

Reproductive Efficiency of Education Spending and the Need to Formulate New Principles of Financing

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Abstract: Contradictions of modern public financing of educational system cause special attention to new organizational economic and integration forms of financing of this branch. Relevance of integration of financial resources of the population, corporations and the state grows in this context. The research objective consists in the general assessment of efficiency of public financing of education from positions of impact on dynamics of key indicators of economic development. The received results show that in domestic economy uncertainty of opportunities of rendering influence by the level of the public expenditures on education as a percentage to GDP on the level of an internal gross product takes place. In general, direct public financing of education systems doesn't give an unambiguous picture of the corresponding increase of efficiency of economic development. This situation shows need of formation of the new system of a financing of education integrating all participants of process presented in reproduction structures.

Key words: Education, expenses for education, financing of education, availability of education, economic relations

INTRODUCTION

Among the many factors that change the content of education, most often stand out: the increasing globalization causes the changing role of the state (Mukimbekov, 2011; Salmina, 2012; Omarova, 2009); the increasing importance of knowledge in economic and cultural development as expressed in the development of the concept of the economy knowledge (Akinin, 2006); the accelerated development of information and communication technologies in knowledge translation and teaching methods (Tatuev, 2012); the expansion of the global labor market, the emergence of new requirements for personal qualities and professional skills of experts (Yermolov, 2011). Taken together, these changes have a significant effect on the reproduction processes knowledge become the basis of modern production.

At the same time, education in the era of the economy knowledge is a rather specific sphere, determining the nature of the relations arising between subjects both in itself and in collaboration with other sectors of society. This education can act in the form of the process and its results in the form that mediates the essence of subject-subject relations in this sphere. Meanwhile, the nature of relations in education in modern conditions also transformed because the main purpose of education is not the creation of the final product consumption and the formation of productive resource-human capital, capable of intellectual work. Therefore, the formation of new economic relations in the

sphere of education is a catalyst of transformation of reproductive relations, including financial in the society (Gishkayeva, 2013; Kapelyushnikov, 2006).

The need to form new economic relations to some extent confirmed by the controversial performance efficiency of public finances allocated to the development of education.

MATERIALS AND METHODS

The research objective consists in the general assessment of efficiency of public financing of education from positions of impact on dynamics of key indicators of economic development.

RESULTS AND DISCUSSION

Table 1 presents data on the share of public expenditure on education in GDP and GDP per capita in Russia and some developed countries. On the basis of these data we can calculate the size of public funding for education per capita GDP. This will allow a comparison of countries represented by the size of public expenditure on education accounted for the final consumer. And compare the obtained data and to identify the extent of their impact on the various socio-economic indicators such as unemployment.

Thus, Table 1 shows that the highest level of public funding for education per capita in Norway 3.7 thousand USD PPP US per person. It is followed by Denmark 3

thousand USD PPP US per person. One of the lowest costs in Russia and Mexico 0.8 thousand USD PPP which is 4.6 times less than in Norway.

Figure 1 shows a scatter diagram showing the relationship between the level of unemployment among the population and the level of public funding for education per capita. An analysis of the chart suggests the impossibility of establishing the existence of a visual of any connection between the values represented by indicators. Therefore, there is a need for more detailed study of the relationship.

Table 1: Calculation of public expenditure on education in GDP per capita in Russia and some countries of the world*

Countries	The share of public spending on education in GDP (%)	GDP per capita, thous. USD US	Government spending on education per capita, thous. USD US
Australia	4.5	38.8	1.7
Austria	5.7	39.8	2.3
Belgium	6.4	36.9	2.4
United Kingdom	5.3	36.8	2.0
Hungary	4.8	20.7	1.0
Germany	4.5	37.2	1.7
Denmark	7.5	39.5	3.0
Israel	5.8	25.7	1.5
Ireland	6.0	42.6	2.6
Iceland	7.3	39.0	2.8
Spain	4.9	33.2	1.6
Italy	4.5	33.3	1.5
Canada	4.8	38.9	1.9
Mexico	5.0	15.3	0.8
Netherlands	5.3	42.9	2.3
New Zealand	6.1	29.0	1.8
Norway	6.1	60.6	3.7
Poland	5.0	18.1	0.9
Portugal	5.5	25.0	1.4
The Republic of Korea	4.9	26.9	1.3
Russia	4.0	20.4	0.8
Slovakia	4.1	23.2	1.0
Slovenia	5.3	29.2	1.5
USA	5.3	46.9	2.5
Finland	6.3	37.8	2.4
France	5.8	34.2	2.0
Czech Republic	4.2	25.8	1.1
Switzerland	5.5	45.9	2.5
Sweden	6.6	39.3	2.6
Estonia	5.9	21.8	1.3
Japan	3.6	33.9	1.2

*Table is designed and compiled by the researcher on the basis of: indicators of education: 2013: statistical publication. Moscow: national research university "higher school of economics", 2013. International statistics//official site of the Federal Service of State Statistics. URL: http://www.gks.ru/bgd/regl/b11_13/IssWWW.exe/Stg/d6/26-22.htm

Correlation and regression analysis: Visual assessment of the distribution of data in the scatterplot leads to the conclusion about the absence of pronounced anomalous points. Therefore, further analysis can be carried out on the basis of the initial general population.

To do this, you can use the table editor MS Excel. Include in the table editor of MS Excel data on the level of unemployment among the population and the level of public spending on education per capita. Based on these data we construct a scatterplot reflecting plane link between unemployment rates and government spending. Then add plane scatterplot graph of the regression function, a function equation ($y = f(x)$) and the degree of reliability the coefficient approximation (R^2) analogue determination coefficient (R^2). Then manually organize overkill typical forms of communication regression (exponential, logarithmic, exponential and polynomial) proposed in MS Excel. And focusing on the value of the coefficient of reliability degree of approximation (R^2) opt for a form that gives the greatest value of R^2 (Table 2).

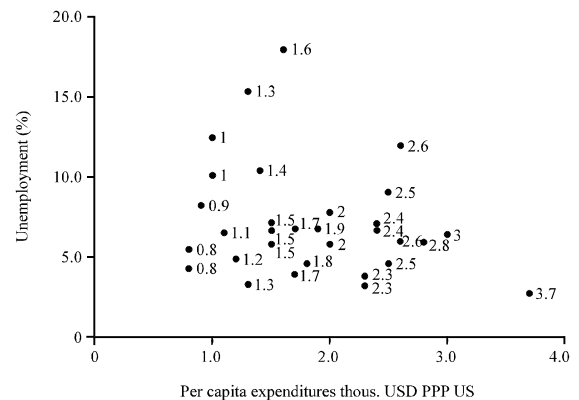


Fig. 1: The relationship between the level of unemployment among the population and the level of public spending on education per capita (chart compiled by the researcher on the basis of: indicators of education: 2013: statistical publication. Moscow: national research university "higher school of economics", 2013. S.261-262; Table 1)

Table 2: Forms of the regression coefficients due to the reliability of the approximation and regression equations for these functions in Fig. 1*

The form of the regression equation	Regression function	Due degree of reliability of approximation
Exponential	$y = 8.9e^{0.2x}$	$R^2 = 0.1$
Linear	$y = -1.2x + 9.4$	$R^2 = 0.1$
Logarithmic	$y = -1.8\ln(x) + 8.1$	$R^2 = 0.0$
Polynomial degree 2	$y = -0.7x^2 + 1.6x + 6.9$	$R^2 = 0.1$
Polynomial degree 3	$y = 0.2x^3 - 1.7x^2 + 3.6x + 5.8$	$R^2 = 0.1$
Polynomial degree 4	$y = -2.8x^4 + 24.4x^3 - 74.8x^2 + 93.4x - 31.8$	$R^2 = 0.1$
Polynomial degree 5	$y = 2.1x^5 - 25.5x^4 + 116.6x^3 - 250.8x^2 + 250.7x - 84.0$	$R^2 = 0.2$
Polynomial degree 6	$y = 0.6x^6 - 5.9x^5 + 15.0x^4 + 13.1x^3 - 109.9x^2 + 153.8x - 57.8$	$R^2 = 0.2$
Degrees	$y = 7.4x^{0.3}$	$R^2 = 0.1$

*Table is designed and compiled by the author based on the data: Fig. 1

Table 2 shows that the highest degree of reliability coefficient approximation (R^2) is equal to 0.2 units and determines polynomial form of communication of 5 and 6 degrees. In the absence of a fundamental difference in the degree of reliability, preference should be given a simpler form of communication which is a polynomial of 5 degree. However, even this sophisticated form of communication does not allow a sufficient degree of accuracy to describe the dependence of the distribution of the data presented in the graph in Fig. 1 ($R^2 = 0.2$). In turn, this is evidence of the inability to establish a statistically significant and easily interpretable relationship between the unemployment rate among the population and the level of public spending on education per capita in the analyzed countries (Table 1).

Also, in this vein, the interest presents analysis of the relationship between the level of unemployment among the population with higher education and the level of public spending on education per capita. Figure 2 shows a scatter diagram illustrating the plane relationship between these indicators. Visual assessment of the data also reveals a clear link. So, we spend a deeper study is analogous to the above (Fig. 1).

Selection of various forms of regression due to the data shown in Fig. 2, revealed the highest degree of reliability coefficient approximation (R^2) equal to 0.2 units for a polynomial of degree 6 forms of communication. However, even this sophisticated form of communication does not allow a sufficient degree of accuracy to describe the dependence of the distribution of the data presented

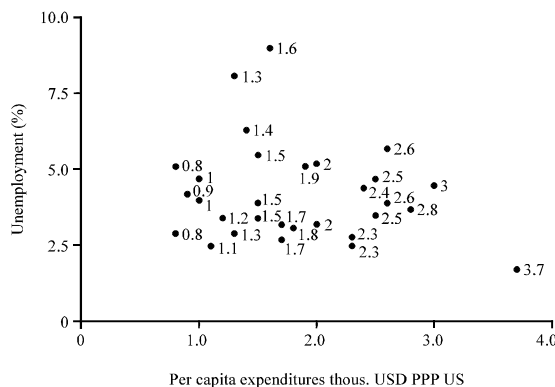


Fig. 2: Relationship between the level of unemployment among the population with higher education and the level of public spending on education per capita (chart compiled by the researcher on the basis of: indicators of education: 2013: statistical publication. Moscow: national research university "higher school of economics", 2013. S.261-262; Table 1)

in Fig. 2 ($R^2 = 0.2$). In turn, it also demonstrates the impossibility of establishing a statistically significant and easily interpretable relationship between the unemployment rate among the population with higher education and the level of public spending on education per capita in the analyzed countries (Table 1).

Thus, it appears that the size of the public funding for education is almost no effect on the unemployment rate of the population. And this is true both for the overall unemployment rate and unemployment rate for people with higher levels of education. Consequently, unemployment in the modern knowledge society is still defined by a different kind of factors including and the state of the economy. In turn, the state of the economy, level of development, according to the theory of the knowledge society should be determined by the level of education of the population. The level of education of the population as shown above is largely determined by the level of public funding.

Consequently, the level of public expenditure on education should have an impact on the level of economic development. Check below this hypothesis based on the analysis of empirical data.

Compare indicators of public funding for education with indicators of the level of economic development. Figure 3 shows a scatter diagram showing the relationship

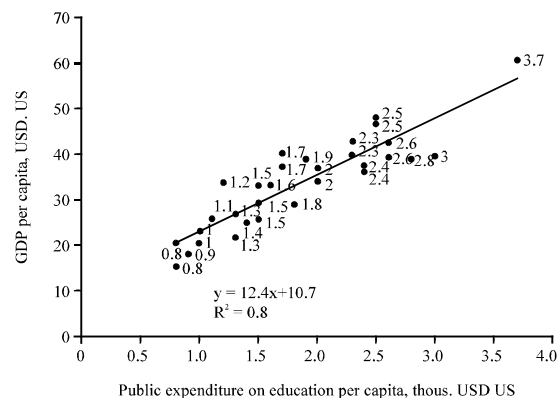


Fig. 3: Relationship between the level of public spending on education per capita and the level of gross domestic product in PPP per capita in Russia and some countries of the world (figure calculated and compiled by the author on the basis of: Indicators of Education: 2013: statistical publication. Moscow: national research university "higher school of economics", 2013. International statistics//official site of the Federal Service of State Statistics. URL: http://www.gks.ru/bgd/regl/b11_13/IssWWW.exe/Stg/d6/26-22.htm)

between the level of public spending on education per capita and the level of gross domestic product in PPP per capita in Russia and some countries of the world. Visual assessment of the data reveals a direct link. We quantify this specification due correlation and regression analysis by means of table editor MS Excel.

Include in the table editor of MS Excel data on the level of public spending on education per capita and the level of gross domestic product in PPP per capita. Based on these data we construct a scatterplot reflecting plane connection between the performance of public spending and the economy. Then, add plane scatterplot graph of the regression function, a function equation ($y = f(x)$) and the degree of reliability the coefficient approximation (R^2) analogue determination coefficient (R^2). Then, manually organize overkill typical forms of communication regression (exponential, logarithmic, exponential and polynomial) proposed in MS Excel.

And focusing on the value of the coefficient of reliability degree of approximation (R^2) opts for a form that gives the greatest value of R^2 .

The highest degree of reliability coefficient approximation (R^2) is 0.9 units and determined polynomial form of communication 3 and higher degrees. The value of the coefficient of the degree of reliability of approximation (R^2) of linear forms of communication is 0.8 units. Therefore, in the absence of a fundamental difference in the degree of reliability, preference should be given to a simpler form of communication linear. As a result, we find that the relationship between the level of public spending on education per capita and the level of gross domestic product in PPP per capita is direct and linear which is a fairly high degree of accuracy determined by equation:

$$y = 12.4x + 10.7$$

Those with an increase in public expenditure on education in 80% of cases there is an increase in GDP per capita of 12.4 thousand USD PPP US.

In this connection, it is necessary to consider other options by which you can determine the degree of the impact of public expenditure on education in economic development. Consider the relationship between the level of public expenditure on education as % of GDP and the level of gross domestic product in PPP per capita. In this case, the impact of indicators of public spending on the level of economic development is more logical than otherwise.

Figure 4 shows a scatter diagram showing the relationship between the level of public expenditure on education as % of GDP and the level of gross domestic product in PPP per capita in Russia and some countries of the world. Visual assessment of the data suggests the existence of a direct link. To quantify this specification

due correlation and regression analysis by means of table editor MS Excel, similar to the way it was done before.

Selection of various forms of regression due to the data shown in the diagram in Fig. 4, revealed the highest degree of reliability coefficient approximation (R^2) equal to 0.2 units for linear and polynomial forms of communication 3 and higher degrees. In the absence of a fundamental difference in the degree of reliability, preference should be given a simpler form of communication-linear. As a result, we find that the relationship between the level of public expenditure on education as % of GDP and the level of gross domestic product in PPP per capita in Russia and some countries of the world can be described as direct and linear. Here with this relationship can be defined by the equation:

$$y = 4.0x + 11.8$$

However, the statistical significance of the connection is low. Since, the coefficient of the degree of reliability of approximation (R^2) analogue of the coefficient of determination (R^2) is only 0.2 units. The coefficient of linear correlation (as calculated by means of the table editor MS Excel), respectively is 0.4 units, also slightly to establish a reliable connection between the values of these parameters. Therefore, taking into account the low level of statistical significance obtained communication; we can talk only about the uncertain possibility of influencing the level of public expenditure on education as % of GDP to the level of gross domestic product in PPP per capita.

In general, direct public funding of education systems doesn't give a clear picture of the corresponding increase of efficiency of economic development. In our opinion, this situation suggests that we need a new system of financing education, integrating all stakeholders represented in the reproductive structures.

Nowadays economic relations in the field of education form the market and nonmarket mechanisms of interaction of subjects of educational process. The effective operation of the market mechanism becomes possible only when in the framework of economic relations served by the market mechanism, the external effect is eliminated. Those we are talking about the possibility of exclusion for those not involved in these relations benefit. If the magnitudes of the external effects are small and the range of interacting entities is limited, the spillover effects of education can be brought under control directly involved in economic relations. However, the economic essence of education is good, reflected in the fact that the scope of its external effects are so large and the number of interacting with these effects people so much that the side effects cannot be brought under control, including and the state while the state fulfills its

essential function. There are the magnitudes of the external effects generated in education which explain the failure of market mechanisms.

These provisions indicate that formed to date system of economic relations in the education sector cannot be attributed to the action of purely market or non-market mechanisms. Thus, itself the sphere of education is a kind of economic space where the system of economic relations is regulated quasi-market and financial mechanisms with the direct involvement of the provision and use of the educational benefits of the various actors in society.

Against this background, in recent years more and more acute becomes the problem of state responsibility for education. Now there is a weakening of the role of government and the role of international organizations the United Nations, the organization for international trade, the world bank, the international monetary fund and others. In this regard, many experts expressed the view on the need to reduce public funding of education. The scientific literature is common statement about the transition has traditionally state of education in the direction of the non-state sector of the economy. However, the statistics do not confirm this trend. Most countries are still dominated by state funding of education (Baykin, 2011).

Increasing the mass of Russian higher education is due to the difficulties experienced by the state in the financing of higher education. According to surveys, 45% of the population believes that the state badly copes with its responsibilities in the field of education. In this regard, an important question about the prospects of combining public and private funding of education as it happens for example in the United States, Australia, Korea and the Philippines. However, the use of a wide model of co-financing of education by the state and private investors still is the exception rather than the rule for developed countries.

In most cases the public, i.e., government spending on higher education is much higher than private. This fact corresponds to the accepted 19 September 2003 Berlin communique of the Conference of Ministers of Higher Education in which higher education is declared a public good and the responsibility for it rests with the state structures (Zatepyakin, 2008).

Meanwhile, today the problem of paid education, especially in countries widely practicing private financing has become more relevant than ever. Thus, in recent years the cost of higher education, in some cases is not just high and uneconomical. Examples of such situations can be found in any country but the most obvious problems of the relationship of the labor market and education, despite the strong economy with the United States. Due to the fact that a growing number of diplomas do not

justify invested in them heavily, many graduates of the US doubt the feasibility of processing the loan for education. According to a study Pew Research Centre, the income of young people with higher education aged 25-32 years, an average of \$17 500 per year exceeds the income of their peers with only a diploma from the high school. However, this difference covers the cost of a four-year full-time study at a prestigious university (about 60 thousand USD).

The average student loan debt of graduates with a bachelor's degree in 2012, averaged 30 thousand USD which largely prevents, for example, buying a future home, their own businesses, etc. According to the non-profit organization the project on student debt, 15% of borrowers declare bankruptcy in the first three years after the start of repayment.

So, despite record low interest rates to buy housing, mortgages in the United States is not available to many citizens because of accumulated debts on loans for education. Many Americans aged 40 years still cannot be taken to pay off the debt to the banks. According to the latest data obtained from the Federal Reserve Bank of New York, at this age group accounts for more than half of the student loans. Compounding the problem of bubble volume of >150 billion USD, results in the market of student loans and higher interest rates for certain existing loans (over 12%). Unlike mortgages, student loans almost did not provide the possibility of refinancing of debt at lower rates. According to the Bureau of Consumer Financial Protection (CFPB), since 2007 private and federal student debt has doubled and by 2012 had already exceeded one trillion USD. The main reason for this dramatic change is the absence of many parents to pay for their children's education as a result of the crisis in 2008. According to the Federal Reserve Bank of New York, almost the third of student borrowers have overdue payments.

According to the Federal Reserve Bank of New York, about 37 million people have the public and private student loans. However, about half of the loans granted are in deferment which allows the borrower does not pay a fee for them during their studies at university or in the case of unemployment.

However, in many cases, during this period there is an increase of the debt due to the addition of interest to the principal amount of the loan.

In Russia, spending on education is low and does not meet the requirements of the community of developed countries. However, the lack of funding in Russia the number of specialists with higher education is at the level of many developed countries of the world both in absolute terms and in relation to the entire population which often has a detrimental effect on the quality of the education.

Many researchers have expressed concern that the process of implementation in the education sector commercial components will be new barriers within society. If the education system is not subject to full reform is to secure a high social status and higher wages can only citizens who have the money to education. At the same time those people who have no possibility of getting paid to provide education will not be able to provide it in the future and their children because of the impossibility to find a paying job (Shevchenko and Gavrilov, 2005).

Economic accessibility of higher education for families is expressed in two forms: the availability of training on a contract basis and the ability to use a variety of ways to prepare to enter. The total sample for the 49% of households paid education is not available at all, 42% admit training on a commercial basis but mainly in public schools. The high proportion of parents who want to give the child the opportunity to get an education on a fee basis is characteristic not only regional but also for the regional centers (38%) and villages (33%). Funding for children's education in high schools and residents of the district centers of villages produce as a rule, not by current income (most of these families belong to low-income groups) and by the sale of products of subsistence farming.

The lowest possible payment of education among single-parent families (only 27% of those willing to pay for training) are in the families where at least one spouse has already retired (31%) as well as the families of workers (37%). It should be noted that the willingness to pay education does not depend on the number of children in the family and lack of work (official) one of the spouses. The lowest possible payment of education among single-parent families (only 27% of those willing to pay for training) are in the families where at least one spouse has already retired (31%) as well as the families of workers (37%). It should be noted that the willingness to pay education does not depend on the number of children in the family and lack of work (official) one of the spouses.

Attitude to paid education in modern conditions of the education system is in two ways. For 30% of payment for parental education increases its availability but 70% of it, on the contrary, makes education inaccessible. Proponents of the view that paid education increases its availability is in every social group. On average, the opportunity to go to college on a contractual basis is a 6 out of 16 places of importance for admission (at the level of school places are training, the opportunity to pass on honest competition, personal talents and abilities of applicants for admission privileges). However, for family business managers and owners of large businesses as well as in families with an average per

capita income paid training is placed on the second-immediately after the level of schooling (Altbakh, 2011).

According to the majority of graduates, school training does not provide a level of knowledge sufficient for admission to where they are planning. The 67% of them use additional forms of training for entrance exams. This is the most common form is a full-time preparatory courses at universities they are visited by 59% of graduates engaged in further, 42% choose tutoring, 38% extracurricular activities at school.

Regarding parental ratings affordability of certain forms of training, it is affordable for most are only extracurricular activities at school. However, 10% of households cannot afford to take advantage of even this form of training. Follow the available forms of training individual training with school teachers can afford every third family. Services also tutors are not able to pay 38% of families and full-time employment on the course 25%. However, they still are the most common forms of training which is determined by the opinion of 66% of parents that only a university degree is an acceptable level for the education of their children/grandchildren (Sukhochev, 2011).

Indicators of economic accessibility of education advocates share the costs of training in the structure of the family budget. Only 18% of families do not spend additional training while 19% of households, these costs make up a small part of total costs. For half of the families preparation for the entering students is of great financial stress with 13% of them borrow money or sell any of the valuables. The share of spending on education highlights the villagers. Most of them during the school year for additional training or do not spend anything or spend a small part of the family budget. However, the money deposited for a period of entrance examinations for the payment of short-term training courses, transport and accommodation in the city as well as to bribe members of the selection committee. The issue of payment of training confirms the problem groups which have been identified earlier: single-parent families, families of pensioners and the unemployed.

In these social groups is particularly high proportion of families who are forced to borrow money to pay for training.

Thus, it becomes evident that the system-industry today faces the challenge of providing access to education for the general population. In addition, the enhanced role of the functional motifs of education, considered primarily as analysis of the conditions, means and ways of solving the problem with setting goals and defining a plan of action (Gorodetskaya and Kuzminsky, 2013). Here are the factors of traditionally intellectual level and the benchmark of success (Shokina, 2011).

In this context, it should be emphasized that the modernization of the education system objectively involves the transformation of a large part of the existing socio-economic relations. Organizational and technological feasibility of immediate priority motivational factors in the formation of new economic relations opens at the present stage of administrative reform in which the Federal Law of July 27, 2010 No. 210-FZ "on the organization of public and municipal services," providing issuance of universal electronic cards of citizens.

This card will be a material carrier, comprising administering to a digital information about the user and his or her rights to state and municipal services. Accordingly, users of the universal electronic card may be citizens of the Russian Federation as well as foreign citizens and stateless persons in cases when it is stipulated by federal laws.

Universal electronic card will be a meaningful document certifying the identity of a citizen, the right of the insured person in the insurance system and other rights of a citizen to receive state and municipal services, including education. Thus, the users of universal electronic cards are directly involved in the budgetary and regulatory relations. In this case, it is important to develop principles to using universal electronic cards to organize the disposal of budget funds and extra-budgetary funds at different administrative levels and guide them to pay for educational services, including the addition of own funds of citizens and the financial resources of corporations.

On this basis, a new structure of economic relations connected with the provision of educational services. This new relationship will significantly increase the revenues of the education system and create a more equal access to quality higher education representatives from all segments of the population. In this context further develop the growth of the personal motives of the cost of acquisition of knowledge, defines the basic specifics of the relevant control systems and the trajectory of development of economic relations in the education system.

CONCLUSION

It is offered to create new structure of the economic relations connected with providing educational services and to develop the principles allowing to organize by means of universal electronic cards the order means of budgets and off-budget funds at various administrative levels and to direct them on payment of educational services, including with addition of own means of citizens and financial resources of corporations.

These new relations will allow to increase significantly the income of an education system and to

create more equal conditions of access to quality higher education of representatives of all segments of the population. In this context further develop the explanation of growth of the personal cost of obtaining knowledge which determines the basic specificity of the respective control systems and the trajectory of development of economic relations in the education system.

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