

Inefficiency of the Basic Contract in the Russian Economic Universities

The problem through lens of
multitasking and common agency approaches

Natalia **Dzagourova**^{*}
NDzagurova@hse.ru

Maria **Smirnova**^{**}
marie_smirnova@hotmail.com

Abstract

In this paper we discuss the actual problems of economic education in Russia related to the substantial deficit of high skilled teaching personnel and the poor teaching quality. We believe that the basic cause of existing situation lies in the imperfections of standard contractual system usually framing the relations between public universities and their teaching staff. Speaking about contractual imperfections we mean the inefficiency of the contracts structure as well as the inefficiency of their parameters. The accumulations of human capital as well as its quality are core production factors for the university activity. This fact allows us to argue that a well-balanced structure of the university contracts presents a gage of high quality education that the university provides. Meanwhile the existing university contracts are based rather on the reasons of the common sense than on the arguments of some scientific approach, whereas a range of problems really typical for the principal-agent models characterizes the relations between universities and their professors. The theoretical framework we use to analyze contractual problems and to give some predictions concerning possible ways to resolve them consists in combining multitasking and common agency approaches.

^{*} High School of Economics, Public University, Moscow, Russia.

^{**} Université Paris-1, Panthéon Sorbonne, France.

0. INTRODUCTION

In the last decade one of the core problems in the sphere of the higher economic education in Russia was substantial deficit of professor staff. Notwithstanding the fact that during this period there have been substantial investments in the training of the lecturer personnel, this problem has aggravated still.

On the one hand, significant increase in the number of economic universities has provoked an increase of the demand for the lecturers force in general. On the other hand, progressive integration of Russian economists into the international scientific society as well as emergence of a great number of specialists in different spheres of economics, which were educated in American and European universities, enhanced the quality requirement for the economic education. This fact has triggered an important deficit of highly qualified lecturers, capable to give specialized and advanced courses at final stages of the higher education. Meanwhile, these changes in demand have not led to reciprocal changes in supply.

We argue, that the principal cause resides in the imperfections of existing contractual system practiced by public universities. Speaking about imperfections of these contracts we mean inefficiency of their structure in general as well as the values of their core parameters in particular. Consequently, the contracts are completely unattractive, and this creates a problem to retain lecturers (especially young professors) in the universities and particularly require high teaching quality standards. Moreover, low remuneration level in public universities forces professors to look for the secondary parallel employment. This fact often makes the problem of efforts allocation still more sever.

In the epoch of the Soviet Union such problem did not occur since the personnel policy – at least concerning the level of salaries and that of workload – was based on the powerful incentives and made multiple employment unnecessary and impossible. Indeed, the salary level in the soviet university was efficient in terms of Shapiro-Stiglitz model of the efficiency wage. For the universities it meant significant choice (as there was a sufficient number of teaching candidates for each position) and at the same time insured them against the moral hazard (since the losses of the lecturer in case of lay-off were too high). However at present, the wage level is far from being efficient, which has led to aggravating the adverse selection and moral hazard problems.

In the present paper we try to analyze the above-mentioned problems and to indicate certain possible ways to overcome them using the framework of multitasking and common agency approaches. The first multitasking model was proposed by Holmström and Milgrom [1991]. Formally, the model could be represented in the form of standard linear principal-agent problem. But there is one crucial additional assumption: the agent is supposed to perform not a single task but a range of tasks (some of that can even represent the agent's outside activities). So, the efforts produced by the agent to realize them can constitute different relations from complete independency to perfect substitution at one extreme and to perfect complementarity at the other. Evidently, the type of relations will be determined by the form of individual

cost function. In the main part of their discussions Holmström and Milgrom use a model describing the perfect substitution case where the agent's costs depend only on the total effort. In such multidimensional situation a real problem to create an efficient incentive system appears when not all performances of the tasks accomplished by the agent can be easily measured (that is have cheap and unbiased proxies)¹.

As a result, this transformed principal-agent model claims to be a theoretical base of really broad empirical applications, which concern the use of higher-powered and lower-powered incentives, ownership patterns, job design and administrative constraints. Going back to the fundamental differences between the more common one-dimensional principal-agent models and the multitasking approach, it is important to emphasize two principal contributions made by the last one, which we are particularly interested in:

- when there are multiple tasks, incentive pay serves not only to allocate risks and to motivate hard work², but also to direct the allocation of the agents' attention among their various duties; moreover, a direct consequence of this multidimensional nature is the fact that incentives for a task can be provided in two ways: either the task itself can be rewarded or the marginal opportunity cost for the task can be lowered by removing or reducing the incentives on competing tasks;
- in multitask principal-agent problems, job design is an important instrument for the control of incentives; apparently in the standard model, when each agent can engage in only one task, the grouping of tasks into jobs is not a relevant issue.

Further researches have developed the multitasking concept. Since the time of Holmström and Milgrom's pioneer article, two principal visions of multitasking situation have been formed. The first one (inspired by Holmström and Milgrom) dealing with task substitution, considers multitasking as a problem to be solved through the well thought-over incentive and job design system. Itoh [1994] discusses basic principles for efficient job design process. Vafaï and Anvar [1998] consider optimal task distribution given the overlapping tasks. Sinclair-Desgagné [1999] proposes specific system of performance measurement aimed at restoring higher-powered incentives. Dewatripont and al. [2000] analyze task clustering conditioned by the nature of principal's objectives and the interdependency of performance signals. It is interesting to note that a great part of empirical papers use an example of retail sales [Slade, 1996; Brickley, 1999; Bai and Tao, 2000]. On the contrary, an example of the teaching activity, which was widely exploited by Holmström and Milgrom, was not sufficiently developed in literature. As far as we know, there exists a sole empirical work on this topic written by Brickley and Zimmerman [1998] in the framework of the multitasking approach. This work strictly confirms the principal results of multitasking model.

¹ Recalling the approach proposed by Alchian and Demsetz [1972], it is interesting to indicate that they argued that monitoring difficulties account for the formation of firms. So, Holmstrom and Milgrom reintroduce measurement cost as a key factor, but in a way, which differs from the original Alchian-Demsetz theory: they do not argue that owners can better monitor the work force.

² As traditional one-dimension models predict. See Ross [1973], Mirrlees [1976], Shavell [1979].

The second vision dealing with complementary tasks treats multitasking as an instrument to improve the agents' performances [Itoh, 1992, 1993; Ichniowski and al., 1997; Crifo-Tillet and Villeval, 2000; Lindbeck and Snower, 2000, 2001]. This approach is based on the possible positive externalities between the tasks, which occur due to agents' *inter-task learning* [Lindbeck and Snower, 2000]. Back to our empirical problem, we should say that both visions described above are susceptible to contribute in the analysis we are going to present below.

Despite the fact that the basic multitasking model analyses the role of outside activities for creating the incentive system, it seems to us that it would be interesting to combine multitasking tooling with that of the common agency approach. As we have mentioned above, besides intra-university tasks the lecturers perform certain outside tasks referred to their secondary employment. The class of related «secondary» principals pursues its own goal and carries out an active incentive policy. So, we are facing not only externality effects between the tasks but also between different principals' policies. And these effects must also be taken into account.

The basic common agency model was developed by Bernheim and Whinston [1985, 1986]. One of the main purposes of this model was to formally prove the advantages of using the services of a single agent by several principals. From this point of view the common agency facilitates the coordination between the principals that allows internalizing the externalities related to their production and price policies. There is one distinctive feature of the models *à la* Bernheim and Whinston – assumption about informational symmetry between principals and the agent. It excludes from the analysis a whole layer of problems related to the adverse selection and the moral hazard.

Allowing the possibility of the asymmetric information can drastically change the criteria of common agency efficiency. Indeed, in the case of symmetric information there are just two types of inter-principals externalities: (i) *technological externalities* – economy of scale³, effect of complementary tasks⁴, effect of coordinated price policy, etc. – and (ii) *contractual externalities* – competition for the agent's efforts realized through different incentive systems and other contractual terms as the delegation of certain rights, etc.

Under assumption of asymmetric information the third type of externalities occurs: *informational externality*. Even if there are no direct contacts between the principals, the strategies they chose, their market shares and profit, etc. can reveal the information about their agents. It is noteworthy that in respect to the completeness of informational flows, the common agency can be more or less preferable

³ This advantage can result from the decrease of fixed or variable cost, which is explained by the effect of *learning by doing* in the framework of similar jobs performed for different principals (*intra-task learning* [Lindbeck and Snower, 2000]). About the effect of complementary tasks in the common agency model see Mezzetti [1997], about the effect of substitute tasks see Martimort [1992].

⁴ Even if the agent's tasks are not the same for different principals, they can still be characterized by a strong complementarity in such a way that the accomplishment of one task reduces the marginal cost of another (*inter-task learning*).

as compared with the situation of independent agents. For example, the model proposed by Esther [1991]⁵ shows that under high uncertainty about the agents' cost and high correlation between the costs of different agents, the information losses will be greater under common agency than under contracts with independent agents. Apparently, this is not always the case. An example of multiple employments typical for the lecturers of Russian economic universities demonstrates the opposite result: the work of a given agent with one principal can be a signal of her «quality» for another one.

In this paper we will try to analyze all types of externalities described above (*inter-task* as well as *inter-principal* ones), to discuss the interaction between them and their effect on the optimal contractual structure. The remainder of the paper is organized as follows. In section 1 we discuss intra-organizational aspects of the multitasking problem existing in the academic activity. In this section we focus mostly on the rivalry of quantitative and qualitative teaching aspects and on the related contractual problem in the sector of public economic education in Russia. Integration of the common agency framework is provided in section 2, where we examine the role of secondary employment and a possible way of basic contract modification aimed at resolving the problem of teaching quality. Concluding remarks and possible tracks of further development of the topic are presented in section 3.

1. INTERNAL MULTITASKING

Most part of existing papers dealing with multitasking problem in the academic practice, focus on its internal (intra-organizational) aspects [Brickley and Zimmerman, 1998; Fox, 1992; Hannaway, 1991]. There are two pairs of competing internal tasks, which are traditionally discussed in the literature: (*i*) teaching versus research activity and (*ii*) quantitative versus qualitative characteristics of teaching performance. As multitasking approach argues, in both cases two crucial questions should be asked before constructing a well-balanced incentive system: (*i*) Are the tasks in question substitutes or complements? and (*ii*) What is the relative measurability of their performance? Let us answer these questions for each pair separately.

1.1. Teaching versus research

Are teaching and research activities substitutes or complements? The answer to this question is not so obvious. Since early seventies there have been two opposite views in the related literature. According to the first one, teaching and research activities being strictly interdependent just represent two aspects of a single task. Thus, development of research activity leads unavoidably to improvement of teaching performance [Parsons and Platt, 1968; Harry and Goldner, 1972; Bowen and Schuster, 1986]. The

⁵ Other common agency models with incomplete and imperfect information see also in Berkok [1990], Stole [1991], Martimort [1992].

supporters of the second point of view argued that even if traditionally teaching and research were combined into a single job, nevertheless they remained rival by their nature [Light, 1974; Clark, 1986].

Naturally the relationship between teaching and research is conditioned by a degree of complexity of given courses. Empirical papers show that degree of complementarity between research and teaching increases with cycle of higher education. Indeed, at the final education stages (master and PhD programs) certain mutual positive externalities do exist between these two academic activities [Fox, 1992].

It is noteworthy that the usual conflict between research and teaching as academicians' personal problem is often just a reflection of a similar problem, which generally universities are facing [Fox, 1992]. In Europe and especially in the United States it is the particular reputation of lecturers as specialists in their disciplines that creates the university prestige. At the same time, professor's fair name is a result of his/her research activity. Finally, universities invite professors to teach but their hiring decisions as well as remuneration ones are based on professors' scientific achievements. Such a policy of university administrations increases the tension between research and teaching activities.

Russian economic universities face a quite opposite problem. Inefficient and insufficient incentive of scientific research at the beginning of the academic work leads to the fact that most lecturers stay completely out of the research activity. It has a strong negative effect on the general teaching culture as well as on the teaching quality at final stages of the higher education.

Under-stimulation of research activity is one of the most severe problems which Russian economic universities are confronted with. It merits a serious discussion apart. But in this paper we are focusing on the problem of teaching quality and under-investments in the «teaching human capital» itself. Thus, in this section we just wanted to outline the existence of «the research question». In the soviet period there were the so-called scientific-research institutes, which were carrying out all researches (contrary to Europe and especially the United States where universities have always been principal centers of research activity). On the one hand, in those days the primary preoccupation of such research institutes in economic domain was planned economy. On the other hand, the financing of these institutes has considerably diminished. Accordingly, nowadays we observe a substantial lack of research culture in the economic disciplines. Neither the existing sharing out of university budgets nor the university contractual policy do not contribute to resolving this problem.

1.2. Quantitative versus qualitative teaching aspects

Teaching and research activities represent just a dimension of multitasking nature of the academic work. Teaching in itself is a complex work. Just as well as any other job it is characterized by known trade-off between «quantity» and «quality». We will start by defining these two teaching aspects and their relative measurability, and then we turn to discussing the relations between them.

1.2.A. General remarks concerning rivalry between quantitative and qualitative aspects

It is easy to define a quantitative dimension of the teaching process: it is determined by hours of lectures and seminars realized by lecturers. Normally, the contracts for permanent positions stipulate an obligatory workload in hours, which professors must work. Apparently, the measurement of this teaching aspect is quite simple. But this is not the case for qualitative dimension of teaching.

First of all, qualitative aspect of teaching has a complex nature. Its most obvious and at the same time important components are the following⁶: (i) profundity and subject coverage provided by lectures; (ii) available methodology materials aimed at facilitating the information processing and training particular skills with students; (iii) general approach to the teaching determined by its purposes as lecturers themselves perceive⁷.

Each of the components mentioned above is more or less difficult to estimate and to monitor. Speaking about teaching quality standard, it is already a great problem to work out a clear system of requirements concerning these three points. And even if universities succeed in creating such a system, it still remains difficult to build it in the incentive and remuneration mechanism. Indeed, it is not obvious to find simple and objective proxies for aforesaid quality dimensions; on the contrary, estimation of teaching quality aspects rather needs a kind of auditing process. On the other hand, the importance of the incentive system in imposing the necessary teaching strategy on the lecturers is out of question. According to the multitasking approach, direct incentives based on easily observable proxies of teaching quality being unable to reflect its complex nature lead to inefficient distribution of lecturers' efforts. This redistribution is often carried to an absurdity as long as lecturers transfer their forces to tasks almost useless in itself but affecting positively the proxies values.

There are numerous examples to illustrate the negative influence on teaching quality produced by inappropriate quality proxies. Brickley and Zimmerman [1998] discuss an example of William E. Simon Graduate Business School where at one time professors' ratings on the basis of students' appreciation were practically the only criteria of teaching performance evaluation. Strictly according to the results of the basic multitasking model such a system encouraged the lecturers to abuse the students' opinion. Apparently, it meant that professors followed the line of least resistance: with minimal efforts, which were not related to the objective teaching quality, they could attain the high popularity in the students' environment. Another good example one can find in Hannaway [1991]; it refers to the frequent use of incentive pay for teachers based on their students' test scores. Proponents of the system, guided by a

⁶ More about qualitative aspects of teaching see Marton and Säljö, 1976; Säljö, 1979; Beaty and al., 1989; Pratt, 1992; Brinko, 1993; Gramlich and Greenlee, 1993.

⁷ Kember and Gow [1994] discuss two principal approaches to the teaching process: (i) *knowledge transmission* and (ii) *learning facilitation*. The first one considers the students as passive recipients of information, thus it is aimed at preparing clear and well-structured courses. The second one tries to develop with students a critical way of thinking and particular skills to solve different problems. An empirical research realized in the framework of this paper shows how these strategies are related to students' learning patterns and teaching performance in general.

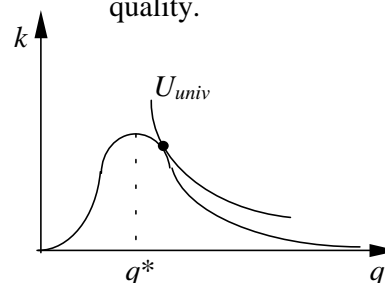
conception very similar to the standard one-dimensional model, argue that these incentives will lead teachers to work harder at teaching and to take greater interest in their students' success. Opponents counter that the principal effect of the system is that teachers sacrifice such activities as promoting curiosity and creative thinking and refining students' oral and written communication skills in order to teach the narrowly defined basic skills that are tested at standardized exams.

As we have seen, even within single qualitative aspect of teaching its various characteristics have different degree of measurability. Thus, it is not surprising that teaching quality is especially weakly measurable as compared with quantitative dimension of teaching. In this situation what plays a crucial role in the efficiency of the incentive system is particular relations (in terms of multitasking approach) between qualitative and quantitative components of teaching.

In general, competitive relations between qualitative and quantitative teaching aspects seem more or less evident. Nevertheless, it should be underlined that for the low levels of obligatory workload there is a mutual positive externality between them. For instance, consider a situation of a young lecturer who does not have a sufficient teaching experience. At the initial levels of the workload its subsequent increase is a possibility for him to acquire and to develop his teaching skills, which consist in capacities to explain the topics in a simple and clear manner, to find quickly his bearings during the interactive work with students. The same logic is true for the lecturers of any skill if they begin to give a new course. Even in the most general case, direct work with students allows optimizing the lectures structure, highlighting key points in a proper way; it helps to reveal the directions to develop the existing courses and the necessity to work out the new ones. The problems which occur during the teaching process, often encourage the lecturers to learn new subjects and to master adjacent disciplinary fields. So, at certain stages an increase of basic workload can favor a development of skills and an improvement of teaching quality.

The Figure 1.1 shows in a schematic manner a possible functional interdependency between basic workload q and teaching quality k . Apparently, starting from a certain point q^* , the negative consequences produced by generally competitive nature of quantitative and qualitative teaching aspects begin to outweigh the positive effects mentioned above⁸. Consequently, further rise of q leads to the quality fall. Undoubtedly, the basic workload fixed by the contract depends on university preferences concerning qualitative and quantitative

Figure 1.1. The link between the basic workload and the teaching quality.



⁸ It is quite obvious that q^* depends on the features of a given teaching activity (for instance, on the particular phase of the higher education), on personal characteristics of a lecturer (in particular on his skill) and, at last, on general working conditions (as, for instance, the presence of a permanent workstation, an access to necessary literature, a general skill level of the lecturers of a given chair).

teaching characteristics. It is noteworthy that the basic workload commonly exceeds the level corresponding to the maximal teaching quality value. But if the university administration is interested in stimulating the quality level, then the workload imposed on lecturers must not surpass significantly the level, which maximizes teaching quality.

The level of obligatory workload, which currently exists in American and European universities, is a result of a long *tâtonnement* process of progressive contracts transformation. But this problem is very severe in Russian universities. We should underline that at present, it is unacceptable to adopt the American or European approach. The question is that the public university contracts do not determine completely the total lecturers' workload. Moreover, often they do not constitute its major part. The lecturers' outside activity is comparable in its scope with basic internal workload. Accordingly, it is absolutely necessary to take into consideration this outside commercial activity if we analyze the relations between quantitative and qualitative teaching dimensions and if we try to understand how these links affect the optimal level of basic workload.

1.2.B. Specificity of the problem for the Russian economic universities

American and European universities instigate an extremely high quality standard in the field of research activity as well as in the sphere of tuition. Here, we define the high teaching quality in terms of profound topics, advanced course level reflecting the most recent achievements in the fundamental economic theory. Currently, the priority objective for the Russian economic universities is to get close to this level of education. Meanwhile, the existing contract system does not create the required incentives for increasing the teaching quality.

Professors' contracts (hereinafter «basic contract») typical for Russian universities, are characterized by two major parameters: (i) the level of obligatory (basic) workload measured in hours of lectures and seminars and (ii) the salary for this given workload. The basic workload can vary with scientific degree of a given lecturer and can take into account the fact that he can also be charged with a certain amount of administrative work⁹. The system in general and the current values of its parameters in particular have two principal disadvantages: (i) non-differentiated method of workload estimation and (ii) excessively high level of obligatory workload given the relatively low remuneration level.

Theoretically, even under fixed remuneration, the use of a complex scale of calculating the workload could restore an equivalent of higher-powered incentives. For instance, it could be motivating to attribute progressively growing weights to the hours spent in order to work out and to give more and more advanced courses. However, the commonly used method of estimating the workload and at the same time its

⁹ It must be stressed that this form of contracting is not anyhow related to “take it or leave it” contracts as long as it does not include any additional normative requirements towards lecturers. Whilst “take it or leave it” contracts imply that the employer buys from the employee a bunch of obligations, which restricts substantially the spectrum of possible worker's strategies that could infringe upon the organizational interests and strike the balance of efforts aimed at various tasks.

extremely high level stimulate the effort reallocation in favor of quantitative teaching aspect. In terms of the Figure 1.1 it means that the imposed q value significantly exceeds q^* .

Taking into consideration the complex nature of the qualitative teaching aspect, one may formulate the above-mentioned problem in two dimensions:

- insufficient incentives for the «current» quality level, which is directly related to the efficiency of teaching methods (the investments in the teaching guides and other supporting materials);
- lack of incentives for developing the «potential» level of teaching quality, which is related to the development of the lecturers' skill due to the need to develop and give advanced courses (the investments in the human capital).

To illustrate the lack of incentives for the current teaching quality, let us briefly analyze typical administrative regulations, which determine the basic rules of workload measurement. In terms of this kind of documents, the major direction of teaching activity can be split in two groups; the first group combines the qualitative teaching characteristics and the second group – the quantitative ones:

- methodology tasks: developing of new courses, development of topics, preparation and adaptation of supporting materials, etc.;
- lecturing: in fact it is direct realization of the methodological workload in form of presentation of the information during lectures and seminars and interactive work with students (carrying out discussions, controls and exams, help in writing term papers and degree works, etc.).

As we have already mentioned above, it is much easier to monitor and to evaluate the second dimension of the workload than the first one. That is why the most common weakness of existing schemes is the fact that the quantitative aspect of tuition becomes the basic factor of the workload calculation. In the situation when the level of obligatory workload is extremely high and when there is no clear way in which the methodical workload is incorporated into the overall workload calculation, the lecturers have a natural tendency to minimize the methodical workload and to engage themselves in giving the courses of introductory or intermediate level being content with reciting the basic textbooks.

Speaking about insufficient investments in the human capital, one must understand that it leads to the inefficient positioning of professors. The absence of the differentiated remuneration system under excessive workload leads to the fact that the most productive and talented lecturers have no interest to prepare and give advanced courses. So, they adopt the strategy of low-performance lecturers giving the courses of introductory levels.

The problem is getting worse as a result of two difficulties. On the one hand, the information about lecturers' potential capabilities is not always symmetric (in particular, this is not the case of young professors). On the other hand, even if the real capabilities of a given lecturer are observable,

they are not still contractable. It means that under existing contractual policy universities cannot impose on the high-performance lecturers the workload characterized by a high teaching quality in terms of development and advancement of given courses. It is the case as long as the basic workload is so high as compared with the salary that if one assumes that the university contract is the only source of lecturers' income then the participation constraint of most professors would not be fulfilled and so, they would be forced to leave the sector. Thus, if the universities try to add in the contracts the new obligation concerning teaching quality, it will worsen the contract conditions and squeeze from the sector a regular lecturers' cluster. Moreover, these are the best ones as their reservation utility is higher.

Going back to the mimicry problem, it is noteworthy that the reason for domination of the strategy of the low-productive agents is twofold. The lack of incentives is one of two explanations. The second one lies in the specificity of the market demand for the lecturers. We mean by the market demand the demand of commercial colleges, which represents a principal source of secondary employment for professors.

2. DIVERSIFIED EMPLOYMENT: OUTSIDE ACTIVITY AND COMMON AGENCY PROBLEM.

As we have already said above, the ratio «basic workload/salary» has a value too high to enable the fulfillment of the participation condition. Accordingly, a secondary employment becomes practically unavoidable as long as it guarantees to the lecturers additional revenue, which allows them to ensure their reservation utility and, so, to stay in the sector of the higher education. In general, the secondary employment can take a lot of different forms from giving individual lessons to students and university entrants to working in private firms or in State institutions. Undoubtedly the most popular type of secondary job is teaching in private (commercial) colleges and institutes. In the present paper we will discuss only this type of secondary employment (hereinafter commercial job/employment/workload).

2.1. The interaction between primary and secondary employments: current situation

A typical contract between the commercial college and the lecturer is normally a short-term contract that stipulates a per hour remuneration rate and main features of the course which the lecture is engaged to give. The remuneration rate offered by commercial institutes is substantially higher than the calculated remuneration rate fixed by basic university contracts. Commercial workload in the framework of a contract varies with courses; to a certain extent it is the lecture himself who determines the level of the overall commercial workload to be realized. As for the complexity level of given courses, most of them are of the introductory and intermediate level; the demand for advanced courses is significantly limited.

Generally, the level of the total commercial workload of an average professor is comparable with his/her basic workload. But we should accentuate that both employments occur simultaneously: most lecturers prefer not to abandon the university contracts in favor of better-paid commercial job. There are two core reasons for it. On the one hand, working in the university is a necessary condition for the access to the «commercial teaching» as long as commercial institutes interpret it as a signal of professors' skills (informational externality). It is the case because normally commercial colleges do not invest themselves in human capital development. Whereas the public universities do it through the system of exchange with the European and American universities or through the specific courses raising the level of lecturers' skill. On the other hand, given that few lecturers have permanent positions in the commercial colleges, university contract is a kind of insurance, a source of guaranteed revenue. And the more the lecturer is risk-averse the more he/she is interested in keeping his/her position in the public university.

At this stage we are facing a complex problem, which amalgamates the aspects of multitasking and common agency approaches. Indeed, there are two types of principals: the principals A – public universities, and the principals B – commercial institutes. They have common agents i.e. professors who have initially been agents of principals A. Internal university activity is characterized by several tasks; and current contractual system does not resolve the problem of efficient effort allocation among them. Moreover, the professors' outside activity, reflecting the interests of principals B, competes with the internal tasks for their efforts. Principals B carry out an active contractual policy, which influences both the lecturers' behavior concerning commercial work and lecturers' strategy related to internal university tasks. At the same time, passive and myopic policy of principals A also affects the final gains of principals B, which they obtain from interaction with agents. The problem lies in the fact that principals A realizing the existence of principals B and even using it in their own way do not take into consideration the real scope of mutual influence of the policies (contractual externalities) and their impact on the agents' behavior.

2.1.A. Contractual externalities: effect of the secondary employment

University administrations often underestimate the negative effect of the low salary: they are sure that while the lecturers are able to get a well-paid secondary job, they do not leave the university. But the secondary employment solves only the problem of fulfilling the participation condition. But the problem of the teaching quality is still unresolved. Moreover, it is deteriorated by the motivations, which exist in the market of the commercial workload.

Indeed, principals B offer the higher-powered incentives, which stimulate increasing of the commercial workload. And the question is about development of quantitative teaching aspect. As we have already said, commercial demand consists mostly in courses of introductory or at best intermediate levels, which require from the professor the capability to give clear and easy-

understandable lectures. Thus, in terms of two qualitative components as we have determined it in 1.2.B, principal's B contracts do not stimulate investments in the potential teaching quality. Moreover, for the over-skilled lecturers it is as difficult to get a commercial workload as for under-skilled ones. This is the second reason why even high-productive and talented lecturers prefer to position themselves as low-productive ones.

Consequently, the presence of the outside activity does not just take away the lecturers efforts aimed at the internal university tasks, but also prevents the efficient sharing out of tasks among professors. An inefficient positioning of the high-performance lecturers is not the only problem. The mimicry process results in the fact that all professors choose the same positioning strategy (giving the courses of the same «elementary» level), whereas the universities are interested in the diversification, i.e. in the uniform distribution of lecturers (according to their skills and capabilities) among the courses of different levels.

2.1.B. Contractual externalities: influence of the terms of the basic contract

The disproportion of the terms of the basic contract also results in a certain externality that affects the sector of the higher education in general. The insufficient salary makes unavoidable the secondary employment, which in its turn engenders inefficient positioning of the lecturers. But at the same time, excessive basic workload (that has a tendency to grow) results in unwinding the adverse selection process.

Let us formulate the problem in terms of the multitasking approach. For simplicity we ignore the aspect of current teaching quality and consider the situation when the lecturer has two internal tasks: development of the potential quality (k) and basic workload (q_1); and an outside task: commercial workload (q_2).

What are the consequences of increasing the basic workload? As long as the basic workload has an obligatory character, the lecturer must take the decision concerning the effort distribution between the commercial workload and his investments into the human capital. On the one hand, commercial institutes propose higher-powered incentives in the form of high per hour remuneration rate and punish over-investment in the human capital. On the other hand, the system of performance measurement applied by the universities contracts does not stimulate the development of the potential teaching quality. Accordingly, the professors' efforts will be redistributed in favor of the commercial workload. Theoretically, there exists another possibility: to sign a half-time contract. But it occurs much more rarely than one could expect, and there are several reasons for it¹⁰.

¹⁰ The passage to the half-time contract has certain disadvantages both for lecturers and for universities. On the one hand, the permanent position has a range of advantages as, for example, a developed system of the social security, a particular system of bonus and premiums, opportunities to have trainings in European and American universities, etc. These practices can be considered as non-pecuniary incentives for the basic workload in the case when the lecturer faces the need to redistribute his efforts. On the other hand, the university is not interested in the mass switch of professors to the half-time

At the same time, as long as lecturers dispose of the limited time and their total effort quantity is not infinite, a growth of the basic workload reduces the time available for the commercial workload. It results in the fact that under given calculated rate of remuneration of the basic workload (w_1) and under unchanged commercial rate (w_2) the participation constraint for certain lecturers is not longer satisfied.

This situation is depicted on the Figure 2.1.

For the simplicity of our graphic demonstrations we have used a quasi-linear utility function where q_1 and q_2 are perfect substitutes: $U = w_1q_1 + w_2q_2 - C(k, q_1 + q_2) = M - C(k, q_1 + q_2)$, where $C(k, q_1 + q_2)$ is a function (increasing and convex on all variables) of individual lecturer's cost. Having signed the basic contract the lecturer takes the decision on k and q_2 by maximizing his utility function under given w_1 , q_1 and w_2 (in terms of the Figure 2.1 these parameters give a budget constraint OAB). It results in the utility level U and the commercial workload q_2 . But if the university increases the level of the basic workload up to q_1' , it modifies the budget constraint, which becomes OCD . So, the maximum possible utility level U' can be attained under the commercial workload q_2' . Thus, for all professors whose reservation utility level (UR) is higher than U' , the participation condition will not hold anymore.

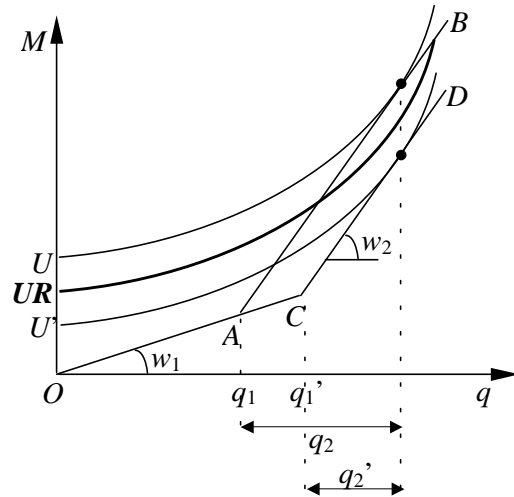


Figure 2.1. Increase of the basic workload: breach of the participation constraint.

Consequently, the increase of the basic workload provokes the flee of lecturers from the sector of the higher education. The less risk averse the lecture is, the more likely he decides to leave the sector. Moreover, this process touches upon the most productive lecturers as long as they have a higher possibility to find a better-paid alternative job, so, their reservation utility is also higher.

But it is just the beginning of the adverse selection process. As we have already said, the public universities are a primary supplier of the teaching personnel for the commercial institutes. Accordingly, the outflow of high-productive agents from universities means the exhaustion of this source, that inevitably has a negative effect on the teaching quality in the sector of commercial education.

It is noteworthy that the adverse selection problem is especially acute for the young professors. Apparently, this lecturers' cluster is the less risk averse and the level of the alternative market salary for them is normally higher than for the elderly professors. Finally, from the psychological point of view it is quite easier to drastically change his field of activity for a young well-educated person.

contracts. This is the case because there is a wide spectrum of supplementary (in relation to teaching) works, which defy any quantitative assessment and cannot be paid apart. So, only permanent employees can be charged with this kind of job. For the same reason the passage to the hourly pay without fixing any basic workload is not efficient and even feasible.

2.2. Possible ways of optimizing the basic contract

In this section we will discuss how the existing university contracts can be modified to resolve the problem of teaching quality, which is coupled with the adverse selection process and the global outflow of professors from the sector of the higher education. To have a general scheme of program to be resolved in order to optimize public university contracts, one should take into account four core dimensions according to the multitasking and common agency approaches:

- (1) A set of different types of principals, with which the principal A would like or has to share his agents as well as the sets of objectives of these principals and the types of incentive systems applied by them.
- (2) A full set of tasks (including outside ones), on which the agents of the principal A have to take their choice. Here, our main concern is the relations between these tasks, i.e.:
 - whether the tasks are substitutes or complements according to the agent's individual cost function;
 - relative measurability of the performances of different tasks;
 - relative importance of different tasks for the principal A and existence of technological externalities between the tasks in the principal's A production function.
- (3) A set of existing types of agents according to their capabilities and preferences (i.e. according to their cost and utility functions) as well as the distribution of agents among different classes of principals.
- (4) A set of parameters of the basic contract, which the principal A can manipulate to stimulate the agent's performance.

Until this moment we were interested exclusively in the interaction between the principals A and B concerning just two aspects of teaching – quantitative and qualitative ones – accomplished by a sole type of agents in the presence of just two contract parameters – basic workload and salary. Further, we will consider two-agent types situation. But let us first look at possible modification of contract parameters.

According to the basic results of multitasking model there are two ways to stimulate an effort reallocation in favor of qualitative teaching aspects: (i) to develop a complex scheme of their measurement and to increase their remuneration (direct incentive) or (ii) to decrease the level of the basic workload (analogue of decreasing the incentive for the rival task). But a current lack of general financing of the public universities makes unfeasible any important changes in the remuneration and incentive system. At the same time, the other way introducing fewer changers can give certain positive results. Thus, it is a basic workload decrease that we are going to focus on.

**2.2.A. Basic workload reduction and the scanning system
resting on the inter-principals externalities**

In the present context the critical question is the following: how will a reduction of basic workload affect the situation in the sector? To answer this question we should start by arguing that for each level of agents' reservation utility principal A can calculate the set of realizable pairs «basic workload»\«minimal per hour rate of reward» $(q_1 \setminus w_1)$. These pairs will constitute nothing else but a kind of labor supply function in the sector of the public higher education. The logic of this formal construction is the following: principal A chooses such combination of contract parameters $q_1 \setminus w_1$ to ensure for an agent her reservation utility level. During this process the principal A minimizes his expenses (i.e. his salary budget) by taking into consideration the fact that the agent has an unlimited access to the higher-paid commercial workload. Principal A knows that each chosen level of commercial workload is a result of utility maximization problem resolved under given parameters of basic contract (q_1, w_1) and given commercial rate w_2 . Formally it means:

$$\begin{cases} q_2 = \operatorname{argmax}\{w_1 q_1 + w_2 q_2 - C(q_1, q_2)\} \Rightarrow q_2 = q_2(q_1, w_2) \\ w_1 q_1 + w_2 q_2 - C(q_1, q_2) = UR \Rightarrow w_1 = w_1(q_1; \dots) \end{cases} \quad (3.1)$$

which gives us

$$w_1 = \frac{UR + C(q_1, q_2(q_1, w_2)) - w_2 q_2(q_1, w_2)}{q_1} = s(q_1, q_2(q_1, w_2), w_2, UR) \quad (3.2)$$

The function $s(\cdot)$ represented by (3.2) shows a minimal level of per hour rate w_1 that the principal A must pay to the agent to induce her to assume the basic workload q_1 by insuring her reservation utility. We can also interpret $s(\cdot)$ as the function of «compensated» labor supply in the sector of public education. Indeed, $s(\cdot)$, calculated under a given reward rate w_2 in commercial education sector, takes into consideration a substitution effect between q_1 and q_2 that appears with changes in the basic workload. Apparently, $s(\cdot)$ is a function increasing on q_1 . With progressive reduction of obligatory workload q_1 fixed by the basic contract, the agent restores her income losses increasing q_2 that is extending her involvement in commercial education sector. Moreover, for a smaller basic workload she is ready to accept a lower reward rate as she restitutes it by the hours of better-paid job.

Proposition 1. Compensated supply function determined by (3.2) is a function that demonstrates a positive interdependency between the volume of obligatory workload q_1 and the minimal level of per hour rate w_1 that the basic contract must stipulate.

Proof. Let us take the first partial derivation of $s(\cdot)$.

$$\frac{\partial w_1}{\partial q_1} = \frac{\frac{\partial C(\cdot)}{\partial q_1} q_1 + \left(\frac{\partial C(\cdot)}{\partial q_2} - w_2 \right) \frac{\partial q_2}{\partial q_1} q_1 - (UR + C(q_1, q_2(q_1, w_2)) - w_2 q_2(q_1, w_2))}{q_1^2}$$

The expression in the first brackets is equal to zero according to the first order condition for the utility maximization problem which agent resolves to choose q_2 under given parameters of basic contract q_1 and w_1 . The expression in the second brackets is equal to $q_1 w_1$ that derives from (3.2). So, we can rewrite:

$$\frac{\partial w_1}{\partial q_1} = \frac{\frac{\partial C(\cdot)}{\partial q_1} - w_1}{q_1} > 0$$

Indeed, the program being set as describe above, the value of $\frac{\partial C(\cdot)}{\partial q_1}$ is always higher than w_1 .

The public universities cannot offer a w_1 , which would be high enough to induce the lecturers to assume the necessary level of basic workload. The very fact that universities let their lecturers have secondary employment in the batter-paid sector of commercial education makes it possible to fix w_1 below the first best level. ■

Using general form of individual cost function $C(\cdot)$ we cannot say whether $s(\cdot)$ is convex or concave on q_1 . But it is not an important question that is likely to modify our main results. Nevertheless, to simplify our graphic presentations we will use for all figures below a particular case of cost function characterized by the perfect substitution effect between q_1 and q_2 , that is $C(q_1, q_2) = C(q_1 + q_2)$. Apparently, for this family of functions the total workload $Q = q_1 + q_2$ will be constant under given rate w_2 , thus the level of commercial workload will be determined by residual rule: $q_2 = Q - q_1$. It is easy to prove that under assumption of perfect substitution $s(\cdot)$ is a concave function. The process of problem (3.1) resolution for this type of cost functions is represented at the Figure 2.2 and Figure 2.3.

It is quite evident from (3.2) that *ceteris paribus* minimal per hour rate w_1 positively depends on the reservation utility level (Figure 2.3). It means that any reduction of basic workload under given per hour reward rate will lead to the extending of labor supply as long as a participation constraint will be satisfied for new clusters of agents characterized by higher reservation utility levels. At the same time this policy will not substantially raise the total cost of hiring.

If the population of potential lecturers with higher reservation utility whose participation constraint is met under reasonable q_1 cutting is sufficiently large, the obligatory workload reduction will stimulate competition for permanent positions in public universities. In this situation the requirements to teaching quality could be increased. Even if qualitative parameters of teaching are not implicitly contractible, there are scanning mechanisms including the important one related to the very practice of common agency and based on the informational externalities that can help principal A to enforce a certain level of teaching quality. But in the current situation the application of such mechanism is not feasible because of lack of competition between the agents. The basic contract is

access of low-performance lecturers to the commercial hours. Indeed, under relatively small basic workload low-performance lecturers are not able any more to get a sufficient commercial workload to retain their reservation utility. Consequently, for all levels of basic workload, which are below a certain break point depending on the maximal available commercial workload, the per hour rate w_1 must be higher than in the situation of unlimited access.

Let us reformulate the problem (3.1) introducing a new constraint on the access to secondary employment. If q_2^{\max} is a maximally possible commercial workload for the lecturers of a low productive (from the qualitative point of view) cluster, then the equation (3.2) is respected only for those q_1 that ensure $q_2(q_1, w_2) \leq q_2^{\max}$. As long as we consider q_1 and q_2 as substitutes from the agent cost function, the last inequality means

that there exists a certain $q_1^{\min}(q_2^{\max}, w_2)$ such that for all $q_1 \geq q_1^{\min}$ the inequality $q_2(q_1, w_2) \leq q_2^{\max}$ is respected. Thus for $q_1 \geq q_1^{\min}$ the dependency $w_1(q_1, w_2, UR^l)$ expressed by (3.2) remains unchanged. On the other hand, for all $q_1 < q_1^{\min}$, w_1 should be such to ensure $w_1 q_1 + w_2 q_2^{\max} - C(q_1, q_2^{\max}) = UR^l$.

Let us resume. Increasing labor supply and, as a result, raising competition in teaching quality in the sector restrict the access of low productive lecturers to the secondary job in the sector of commercial education. This new restriction modifies their curve of compensated supply that is determined henceforth by piecewise function:

$$w_1 = \begin{cases} = \frac{UR + C(q_1, q_2(q_1, w_2)) - w_2 q_2(q_1, w_2)}{q_1}, & \text{for } q_1 \geq q_1^{\min} \\ = \tilde{w}_1 = \frac{UR + C(q_1, q_2^{\max}) - w_2 q_2^{\max}}{q_1}, & \text{for } q_1 < q_1^{\min} \end{cases}$$

A principal difference of high-skilled lecturers' position is unlimited access to the commercial workload due to their better qualitative performance. Thus their compensated supply function still has a unique form for all reasonable q_1 :

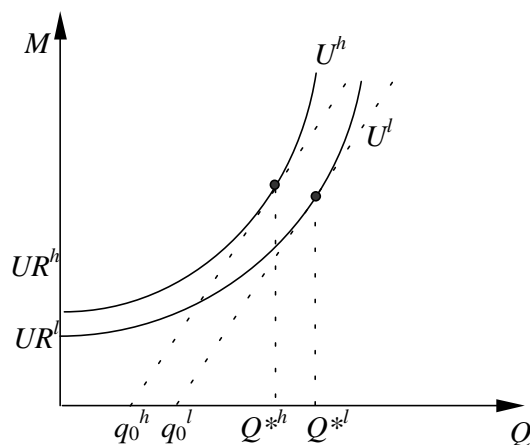


Figure 2.4. High- and low-performance lecturers: reservation utility curves.

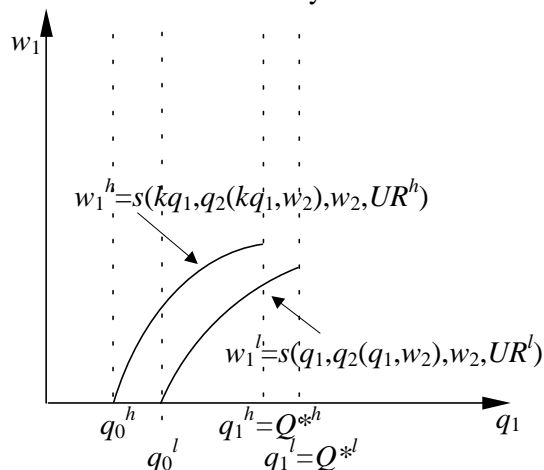


Figure 2.5. High- and low-performance lecturers: compensated supply curves.

$$w_1 = \frac{UR + C(q_1, q_2(q_1, w_2)) - w_2 q_2(q_1, w_2)}{q_1}$$

Proposition 2. Under assumption of negative interdependency between q_2 and q_1 that we made at the very beginning $\left(\frac{\partial q_2(q_1, w_2)}{\partial q_1} < 0\right)$, the impossibility to increase commercial workload beyond a certain level q_2^{\max} must lead to a higher reward rate w_1 (compared with the «no-limit» situation) to compensate a utility fall related to the decreasing of basic workload below q_1^{\min} .

Proposition 2 means that if we move from higher levels of basic workload to lower ones, then starting from q_1^{\min} the compensated supply curve must become less steep than as if there has not been any limitation on the commercial workload (Figure 2.6).

Proof. Let us compare two functions in question – $w_1 = s(q_1, q_2(q_1, w_2), w_2, UR)$ and $\tilde{w}_1 = s(q_1, q_2^{\max}, w_2, UR)$ – in the interval (q_0, q_1^{\min}) . More precisely, let us find the sign of the difference $(\tilde{w}_1 - w_1)$ under given q_1 :

$$\tilde{w}_1 - w_1 = \frac{C(q_1, q_2^{\max}) - C(q_1, q_2) - (w_2 q_2^{\max} - w_2 q_2)}{q_1} = \frac{\frac{\partial C(\cdot)}{\partial q_1} dq_1 + \frac{\partial C(\cdot)}{\partial q_2} dq_2 - w_2 dq_2}{q_1} = \frac{\left(\frac{\partial C(\cdot)}{\partial q_2} - w_2\right) dq_2}{q_1}$$

The difference in the brackets is negative because under $q_1 < q_1^{\min}$, q_2^{\max} is always lower than q_2 in non-constrained problem where $\frac{\partial C(\cdot)}{\partial q_2} = w_2$; thus $\frac{\partial C(q_1, q_2^{\max} | q_1 < q_1^{\min})}{\partial q_2} < w_2$. As long as dq_2 is also negative ($q_2^{\max} < q_2(q_1, w_2 | q_1 < q_1^{\min})$ by definition), the whole expression $(\tilde{w}_1 - w_1)$ is positive. ■

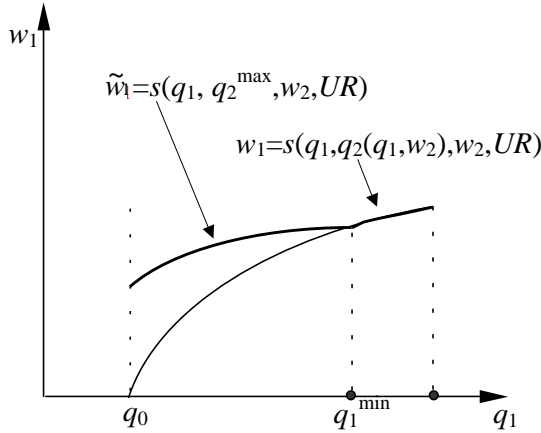


Figure 2.6. «Compensated» supply curve with limited access to the commercial workload.

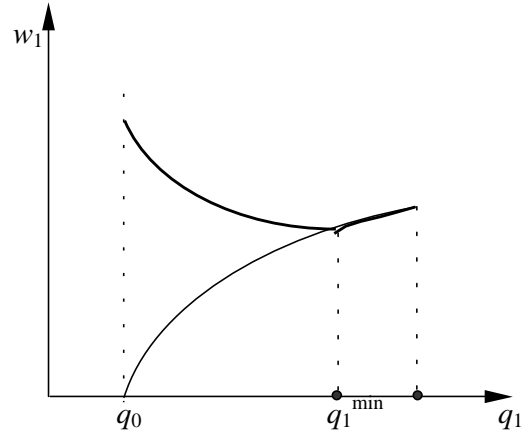


Figure 2.7. Down-slope «compensated» supply curve under limited commercial workload.

It is important to underline that the compensated supply curve can become even decreasing in the interval (q_0, q_1^{\min}) . It means that principal A has to increase progressively per hour rate w_1 if he continues to diminish the basic workload below q_1^{\min} level (Figure 2.7). Decreasing compensated

supply function appears when the cost reduction related to the fall of basic workload is substantially less than the corresponding fall of income that can not be recovered by raising the commercial workload above q_2^{\max} level.

Let us return to our two-cluster market and recall that it was the emergence of well skilled and higher performance lecturers that brought these new limits on the access of the low performance lecturers to the contracts in the sector of commercial education. Thus, it would be interesting to bring together two resulting types of compensated supply function to find out if there is a possibility of separating equilibrium and to get some ideas about contracts in which this equilibrium could be embodied.

At the Figure 2.8 we have brought together the compensated supply curves for two lecturers' clusters. This figure shows clearly that separating equilibrium is attainable. In terms of Figure 2.8 the current situation in the sector of public education can be represented by a point at the top area of the frontier ED . What becomes clear is an unreasonable new policy of certain public economic universities

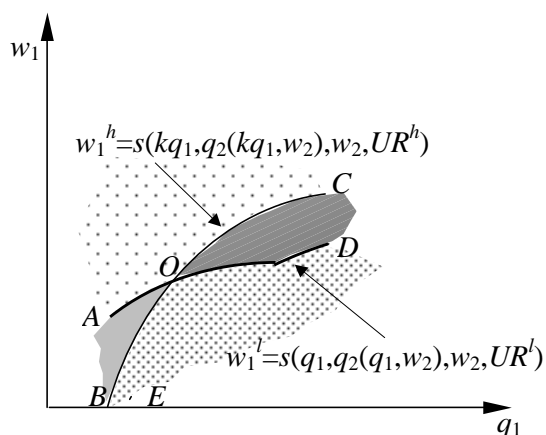


Figure 2.8. Different types of equilibrium:

- «good» separating equilibrium
- «bad» separating equilibrium
- mixed equilibrium: nobody signs the contract
- mixed equilibrium: both types of lecturers sign the contract

that consists in increasing per hour rate w_1 and keeping unchanged the level of basic workload. Such a practice moves basic contracts either in the center of the area DOC or towards the area COA . The first case occurs if per hour rate increase is not sufficiently high. And it is the worst situation because this type of contracts is acceptable only for low-performance lecturers. The second case is when w_1 rising is sufficiently high. But it does not resolve the quality problem as such contracts lead to the mixed equilibrium where both types of lecturers sign it.

On the contrary, easy realizable (from the financial point of view) contracts from the area AOB are capable in middle term of ensuring the separating equilibrium where only high-performance lecturers accept the contract terms. During the first phase «low basic workload-low per hour rate» contracts induce competition in the public education sector and make it possible to raise the teaching quality standards. Then, the information on lecturers' productivity is communicated to the commercial sector where hiring process is based on lecturers' reputation. So, during the second phase the compensated supply curve for low-performance lecturer experiences the transformation described above (passage from curve ED to curve AOD at the Figure 2.8). Starting from this moment the contracts from AOB do not satisfy anymore the participation constraints of low-productive lecturers, they become convenient only for high-productive ones.

2.2.B. Basic workload reduction and the possibility to apply general scanning mechanisms

Since the competition between the professors is initialized, it becomes possible to apply other common mechanisms, which accomplish scanning and incentive functions simultaneously. For example it makes possible to introduce the practice of tenure positions. If due to the basic workload reduction the lecturers supply increases considerably, then the introduction of such positions can be a good incentive for young professors to invest into the human capital from the very beginning of their career. This mechanism will also implement the scanning function as long as under sufficiently high quality requirements, only high-productive and talented lecturers will invest in raising the level of their skill.

At the same time, introducing the differentiated scheme of the workload calculation can also produce a certain positive effect. The logic of such a scheme could be the following: the hours related to the preparation and realization of more advanced courses must have a greater weight than those related to introductory or intermediate ones. As a result, the real obligatory workload level will fall with increasing the courses complexity. Coupled with more rigorous monitoring (more complete contracts in the view of quality performance measurement) this system could work as a self-selection mechanism.

3. CONCLUSION

To conclude it is important to answer the question whether the contractual changes described above are Pareto-optimal or not. So, how does the basic load reduction affect the interests of the commercial institutes? In the examined situation the logic of action will be similar to the one, which we have observed while analyzing the spreading of the adverse selection results within the universities on the sector of the commercial education. Rising of teaching quality in the public universities should engender the same tendency in the commercial sector, since a greater supply for the public universities (and as a result the competition in the teaching quality between the lecturers) means the same for the commercial institutes, whose the only source of teaching personnel is the public education sector.

We should admit that the positive changes derived from the obligatory workload reduction are a possible version of the story. To answer more precisely the question how proposed modifications would affect the current situation, it is necessary to examine the professors' preferences, potential capacity of the supply and the demand for lecturers. Such empirical research must answer two principal questions: (i) whether the increase of lecturers supply provoked by the basic workload reduction will be enough to create a sufficient degree of competition between the professors and (ii) if yes, whether the necessity to continuously invest in the teaching quality will not lead to the violation of the participation constraint. Otherwise, the basic load decrease alone is not a sufficient condition for overcoming the existing problems and it is absolutely necessary to rise from the very beginning the per hour remuneration rate.

Nevertheless, it seems undutiful that for the moment the public university cannot compete with the market in the wage levels. But at the same time they can resist a certain «negative» influence of market environment and use its positive externalities attaining at the same time their objectives, i.e. attraction and retaining the most talented young lecturers, stimulating the investment in the human capital and efficient positioning of lecturers in general.

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