

Distributed Educational Systems and their Social Efficiency

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Abstract

In this study we investigate the principal factors of influence of distributed regional institutions (like universities) on the social life.

As the primary example in more details we discussed the model of such influence based on Bellman model for labor market.

Keywords: Educational distributed systems, social capital.

1. Introduction

For maintenance of the accelerated development and increase of efficiency of economy, for perfection of social structure of regions each country needs the qualified experts. At the moment education becomes all more focused on individual interests and requirements of the separate individual, and that is especially important, interests and inquiries of business. Thus, the formation of the regionally focused educational establishments is topical [1,2].

Changes in an education system have led to gradual introduction in educational process so-called campus technologies, assuming development of a network of student's and academic cities, to development of the distributed educational institutions. The distributed educational institutions use new educational technologies, such as training with use the Internet, optical networks, systems of videoconferences, etc. The distributed university is a type of multilevel system consisting from scientifically-administrative kernels and networks of the educational centres united by flexible system of delivery of the educational resources. Management of such higher schools is based on use of network technologies, network communications and relations, and educational activity is focused on individual interests and requirements of the separate individual, and that is especially important.

This phenomenon was known at business level years ago. The distributed universities actually represent one of forms of the organizations – the network companies. In the modern world in quickly changing environment such organizations are capable to use optimum knowledge and also internal and external relations which the company has [3]. Scales of growth of the network organizations, mass distribution and use of Internet technologies allows speaking about a world scale of network economy. In comparison with classical type of hierarchically built bureaucracy these network structures unite two

key distinctive features: fusion borders of the organization and a support on informal relations of trust. Thus expenses for overcoming of spaces it is compensated by expenses for connection to network resources and the organization of effective access to them. The support on informal relations of trust assumes the optimum organization of process of maintenance.

Transition to a competition on the basis of the intellectual capital and formation of economy of knowledge creation of such relations between employees who would stimulate them to an exchange of knowledge and experience with each other have demanded, and also formed requirement to share them with the organization as a whole. All above becomes competitive advantage and with the minimum costs to mobilize expert resources under a specific target.

Such possibilities cannot be got for money and in short terms – their creation demands not information purchase, and formation of relations of trust inside and out of the company [4].

Thus, studying of the social aspect in network universities is connected as with mechanisms of successful realization of projects of modernization of centralized educational system (federal one in Russia). The social capital is a resource in which other resources in expectation of the future profits on investments can be invested. Just as investments of the capital into industrial sphere are capable to make profit, and investment in the human capital is capable to increase the price of labor, the expenses necessary for creation of social communications, are productive. These expenses allow using possibilities of a social network for the decision of problems which could not be solved in another way or their decision would be less effective.

The traditional view of human capital ties schooling to labor productivity. However, in recent years, researches have paid attention to the role of schooling for developing social behavior: education imparts academic knowledge and promotes cognitive abilities; schooling helps develop students' personality traits and social skill. But up to now these aspects are regarded as exogenous and are not related with investment decisions.

Let us assume that individuals have a fixed amount of time to devote to acquiring each type of capital [5, 6]. In this manner, individuals' *total* human capital investment is fixed. While higher levels of social capital allow individuals better access to jobs, they will earn lower wages since their level of productivity will be lower. Because individuals do not take into account that their social investments improve the flow of information in the labor market, equilibrium social capital accumulation is inefficiently low. As a result, individuals over-invest in cognitive skills. In turn, the economy's unemployment rate is inefficiently high.

2. Main Research Hypotheses

For modeling purposes let us consider a discrete-time framework in which the economy is represented by a continuum of identical infinitely-lived individuals. Individuals are endowed with one unit of time in the initial period (time $t = 0$) which they devote to education. Schooling not only imparts academic knowledge to students but also helps develop their social skills. In this regard, we as in [5] construct a model with two types of human capital: knowledge capital (k) and social capital (s). In particular, knowledge capital refers to the traditional form of human capital that improves an individual's productivity on-the-job. In contrast, social capital refers to behavioral traits that enhance an individual's interactions with other workers. We postulate that social interactions can lead to the formation of sustained social relationships. These connections may occur in a number of ways. For instance, one may have a higher degree of interaction with neighbors than distant relatives. Others may simply have more social contacts through friendships and civic organizations. In particular, let N denote the total size of an economy's social network. Once individuals have completed their schooling, a fraction (N) of them gain access to the social network. As in [6], agents, who belong to a social group, are assumed to have better connections than others. Let us choose to endogenous the total number of social connections through explicit investment decisions of individuals. In particular, we [] consider that an individual's probability of becoming connected, N_i , is determined through the following social membership function:

$$N_i = n_0 s_i^\sigma \bar{S}_{\neq i}^{-\sigma} < 1, \quad (1)$$

where n_0 is exogenous potential for social relationship; s_i individual i personal investment; $\bar{S}_{\neq i}$ - average level among other individuals.

As specified by equation (1), an individual's social investment has two different effects. First, increased investment in social activities increases the likelihood of joining the economy's social network. However, it also affects the likelihood that others form social relationships. This positive external effect results from interactions among people. For instance, if an individual increases his investment and becomes more cooperative, other people will also be more likely to gain social contacts. As a result, an increase in an individual's social investment not only improves his connections to others, but also affects overall connections in the economy.

Thus, the behavior of the person depends not only on its own educational level, but also from an educational level of people surrounding it. Hence, its decisions concerning participation or nonparticipation in public life or labor market it is in many respects defined by education of people of its social circle. With a view of empiric marks of influence of education on social activity authors [6] have entered division of educational variables on relative and absolute levels. The first indicator reflects the education average level in a social environment of the individual, the second – its own educational level. Also effects from education accordingly differ. The relative effect is observed, when positive results from growth of individual level are compensated by growth of the average level of education on sample. The absolute effect depends only from own educational level of the individual also does not depend on the education average level in its social environment. The cumulative effect (cumulative effect) is observed in that case when positive influence of environment is supplemented with activity of the individual.

3. Bellman Modelling Approach

So, we have determined that individuals' social investments will lead to one of two possible outcomes — they will either be a member of the economy's social network or not. In addition, individuals will either be employed or unemployed in any period thereafter. Each state is associated with a different level of expected lifetime utility because individuals' expected income will vary depending on both their employment status and their social contacts. Therefore, let V_i^j denote the expected lifetime utility for an individual with superscript $j \in \{0,1\}$ denoting whether an individual is connected (1) or unconnected (0) and subscript $i \in \{E, U\}$ denoting whether an individual is currently employed (E) or unemployed (U).

3.1. Employed Case

Let us suppose [7] that the values of all variables are assumed to be constant over time. Since β denotes the rate of time preference, the Bellman equations for employed workers are:

$$V_E^j = Ak + \beta \left[\delta V_U^j + (1 - \delta) V_E^j \right], j \in \{0,1\}. \quad (2)$$

This equation implies that the expected lifetime utility for an employed worker is the sum of temporary earnings and discounted expected future utility. In turn, expected future utility depends on the likelihood of remaining employed. Notably, connected workers obtain higher expected lifetime utility since they will experience shorter unemployment period.

3.2. Unemployed Case

There are two types of unemployed workers: connected and unconnected workers. As we have emphasized, connected workers have better job prospects in terms of learning information about job vacancies. If λ^j represents the probability that a worker will find a job opening, the Bellman equations for unemployed workers in each state are:

$$V_U^j = \beta [\lambda^j V_E^j + (1 - \lambda^j) V_U^j], j \in \{0,1\} \quad (3)$$

Equation (3) implies that individuals do not earn any income if unemployed. That is, expected lifetime utility depends on the discounted expected value of finding employment in the future.

4. Conclusions

The traditional view of human capital ties schooling to labor productivity. However, in recent years, researchers have paid increasing attention to the role of schooling in developing social behavior. In light of these concerns, this paper examines the determination of investments in traditional human capital along with behavioral skills. In contrast to previous research, we study the acquisition of both types of skills in the presence of equilibrium unemployment, when transactions costs in the labor market are endogenous.

We refer to the traditional form of human capital as knowledge capital - these are skills that improve an individual's productivity on the job. In contrast, individuals also make investments in their social capital which enhances their connections to other workers and alleviates problems from incomplete information about opportunities for employment. In turn, the aggregate degree of social interaction affects the extent of unemployment. We assumed that individuals have a fixed amount of time to devote to acquiring each type of capital. Due to the fixed time endowment, *total* human capital investment is fixed. While higher levels of social capital allow individuals better access to jobs, they will earn lower wages since their productivity will be lower. Since individuals do not take into account that their social investments improve the flow of information in the labor market, equilibrium social capital accumulation is inefficiently low. As a result, people over-invest in cognitive skills. We have recognized that human capital investment involves resources other than time. For example, schooling is costly in terms of direct pecuniary costs as well as indirect scholastic effort. On the other hand, investment in social capital is also likely to be costly.

We have found that investments in job skills and social capital are positively related. Nevertheless, social capital remains inefficiently low. Moreover, the accumulation of cognitive skills is also too low. As a result, transactions costs in the labor market are further exaggerated, contributing to an excessively high unemployment rate.

Usually researchers note that the concept of social capital has been important for explaining a wide set of economic activities: the determinants of labor earnings, the design of institutions and performance, the development of financial markets and economic growth and development. In order to better understand how social capital affects economic activity, it is important to take a deep look at the formation of social capital. In this regard we have made this research that examines the accumulation of social capital and its impact on macroeconomic outcomes.

The primary aim was to investigate the determination of investments in traditional human capital along with behavioral skills in the presence of equilibrium unemployment. Following the traditional view of human capital, investment in job skills raises an agent's labor productivity and earnings. In contrast, behavioral investments such as learning social norms and participating in social activities may not be inherently productive. In this manner, transactions costs in the labor market are endogenous. The results indicate that when total human capital investment is fixed, a representative individual, in comparison with a benevolent social planner, under-invests in social capital. This occurs because individuals do not take into account that their social investments improve the flow of information in the labor market. Consequently, equilibrium unemployment is inefficiently high. Interestingly, when total human capital investment is endogenous, then there is a positive relationship between investments in job skills and social relationships. This result is intuitive. As an increase in social capital enhances an individual's likelihood of being employed, this also leads to more incentives to invest in labor productivity.

More importantly, we can indicate that social capital should play a significant role in the design of labor market policy. Policymakers should recognize that the availability of unemployment benefits can lead to a significant psychological effect. To be specific, the provision of unemployment benefits

lowers the costs of being unemployed. Therefore, individuals decrease their investments for the labor market.

We can assume that educational systems can affect human capital investment and the formation of social capital.

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