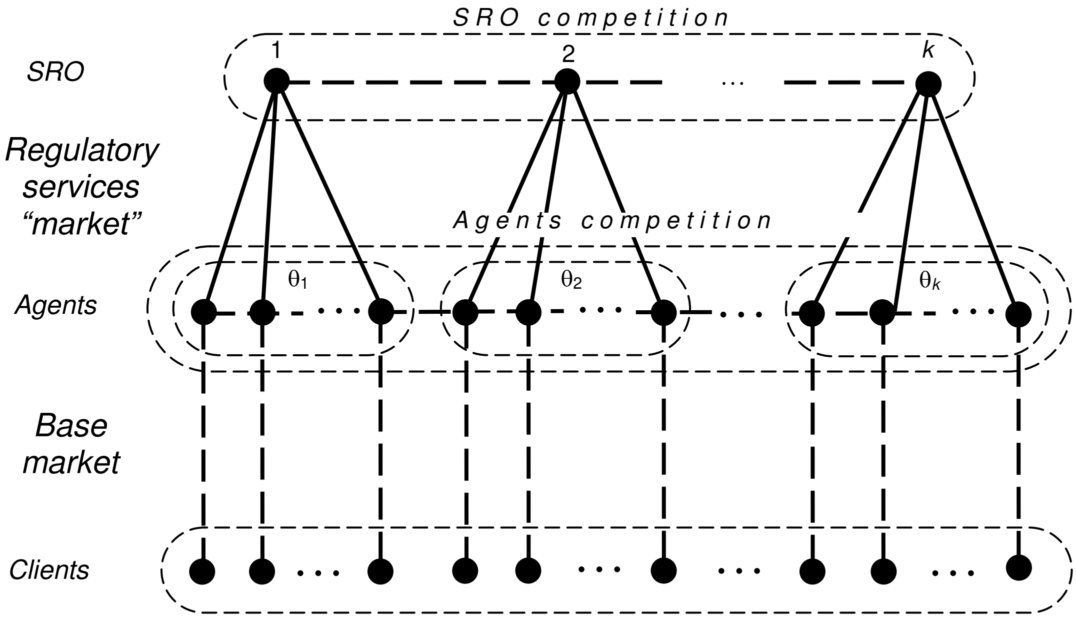

Fig. 1. The scheme of a self-regulated market

The model investigated here differs from the one considered in [3] in two ways. First, the criterion of a SRO is defined as the consumer's welfare, rather than the agent's one. This allows us to avoid considering the effects generated by the possible conflict of interests of the consumers and SROs. Second, it is assumed that several SROs operate onthe market and that each of them may set its own professional standards.

Formally self-regulating market is represented by a three-level hierarchical system, which includes the sets of the agents providing a certain type of services (A), the clients consuming these services (K), and the self-regulatory organizations establishing professional standards and controlling their observance (S), see Fig. 1. The activity of a SRO in this system can be thought of as a special kind of service – a "regulatory service".

So the market considered can be viewed as\consisting of two parts: the base market defined by the interaction between the clients and the agents, and the derived market of regulatory services rendered by the SROs.

The base market is described by the standard «principal - agent» model [15]. In this model the principal (client) with the reservation utility α hires an agent for certain services. The benefit (cash flow) received is a random variable W defined on measurable set $\mathbf{\Omega} \subseteq \mathbf{R}_+$ having a minimal element $\underline{w}$. The realization w of the random variable W is known to the agent, but is unknown to the client.

A client and an agent[1] sign a contract that defines the size of the payments from the agent to the client as a function $z(r) \geq 0$, where r is the information about the realization w which agent reports to the client. The remaining part of the cash flow constitutes the agent's profit from her professional activity:

$$y(w, r) = w - z(r). \tag{1}$$

We abstract from the effects of risk sharing among the agent and the customer considering like in [3] a risk-neutral consumer which maximizes an expected return, and risk-averse agent which maximizes the utility of the received income, represented by increasing concave function $v(y)$ with $v(0) = 0$.

The consumer's strategy is the choice of the parameters of the contract $z(r)$, the agent's strategy is the information reported to the client as a function of the random variable realization $r(w)$. The information asymmetry among the client and the agent leads to the problem of moral hazard on this market since the opportunistic agent can provide a false information to the client.

The SROs which form the top level of the hierarchy set performance standards for their members and monitor them. We assume that the membership in a SRO is compulsory for an agent, and that each agent belongs to the only one SRO. To ensure the compliance of the market participants with the quality standards a SRO is endowed with the power to audit the performance of the contracts by its members and to apply penalties. We assume that each SRO conducts an audit of an agent with the probability $p(r)$, depending on the agent's report. The auditing of an agent is costly to the SRO. The expenses $c \geq 0$ are compensated by charging a fixed fee t with each contract made by the SRO's members.

The audit reveals the true value of w, and when there is a difference of the information provided by the agent r, and the real value of cash flow w the agent pays the penalty $x(w, r) \geq 0$. It is assumed that the agents have limited liability, so their total payments cannot exceed the amount of cash flow:

$$z(r) + x(r, w) \leq w. \tag{2}$$

The triple $\lambda_i = (p_i(r), x_i(w, r), t_i)$ is the regulation strategy of the i-th SRO. We denote by Λ the set of all possible regulation strategies.

The strategy chosen by a SRO must ensure the profitability of its activities, i.e. it must satisfy the SRO's budget constraint:

$$t \geq E(p(r(W))(c - x(W, r(W)))), \tag{3}$$

[1] We assume all the groups of the participants in the model (customers, agents and SROs) to be homogeneous. So, everywhere forth, where it would not cause a misunderstanding, representative participants will be considered and the corresponding indices in the variables and functions will be omitted.

where E denotes the mathematical expectation.

The purpose of the SRO is to maximize the expected welfare of consumers, who have contracts with its members:

$$Q(\lambda) = \Phi(\lambda)\hat{U}(\lambda), \tag{4}$$

where $\boldsymbol{\lambda}$ - the regulation strategies profile of all SROs in the market; $\Phi(\boldsymbol{\lambda})$ - the share of clients served by the members of the SRO under the profile $\boldsymbol{\lambda}$; $\hat{U}(\lambda)$ - the objective function of a client on the optimal contract $z^*(r;\lambda)$ which is determined as a solution of the problem:

$$U(z(r);\lambda) = E\big(z\big(r(W)\big)\big) - t = \int_{\Omega} z(r(w))dF_W(w) - t \to \max_{z(\cdot)}, \tag{5}$$

with respect to the client's individual rationality condition:

$$U(z(r);\lambda) \geq \alpha \tag{6}$$

and the agent's limited liability condition (2).

The agent for the each realization of the cash flow w chooses the strategy $r(w)$ which maximizes her expected utility with respect to the terms of the contract $z(r)$ and regulation strategy λ:

$$\begin{aligned} V(r(w); z(r), \lambda) = (1 - p(r(w)))v(w - z(r(w)) + \\ + p(r(w))v(w - z(r(w)) - x(r(w), w)) \to \max_{r(\cdot)}. \end{aligned} \tag{7}$$

As a starting point for further analysis we consider the market regulated by a single SRO.[2] In this case $\Phi(\boldsymbol{\lambda}) \equiv 1$ and the criterion (4) takes the form

$$Q(\lambda) = \hat{U}(\lambda) = U(z^*(r;\lambda);\lambda). \tag{8}$$

The interaction in this system (let us call it *model 1*) includes the following steps:

1. SRO chooses regulation strategy $\lambda = (p(r), x(w, r), t)$.
2. Given the strategy λ, the client offers an agent a contract $z(r)$.
3. If the agent does not accept the terms of the contract, the participants receive their reservation utilities (agent - 0, client - α) and the interaction ends. Otherwise, the client pays the agent's SRO value t and the interaction continues.
4. The agent observes the realization w of the random variable W.
5. The agent provides the client with the information r and pays her the amount $z(r)$.
6. SRO investigates the agent with the probability $p(r)$ incurring costs c and collecting the penalty $x(w, r)$.

[2] So, this model differs from the one described in [24] only by the form of the SRO's criterion.

As it is noted in [3] the interaction described by the *model 1* is not the standard «principal - agent» problem since the decisions on the different components of the agent stimulating mechanism are made by different participants. The amount of payments $z(r)$ is defined as the solution of client's problem in the stage 2, and the investigation probability $p(r)$ and the penalty size $x(w, r)$ are the elements of the SRO's strategy which is determined in the step 1. Considering the *model 1* for the case when the SRO maximizes the utility of agent (7), the authors in [3] establish that in an equilibrium too liberal regulation strategy is chosen which significantly weaken the competition in the underlying market.[3]

In contrast here we consider the case when the client's utility function (5) and the SRO's criterion (8) are the same differing only in the sets of optimization parameters. Therefore the SRO in the *model 1* can implement the second best solution (taking into account the information asymmetry), as a result of solving the problem of maximizing client's utility function (5) with respect to $(z(r), \lambda)$. This is a well-studied standard "principal - agent" problem [8, 15]. According to the revelation principle [2], its solution can be found in the class of direct mechanisms when the agent reports the truthful information about the cash flow realization:

$$r(w) = w.$$

The strategy $(z(r), \lambda)$ which ensures the agent's truthful information must satisfy the following incentive compatibility conditions:

$$\forall\ w, r \in \Omega\text{: } v(w - z(w)) \geq (1 - p(r))\ v(w - z(r)) + p(r)\ v(w - z(r) - x(w, r)). \tag{9}$$

As it is shown in [3] the optimal regulation strategy in this case requires imposing the maximal penalty on the agent for the false message with regard the limited liability condition (2) and no penalty for the true one:

$$x^*(r,w) = \begin{cases} w - z(r), & r \neq w; \\ 0, & r = w. \end{cases} \tag{10}$$

As a result the incentive compatibility constraints (9) take the form:

$$\forall\ w, r \in \Omega\text{: } v(w - z(w)) \geq (1 - p(r))\ v(w - z(r)) + p(r)\ v(0). \tag{11}$$

Since in equilibrium all the agents report the true information then there is no penalty and the SRO's budget constraint is

$$t^* = cE(p(r(W))), \tag{12}$$

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3 This statement is true for the model with a fixed set of agents. If the entry of new agents on the market is possible the regulation liberalization does not necessarily lead to the competition weakening, as the reduction of barriers can attract new market participants. In this case the nature of the competition changes passing from the quality competition to the price one.

Due to the above-mentioned possibility of implementing the "second best" solution the optimal contract $z^*(r)$ and the audit strategy $p^*(r)$ in this model are defined as a solutions of the optimization problem

$$U(z(r), p(r), x^*(r, w), t^*) = \int_{\Omega} \big(z(w) - cp(w)\big) dF_W(w) \to \max_{(z(\cdot)\, p(\cdot))}, \tag{13}$$

regarding the limited liability condition (2), the incentive compatibility constraints (11) and the consumer's individual rationality (6).

The optimal contract z^* is the "second best" solution which maximizes the consumers' welfare under asymmetric information. Generally its form depends on the audit cost c and cash flow W distribution.

Consider now the situation when there are k SRO's operate on the market i.e. $S = \{1, ..., k\}$. The SROs set the standards of their members' activity and monitor their observance. The regulation strategy of the i-th SRO is the set $\lambda_i = (p_i(r), x_i(w, r), t_i)$. The choice of the lambdas by all the SROs in the market generates a regulation profile $\boldsymbol{\lambda} = (\lambda_1, \lambda_2, ..., \lambda_k)$.

Assume that the sets of the agents and the clients are isomorphic to [0, 1]. Each agent $x \in [0, 1]$ can choose a SRO for membership. Let us denote θ_i the fraction of the agents which are the members of the i-th SRO and let $\boldsymbol{\theta} = (\theta_1, \ldots, \theta_k)$. Due to our assumptions about membership in SRO

$$\sum_{i=1}^{k} \theta_i = 1. \tag{14}$$

In general the members of different SROs can offer a client different terms of the contracts. So the consumer has an additional optimization parameter – the number of SRO $i \in S$ with a member of which she signs the contract.

So the parties' interaction in this system takes the following form (*model 2*):

1′. Each SRO chooses a regulation strategy $\lambda_i = (p_i(r), x_i(w, r), t_i)$.

2′. Given the regulation profile $\boldsymbol{\lambda}$ each agent chooses a SRO for membership. The choices of all agents form a partition of the agents' set $\boldsymbol{\theta}(\boldsymbol{\lambda})$.

3′. Given the regulation profile $\boldsymbol{\lambda}$ and the partition $\boldsymbol{\theta}(\boldsymbol{\lambda})$ the client chooses the SRO with a member of which she will make a contract.

4′. The client offers the agent a contract $z(r)$.

5′. If the agent does not accept the terms of the contract, the participants receive their reservation utilities (agent - 0, client - α) and the interaction ends. Otherwise, the client pays the agent's SRO value t_i and the interaction continues.

6′. The agent observes the realization w of the random variable W.

7′. The agent provides the customer with the information r and pays her the amount $z(r)$.

8′. The i-th SRO investigates its members with the probability $p_i(r)$ incurring the cost c and receiving the penalty $x_i(w, r)$.

At the stage 1′ SROs choose parameters of their regulation strategies $\lambda_i \in \Lambda$ so as to maximize their criteria $Q_i(\boldsymbol{\lambda})$, defined by (4). The resulting regulation profile $\boldsymbol{\lambda} = (\lambda_1, \lambda_2, ..., \lambda_k)$ can be associated with the set of affordable regulation strategies $\Lambda_1(\boldsymbol{\lambda}) \subseteq \Lambda$ which consist of the regulation strategies used at least by one SRO:

$\Lambda_1(\boldsymbol{\lambda}) = \{\lambda \in \Lambda: \exists\, i: \lambda_i = \lambda\}$.

The agent's problem which is solved on the stage 2′ is to choose from the set $\Lambda_1(\boldsymbol{\lambda})$ the strategy which maximizes her expected utility:

$$\hat{V}(\lambda) = I(\lambda)E\big(V(W; z^*(r;\lambda),\lambda)\big) = I(\lambda)\int_{\Omega}\big(v(w - z^*(w;\lambda))\big)dF_W(w) \to \max_{\lambda\in\Lambda_1(\boldsymbol{\lambda})}, \qquad (15)$$

where $I(\lambda)$ is the indicator function which takes the value 1 if there is a client which makes contract with the agent and 0 in the opposite case.

The solution of this problem by all agents in the system determines their allocation $\boldsymbol{\theta}(\boldsymbol{\lambda})$ and the *feasible regulation strategies set* $\Lambda_2(\boldsymbol{\lambda}) \subseteq \Lambda_1(\boldsymbol{\lambda})$ consisting of the regulation strategies λ_i such that $\theta_i(\boldsymbol{\lambda}) > 0$. It follows from (15) that

$$\Lambda_2(\boldsymbol{\lambda}) = \operatorname{Arg}\max_{\lambda\in\Lambda_1(\boldsymbol{\lambda})} \hat{V}(\lambda).$$

Let us assume that in the case when more than one SRO uses a strategy from $\Lambda_2(\boldsymbol{\lambda})$ the agent can choose each of them with equal probability, i.e.

$$\theta_i(\boldsymbol{\lambda}) = \begin{cases} 1/l, & \lambda_i \in \Lambda_2(\boldsymbol{\lambda}), \\ 0, & \lambda_i \notin \Lambda_2(\boldsymbol{\lambda}), \end{cases} \qquad (16)$$

where l is the number of the SROs which use the strategies from $\Lambda_2(\boldsymbol{\lambda})$.

At the stage 3′ each client chooses an agent to contract with. Since the agents in the model are identical the client's utility does not depend on the agent's number but on her SRO regulation strategy. Hence the following maximization problem arises at the stage 3′.

$$\hat{U}(\lambda) = U(z^*(r;\lambda);\lambda) \to \max_{\lambda\in\Lambda_2(\boldsymbol{\lambda})}. \qquad (17)$$

A solution of this problem gives us a set of regulation strategies $\Lambda^*(\boldsymbol{\lambda}) \subseteq \Lambda_2(\boldsymbol{\lambda})$, such that the contracts will be made only with the members of SROs using them:

$$\Lambda^*(\boldsymbol{\lambda}) = \operatorname{Arg}\max_{\lambda\in\Lambda_2(\boldsymbol{\lambda})} \hat{U}(\lambda).$$

The indicator function $I(\lambda)$ in (15) takes the form:

$$I(\lambda) = \begin{cases} 1, & \lambda \in \Lambda^*(\boldsymbol{\lambda}), \\ 0, & \lambda \notin \Lambda^*(\boldsymbol{\lambda}). \end{cases} \tag{18}$$

Then the share of the clients which make a contract with the members of the i-th SRO is

$$\Phi_i(\boldsymbol{\lambda}) = \left(\theta_i(\boldsymbol{\lambda}) \Big/ \sum_{\lambda_j \in \Lambda^*(\boldsymbol{\lambda})} \theta_j(\boldsymbol{\lambda}) \right) I(\lambda_i) .$$

At the stages 4′ – 8′ the optimal contract is determined and implemented under fixed regulation strategy. These stages are fully equivalent to the stages 2 – 6 of the *model 1*. The solutions of the corresponding sub-games represent the terms of the optimal contracts $z^*(r; \lambda)$ offered to the members of a SRO with the regulation strategy λ.

In contrast with the *model 1* the stages of determination of different elements of agent's stimulation mechanism (λ_i, $z(r)$) are divided here by her move and cannot be obtained as a single optimization problem solution. It will be shown below that this fact significantly affects the properties of the resulting equilibria.

Let us find a subgame-perfect equilibrium in the *model 2*. Due to the above mentioned equivalence of the last five stages in the both models the optimal contract $z^*(r; \lambda)$ under fixed SRO regulation strategy λ is identical to the one chosen in the *model 1*.

We will assume that $z^*(r; \lambda)$ is defined on the whole set of regulation strategies i.e. the constraints (2), (6), (9) in the client's problem are compatible.

At the stages 2′ and 3′ the agents and the clients respectively choose a SRO which offers the best conditions. For a certain regulation profile $\boldsymbol{\lambda}$ introduce the following values:

$$V^*(\boldsymbol{\lambda}) = \max_{\lambda \in \Lambda_1(\boldsymbol{\lambda})} E\big(V(W; z^*(r; \lambda), \lambda)\big), \tag{19}$$

$$U^*(\boldsymbol{\lambda}) = \max_{\lambda \in \Lambda_2(\boldsymbol{\lambda})} \hat{U}(\lambda) . \tag{20}$$

Since the agent's optimal strategy in (15) is to participate in a SRO having a feasible regulation strategy then for each agent

$$\hat{V}(\lambda) = V^*(\boldsymbol{\lambda}^*).$$

Likewise the optimal client's solution in (17) is to make a contract with a member of a SRO such that $\lambda \in \Lambda^*(\boldsymbol{\lambda}^*)$. Then

$$\hat{U}(\lambda_i^*) = U^*(\boldsymbol{\lambda}^*) .$$

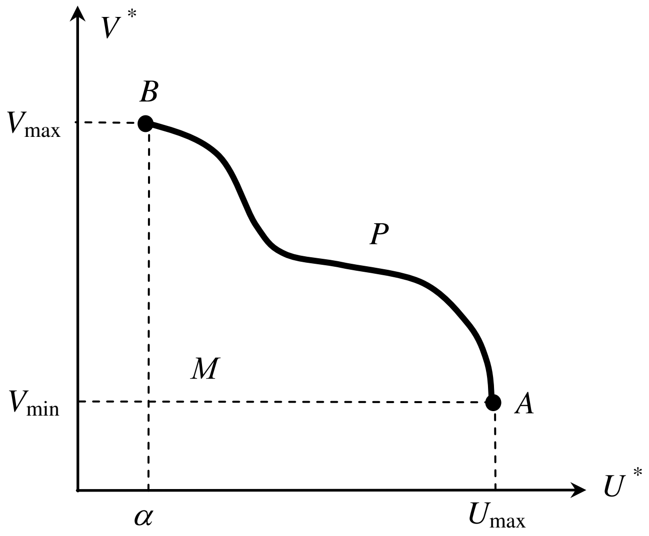

Fig. 2. An effective market states set

So each regulation profile $\boldsymbol{\lambda}$ can be associated with a pair $(U^*(\boldsymbol{\lambda}), V^*(\boldsymbol{\lambda}))$, which describes the state of the corresponding market.

Let $M = \{(U^*(\boldsymbol{\lambda}), V^*(\boldsymbol{\lambda})) \mid \boldsymbol{\lambda} \in \Lambda^k\}$ be the set of every possible market states under the regulation profiles from the set Λ. M is limited due to (2) and (6).

We call a state $(U, V) \in M$ as an effective one if there is no other element which Pareto-dominates (U, V). The set of effective states we denote by P (Fig. 2). A regulation profile $\boldsymbol{\lambda}^*$ is called effective if the corresponding state $(U^*(\boldsymbol{\lambda}^*), V^*(\boldsymbol{\lambda}^*)) \in P$.

The situation when all the SROs use the "second best" solution that gives the maximum expected revenue to the client is an extreme point of the set of effective regulation profiles. The other extreme point is the profile consisting of the regulation strategies defined in [3, proposition 2] which maximizes the expected utility of an agent. The set of such strategies Λ^0 is determined as a solution of the problem

$$E\Big(V(W; z^*(r; \lambda), \lambda)\Big) \to \max_{(z,p)}, \tag{21}$$

under conditions (2), (6), (10), (11), (12).

The following result holds.

Proposition 1. *Every regulation profile* $\boldsymbol{\lambda}^*$ *which generates subgame-perfect equilibrium in model 2 is effective.*

Proof. Assume the contrary, i.e. that certain regulation profile $\boldsymbol{\lambda}'$ exists such that $U^*(\boldsymbol{\lambda}') \geq U^*(\boldsymbol{\lambda}^*)$, $V^*(\boldsymbol{\lambda}') \geq V^*(\boldsymbol{\lambda}^*)$ and at least one inequality is strict. Consider a strategy $\lambda' \in \Lambda^*(\boldsymbol{\lambda}')$ and construct profile $\boldsymbol{\lambda}''$ such that $\lambda_i'' = \lambda'$ for certain i and $\lambda_j'' = \lambda_j^*$ for $j \neq i$.

Let us study the case $U^*(\boldsymbol{\lambda}') > U^*(\boldsymbol{\lambda}^*)$, $V^*(\boldsymbol{\lambda}') \geq V^*(\boldsymbol{\lambda}^*)$. The client who make a contract with a member of the i-th SRO under the regulation profile $\boldsymbol{\lambda}''$ receives expected payoff

$$\hat{U}(\lambda_i'') = U^*(\boldsymbol{\lambda}') > U^*(\boldsymbol{\lambda}^*) = \hat{U}(\lambda_j'').$$

According to the optimal strategy at the stage 3' all clients in the system will make contracts with members of the i-th SRO, therefore $\Lambda^*(\boldsymbol{\lambda}'') = \{\lambda'\}$. It follows from (18) that in this case the members of the i-th SRO have a non-zero income while the income of the other agents is zero, therefore $\theta_i(\boldsymbol{\lambda}'') \geq {}^1/_k$. Then the i-th SRO criterion value is

$$Q_i(\boldsymbol{\lambda}'') = \Phi_i(\boldsymbol{\lambda}'')U^*(\boldsymbol{\lambda}') \geq \frac{1}{k}U^*(\boldsymbol{\lambda}') > \frac{1}{k}U^*(\boldsymbol{\lambda}^*) = Q_i(\boldsymbol{\lambda}^*),$$

i.e. it has increased as a result of the deviation.

Let us study the case $V^*(\boldsymbol{\lambda}') > V^*(\boldsymbol{\lambda}^*)$. The expected profit of the i-th SRO member under regulation profile $\boldsymbol{\lambda}''$ exceeds the one for the members of other SROs. The solution of (15) gives us that $\Lambda_2(\boldsymbol{\lambda}'') = \{\lambda'\}$, i.e. all agents in the system will choose to join the i-th SRO. Since $\Lambda^*(\boldsymbol{\lambda}'') \subseteq \Lambda_2(\boldsymbol{\lambda}'')$ then all clients at the stage 3′ will contract with the members of the i-th SRO. Then

$$Q_i(\boldsymbol{\lambda}'') = \Phi_i(\boldsymbol{\lambda}'')U^*(\boldsymbol{\lambda}') = U^*(\boldsymbol{\lambda}') > \frac{1}{k}U^*(\boldsymbol{\lambda}^*) = Q_i(\boldsymbol{\lambda}^*),$$

i.e. the i-th SRO criterion has increased as a result of the deviation.

Thus, in the both cases the deviation from the profile $\boldsymbol{\lambda}^*$ is beneficial for the i-th SRO, therefore this profile cannot be a part of a subgame-perfect equilibrium. ■

This result demonstrates that self-regulation allows to implement the states of the underlying market which are Pareto-efficient in the multicriteria problem with criteria $(U^*(\boldsymbol{\lambda}), V^*(\boldsymbol{\lambda}))$. However, these solutions can vary considerably by their preferability for the clients, and therefore, by the corresponding market equilibrium effectiveness.

Let us define the following values for every pair of regulation profiles $\boldsymbol{\lambda}'$, $\boldsymbol{\lambda}''$:

$$\Delta V(\boldsymbol{\lambda}', \boldsymbol{\lambda}'') = V^*(\boldsymbol{\lambda}'') - V^*(\boldsymbol{\lambda}'),$$

$$\Delta U(\boldsymbol{\lambda}', \boldsymbol{\lambda}'') = U^*(\boldsymbol{\lambda}'') - U^*(\boldsymbol{\lambda}').$$

We call as *equivalent* the regulation profiles $\boldsymbol{\lambda}'$, $\boldsymbol{\lambda}''$ such that $\Delta V(\boldsymbol{\lambda}', \boldsymbol{\lambda}'') = 0$ and $\Delta U(\boldsymbol{\lambda}', \boldsymbol{\lambda}'') = 0$.

Corollary. *For any two non-equivalent regulation profiles* $\boldsymbol{\lambda}'$, $\boldsymbol{\lambda}''$, *which generate subgame-perfect equilibria, the following ratio holds:*

$$\frac{\Delta U(\boldsymbol{\lambda}', \boldsymbol{\lambda}'')}{\Delta V(\boldsymbol{\lambda}', \boldsymbol{\lambda}'')} < 0. \tag{22}$$

Proof. The inequality (22) is violated only in the cases when either $V^*(\boldsymbol{\lambda}'') \geq V^*(\boldsymbol{\lambda}')$, $U^*(\boldsymbol{\lambda}'') \geq U^*(\boldsymbol{\lambda}')$ or $V^*(\boldsymbol{\lambda}') \geq V^*(\boldsymbol{\lambda}'')$, $U^*(\boldsymbol{\lambda}') \geq U^*(\boldsymbol{\lambda}'')$, and one of the inequalities in each group is strict (since the profiles are non-equivalent). In any case, one of the equilibrium profiles is not effective, contrary to the claims of proposition 1. ■

Thus, all subgame-perfect equilibria in this system which generated by non-equivalent regulation profiles are ordered by their preference for the customers and for the agents. The more preferred equilibrium for the clients, the less it is preferred for the agents and vice versa.

Now we are ready to formulate the main result of this paper.

Proposition 2. *If the set P of the effective market states is a continuous curve in the space (U^*, V^*), then any subgame-perfect equilibrium is generated by equivalent regulation profiles* $\boldsymbol{\lambda}^* = (\lambda^*_1, \lambda^*_2, ..., \lambda^*_k)$*, such that*

$$\forall\, i \in S\ \lambda_i^* \in \Lambda^0, \qquad (23)$$

where Λ^0 *is the set of solutions of the problem (21).*

To prove this result, we need the following property of the regulation profiles, generating subgame-perfect equilibria.

Lemma 1. *Let the regulation profile* $\boldsymbol{\lambda}^* = (\lambda_1^*, ..., \lambda_k^*)$ *generates a subgame-perfect equilibrum. Then for any* $i \in S$ *holds:*

$$\hat{V}(\lambda_i^*) = V^*(\boldsymbol{\lambda}^*),\ \hat{U}(\lambda_i^*) = U^*(\boldsymbol{\lambda}^*).$$

The proof of this result follows immediately from the form of the agent's and client's problems (15), (17). Indeed, (15) implies that for every feasible regulation strategy $\lambda \in \Lambda_2(\boldsymbol{\lambda}^*)$ the equality holds

$$\hat{V}(\lambda) = V^*(\boldsymbol{\lambda}^*).$$

It follows from (17) that for each regulation strategy $\lambda \in \Lambda^*(\boldsymbol{\lambda}^*)$ $\hat{U}(\lambda_i^*) = U^*(\boldsymbol{\lambda}^*)$.

Let us prove that in every subgame-perfect equilibrium $\forall\ i \in S\ \lambda_i^* \in \Lambda^*(\boldsymbol{\lambda}^*)$. Indeed, if for any $i \in S$: $\lambda_i^* \notin \Lambda^*(\boldsymbol{\lambda}^*)$, then from (18) it follows that $\mathrm{I}(\lambda_i^*) = 0$, hence $Q_i(\boldsymbol{\lambda}^*) = 0$. But in this case the choice of any strategy $\lambda \in \Lambda^*(\boldsymbol{\lambda}^*)$ by the i-th SRO leads to $\mathrm{I}(\lambda) = 1$ and $\theta_i(\boldsymbol{\lambda}') > 0$.

Then the i-th CPO receives strictly positive payoff i.e. regulation profile $\boldsymbol{\lambda}^*$ does not generate equilibrium. ■

Proof of proposition 2.

Let us prove that a regulation profile $\boldsymbol{\lambda}^*$ which satisfies (23) generates a subgame-perfect equilibrium.

Since the expected payoff of the members of any SRO under regulation profile $\boldsymbol{\lambda}^*$ is the same then the choice of the agents' optimal strategies (16) in the stage 2 leads to the symmetric allocation $\forall\ i = 1, ..., k\ \theta_i(\boldsymbol{\lambda}^*) = {}^1/_k$.

As it is shown in [3, proposition 3] the optimal behavior at the stages 4′ – 8′ implies that for any regulation strategy $\lambda \in \Lambda^0$ client's individual rationality constraint (6) is satisfied as equality. In this case client at the stage 3′ will be indifferent among the SROs hence $\forall\ i \in S\ \Phi_i(\boldsymbol{\lambda}^*) = \theta_i(\boldsymbol{\lambda}^*)$ and any SRO's payoff is

$$Q_i(\boldsymbol{\lambda}^*) = \frac{\alpha}{k}.$$

Consider a deviation of the i-th SRO which generates a new regulation profile $\boldsymbol{\lambda}'$ such that $\lambda'_i \notin \Lambda^0$ and $\lambda'_j = \lambda^*_j$ for $j \neq i$. In this case $\hat{V}(\lambda'_j) < V^*(\boldsymbol{\lambda}^*)$, therefore it is not profitable for the agents to participate in the i-th SRO i.e. $\theta_i(\boldsymbol{\lambda}') = 0$. Then

$$Q_i(\boldsymbol{\lambda}') = \Phi_i(\boldsymbol{\lambda}')\hat{U}(\lambda'_i) = 0 < \frac{\alpha}{k} = Q_i(\boldsymbol{\lambda}^*).$$

Thus it is not profitable for any SRO to deviate at the stage 1′ from regulation profile $\boldsymbol{\lambda}^*$. Since the other parties at the remaining stages of the game follow their optimal strategies this profile generates subgame-perfect equilibrium.

Now let us prove that no other regulation profile leads to a subgame-perfect equilibrium. Due to the result of proposition 1 we can limit our consideration by the effective profiles.

Assume that an effective profile $\boldsymbol{\lambda}' = (\lambda'_1, \lambda'_2, \ldots, \lambda'_k)$ exists which does not satisfy the condition (23) and generates a subgame-perfect equilibrium. Then it follows from Lemma 1 and Corollary 1 that for every $i \in S$ holds

$$\hat{U}(\lambda'_i) = U^*(\boldsymbol{\lambda}') > U^*(\boldsymbol{\lambda}^*) = \alpha,\ \hat{V}(\lambda'_i) = V^*(\boldsymbol{\lambda}') < V^*(\boldsymbol{\lambda}^*),$$

The payoff of any SRO under regulation profile $\boldsymbol{\lambda}'$ is

$$Q_i(\boldsymbol{\lambda}') = \frac{1}{k}U^*(\boldsymbol{\lambda}').$$

Consider for certain $\varepsilon \in (0,\ U^*(\boldsymbol{\lambda}') - \alpha)$ an effective profile $\boldsymbol{\lambda}_\varepsilon$ such that

$$U^*(\boldsymbol{\lambda}_\varepsilon) = U^*(\boldsymbol{\lambda}') - \varepsilon.$$

This profile exists due to our assumption about Pareto frontier continuity.

Consider a regulation strategy $\lambda_\varepsilon \in \Lambda^*(\boldsymbol{\lambda}_\varepsilon)$ and construct the regulation profile $\boldsymbol{\lambda}'' = (\lambda''_1, \lambda''_2, \ldots, \lambda''_k)$ such that for certain $i \in S$ $\lambda''_i = \lambda_\varepsilon$ and $\lambda''_j = \lambda'_j$ for $j \neq i$. We will show that the profiles $\boldsymbol{\lambda}''$ and $\boldsymbol{\lambda}_\varepsilon$ are equivalent.

Indeed, since the profile $\boldsymbol{\lambda}_\varepsilon$ is effective and $\lambda_\varepsilon \in \Lambda^*(\boldsymbol{\lambda}_\varepsilon) \subseteq \Lambda_2(\boldsymbol{\lambda}_\varepsilon)$, therefore $\hat{U}(\lambda_\varepsilon) = U^*(\boldsymbol{\lambda}_\varepsilon) < U^*(\boldsymbol{\lambda}'),\ \hat{V}(\lambda_\varepsilon) = V^*(\boldsymbol{\lambda}_\varepsilon) > V^*(\boldsymbol{\lambda}').$

Then under the profile $\boldsymbol{\lambda}''$ for every $j \neq i$ the inequality is held

$$\hat{V}(\lambda_i'') = \hat{V}(\lambda_\varepsilon) = V^*(\boldsymbol{\lambda}_\varepsilon) > V^*(\boldsymbol{\lambda}') = \hat{V}(\lambda_j') = \hat{V}(\lambda_j'').$$

In this case the agent's problem solution at the stage 2′ under regulation profile $\boldsymbol{\lambda}''$ is to choose the i-th SRO and the resulting agents distribution takes the form $\theta_i(\boldsymbol{\lambda}'') = 1$, $\theta_j(\boldsymbol{\lambda}'') = 0$ for all $j \neq i$. The set of feasible regulation strategies is $\Lambda_2(\boldsymbol{\lambda}'') = \{\lambda_\varepsilon\}$. Since $\Lambda^*(\boldsymbol{\lambda}'') \subseteq \Lambda_2(\boldsymbol{\lambda}'')$ and $\hat{U}(\lambda_\varepsilon) = U^*(\lambda_\varepsilon) > \alpha$, then $\Lambda^*(\boldsymbol{\lambda}'') = \{\lambda_\varepsilon\}$ and all clients can make contracts only with the members of the i-th SRO. Therefore

$$V^*(\boldsymbol{\lambda}'') = \hat{V}(\lambda_i'') = \hat{V}(\lambda_\varepsilon) = V^*(\boldsymbol{\lambda}_\varepsilon), \;\; U^*(\boldsymbol{\lambda}'') = \hat{U}(\lambda_i'') = \hat{U}(\lambda_\varepsilon) = U^*(\lambda_\varepsilon),$$

i.e. the regulation profile $\boldsymbol{\lambda}''$ is equivalent to $\boldsymbol{\lambda}_\varepsilon$.

The value of the i-th SRO criterion on the regulation profile $\boldsymbol{\lambda}''$ is

$$Q_i(\boldsymbol{\lambda}'') = \Phi_i(\boldsymbol{\lambda}'')\hat{U}(\lambda_i'') = \hat{U}(\lambda_\varepsilon) = U^*(\boldsymbol{\lambda}') - \varepsilon,$$

that is more than $Q_i(\boldsymbol{\lambda}')$ for sufficiently small ε.

So, under the regulation profile $\boldsymbol{\lambda}'$ it is profitable for every SRO to deviate and to use the strategy λ_ε. This contradicts to the assumption that the profile $\boldsymbol{\lambda}'$ generates a subgame perfect equilibrium. ■

The economic sense of the proposition 2 is that competition among SROs leads to an ineffective equilibrium on the underlying market, which corresponds to the solution of the monopolistic agent.

The requirement of the Pareto frontier continuity is essential for the result obtained. As an example, let us consider a system with two-element set of feasible regulation strategies: the "second best" λ_A and the monopolistic agent's solution λ_B. It is easy to show that if $\hat{U}(\lambda_A) \geq k\alpha$ then both regulation profile, consisting of the strategies λ_A and the profile that consists of the strategies λ_B generate subgame-perfect equilibria.

The result of the introduction of self-regulation on such market depends on its initial state. If in the beginning of this process the agents adhere to high standards of quality then the resulting state of the system will be effective for the customers. Otherwise, the self-regulation leads to the "institutional trap" when the system is "frozen" in an inefficient state [26].

This type of behavior, at least partially, allows to explain the fact that the "success stories" of the self-regulation implementation, as a rule, associated with the markets where a well-developed regulatory framework or other mechanisms (tradition, reputation and so on) allowing to maintain a high quality of service have already been existed. The introduction of the self-regulation "from the scratch", for the markets having no set of rules, usually led to the collapse of this mechanism and the necessity of the state interference in their activities.

The decline in the quality of the of the regulators' activities as a result of their competition, called "race to the bottom", is well studied for the systems of the jurisdictions competing for investments and taxpayers (tax and more widely institutional competition). As it is shown in [22], this phenomenon represents a special case of vertical effects of the competition in hierarchical socio-economic systems, which result in simultaneous changes in the agents' competition acuity at different levels of the hierarchy in response on some change in the system parameters.

For the self-regulating markets considered here the vertical effects of competition manifest themselves in the increase in competition of the agents on the underlying market as a result of the decrease in the "competition" among SROs.

3. SELF-REGULATED MARKET MODEL WITH ALTERNATIVE STATE SUPERVISION

Since the introduction of self-regulation may result in a decrease in the efficiency of the market equilibrium, a significant part of the research of self-regulation is devoted to mechanisms of the reduction of these negative effects. One of the most commonly discussed methods is the alternative state supervision over the market [3, 7, 10]. Further we consider the impact of this mechanism on the efficiency of equilibria in the presence of SRO's competition.

In [3] the model of the self-regulating market with state supervision is investigated where the state maximizes consumers' utility and has regulation powers similar to SRO. The costs of the agents' auditing for the state is c_g. The introduction of self-regulation in this case makes sense only if $c_g \geq c$.

The agents are audited by the state with probability $p_g(r)$, a fixed fee t_g is charged from each contract to offset the corresponding state costs. If the state audit of an agent detects a false reporting, the state imposes a fine $x_g(r, w)$ on the agent. The value $x_g(r, w)$ is not necessarily the same as the fine $x(r, w)$ imposed by the SRO. In [3, proposition 7] it is shown that in such system SRO, maximizing the welfare of its members adheres to much more stringent strategy, coinciding with the "second-best" solution under state regulation.

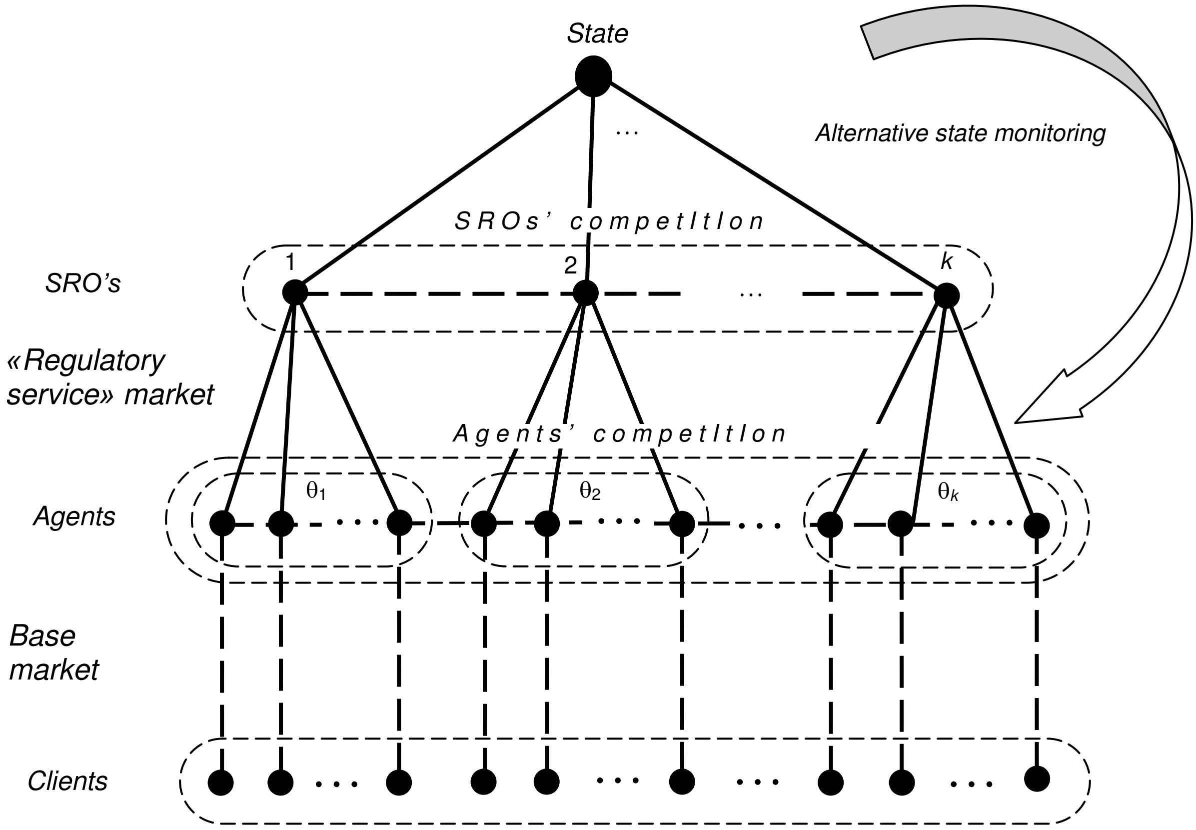

Fig. 3. A self-regulated market with alternative state supervision

Such dramatic change in the regulatory strategy of the SRO in the presence of the alternative state supervision is explained in [8] by analogy with the formation of entry barriers in monopoly markets. The monopolist in the market of regulatory services (SRO) does not allow to enter the potential "competitor" (state), supporting more stringent standards than optimal ones from the point of view of the state. However, in contrast to classical models of entry barriers, the crowding out of the "competitor" is achieved here by investing in increasing of his welfare.

Let us study now the effect of the alternative state supervision on the SROs' regulatory strategies when they compete. Since the state authority on the regulatory services market is significantly larger than SROs' one the introduction of the alternative state supervision leads to the emergence of a hierarchy on this market (Fig. 3). The state in this structure plays the role of the "leader" empowered with the right of the first move [21] and establishing general "rules of the game" on the market which we denote as ζ.

The SROs form the second level of the hierarchy and choose their strategies $\lambda_i(\zeta)$ taking into account the state policy ζ.

Then the regulation profile in this model will include the state policy and the regulation strategies of all SROs:

$\boldsymbol{\lambda} = (\zeta, \lambda_1(\zeta), \ldots, \lambda_k(\zeta))$.

The utility of a client, who makes a contract $z(r)$ with the i-th SRO member under regulation profile $\boldsymbol{\lambda}$ is

$$U(z(r);\boldsymbol{\lambda}) = \int_{\Omega} z(r(w;\boldsymbol{\lambda});\boldsymbol{\lambda})dF_W(w) - t_i(\boldsymbol{\lambda}) - t_g(\boldsymbol{\lambda}), \tag{24}$$

where the value of the fee t_i is determined individually for each SRO while t_g is the same for all market participants.

The utility function of the state in this system represents the total clients' welfare or what is the same the total welfare of the SROs:

$$G(\zeta) = \sum_{i=1}^{k} Q_i(\boldsymbol{\lambda}) = \sum_{i=1}^{k} \Phi_i(\boldsymbol{\lambda})U_i(\boldsymbol{\lambda}). \tag{25}$$

where $\Phi_i(\boldsymbol{\lambda})$ is the share of the contracts made by the members of the i-th SRO; $U_i(\boldsymbol{\lambda}) = U(z_i^*(r);\boldsymbol{\lambda})$ is the welfare of a client who signed the optimal contract $z_i^*(r)$ with a member of the i-th SRO.

In contrast to the model with a single SRO, to ensure the uniform quality control of the agents throughout the market, the state must compensate for the "failures" of the SROs' regulatory policy, providing more frequent audit of the members of those SROs, which use a more lenient regulatory strategy. In this case $p_g(r)$ is the average probability of the state audit throughout the market, whereas the probability of the audit of the i-th SRO member $p_i^g(r)$ depends on the regulatory strategy of the SRO.

Let us assume that the state has information about the agents audited by SROs. Since the audit is costly for the state there are no redundant audits in equilibrium [3]. In this case the probability of the state audit of the members of the i-th SRO $p_i^g(r)$ satisfies the condition

$$p_g(r) = p_i(r) + (1 - p_i(r))p_i^g(r), \tag{26}$$

therefore

$$p_i^g(r) = \max\left\{\frac{p_g(r) - p_i(r)}{1 - p_i(r)}, 0\right\}. \tag{27}$$

Similarly to [3] we assume that the state may impose penalties, other than SROs' ones. In this case, the effective fine imposed on the agent is $x_g(w, r)$. When the agent is audited by SRO the share $\min\{x_i, x_g\}$ of the fine is collected by SRO and $\max\{x_g - x_i, 0\}$

– by the state. In the case of the state audit the entire value of x_g comes to the state budget.

The i-th SRO's budget constraint (3) takes the form

$$t_i \geq E(p_i(r(W)))(c - \min\{x_g(W, r(W)), x_i(W, r(W))\}). \tag{28}$$

The audit costs for the state depends on the resulting distribution of the contracts among the SROs $\Phi_i(\boldsymbol{\lambda})$. But since the payment t_g is determined prior to the transactions in the underlying market some forecast $\tilde{\Phi}_i(\boldsymbol{\lambda})$ of this distribution should be used in order to balance the budget of the state. We assume that the state's expectations are rational, i.e. $\tilde{\Phi}_i(\boldsymbol{\lambda}) = \Phi_i(\boldsymbol{\lambda})$. Then the budget constraint would be[4]

$$\begin{aligned} t_g \geq & \sum_{i=1}^{k} \Phi_i(\boldsymbol{\lambda}) E((1 - p_i(r(W)) p_i^g(r(W)))c_g - \\ & - \sum_{i=1}^{k} \Phi_i(\boldsymbol{\lambda}) E((1 - p_i(r(W))) p_i^g(r(W)) x_g(W, r(W))) + \\ & + p_i(r(W)) \max\{x_g(W, r(W)) - x_i(W, r(W)), 0\}). \end{aligned}$$

The first term in the right hand side of this constraint represents the average cost of the state audit of a contract, the second one is the average size of penalties coming into the state budget from an audit conducted by a SRO or state.

Taking into account (24) this constraint can be converted to the form

$$\begin{aligned} t_g \geq & E(p_g(r(W)))\big(c_g - x_g(W, r(W))\big) - \\ & - \sum_{i=1}^{k} \Phi_i(\boldsymbol{\lambda}) E(p_i(r(W)))\big(c_g - \min\{x_i(W, r(W)), x_g(W, r(W))\}\big). \end{aligned} \tag{29}$$

The resulting interaction in the presence of the state control (model 3) is as follows.

1″. The state determines the regulation policy $\zeta = (p_g(r), x_g(w, r))$.

2″. Given the policy ζ SROs set their regulation strategies $\lambda_i(\zeta) = (p_i(r; \zeta), x_i(w, r; \zeta), t_i(\zeta))$.

3″. Given the regulation profile $\boldsymbol{\lambda}$ the agents choose SRO i to join. The choices of all agents in the system result in a partition of the set of agents $\boldsymbol{\theta}(\boldsymbol{\lambda})$.

4″. Given the regulation profile $\boldsymbol{\lambda}$ and the partition $\boldsymbol{\theta}(\boldsymbol{\lambda})$ the state determines the probability of the audit of the i-th SRO members and the rate t_g charged from each contract on the underlying market.

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[4] To avoid complications further we drop the argument $\boldsymbol{\lambda}$ in the notation of the functions, where it does not entail confusion.

5″. Given the parameters λ, $\theta(\lambda)$ and t_g the client chooses the SRO i with a member of which she will make a contract.

6″. The client offers the contract $z(r)$ to a member of the i-th SRO.

7″. If the agent does not accept the terms of the contract, the participants receive their reservation utilities (agent - 0, client - α) and the interaction ends. Otherwise, the client pays t_i to the i-th SRO and t_g to the state budget and the interaction continues.

8″. The agent observes the realization w of the random variable W.

9″. The agent provides the customer with the information r and pays her the amount $z(r)$.

10″. The i-th SRO investigates the agent with the probability $p_i(r)$ incurring cost c and collects the share $\min\{x_i(w, r),\ x_g(w, r)\}$ while the state receives $\max\{x_g(w, r) - x_i(w, r), 0\}$.

11″. The state investigates members of the i-th SRO with the probability $p_i^g(r)$ incurring cost c_g and collects the value $x_g(w, r)$.

This scheme is similar to the interaction described by the *model 2* except the steps 1″, 4″ и 11″ where the state determines the elements of its regulation strategy and oversees the activities of the agents.

Let us compare the equilibrium in this system with the one under "pure" state regulation. The model of the state regulation on this market is identical to the *model 1* where the SRO criterion has the form (8). So the equilibrium in the state regulation model is the "second best" solution with the audit cost equal to c_g.

Denote by Ξ the set of the state regulation strategies which correspond to the individually rational for customers equilibria. We will consider the non-trivial case, when the individual rationality constraint at the "second best" solution is strict.

Let us find the subgame-perfect equilibrium in the *model 3*. First we note that Lemma 1 remains true for this system. Therefore, in any subgame-perfect equilibrium the utilities of agents and clients will not depend on their choice of the SRO.[5]

The penalties for all agents operating in the market are the same and equal to $x_g(w, r)$. If for certain $r \in \omega \subseteq \Omega$ the i-th SRO sets the probability of the audit $p_i(r) \geq p_g(r)$ then for such r in accordance with (27) $p_i^g(r) = 0$ and the interaction on the market is similar to that in the system without state regulation. If $p_i(r) < p_g(r)$, then the state fully compensates the deviations of the SROs from the policy ζ. As a result regardless of the strategy chosen by SRO, its members will be audited with the same probability $p_g(r)$.

[5] The proof of this result is identical to Lemma 1 and is not given here.

Further we show that in an equilibrium the second case is implemented.

Lemma 2. *Let the state regulation policy* $\zeta \in \Xi$ *and the regulation profile* $\boldsymbol{\lambda} = (\zeta, \lambda_1, \ldots, \lambda_k)$ *generates a subgame-perfect equilibrium in the model 3. If client's profit* $U^*(\boldsymbol{\lambda})$ *is continuous in the equilibrium neighborhood by the parameters of the SROs' regulation strategies* $\boldsymbol{\lambda}$*, then for any nonzero measure set* $\omega \subseteq \Omega$ *the following inequality holds:*

$$\forall\ i = 1, \ldots, k,\ \int_{\omega} p_i(r)dr \leq \int_{\omega} p_g(r)dr.$$

Proof. It follows from Lemma 1 that the utility of all agents in the market under regulation profile $\boldsymbol{\lambda}$ is the same and is equal to $V^*(\boldsymbol{\lambda})$ and the profit of each client is $U^*(\boldsymbol{\lambda})$. So the value of every SRO's criterion is

$$Q_i(\boldsymbol{\lambda}) = \frac{1}{k} U^*(\boldsymbol{\lambda}).$$

Since the profile $\boldsymbol{\lambda}$ generates equilibrium and $\zeta \in \Xi$ then $U^*(\boldsymbol{\lambda}) \geq \alpha$.

Let us assume that Lemma 1 is not fulfilled here i.e. for certain SRO a nonzero measure set $\omega \subseteq \Omega$ exists such that

$$\int_{\omega} p_i(r)dr > \int_{\omega} p_g(r)dr.$$

The effective probability of the i-th SRO members audit in this case is $\hat{p}_i(r) = \max\{p_i(r), p_g(r)\}$.

Assume that the i-th SRO chooses a regulation strategy $\lambda_i' = (p_i'(r), t_i')$ such that for $\forall\ r \in \omega\ p_g(r) \leq p_i'(r) < p_i(r)$ and $p_i'(r) = p_i(r)$ otherwise and SRO's budget constraint (28) holds as equality in the corresponding equilibrium.

The choice of an audit probability $p_i'(r) < p_i(r)$ by the i-th SRO leads to an increase in the right hand sides of the incentives compatibility conditions (9) corresponding to the information r that results in narrowing of the set of feasible solutions of the problem (13). So the amount of payment to the client at the optimal contract does not increase while lowering the audit probability

$$\forall r \in \Omega\ z^*(r; \lambda_i') \leq z^*(r; \lambda_i). \tag{30}$$

It follows from (30) that if $I(\lambda_i') = 1$ then $\lambda_i' \in \Lambda_2(\boldsymbol{\lambda}')$. Therefore at the stage 3″ $\theta_i(\boldsymbol{\lambda}') > 0$. Let us determine whether it is beneficial for a client to sign a contract with a member of the i-th SRO under the regulation profile $\boldsymbol{\lambda}'$.

If $\int_{\Omega} z^*(r; \lambda_i')dr = \int_{\Omega} z^*(r; \lambda_i)dr$ then the first term in (24) doesn't change. The second one t_i decreases since (28) is held as equality and $p_i'(r) < p_i(r)$ on certain non-zero measure set ω. Because the fee t_g is the same across the market, the client who uses the services of the i-th SRO has the greatest profit. Hence $\Phi_i(\boldsymbol{\lambda}') = 1$ at the step 5″.

Since $\forall\ r \in \omega$, $p_i'(r) \geq p_g(r)$ then it follows from (27) that $p_i^g(r) = 0$. The probability of audit $p_i'(r) = p_i(r)$ for $\forall r \notin \omega$. Then $p_i^g(r)$ is not altered as well as the state budget constraint (29). Thus, the value of the i-th SRO's criterion in this case is

$$Q_i(\boldsymbol{\lambda}') = U^*(\boldsymbol{\lambda}') = \int_\Omega z(r(w; \boldsymbol{\lambda}'); \boldsymbol{\lambda}')dF_W(w) - t_i(\boldsymbol{\lambda}') - t_g(\boldsymbol{\lambda}') >$$

$$> \int_\Omega z(r(w; \boldsymbol{\lambda}); \boldsymbol{\lambda})dF_W(w) - t_i(\boldsymbol{\lambda}) - t_g(\boldsymbol{\lambda}) = U^*(\boldsymbol{\lambda}) > \frac{1}{k}U^*(\boldsymbol{\lambda}) = Q_i(\boldsymbol{\lambda}).$$

Hence the regulation profile $\boldsymbol{\lambda}$ doesn't generate a subgame-perfect equilibrium.

Let us consider further the case when $\int_\Omega z^*(r; \lambda_i')dr < \int_\Omega z^*(r; \lambda_i)dr$, i.e. the condition (30) is strict for certain r from a non-zero measure subset of Ω. In this case $\forall\, j \neq i,\ V(\lambda_j') < V(\lambda_i')$, hence $\theta_i(\boldsymbol{\lambda}') = 1$ at the stage 3″. Only the members of the i-th SRO act on such market and the clients use their services if the individual rationality constraint (6) is held at the optimal contract $z^*(\lambda_i')$.

Consider a small $\varepsilon > 0$ and assume that

$\forall\ r \in \omega\ \ p_i'(r) = \max\{p_i(r) - \varepsilon, p_g(r)\}$.

In this case $U^*(\boldsymbol{\lambda}') \geq \alpha$ since the effective probability of the members of the i-th SRO audit $\hat{p}_i(r) \geq p_g(r)$ and $\zeta \in \Xi$.

Since $U^*(\boldsymbol{\lambda})$ is a continuous function of the regulation strategies characteristics then for any $\delta > 0$ there exists $\varepsilon > 0$ such that the following inequality is held

$$Q_i(\boldsymbol{\lambda}') = U^*(\boldsymbol{\lambda}') \geq U^*(\boldsymbol{\lambda}) - \delta > \frac{1}{k}U^*(\boldsymbol{\lambda}) = Q_i(\boldsymbol{\lambda}).$$

Thus, in all possible cases, the deviation of the i-th SRO from the strategy λ_i increases its gain, that contradicts the assumption that the profile $\boldsymbol{\lambda}$ induces a subgame-perfect equilibrium. ■

The result obtained here allows us to consider in the further analysis only the case when all SROs in the market establish an audit probability $p_i(r) \leq p_g(r)$. In this case the state fully compensates by its actions the deviations of the SROs' regulating strategies from the policy ζ. All agents in the market, regardless of the SROs' strategies, are audited with the same probability $p_g(r)$ and pay the same penalties $x_g(w, r)$. Then the optimal contract $z(r)$ and the agent's information strategy $r(w)$ do not depend on the agent's membership in a SRO.

The maximum agent's utility $V^*(\boldsymbol{\lambda})$ defined by (19) does not depend on the strategy of the SRO, and the maximum value of the customer $U^*(\boldsymbol{\lambda})$ (20) can be changed only by the fees t_i and t_g amendment. Lessening the i-th SRO audit probability p_i is accompanied by a decrease in t_i and an increase in t_g to compensate for the additional costs of the state associated with increased p_i^g. This leads to the "free-rider problem", because the clients of the i-th SRO fully internalize the benefits from the reduction of t_i, while the cost from increasing t_g is allocated among all market participants. As a result it is advantageous for the SRO to reduce the probability of their members auditing.

The following result holds.

Proposition 3. *For any given state regulation policy $\zeta \in \Xi$ all equilibria in the subgames starting at the stage 2″ are generated by the SROs' regulation profiles such that $\forall\ i = 1, \ldots, k\ E(p_i(r(W))) = 0$.*

Proof. Let us find the client's welfare in equilibrium. Since the SRO's and the state criteria (25) are decreasing functions of the amount of the fees then at the optimal solution the budget constraints (28) and (29) are held as equalities. Then the client's welfare is

$$U(z(r);\boldsymbol{\lambda}) = \int_\Omega z(r(w))dF_W(w) - t_i - t_g =$$
$$= \left[\int_\Omega z(r(w))dF_W(w) - E(p_g(r(W)))\left(c_g - x_g(W, r(W))\right)\right] +$$
$$+\sum_{i=1}^{k} \Phi_i(\boldsymbol{\lambda})E(p_i(r(W)))\left(c_g - \min\{x_i(W, r(W)), x_g(W, r(W))\}\right) -$$
$$-E(p_i(r(W)))(c - \min\{x_g(W, r(W)), x_i(W, r(W))\}) =$$
$$= \left[\int_\Omega z(r(w))dF_W(w) - E(p_g(r(W)))\left(c_g - x_g(W, r(W))\right)\right] +$$
$$+\sum_{j\neq i} \Phi_j(\boldsymbol{\lambda})E(p_j(r(W)))\left(c_g - \min\{x_i(W, r(W)), x_g(W, r(W))\}\right) +$$
$$+E(p_i(r(W)))\left(\Phi_i(\boldsymbol{\lambda})c_g - c + (1-\Phi_i(\boldsymbol{\lambda}))\min\{x_i(W, r(W)), x_g(W, r(W))\}\right).$$

Since the agents tell the truth in an equilibrium then

$$U(z(r);\boldsymbol{\lambda}) = \left[\int_\Omega z(r(w))dF_W(w) - c_g E(p_g(r(W)))\right] +$$
$$+ c_g \sum_{j\neq i} \Phi_j(\boldsymbol{\lambda})E(p_j(r(W))) + E(p_i(r(W)))\left(\Phi_i(\boldsymbol{\lambda})c_g - c\right). \tag{31}$$

It follows from Lemma 2 that in an equilibrium $p_i(r) \leq p_g(r)$ at any non-zero measure set. The optimal contract $z(r)$ and the agent's information strategy $r(w)$ do not depend on the SRO's regulation strategy λ_i. In addition, due to the symmetry of the solution $\forall\ i = 1, \ldots, k$, $\Phi_i(\boldsymbol{\lambda}) = {}^1/_k$, so the welfare of the client who has a contract with a member of the i-th SRO depends only on the value of $E(p_i(r(W)))$. The conditions of Lemma 1 in this case are satisfied only if $\forall i, j = 1, \ldots, k$, $E(p_i(r(W))) = E(p_j(r(W))) = \bar{p}$.

Then the client's welfare is

$$U(z(r); \boldsymbol{\lambda}) = \int_{\Omega} z(r(w))dF_W(w) - c_g\left(\bar{p}_g - \bar{p}\right) - c\bar{p},$$

and the i-th SRO criterion

$$Q_i(\boldsymbol{\lambda}) = \frac{1}{k}\left(\int_{\Omega} z(r(w))dF_W(w) - c_g\left(\bar{p}_g - \bar{p}\right) - c\bar{p}\right),$$

where $\bar{p}_g = E(p_g(r(W)))$.

Consider a situation when $\bar{p} > 0$. Assume that the i-th SRO reduces the probability of audit in such a way that $E(p_i(r(W)) = \bar{p} - \varepsilon$ and sets the fee t_i so that the budget constraint (26) is held as equality, while the regulation strategies of the other SROs remain unchanged. We denote the resulting regulation profile as $\boldsymbol{\lambda}'$. It follows from (28) that in this case $\forall\, j \neq i$, $t_i < t_j$.

Since the values of t_g and $z(r(w))$ which are determined at the subsequent stages of the game do not depend on the choice of the SRO, it is optimal for a client to make a contract with a member of the SRO which charges the lowest fee t_i. Therefore in any equilibrium generated by the disturbed regulation profile $\boldsymbol{\lambda}'$ the equality $\Phi_i(\boldsymbol{\lambda}') = 1$ holds.

Substituting $\Phi_i(\boldsymbol{\lambda}')$ in (31), we obtain that the value of the i-th SRO criterion under the optimal strategies of the rest of the participants of the game at stages 3″ - 11″ after the deviation is

$$Q_i(\boldsymbol{\lambda}') = \int_{\Omega} z(r(w))dF_W(w) - c_g\left(\bar{p}_g - \bar{p}\right) - c\bar{p} - (c_g - c)\varepsilon.$$

The increase in this case is

$$Q_i(\boldsymbol{\lambda}') - Q_i(\boldsymbol{\lambda}) = \frac{k-1}{k}\left(\int_{\Omega} z(r(w))dF_W(w) - c_g\bar{p}_g\right) + \frac{k-1}{k}\left(c_g - c\right)\left(\bar{p} - \frac{k}{k-1}\varepsilon\right).$$

Since $\zeta \in \Xi$, we get that for any probability $\bar{p} > 0$ there exists sufficiently small value ε such that

$$Q_i(\boldsymbol{\lambda}') - Q_i(\boldsymbol{\lambda}) > 0.$$

This result proves that the SROs' regulation strategies belonging to the initial regulatory profile $\boldsymbol{\lambda}$ cannot generate a subgame-perfect equilibrium.

Consider now the situation when $\bar{p} = 0$. In this case, for any regulatory strategy of the i-th SRO $E(p_i(r(W)) \geq \bar{p}$, therefore the client's profit after its deviation does not increase. As a result, under any disturbed regulatory strategies profile the value of the i-th

SRO criterion does not exceed $Q_i(\lambda)$, so this profile induces a subgame-perfect equilibrium. ■

The economic sense of this result is that under any state regulatory policy the SROs are interested in shifting the burden of the agents' auditing to the state. This result contradicts the one obtained in [3, proposition 7] for the model describing a similar regulation mechanism in the absence of the SROs' competition.

Proposition 4. *Any subgame-perfect equilibrium in the model 3 coincides with the "second-best" solution under the state regulation.*

Proof. It follows from Proposition 3 that for any state regulation strategy $\zeta \in \Xi$ the SROs do not audit agents in an equilibrium. As a result, all inspections in an equilibrium are carried out only by the state. Their effective probability $\hat{p}_i(r) = p_g(r)$ and the fine paid by the agent when the audit detects false report is $x_g(w, r)$.

In this case the contract offered by any agent is the same as on the state regulated market with the regulation policy ζ. The expected income of the client reaches its maximum on the "second best" which is defined as the solution of the optimization problem (13) with the cost of audit equal to c_g, and so does the state criterion (25). ■

Thus, the equilibrium established on the self-regulating market with the state control is identical to the one in the system with a "pure" government regulation.

The equilibrium on the underlying market in this case coincides with the result obtained for the self-regulating market with the government control in [3]. However the ways of their formation have fundamental differences.

In the model considered in [3] the "second best" solution is implemented entirely by the SROs, while the state does not perform audits in the equilibrium. Since the audit costs for the SROs are lower than the state ones, the welfare of the agents on this solution increases in comparison with the state regulation.

In contrast, in the *model 3* the SROs do not conduct audits in the equilibrium, and the "second best" solution is implemented by the state, which makes this equilibrium identical to the "pure" state regulation. In this case the introduction of the self-regulation in such market does not increase the clients' welfare.

4. CONCLUSION

The results obtained in this paper prove that the competition of self-regulatory organizations is not always beneficial for the quality of the underlying market operation. Similar to other processes of the regulatory competition the competition of the SROs may be accompanied by the "race to the bottom" effect which manifests itself in the reduction of the quality of the agents' activity control and, consequently, in the decrease in the product or service quality on the underlying market.

The source of this inefficiency is the specific character of "consumption" of the SROs' regulatory "services". Despite the fact that the clients on the underlying market are the final consumers and the payers for these services, the size of the demand for them is determined by the agents. Therefore the regulation characteristics are determined on the basis of the agents' interests and not of the clients' ones. Due to the vertical effect of the competition inherent in hierarchical systems the increase in the severity of the competition at the level of the SROs leads to its reduction at the level of the agents and to the formation of the underlying market equilibria, characterized by lower consumer welfare.

The peculiar and unusual feature of the SROs' competition as compared with other types of regulatory competition (e.g., tax competition), is that even the creation of an additional control mechanism, namely the alternative state control, does not improve the quality of the SROs' operation.

The most effective means to reduce the negative effects of the SROs' competition in this case is the transfer of the authority of the demand for their "services" fomation from the agents to the customers on the underlying market. This can be achieved, for example, by the introduction of the cross-auditing when the SRO controlling the quality of the agent's operation is selected by the client, regardless of the agent's membership. In this case, the hierarchical system considered above is divided into two adjacent markets of the basic products and the control services, and the demand on both of them is formed by the same set of clients. The vertical effects of competition in such markets are absent, resulting in the unilateral change in the severity of the competition.

Moreover, in some areas the underlying market and the market of the control services may be merged with each other. For example, according to the Uniform Standards of Professional Appraisal Practice (USPAP), appraisal report expertise is not distinguished as an independent activity and is carried out by the appraisers in the context of the general requirements to the appraisal reports [24]. This suppresses the competition at the level of the SRO and stimulates it at the agents' level, which has a positive effect on the quality of their work.

Unfortunately, the existing Russian legislation in the sphere of self-regulation remains quite confusing and ambiguous. For example, the expertise of appraisal reports is understood in the Federal valuation standard ФСО-5 [31], as "the actions of the expert or experts of the self-regulating organization of appraisers in order to verify the report, signed by the appraiser (appraisers), **which is (are) the members of the SRO**..." (emphasis ours).

On the other hand, the legislation does not contain an explicit restriction on the conduct of the expertise of the appraisal reports made by members of other SROs. Moreover, in some cases the relevant legislative acts require mandatory report expertise by specially authorized bodies (e.g., in the cases of bankruptcy or state property manipulation). Thus, in accordance with Art. 130 "Assessment of the debtor's property" of the Federal law of the Russian Federation "On insolvency (bankruptcy)" [29], the appraisal report must be verified by the authorized body, which makes a conclusion about its compliance with the legislation of the Russian Federation and authenticity of the information used in the report. The conclusion is sent to the bankruptcy commissioner and the appraiser's SRO. The SRO is required to submit its expert opinion about the compliance of the report with the above requirements.

A similar procedure is provided by the Federal law "On joint stock companies" [27] for the appraisal reports used in the transactions involving state property (article 77), as well as with the compulsory redemption of the shares by major owner (Art. 84.7 and 84.8). The latter case allows for the expertise of the report by the other SRO than the appraiser's one. The requirements to this SRO and the procedure of its choice are determined by the federal executive body regulating the appraisal activity.

Under this uncertainty of the legislation, the reduction of the negative effects of the SROs' competition is possible by introducing direct constraints in the form of quality indicators of the SROs' activities and sanctions for their violation. This can be achieved, for example, by legislative minimum quality standards for both the SROs and their members which are monitored by the state authorities.

However, it should be noted that greater regulation of the SROs leads to the loss of the advantage of flexibility, which allows them to respond quickly to the changes in the underlying markets conditions. In this regard, a combined approach to self-regulation is widely used which implies a non-state authority which oversees the activities of the SRO. For example, according to the changes made in the Federal law "On valuation activities in the Russian Federation" [28] in 2006, the National Appraisal Board was created. It is non-profit organization comprising more than 50 percent of the SROs which unite more than 50% of all appraisers (Art. 24.10). The National Appraisal Board is managed by a collegial body, which includes, along with the SROs' representatives, the independent experts, representatives of the consumers, scientific and educational community and other persons who are not members or representatives of the SROs.

A similar structure, the Union of self-regulating organizations of bankruptcy commissioners, is formed on the market of arbitration management services in accordance with the requirements of the Federal law "On insolvency (bankruptcy)".

In other areas of professional activity, e.g. on the markets of audit or construction services, the supervision over the SRO is provided by the federal executive bodies [25].

Thus, despite the benefits of self-regulation mechanisms declared in the modern economic literature, the formation of a corresponding hierarchical system “SRO - agent - client” leads to vertical effects, which restrict the possibility of the use of market self-organization mechanisms. This reduces the competition on the underlying market resulting in consumers’ welfare decrease. To compensate for these effects, the state has to form more complex regulatory structures thus making the market similar to the centrally regulated one.

REFERENCES

[1] C. Chaserant, S. Harnay, Reputation on a credence good market: an economic analysis of professional self-regulation, EconomiX Working Paper No. 2011-32, Université de Paris Ouest Nanterre La Défense, 2011 [Electr. resource] URL: http://economix.fr/pdf/dt/2011/WP_EcoX_2011-32.pdf (Accessed on March, 11, 2015).

[2] P. Dasgupta, P. Hammond, E. Maskin, The Implementation of Social Choice Rules: Some General Results on Incentive Compatibility, Review of Economic Studies, 46 (1979), No. 2, 185-216.

[3] P.M. DeMarzo, M.J. Fishman, K.M. Hagerty Self-Regulation and Government Oversight, Review of Economic Studies, 72 (2005), No. 3, 687-706.

[4] T. Gehrig, P.J. Jost, Quacks, Lemons, and Self-Regulation: A Welfare Analysis, J. of Regulatory Economics, 7 (1995), No. 9, 309-325.

[5] J. Kay, J. Vickers, Regulatory Reform: An Appraisal, in: G. Majone (Ed.), Deregulation or Re-regulation: Regulatory Reform in Europe and the United States, Frances Pinter, London, 1990, pp. 223-251.

[6] H.E. Leland, Quacks, Lemons, and Licensing: A Theory of Minimum Quality Standards, J. of Political Economy, 87 (1979), No. 6, 1328-1346.

[7] J. Maxwell, T.P. Lyon, S.C. Hackett Self-Regulation and Social Welfare: The Political Economy of Corporate Environmentalism, J. of Law and Economics. 43(2000), No. 2, 583-617.

[8] D. Mookherjee, I. Png, Optimal Auditing, Insurance, and Redistribution, Quarterly J. of Economics, 104(1989), No. 2, 399-415.

[9] E. Nowak, R. Rott, T.G. Mahr, The (Ir)relevance of Disclosure of Compliance with Corporate Governance Codes-Evidence from the German Stock Market, National

Centre of Competence in Research Financial Valuation and Risk Management Working Paper № 325, 2006 [Electr. Resource] URL: http://www.nccr-finrisk.uzh.ch/media/pdf/wp/WP325_B1.pdf (Accessed on March, 11, 2015).

[10] J. Nuñez, A model of self-regulation, Economic Letters, 74 (2001), 91-97.

[11] A. Ogus, Rethinking Self-Regulation, Oxford J. of Legal Studies, 15 (1995), 97-108.

[12] A. Ogus, Self-Regulation, in: B. Bouckaert, G. De Geest (Eds.) Encyclopaedia of Law and Economics, Edward Elgar, Cheltenham, 2000, pp. 587-602.

[13] S.C. Pirrong, The Self-Regulation of Commodity Exchanges: The Case of Market Manipulation, J. of Law and Economics, 38 (1995), No. 1, 141-206.

[14] A. Shaked, J. Sutton, The Self-Regulating Profession, Review of Economic Studies, 48 (1981), No. 2, 217-234.

[15] R.M. Townsend, Optimal contracts and competitive markets with costly state verification, J. of Economic Theory, 21 (1979), No. 2, 265-293.

[16] R. Van den Bergh, M. Faure, Self-Regulation of the Professions in Belgium, International Review of Law and Economics, 11 (1991), 165-182.

[17] Д. Балабошина, Нерегулируемая конкуренция: строительные СРО делят рынок, СНИП (2010), No 4. [D. Balaboshina, Unregulated Competition: Developers' SRO Share the Market, SNIP (2010), No. 4] [Electr. resource] URL: http://www.indpg.ru/snip/2010/04/31236.html (Accessed on March, 11, 2015).

[18] Временное положение о ведении реестра владельцев именных ценных бумаг, Утв. постановлением Федеральной комиссии по ценным бумагам и фондовому рынку от 12 июля 1995 г. № 3. [Provisional regulations for keeping the register of owners of registered securities, Appr. by the Decree of the Federal Board on Securities and Stock Market of July, 12, 1995, No. 3].

[19] В.В. Галкин, Методы недобросовестной конкуренции: экономическое содержание и правовое регулирование. Монография. Воронеж: Центрально-Черноземное книжное издательство, 1996. [V.V. Galkin, Unfair Competition Techniques: the Essence and Legal Regulation. Monograph, Central-Chernozem Book Publishers, Voronezh, 1996].

[20] А.А. Герасимов, Современное саморегулирование за рубежом – законодательство, практика и тенденции, Безопасность труда в промышленности (2010), No. 10, 52-57. [A.A. Gerasimov, The Contemporary Self-regulation Abroad - Legislation, Practice and Tendencies, Labor Safety in Industry (2010), No. 10, 52-57].

[21] Ю.Б. Гермейер, Игры с непротивоположными интересами. М.: Физматлит, 1976. [Ju.B. Germeyer, Games with Non-Antagonistic Interests, Fizmatlit, Moscow, 1976].

[22] Г.В. Колесник, Н.А. Леонова, Модель налоговой конкуренции юрисдикций в условиях локальной конкуренции налогоплательщиков, Математическая теория игр и её приложения, 3 (2011), No. 1, 60-80. [G.V. Kolesnik, N.A. Leonova, A Model of Jurisdictions' Tax Competition under Local Taxpayers Competition, Math. Games Theory and its Applications, 3 (2011), No. 1, 60-80].

[23] О.В. Кузнецов и др. Саморегулируемые организации: Научно-практическое пособие. Под общ. ред. О.В. Кузнецова. М.: Финакадемия, 2009 [Kuznetsov O.V. et al. Self-Regulatory Organisations: Scientific-practical guide, Ed. O.V. Kuznetsov, Finacademiya, Moscow, 2009].

[24] В.И. Лебединский, Анализ международной практики экспертизы отчетов об оценке [V.I. Lebedinskiy, An Analysis of the International Practice of Appraisal Reports Expertise] [Electr. resource] URL: http://www.advisers.ru/review_article/article3899.html (Accessed on March, 11, 2015).

[25] Об итогах анализа практики применения законодательства о саморегулируемых организациях в отдельных сферах и отраслях экономической деятельности. Доклад Минэкономразвития России. 2010 [On the results of the analysis of the practice of legislation on self-regulatory organizations application in specific areas and sectors of economic activities, Report of the Ministry of economic development of Russia, 2010] [Electr. resource] URL: http://www.economy.gov.ru/minec/about/structure/depcorp/doc20110117_03 (Accessed on March, 11, 2015).

[26] В.М. Полтерович, Институциональные ловушки и экономические реформы, Экономика и математические методы, 35 (1999), No. 2, 3-20. [V.M. Polterovich, Institutional traps and economic reforms, Economics and mathematical methods, 35 (1999), No. 2, 3-20].

[27] Федеральный закон от 26 декабря 1995 г. № 208-ФЗ «Об акционерных обществах» [Federal Law of December, 26, 1995 No. 208-FZ "On joint stock companies"].

[28] Федеральный закон от 29 июля 1998 г. № 135-ФЗ «Об оценочной деятельности в Российской Федерации» [Federal Law of July, 29, 1998 No. 135-FZ "On valuation activities in the Russian Federation"].

[29] Федеральный закон от 26 октября 2002 г. № 127-ФЗ «О несостоятельности (банкротстве)» [Federal Law of October, 26, 2002 No. 127-FZ "On insolvency (bankruptcy)"].

[30] Федеральный закон от 1 декабря 2007 г. № 315-ФЗ «О саморегулируемых организациях» [Federal Law of December, 1, 2007 No. 315-FZ "On self-regulatory organizations"].

[31] Федеральный стандарт оценки «Виды экспертизы, порядок ее проведения, требования к экспертному заключению и порядку его утверждения (ФСО No. 5)», Утв. приказом Минэкономразвития России от 4 июля 2011 г. No. 328 [Federal valuation standard "Types of expertise, procedure, requirements for expert opinion and order approval (FSO No. 5)", Appr. by the Decree of the Ministry of economic development of Russia of July, 4, 2011, No. 328].