Organization of the state inspections and suppression of corruption.

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The state inspections play an important role in the modern economy. There are two main directions of their activity. The first one is collection of payments to the state budget. The tax inspections and the customs control the payment's values and check exemptions from payments for different economic agents. The agency should prevent tax or customs evasion but not interfere with the agents eligible for exemption from the payment. The second direction is concerned with prevention of the law infringement. Police, sanitary, firework inspection and others deal with this task. The efficiency of an inspection should be measured by the social welfare increase proceeding from its activity.

For many countries in transition, in particular for Russia, corruption is the most important problem in inspections' organization. Bribery is one form of corruption that is the most difficult to reveal. There exists a wide literature that discusses problems of optimal inspection organization (in particular for tax inspection) and the problem of corruption. The first type of models (see Srinivasan (1973)) studies the interaction between the tax authority and a group of taxpayers, whose income is random, without taking into account the possibility of corruption. It is assumed that at the end of the accounting period each taxpayer declares his/her income to the tax inspectors. The reported income is taxed according to the given tax rates. However, a taxpayer may try to hide some part of income by underreporting. If the taxpayer is audited, the inspector will inevitably uncover the true level of income. The detected tax evader is fined and made to pay the evaded tax. Further, it is assumed that auditing is costly and that the central authority is interested in maximizing net tax revenue (i.e. the sum of taxes and penalties minus expenditures on audits) given the tax rates, fines and the costs of auditing. In the case of a homogeneous group of taxpayers, the only taxpayer-specific information available to the tax authority is the declared incomes. Thus, the authority must determine the probability of audit, using these declarations. The purpose of this model is to find the optimal auditing rule given the tax rates and income distribution.

Chander, Wilde (1992) and Vasin, Panova (2000) extend the previous model by taking corruption into account. The model assumes that a tax inspector, which has discovered an instance of tax evasion, may bargain with the detected evader over the size of a bribe given in exchange for not revealing the evasion. In order to prevent this kind of corruption, the authority chooses to review some of the inspectors' audits and fires those inspectors who have not reported tax evasion. Thus, the authority's problem is to choose the frequencies of both levels of audit - the audit of taxpayers by inspectors and the review of audits from the center as well as inspectors salary. There are two variants of the optimal strategy depending on parameters of the model:

1. If the ratio of the audit cost to the cost of reviewing is above some threshold then the optimal strategy includes threshold probabilities of auditing and reviewing that make corruption and tax evasion unprofitable.

2. If the ratio is below this threshold level then it is optimal to cancel reviewing and increase the auditing probability to such value that tax evasion turns out to be unprofitable in spite of the possibility for bribing.

However, realization of these variants meets the following difficulties:

1. The first variant assumes that there is a possibility to hire sufficient number of honest collaborators for reviewing, but actually the center typically has very few reliable collaborators and their time is a very expensive resource. Thus, this variant may be impossible or inefficient.

2. As to the second variant, the lack of control creates incentives for cooperation among inspectors in order to reduce the actual auditing probability

to such value that maximizes the total amount of bribes.

An alternative approach is to form a controlling hierarchy that suppresses corruption at all levels. Consider a country where a benevolent leader aims to organize an efficient tax collection. There are N firms, each gets high or low income with probabilities h and $1-h$ respectively. The additional tax from the high income is T and the penalty for evasion is F. For the inspection, the leader can use a small number M of reliable collaborators and also employ any number of rational inspectors who maximize their expected incomes with account of possible salaries, bribes and penalties. Salary s_M (per one audit or review) permits to employ a sufficient number of such inspectors, and $\tilde{c}$ is the cost of one audit by a reliable collaborator. Consider a strategy of the tax inspection organization. It includes probability p_0 of primary audit for any low-income declaration. In order to prevent bribing of a primary auditor, any report confirming low income is under reviewing (first-level audit) with probability p_1. And so on, any i-level audit confirming the low income is under reviewing ($i+1$-level audit) with probability p_{i+1} until the upper level k where honest collaborators work. A salary of an i-level inspector is $s_i \geq s_M$. Each revealed inspector which has not reported tax evasion is fired and gets after that alternative salary s_{alt}. This value is uncertain: we assume that $s_{alt} \in (s_M - \Delta, s_M)$. Thus, a government strategy includes the number $k+1$ of audit levels, auditing probabilities $p_0, \ldots, p_k$ and salaries $s_0, \ldots, s_k$ at each level.

A formal problem is to find the optimal strategy that provides honest behavior of all agents and maximizes net tax revenue under this condition. Note that, for risk-neutral inspector, firing as equivalent to monetary fine $\tilde{F} = (s - s_{alt})\alpha$, $\alpha = \delta/(1-\delta)$, where δ is a discount coefficient. Let $d_i = s_i - s_M$ denote the increment of the salary at level i above the maximum alternative salary.

Proposition 1 *Assume that auditors at level i check honestly. Then mutually beneficial collusion between $i-2$-level inspector and his auditor is impossible if and only if $p_i \geq \dfrac{d_{i-2} + \Delta}{d_{i-2} + d_{i-1} + \Delta}$ for $i = 2, \ldots, k$. Tax evasion is unprofitable if and only if $p_0 \geq T/F$ and collusion between taxpayer and his auditor is impossible if and only if $p_1 \geq \dfrac{F}{F + d_0\alpha}$. (*)*

Proposition 2 *The subgame perfect equilibrium corresponding to the honest behavior in the interaction of inspectors and taxpayers exists if and only if the government strategy meets the inequalities in the previous proposition. The net tax revenue at such equilibrium is as follows:*

$$R(k, \overrightarrow{d}) = hT -$$

$$p_0(1-h)(s_M + d_0 + p_1(\cdots + p_{k-1}(s_M + d_{k-1} + p_k\tilde{c})\ldots).$$

Consider the following example. The additional tax from the high income is 10 000 and the penalty for evasion is 80 000. The number of taxpayers is 100 000, the probability to get high income is $h = 0{,}5$. Reliable collaborators get 100 000 per one check. Salary s_M equals 150 and Δ equals 100, so $s_{alt} \in (50, 150)$. Each auditor can make 60 inspections or revisions per year. So his alternative salary per year lies between 3 000 and 9 000. Let a discount coefficient δ equal 0,1.

The following table shows the net tax revenue and auditing expenses for optimal salaries, probabilities and different number of auditing levels.

Number of auditing levels	Net tax revenue	Auditing expenses	Number of employed honest collaborators
2	181 940 000	318 060 000	1863
3	459 222 000	40 778 000	200
4	480 532 000	19 468 000	62
5	488 653 000	11 347 000	25
6	491 774 000	8 226 000	12
7	493 424 000	6 576 000	6
8	494 215 000	5 785 000	4
9	494 695 000	5 305 000	2
10	494 947 000	5 053 000	2

According to this data, the 6-level inspection organization cuts down auditing expenses 40 times with respect to the base model with 2 levels. Moreover, the necessary number of honest collaborators also decreases by 150 times. So even a small number of honest collaborators can provide an efficient tax audit.

Список литературы

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