Introducing Vouchers and Standardized Tests for Higher Education in Russia: Expectations and Measurements

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The reform of higher education in Russia, based on standardized tests and educational vouchers, was intended to reduce inequalities in access to higher education. The initiative with the vouchers has failed and by now is already forgotten while the national test is planned to be introduced nationwide in 2009. The national test called to replace the present corrupt system of entry examinations has experienced numerous problems so far and will likely have even more problems in the future. This paper analyses the reform and suggests a methodology of measuring effects of the reform on access to higher education.

Key words: higher education, inequalities, reform, standardized test, voucher, Russia

Introduction

Russian education is strong and has a proud tradition. All school-age children have access to school places and 98.9 percent of adults are literate. In 1992 a large part of the education sector was decentralized to the regional level. Most regions benefit from the federal transfers. These transfers, however, has fallen both in relative terms and relative to what the regions themselves spend. Fluctuating between 3.4 and 4.5 percent of GDP, public expenditure on education has fallen during the 1990s. It fells at a rate of 6 percent per year (World Bank, 2001).

The decentralization process coincided with growing regional economic inequality and inequality in access to education. Inequality in access to higher education is considered as one of the major components of social inequalities in the society. The decrease in this type of inequality is expected to be of primary importance for successful economic transformation and future sustainable development.

The Commission for Economic Reform requested the Ministry of Education of the Russian Federation to prepare proposals to increase efficiency and to reduce unit costs in education while improving relevance to the needs of transforming economy. Reform of education financing, including new systems to make fiscal flows to schools and higher education more transparent and the use of the funds more efficient, was an objective. The Development Strategy of the Russian Federation Until 2010 emphasizes the recovery of social capital as a major goal of the reform.

There are two projects implemented by the Government of the Russian Federation: “The General State Examination,” and “The Reform of Financing of Higher Education through the Implementation of the State Personified Financial Obligations.” This paper presents the general

concept, expected results, and suggestions for evaluation and measurements of possible effects of the projects on the existing inequalities in access to higher education.

Current situation in higher education in Russia

Higher education in Russia is under pressure because of the reduction in federal funding and the need to modernize curricular content and teaching methods in higher education institutions. Important indications of efforts to adjust to the changing needs of people for education and the needs of businesses for human resources are changes in distribution of admissions and graduations by areas of specialization, an increase in the number of new private colleges that provide training in the most wanted areas, and changes in the standards and content of educational programs. The system responded to the reduced federal funding by increasing extra-budgetary and local budget sources. The higher education sector continues to suffer from a lack of clearly defined responsibilities between the governing agencies together with an incomplete legal framework and a lack of transparency in the allocation and use of public funding. The developing commercialization and widespread corruption on all levels of the governing structure and higher education institutions are also a matter of public concern.

Federal funding for higher education continues to decrease. In addition to the programs where students study for free and receive stipends, all public universities have programs financed by the tuition students pay. All private universities are for-profit. There are no traditions or practices of donations and charitable giving to higher education institutions. There are no scholarships for students as well. The system of governmental or public and commercial or private educational loans is not in place. Absence of public and private educational loans causes additional difficulties in access to higher education, especially for the poor. The government is

now discussing possible development of a system of educational loans. 54 percent of students pay for their education, while 46 percent are paid by the federal government and the local administrations. By law the government funds the education of students according to the rate of 170 students per 10000 of population. In fact, it pays for 190 per 10000, i.e. even more than is required by the law. Free compulsory secondary education of a high quality creates opportunities for individuals. During the period from 1989 to 2000, the share of people with higher education degrees participating in the labor force increased almost twice and reached 25 percent (Sandgren, 2002; Ministry of Education and Science of the Russian Federation, 2007). The dynamics of the number of students in higher education institutions per 10000 population in the Russian Federation in 1980-1999 are presented in Table 1 and Figure 1.

TABLE 1

Number of students in higher education institutions per 10000 population in the Russian Federation, 1980-1999

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Russia	219	219	218	216	213	206	200	194	190	193
Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Russia	190	186	177	171	171	188	201	221	245	280

Source: Commonwealth of Independent States (CIS) - Official Statistics, retrieved from the database in August 8, 2006.

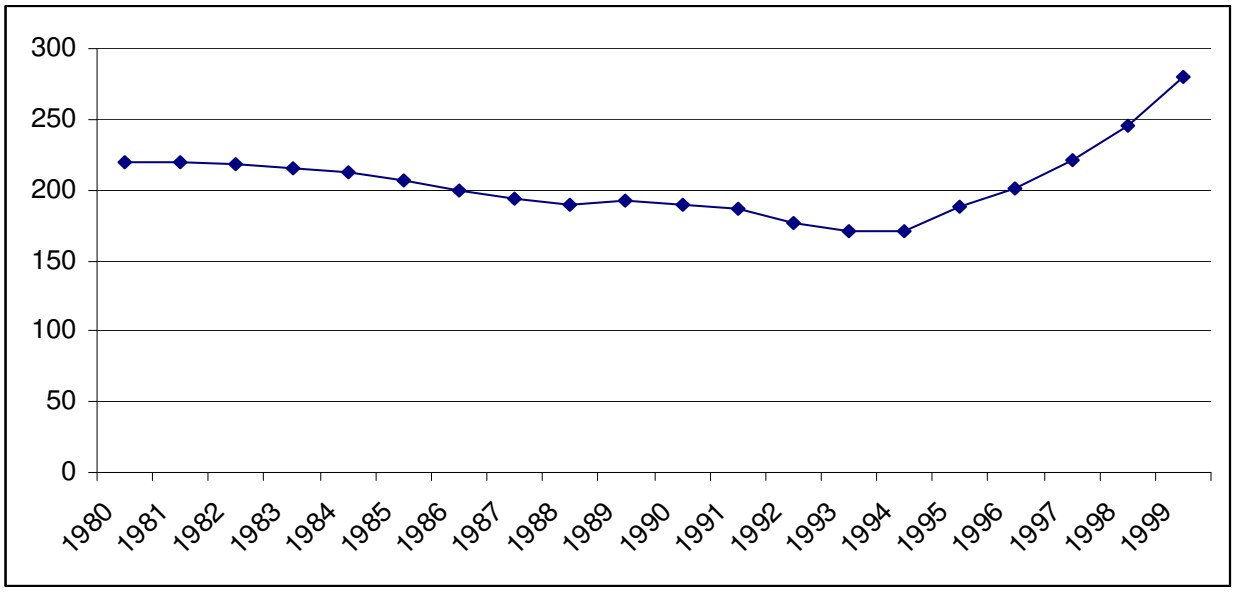

Figure 1. Dynamics of the number of students in higher education institutions per 10000 population in the Russian Federation in 1980-1999

Source: Commonwealth of Independent States (CIS) - Official Statistics, retrieved from the database in August 8, 2006.

At the same time in Russia, a country consisting of eighty-nine regions, a population of one hundred and fifty millions and eleven time zones, there is no one universal national standardized examination for high school graduates. In order to enter any public or private higher education institution, the high school graduates must be present at the college of their choice to pass competitive entry examinations. Competition to enter government-financed programs is high. Statistics on the growing competition are presented graphically in Figure 2.

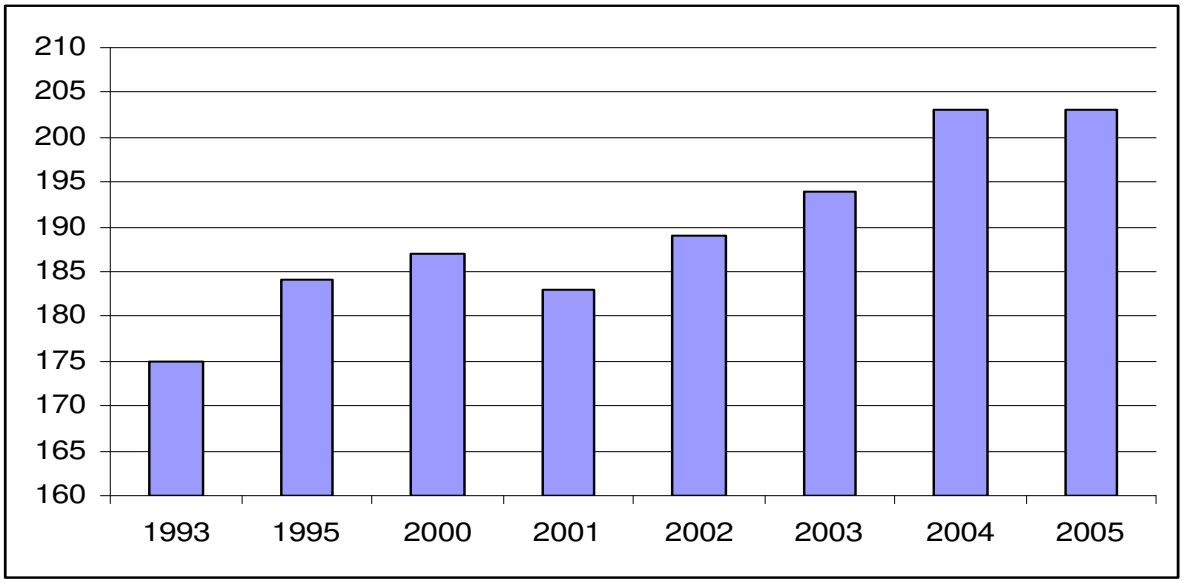

Figure 2. Contest for admittance to public and municipal higher education institutions in the Russian Federation, 1993-2005 (number of applicants per 100 places).

Source: Composed from: Corruption Process in Russia: Level, Structure, Trends. In G. Satarov (Ed.). *Diagnostics of Corruption in Russia: 2001-2005*. INDEM Foundation. Retrieved May 12, 2006 from http://www.indem.ru/en/publicat/2005diag_engV.htm

All public higher education institutions run entry examination sessions at the same time, once a year. There is no legal way to apply to more than one institution at a time. Those not accepted have an opportunity to enter a for-tuition program at a public university or a private college that requires full tuition. Private colleges do enroll students after the period of entry examinations if they have vacancies. Rampant corruption transforms public universities into "family enterprises," where government-financed places are distributed among the relatives and friends of the faculty and administration. This creates enormous inequalities in access to higher education. Presence of corruption in Russian universities is broadly acknowledged (Bondarev, 2002; Glebov, 2007; RBC, 2007; RIA Novosti, 2004; Rudenko, 2002).

Some households are unable to cover travel expenses for their children to a university of their choice to take entry examinations. Some candidates with high academic potential do not

accept the risk of competing for places in top schools. If not accepted, they will not be able to compete even in lower tier colleges, since the time for entry examinations will be over. The number of places financed from the central budget continues to decrease. State expenditures on education decreased from 3.6 percent of GDP in 1991-1992 to 3.1 percent of GDP in 2000. State expenditures on education in 2000 were 48 percent of 1991 levels. State financing of higher education decreased from 1.2 to 0.4 percent of GDP. The average wage in education decreased from 62 percent of the average for the economy in 1992 to 54 percent in 2000.The average age of faculty members is 55 years in the social sciences and humanities and 60 years in the technical sciences (World Bank, 2001).

In the USSR information, application, examinations, and housing for prospective students were free. However, each year everyone had an opportunity to take entry examinations only in one of the Moscow universities, and then, if unsuccessful, they could try to enter any other university. All the universities were fully funded by the state while the private sector was absent. The national economy is in transition as values, incentives, and the allocation of resources change. At the beginning of the transition, all the public universities realized that the demand on higher education is much higher than the supply of educational services, especially in the social sciences. The public represented a demand for knowledge, diplomas, and prestige associated with higher education. They started to organize for tuition programs within the departments in the universities and in the branches and affiliations outside, located in different towns. Later many of these departments became private universities. Each public university has departments, where at least some of the students pay for the study. Many students seek diplomas, not knowledge. The state guarantees all the diplomas from the universities that have passed accreditation. Many of the students need a diploma to satisfy a requirement for holding the job

they already have. With a high level of unemployment and low real wages, opportunity costs for prospective and current students in higher education are very low. It keeps tuitions low and the demand on degrees high.

Top schools continue to generate excessive demand and select students with characteristics they want by using the system of entry examinations. This is one of the major arguments for the system of entrance, where the applicant has to appear in person in college and pass the examinations. Maintaining selectivity requires the generation of demand and restriction of supply. Before 1990, supply was restricted by the central government. After 1990, colleges created for-tuition programs where virtually everyone was able to enroll. The previously existing system, where high student quality was a result of selectivity, and selectivity, in its turn, was a result of high student quality, was seriously undermined by all different types of corruption.

Private education started not because of the budget cuts, but because of the higher degree of financial freedom and high demand on certain specialties in higher education. Only later budgets of the public universities were cut. There are no private, not-for-profit universities in Russia. Public universities are more prestigious than the private ones; they possess buildings, libraries, notable social facilities, and thus are attractive for privatization. To avoid the negative experience of privatization in the industry, government should not be hasty in making decisions. A pure market in higher education at this time is impossible, because there is no pure market in the country.

The state is represented in the industry by public universities. However, the status of a public or state university cannot be interpreted as if it is completely owned, governed, managed, and financed by the government. These functions of financing, management, governance, and ownership can be distributed differently or shared. Some of the oldest and strongest universities

had an experience in self-governance before 1917. With the gradual decentralization of higher education, self-governance should become stronger along with self-financing. It will create pluralism in forms of ownership, management, and organizational structure. The process will be synchronized with the continuing market reforms and will become one of their locomotives.

In 2000 54 percent of all students who entered higher education institutions paid full tuition. Overall, 40 percent of students study for tuition. Students in private colleges constitute 10 percent of all students. Only 20 percent of students for tuition are students in private colleges. Public universities play a leading role in for-tuition programs. The value of all paid higher education services in 2000 was equal to 0.6 percent of GDP. Around 20 percent of all students enter colleges for bribes. Some people prefer to pay a bribe because it may be cheaper than full tuition for the period of study. Another reason is that the bribe is paid once for the entrance to the budget-financed program, while tuition in a for-tuition program may increase from year to year during the four- to six-year period of study. There were more than 1000 cases of bribery for entering higher education recorded in 2001. By estimation, the amount of money spent on illegally accessing higher education is equal to 0.75 percent of the GDP (Konstantinovskiy, 2001). In households with children under 16 saving for higher education is the highest priority, leaving behind health care, durable goods, housing, cars, and insurance.

Education by correspondence is the fastest growing form of education and now constitutes the sector that enrolls 40 percent of all students, while in 1992 it was only 25 percent. During the 10-year period from 1991 to 2001, the share of graduates from the sciences decreased from 9 to 7 percent, while the share of graduates majoring in economics and business administration increased from 14 to 22 percent (Konstantinovskiy, 2001). The structure of specialization does not correspond perfectly with the labor market demand that can be explained

by the rapid changes in the economy. Observations indicate that the drop out from secondary education has a social character. As a result, as the number of children from poor households who drop out from high school increases, the percentage of children from wealthier households who go on to college increases. Differences in access to higher education are based on differences in the following areas: academic abilities; quality of obtained secondary education; amount and quality of additional educational services obtained, such as extracurricular courses in high school, preparation courses, private tutoring, etc.; access to the information about higher education institutions; physical disabilities; educational level of family members; family income; social capital of family; place of residence; and citizenship.

Observations indicate that socio-economic factors are most significant when it comes to access to higher education, especially to top schools. Three major factors are household income, place of residence, and quality of secondary education. People in poor households, rural areas, and economically depressed regions have less access to higher education. If in 1990 75 percent of students in Moscow were from the regions, now they constitute only 25 percent (Kuzminov et. al., 2002).

Description of the projects

There are two educational policy projects implemented by the federal government: The General State Examination (GSE), begun in 2001, and The Reform of Financing of Higher Education through the Implementation of the State Personified Financial Obligations (SPFO), also known as educational vouchers, begun in the academic year 2002/2003 and running through the 2003/2004 academic year. The first is a project with a standardized, computer-graded examination, which will be used for entrance to universities; the second is a project that

introduces a voucher-based system of higher education funding. The General State Examination is analogous to the US national educational tests (such as the SAT and ACT), and the French Baccalaureate, and is referred to as the national test.

The projects were conducted in the sixteen regions that represent all different types of regions in the country. All high school graduates in the sixteen regions take the national test in one of the 1938 places, where the national test is conducted, in number of subjects, to be defined in each region. Set of the subjects included in the national test varies from region to region. Mathematics is included in the national test in all the sixteen regions, Russian in twelve, Physics in ten, Chemistry in ten, Biology in nine, Geography in six, History in six, and Social Science in four regions. Samarskaya oblast[1] includes all the nine subjects in the national test; Saha (Yakutiya), Novosibirskaya oblast, and Chuvashiya eight; Novgorodskaya oblast seven; Rostovskaya, Pskovskaya, Orenburgskaya, and Kaliningradskaya oblast five; Mariy El four; Krasnoyarskiy Kray, Tomskaya oblast, Cheliabinskaya oblast, and Mordoviya two; Bashkortostan and Udmurtiya one.

Results of the examinations are graded on a scale from one to five, that is A+, A, B, C, and D (letters adapted to Latin alphabet by the author). Every high school graduate, except those who receive a D, obtains an educational voucher with a value corresponding to the grade received. The vouchers are grants that can be spent only on higher education and should not be refinanced. One of the major characteristics of educational vouchers is portability. A portable voucher can be taken by a prospective student to any higher education institution that participates in the project. Anyone from non-participating regions or graduates from previous years can take the national test. It is set up so that the top 5 percent get an A+, the next 15 percent an A, next 40

[1] Oblast – an administrative territorial unit, analogous to a region.

percent get B, the next 25 percent a C, and the lowest 20 percent a D. No vouchers are assigned to those with a D score (Kuzminov, et. al., 2002).

There are 140 institutions participating in the projects. The only institutions that participate are public higher education institutions under the authority of the Ministry of Education within the participating regions. Public higher education institutions under the authority of other Ministries may apply to be considered for participation in the projects. Some quotas and restrictions are imposed. All higher education institutions that participate are allowed to enroll in all programs only applicants with educational vouchers. The number of students whose educational vouchers will cover full tuition and fees without any other extra payment should be not less than 50 per cent of all enrolled, including not less than 25 per cent in each program. Each participating institution indicates the admission test score and tuition three months prior to the application deadline. Application is free of charge. Access to the information is free and available to the public.

All participating students are free to disregard their national test score and educational vouchers and take competitive entry examinations in higher education institutions of the non-participating regions. They are also free to retake the examination each year. The government covers the cost of the student's educational voucher to a college/university during four to six years of study, depending on the length of the program. It is expected that colleges will compete for better students, since they will bring vouchers with higher monetary values. It will result in an increase in quality of higher education.

The goals of the projects are presented by the governmental agencies as follows:

- establish the mechanism of financing higher education institutions on the basis of SPFO;

- increase access to professional education;
- adequately estimate preparation of high school graduates and equal opportunities to enter colleges;
- establish a closer link between secondary and professional education;
- maintain equivalency of the state documents (certificates) of secondary education;
- establish state control of quality of secondary education based on independent evaluation.

This paper suggests identifying the goals of the projects as follows:

- decrease inequality in access to higher education;
- improve financing of higher education;
- increase effectiveness and efficiency of higher education;
- establish a closer link between secondary and higher education;
- reduce corruption in access to higher education.

The reform is based on the hypothesis that a decrease in inequality in access to higher education and redistribution of the state funds among public and private higher education institutions will lead to an increase in quality of students and higher education services and to more efficient and effective functioning of the system. It will facilitate accumulation of human and social capital and strengthen of social cohesion in the nation. Hot public debates about the usefulness of the reform continue (Filippov, 2001; Adamskiy, 2002; Sergeev, 2002; Slavina, 2002; Smolentseva, 2000, 2002; Oberemko, 2006; MacWilliams, 2007).

The projects, as well as the idea of the reform, are heavily criticized. Those opposed to the policy experiments consider higher education a public good. Since it is not available to all, the opportunity to get a higher education for free is considered a public good. They support

selection on the basis of competitive entry examinations and full financing of all students. Some of the critics accept the existence of private higher education, but insist that it should be separate from public education (Kolesov, 2002; Sadovnichiy, 2001). They believe that the reform will lead to an increase in inequality and corruption, an eradication of free higher education, a decrease in its quality, a weakening of free secondary education, and its commercialization. Sergei Lisovsky, a senator in the Federation Council, or upper house of Parliament, called the exam "the total destruction of the quality of education in Russia" (MacWilliams, 2007, p. A20). Under the law, some of the leading universities, including Moscow State University, would retain the right to continue administering their own entry examinations.

Critics of the reform predict an increase in the educational bureaucracy and transaction costs needed to regulate voucher financing schemes and the national test (Kolesov, 2002). Educational vouchers create the wrong incentives for many high school graduates. First, many think that it is better to live with a diploma than without one. Second, entering college means deferring military service. Admission to a college is considered a way to avoid draft. People who receive a voucher of certain, even if low value, would be willing to use it to enter a low-quality college, and would use it even if they had not planned to attend college.

The national test is going to be introduced nationwide in 2009 (Lemutkina, 2006). Many doubt its objectivity and point the fact that the test was initially approved for nationwide use in 2006, followed by two postponements, in 2007 and 2008. Even before its introduction nationwide, it is clear that the test is not free of corruption. In a few regions the results of the test have been annulated because of suspicion of massive falsifications and violations of the protocol. McWilliams (2007, A20) comments: "Ironically, the test has been soiled by the very corruption it was designed to root out. Test scores have been annulled in regions that reported suspiciously

high results. Only last week the Prosecutor General's Office accused officials at the Federal Testing Center -- which processes the standardized tests for the Federal Service for the Supervision of Education and Science -- of spending some 33 million rubles in state funds on spurious business trips, private purchases, and fictitious contracts."

Supporters of the new examination system argue that the reform will create equal opportunities in access to higher education, prevent corruption, and make higher education a demand-driven industry. Intervention is based on the assumption that since low-income households, cannot afford to pay for their children to travel far from home to take entry examinations, let alone pay for tuition, and since entry examinations are corrupted, implementation of the national examinations will increase access to higher education for children from lower-income households.

Supporters of the voucher plan assume that the state personified financial obligations or vouchers will give real value to the academic credits and achievements of prospective students in secondary and high school in the market of higher education and will increase the quality of students because of the anticipated decrease in inequality in access to higher education. It will increase the role of personal academic achievement in obtaining higher education and decrease the role of household income. Among other expected positive effects are a decrease in corruption, better budget distribution and allocation of the state budget, and an increase in quality and adequacy of higher education.

Competitiveness in national higher education will also be influenced by demographics. Kuzmin points out that between 2000 and 2008, the number of pupils in secondary education will decline by seven million. The number of students in secondary education institutions will

decrease from 21 million in 1999 to 14 million in 2008. In 2000, 1.5 million have graduated from high schools and 1.3 million entered higher education (Kuzmin, et al., 2002).

Evaluation of the effectiveness of the projects

Evaluation should be focused on the goal of decreasing inequality in access to higher education. Evaluation is based on the assumption that the intervention will lead to statistically significant effects, i.e. the percentage of students from low-income households in colleges in the participating regions will increase. The assumption here is that inequalities in academic achievement will be smaller and independent of income. Otherwise, inequality in access to higher education after intervention may increase.

Evaluation can be summative, that is "done for, or by, any observers or decision-makers (by contrast with developers) who need to evaluate conclusions for any other reasons besides development." (Scriven, 1991, p. 35) Evaluation could be designed to find out whether implementing the projects led to a decrease in inequality in access to higher education, which will be indicated in the percentage of students from each decile who entered higher education institutions, and by the percentage of higher education institutions entered in each decile. Projects are quasi-experimental. Weiss points out: "Quasi-experiments have the advantage of being practical when conditions prevent true experimentation." (Weiss, 1972, p. 67)

Opportunity in access to higher education will be measured by the result, i.e. of entering higher education. It assumes that changes in the result are an indicator of changes in the opportunity. All the measurements will be taken before and after the project's implementation in the participating and non-participating regions. Key measures should include income inequality indices, educational inequality indices, and inequalities in the educational voucher values.

Since the sixteen participating regions in the pilot projects constitute quite a representative group of the country's regions with all their diverse characteristics, but not a random sample, a comparison group of sixteen regions will be selected by way of matching based on such characteristics as income inequality, number and quality of higher education institutions, and geographic location, in order to compare the inequality measures. As stated by Rossi and Freeman: "The most common of quasi-experimental designs involves constructing control or comparison groups in an attempt to approximate a randomized design." (Rossi and Freeman, 1999, p. 310)

There are no federal, regional, or commercial educational loans in place that make the task of evaluation easier, since there are no fluctuations in the credit market and other connected issues to be dealt with. However, there are a number of validity threats when it comes to attributing changes to the projects and interpreting effects as the result of intervention alone.

An observed effect might be due to an event that takes place between the pre-test and the post-test that is not the treatment, and may be present in the following forms:

People's priorities in regard to higher education may change from year to year.

The projects take place in 2002 and 2003 with the national test running every year till the present, and the populations awareness of the results of the previous year may cause changes in the behavior of different strata with regard to higher education, making them either more or less active in entering higher education institutions.

There are a number of other changes that may occur before and during the period of project implementation, which can influence access to higher education, including changes in the federal and regional legislation, budget financing and budget deficit, changes in the total voucher fund, total number of places in higher education and budget-financed places in particular, income

inequality, tuitions in both public and private higher education institutions, rules and requirements for licensing and accreditation, restrictions imposed on corruption, demographic changes, changes in the labor market and economic situation overall. All of these changes, if identified and measured properly, may be included in the econometric model and their effects captured. Some of the changes occur nationwide while others take place on the regional level. The changes with significant variation will be included as independent variables, and major changes in time, if specified, may be represented by the dummy variables in order to capture fixed effects.

People are not required to take advantage of their vouchers. Of course, one can count how many people did not use their vouchers and the total sum of unused vouchers, but people may use them in the future, or they may think they will retake the national test in the hope of receiving a better score and a voucher of a higher value. It is impossible to predict how many people will take advantage of their vouchers and how many will retake examinations in an attempt to improve their score. Also, the value of vouchers changes year by year. Lower national test scores today may have a higher voucher value than a higher national test score a year later. All people act differently. The evaluation is based on the assumption that since the opportunity costs of attending higher education institutions are very low and unlikely to change dramatically during the period of 2002-2004, almost all voucher-holders would use them. Presumably, even lower-value vouchers will satisfy tuition requirements for the low-quality higher education.

Another threat is that the government may manipulate the data; the results of the national test and the size of tuition in colleges may be manipulated as well, in order to give the false impression that the projects were successful. In order to safeguard against possible manipulations on the measurements, the data from all different sources, including those of the National

Training Foundation and the World Bank, may be used. These measures, however, will mostly prevent manipulations with data, not with the content.

The maturation threat was unlikely at the early stages of the project implementation since the public is not familiar with the national test. The situation may change by the year 2007 and later, when general content and the composition of the tests will become familiar to the high school students and prospective students will take preparatory courses. Also, everyone is free to take the national test every year. This practice may lead to an increase in the level of test-required knowledge. However, there are fixed percentages set for the grades for all years, independently of the level of academic preparation.

Despite the fact that all measurements and procedures are the same, there may be some problems caused by the following:

Many households do not know their exact annual income, others will report it inaccurately, and many households may choose either to mis-specify their income or not report it at all. The precise determination of household income is crucially important for the purpose of identifying income thresholds and assignment of the representatives to the income deciles. In order to make the data as correct and reliable as possible, information from the State Tax Office should be used for the calculations of the Gini coefficient and the distribution index (DI) for income, and students from different deciles in higher education institutions should be identified.

There is a different set of subjects in the national test in each of the participating regions. These sets were selected by the regions independently. The evaluators may consider such differences a failure of the designers of the quasi-experiments and may not see any viable solutions to that. The sets of subjects can be grouped into seven groups, and the scores can be separated by subject, but even then it will still cause enormous differences in requirements for

the enrollment and the unequal degree of educational mobility among prospective students from the different participating regions.

Changes in household income and the level of inflation will not have an influence on the interpretation of the results. The DI and other indexes measure inequalities in relative terms. The move from one income decile to the other or a change in the absolute values of the deciles' income thresholds is not a problem, keeping everything in relative terms.

It is important to note that the proposed evaluation measures access to higher education as a fact of entry to a higher education institution. Depending on the definition of the term "access" it may seem more precise to observe not only the fact of entry alone, but also process of education and different obstacles to pursue the degree, including dropout rates for the groups with different socio-economic characteristics. The retention and attrition may be non-random. However, two-year period of the projects does not give an opportunity to obtain and process such data. The national test may be evaluated based on its continuity.

The selection threat exists to the extent to which the government is able to manipulate the selection of participating regions. The selected regions could be those with a relatively high average household income, a large number of the higher education institutions and budget-financed places in them, and a strong secondary education system. However, when the selected regions have been characterized not as advantaged or disadvantaged, but rather as typical, then the selection threat, if any, is insignificant. A comparison group, selected on the basis of region-by-region matching by the evaluators, will control for the potential selection threat. As recognized by Weiss: "Unlike experimental design, which protects against just about all possible threats to internal validity, quasi-experimental designs generally leave one or several of them uncontrolled." (Weiss, 1972, p.67)

Since there are no educational loans, changes in inequality in access to higher education could be interpreted as a result of the intervention of the projects. Income inequality is high and stable. The results obtained from this project can be generalized and said to apply to all eighty-nine regions of the Russian Federation and to Ukraine and Belarus as well. The results, however, may not be applied to the two leading educational centers of the Russian Federation - Moscow and St. Petersburg, - since they do not participate in the projects. There is the highest concentration of nationally recognized top higher education institutions in these two cities, and a high average level of household income and income distribution is not typical for the rest of the country. Hence, a comparison group that will match them may not be assigned.

There are a number of challenges to the appropriateness of the results owing to the quasi-experimental design of the projects. Only public higher education institutions participate in the project. Private higher education institutions have not participated, but will participate in the future. Thus the results do not provide us with a general picture. In fact, only one of two sectors of the market is targeted, that is state higher education institutions. The public sector is under the direct control of the federal and regional governments and may easily be manipulated. Data will also be collected by the government agencies.

The federal government is planning a significant increase in the funding of higher education that may lead to a subsequent increase in the total number of the government-financed places in public higher education institutions. It will create more opportunities for the applicants from low-income households to enroll in higher education institutions. It may, however, be done for the period of the projects only. After the recording of positive results, i.e. the decrease in inequality in access to higher education, the federal funding may be cut down. This scenario is

especially possible since the general trend for the last fifteen years indicates a decrease in government funding of higher education institutions.

The total value of voucher funds is planned to be determined each year based on the overall capacity of the federal budget and regional budgets. This creates two challenges for the evaluation of the projects:

a) For the period of the projects' duration the voucher fund will be increased significantly. Hence, the value of each type of vouchers for the grades A+, A, B, and C, will be high. It will be high enough for prospective students with a B or may be a C to enter higher education institutions without making extra payments or else by making extra payments that are smaller than they would be otherwise.

b) After the projects considered as successful and the government's mission as accomplished, if implemented nationwide, total value of the voucher fund may be decreased voluntarily and the distribution of this fund among all the high school national test takers will decrease the value of the individual vouchers dramatically.

Due to the expectation of tough control from the government, corruption in entry examinations may decrease significantly. It will result in an increase in the number of accepted applicants from low-income households to the government-funded places. After the projects have been converted into the national system, governmental control will decrease and corruption will regain its hold.

Obtaining the voucher creates psychological "to use" and economic "extra value" incentives to enter higher education institutions for those who did not plan to do so and would not do otherwise. People would prefer to use their voucher instead of loosing it. Many people

will also consider vouchers as a valuable addition to cover part of the cost of their education. The massive information campaign, including all types of the media and the internet, also creates a certain rush and increases incentives to take a chance at studying in a higher education institution.

Top schools, as well as a number of other participating higher education institutions, are forced to have quotas on admissions for the applicants with the national test scores. Any quotas are externally imposed and provide somewhat biased information. With the quotas in place, more applicants will be accepted in the top schools than would happen otherwise. The stipend support that comes from the old system will also apply to the holders of the national test scores. In the future, however, when the system is implemented nationwide, admission quotas for the national test score applicants will be abolished and top schools will enroll on the basis of the national test score plus the voucher value and an extra payment. No stipend will be provided to such students by the government. Applicants from low-income households will be cut off from the top schools almost entirely. The size of an extra payment will be determined based on the increasing competition and justified by the fact that the voucher value will not cover total cost of providing education at the top higher education institutions.

High school graduates of previous years from any region can take the national test in the participating regions for the minimal fee. The increase in applications based on the national test will increase pressure on the limited number of the government-financed places in public higher education institutions, which will result in an increased share of representatives from low-income households in public higher education institutions and move some applicants from the middle-income households into the country's private higher education institutions, since these institutions are not allowed to participate in the projects.

One of the most misleading assumptions being made by the supporters of the projects is that growing competition between colleges and universities will result not only in an increase in the quality of the educational programs they offer, but in the reduction of the cost of education as well. The model was developed mathematically by the supporters of the projects. It manifests an expected decrease in inequality in access to higher education. In our view, the real price of education is not voucher-value-driven. It depends heavily on the costs of providing educational services. A decrease in voucher value will not push the price of higher education services down. Instead, an extra payment collected in addition to the voucher value will increase. It may result in higher extra payments in the top-ranked schools, and, as such, cut applicants from low-income households off from these higher education institutions.

If not accepted based on their national test scores in the participating higher education institutions, the national test-takers may take a chance to enter one of the non-participating higher education institutions either in their region of residence or any other region, by taking on-site entry examinations. It will broaden the variety of options for the national test takers and increase the probability of their being enrolled in a higher education institution. It may be compensated for by the applicants from the non-participating regions and by taking the national test to apply to participating higher education institutions. It is difficult to suggest which one of these processes will become more influential. The national test is not homogeneous in its content. The requirements for the national test scores from the side of the participating higher education institutions may vary accordingly. This creates restrictions on the applicant's mobility between the participating regions and the institutions.

In the evaluation of the projects, access to higher education is considered in terms of enrollment. Once an individual is accepted in a higher education institution, he utilizes his access

to higher education. In a broader sense access to higher education can be interpreted as acceptance to a higher education institution and provision of the means necessary to proceed successfully with the study. It will also include dropout rate. However, we cannot take this into account in the evaluation, since the projects are designed to continue for two years only.

Access, i.e. opportunity, is measured by attendance, i.e. the result. The argument in favor of measuring access in terms of attendance is that there is little or no room for speculation, since the conclusions will be based on the specific results, i.e. number of people accepted to higher education institutions. The argument against using this indicator may be that the government created conditions necessary to increase equality of opportunity in access to higher education. It is up to individuals to take this opportunity. The suggested evaluation ties the opportunity to the result. Multiple time-series design and comparison group design will allow us to determine whether changes in the outcome variables can be attributed to the program intervention. Multiple time-series design can use the data drawn from a number of indicators for all the regions in both the project group and the comparison group for the years 1998–2003. The results will indicate whether and to what extent intervention led to a decrease in inequality in access to higher education. Cohen and Garret note: “Better scientific information will improve policy by making decisions more rational. Applied research does not necessarily reduce disagreement. It calls attention to the existence of conflicting positions, sometimes elaborates them, generates new issues altogether.” (Cohen and Garret, 1991)

Measurements of inequalities in access to higher education in Russia

The Gini coefficient, which is normally used for measurements in income inequality and other inequalities, does not reflect what could be called internal dynamics. More specifically, it

does not indicate whether income redistribution to the poorest decile has been made at the expense of the richest decile, or middle class, or upper-middle class, or any combination of those. The same problem exists when it comes to measuring other forms of inequality while using the Gini coefficient. We suggest using another way of measuring inequalities and developing an index that will help us measure inequalities in access to higher education. The Distribution index allows capturing more precisely than does the Gini coefficient inequalities in the distribution of income or access to higher education.

The DI coefficient for household income can be calculated as follows:

$$DI = \sum_{i=1}^{N} (X_i)^2$$

where *Xi* is the share of i^{th} decile in the National Income.

Based on the fact that there are ten deciles, the value of the DI will be in the range of 1000 to 10,000. If income will be distributed equally by 10 percent to each decile, the DI will be equal to 1000. If the wealthiest decile will concentrate 100 percent of total income, the DI will be equal to 10,000. Any changes in distribution will be captured based on squaring of the shares in income. An increase in income of the wealthier decile will lead to an increase in the DI. An increase in inequality will be indicated by a DI increase. Hence:

access to higher education = f(household income, ability to study)

Inequality in access to higher education can be measured with inequality coefficients. Accordingly, access to higher education as a dependent variable can be expressed in terms of inequality coefficients. Ability to study or scholastic ability can be presented in terms of academic achievements measured by the national examination. Also, dummy variable will be necessary to control for the program. Other variables may include: index of corruption, budget

deficit, price level in higher education, fixed effect for each year to control for influence of changes in economic situation.

Fixed coefficients for each year can be included in the model. All variables will be taken for the years 1994 to 2002, for 16 regions-participants and 16 regions from the comparison group. The model will indicate to what extent variation in the DI for education is explained by variation in the DI for income. Other models will incorporate data on individual and group levels, where dependent variable will be presented by the probability of enrollment in higher education institution and percentage of enrolled in higher education institution, respectively. Independent variables will include individual household income and the national test score, and mean of income and academic achievement for the groups. These models will explain to what extent probability of enrollment in higher education institution may be predicted by the household income, and percentage enrolled in higher education institutions in the certain decile predicted by the mean of academic achievement and income for the group. It will show changes before and after the reform. Whole point is to make household income as much irrelevant in respect to access to higher education, as possible. This point is based on the goal of decrease in inequality in access to higher education and should not be referred to the functioning of higher education industry overall.

One of the major assumptions for the model is that in Russia all children have equal access to the level of educational quality in secondary education, which will allow them to pass the national test successfully. One of the major challenges to the project, but not to the model, may be the question whether student performance in secondary school depends on the household income, and if yes, to what extent? If students from wealthier families perform better, it will lead to the fact that proportionally larger part of voucher money will go to wealthier that in its turn

will mean even more inequality. The assumption of the intervention is that academic achievements of high school students and their national test scores are more income-independent than the access to higher education. It means that income-based inequalities in academic achievement of high school graduates are less than income-based inequalities in access to higher education. If academic achievements are more household income-dependent, than the access to higher education, inequality in access to higher education after the intervention may increase.

It is expected that an increase in access to higher education will result in an increase of number of representatives of poor and middle class households in higher education institutions. We cannot say that decreased inequality in opportunity entails increased number of students from poor households in higher education. It is up to the poor, whether they want to enter colleges more intensively, or not. However, we assume that since the wealthier already have an access to higher education, with existence of definite income thresholds according to tuitions in top schools and local schools, we tend to measure changes in access to higher education by changes in number of poor in higher education institutions, and top schools, in particular.

Deciles obtained from income distribution will be marked starting from 1st for the poorest to 10th for the wealthiest. All admitted in higher education institutions will be identified as representatives of one of the deciles. Calculation of the DI for education will be made as the following:

$$DI_{ed} = \sum_{i=1}^{N} (X_i)^2$$

where *Xi* is the percent of accepted representatives of i^{th} decile in total places in higher education. $N = 10$ (by the number of deciles).

A variety of distributional patterns in higher education is presented in Figure 3.

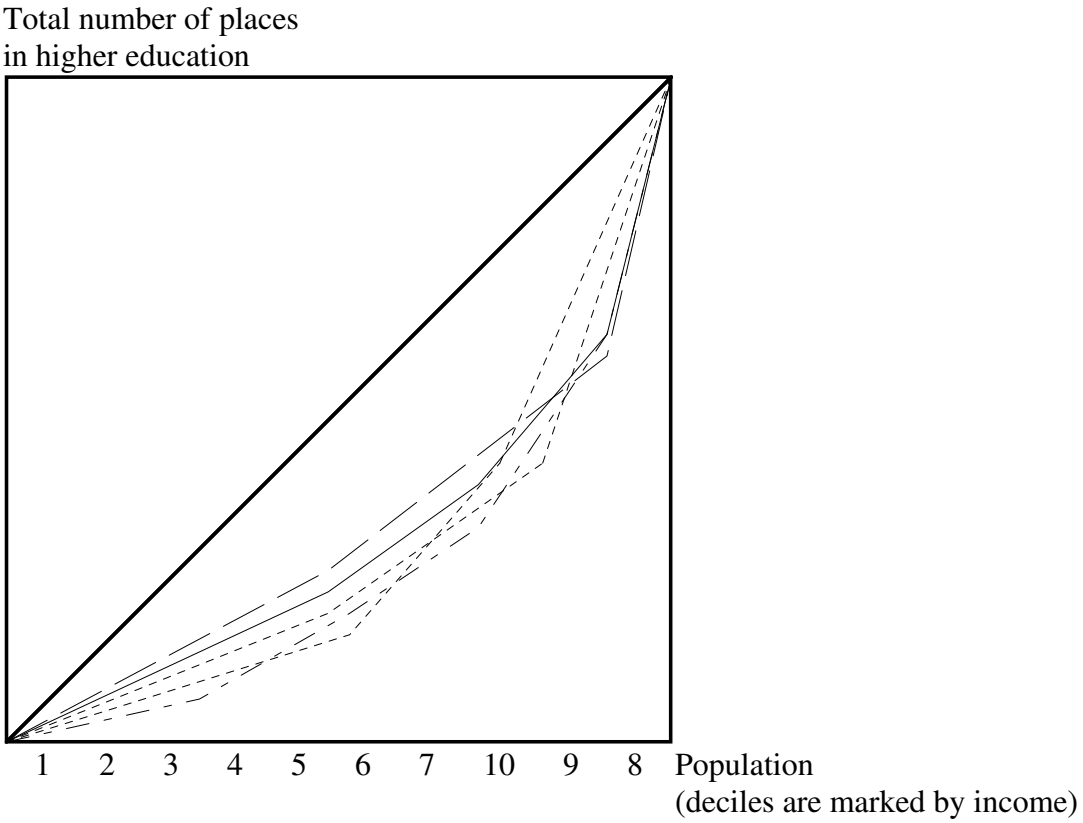

Figure 3. Distribution of places in higher education

Observation has been made that children from richest deciles do not occupy largest number of places in colleges, but representatives of middle class deciles do. Therefore, it may be suggested that income distribution does not present us with the mirror-like or symmetric reflection of distribution of places in higher education. The largest share in the National Income does not mean that the decile has the largest share of places in higher education institutions, occupied by its representatives. It is necessary to say that the share in higher education is not the same as access to higher education. Obviously, there is a threshold in terms of household income, above which access to higher education depends on willingness of parents and children to pursue study in college, rather than on the household income. Number of college age children in household and amount of tuition also play a role in defining such income threshold.

It can be speculated that despite children from wealthiest deciles do not occupy largest number of places in higher education, they may occupy largest number of places in top schools, or more likely in for tuition programs and access-by-bribe places of top schools, since all the top schools are public. It would be interesting to calculate whether the placement of the decile by income is proportional to total sum of money, spent on tuition and fees by the decile.

The same steps will be undertaken after the implementation of the projects. Results obtained before and after the implementation of the projects will be compared. If decrease in the DI for education will be indicated decrease in inequality in access to higher education will be reported. Conversely, if increase will be indicated in the DI for education, it will be interpreted as an increase in inequality in access to higher education. Same measures in comparison group will control for any side effects. If the Gini coefficient for education will increase, but the DI for education will decrease, the DI will be considered as a more precise and reliable indicator for making conclusions. It will be concluded that despite the decrease in the overall inequality measured externally decreased, inequality among the deciles in access to higher education increased. The problem is that we cannot compare deciles by income and deciles by education. Moreover, we cannot measure opportunity, but we can measure access by the result, that is how many representatives of each decile enrolled successfully into colleges.

Since all deciles are of equal size, it does not matter which way inequality is measured: as share of people from each decile in higher education, or as share of people in each decile, who were accepted by colleges. By transferring shares of entered higher education in each decile into 100 percent total, the DI for education for share of 1st year college students in each decile can be obtained by summarizing all the percentages, then dividing 100 percent over this sum, and multiplying percentage in each decile on the coefficient obtained. The proportion coefficient may

be calculated simply by dividing total number of households over the number of entered higher education in a given year.

The DI for education, measured on the basis of percentage of those who entered higher education institution in each decile will be:

$$DI_{ed} = \sum_{i=1}^{N} \left(S_i \times \frac{Q}{H} \right)^2$$

where *Si* is a percentage of those who entered higher education in i^{th} decile,

Q is the number of households,

H is the number of people who entered higher education.

In the experiment deciles may be taken in each region in both the experimental group and the comparison group. Higher education, taken in each region is, however, not as precise, since people move nationwide to study in colleges. One of the assumptions to be made in order to decrease this risk in measurement is to assume that people normally move outside the region of residence if they plan to enter top ranking that is national level schools. Otherwise they choose to study in the local college within the region of residence. Assuming this, problem can be solved by identifying national and local level higher education institutions.

Two segmentations will be made. First, all colleges will be classified into three groups depend upon the tuition they charge: $3000 a year and up, $1000 to $3000, less than $1000. Schools in the first group are the top schools. Schools in the second group are mid-level, and schools in the third group are low-level quality. Segmentation can also be done on public and private higher education institutions. The weighted DI coefficient for education will be introduced in order to capture inequalities in access to higher education expressed in terms of differences in percentage of representatives of different deciles in different groups of higher

education institutions. This measure will be used to estimate the overall inequality of a set of markets, which are colleges of groups I, II and III.

Let us assume that γ_{ik} is a share of representatives of decile *i* in college group *k*. *i = 1, 2, 3, … N*. *N* = 10 by number of deciles. *k = 1, 2, 3*. *K = 3* by number of the groups.

Xik is the share of the decile *i* in college group *k* within the *K* college groups.

$$X_{ik} = \frac{\gamma_{ik}}{\left(\sum_{i=1}^{N} \gamma_{ik}\right)}$$

L_{ik} is the share of the decile *i* across the *K* college groups.

$$L_{ik} = \frac{\gamma_{ik}}{\left(\sum_{k}^{K} \gamma_{ik}\right)}$$

The DI for education for college group *k* can be calculated as following:

$$DI_{ed_k} = \sum_{i=1}^{N} (X_{ik})^2$$

Weighted share of decile *i* can be calculated as follows:

$$WX_{ik} = \sum_{k}^{K} L_{ik} X_{ik}$$

The Weighted DI for education for decile *i* in all three sectors of higher education will be calculated as the following:

$$WDI_{ed_i} = \sum_{k}^{K} L_{ik} DI_{ed_k} = \sum_{k}^{K} L_{ik} \sum_{i=1}^{N} \left(X_{ik}\right)^2$$

The Weighted DI for education for decile *i* determines the weighted sector share for the i^{th} decile across the *K* sectors of higher education in which it is presented.

It will be necessary to introduce Share weighted DI to estimate the overall degree to which a decile might benefit from its specific higher education share combined with the overall sector concentration in the specific sectors it is represented.

$$SWDI_{ed_i} = \sqrt{\sum_k^K L_{ik} X_{ik} DI_{ed_k}} = \sqrt{\sum_k^K L_{ik} X_{ik} \sum_{i=1}^{N} (X_{ik})^2}$$

The weighted average of sector specific DIs multiplied by the decile's sector share in each group of colleges (or any other type of sectors, depending on segmentation) is taken across each of the *K* groups in which the i^{th} decile is presented. The square root is taken to return the estimate to a range similar to the traditional DI calculation.

The hypothesis can be made that elimination of the government-financed places will cut applicants from poor households from the top schools. The reasons for this hypothesis may be formulated as the following:

1) Top schools will have more applicants with the highest (A+) value vouchers than they have places. This competition will lead to an increase of tuition over the value of the voucher. As a result, only those who will be able to pay extra money to cover the difference between the value of voucher and tuition will be accepted. Applicants from poor households, unable to make extra payments in order to cover the difference, will be separated from the top quality higher education.

2) It is still unclear whether students, whose voucher value will exceed tuition in the college, they choose, will get this extra money as their stipend and allowance for textbooks and other supplies. Apparently, they will not. Value of a voucher is supposed to be transferred to the college directly from the government. No other payments are planned, including those from the

government to the students that would represent stipend. It creates a situation which we would define as "the Latin American case," when higher education institutions are open for everyone, but youth from low-income households "choose" to go to the labor market instead of college. One of the major reasons for that is that their families are not able to support them during their study. Colleges do not pay stipend either.

If this is true, it will lead to the fact that the top schools in Russia will become completely unaffordable for the poor. Also, everyone will prefer to stay as close to home as possible, preferably attending college in ones home town, in order to avoid extra costs of living in a different city. As a consequence, diversity of the student body in colleges will decrease. All concentration will appear within the regions and within the educational centers. The role of place of residence may not decrease, but even increase. Also it will lead to weakening the ties between the regions, a negative process for the nation building.

The other important aspect is inequalities in distribution of total value of vouchers between the deciles. A share of prospective students entering higher education in each decile is a fundamental indicator for measuring inequalities in access to higher education that should be measured to evaluate changes in inequalities, caused by the projects, that is impact assessment.

Despite the fact that value of vouchers will be distributed according to academic achievements on the national test, it will be interesting to follow the voucher value distribution among the deciles. This inequality can be measured by the DI for vouchers and calculated as follows:

$$DI_v = \sum_{i=1}^{N} (V_i)^2$$

where *Vi* is a share of i^{th} decile in the total voucher fund.

Despite the fact that the government preserves the right to define total value of voucher fund and value of different categories of vouchers, the DI for vouchers still is valid for making comparisons in time. There are four types of vouchers by value, according to A+, A, B, and C grades on the national test. Shares of the deciles in these four types of vouchers can be measured by analogy with the DI for education by the share weighted DI for vouchers.

It may be found, for instance, that the poorest 1st decile receives larger voucher value in the lowest C-grade vouchers, while the middle-class deciles or wealthiest 10th decile receives larger voucher value in highest A+ grade vouchers, or may be vise versus. The share weighted DI for vouchers will present an exposure of internal changes of shares of the deciles in different types of vouchers.

Conclusion

The reform of higher education in Russia, based on the national examinations and educational vouchers, is an attempt of an adequate response to the rapidly changing economic environment and the new social order. There are number of validity threats to measurements of the projects' impact and challenges to the reform itself, and possibility of adverse effects, including that of an increase in inequality in access to higher education. The Distribution Index (DI), the Weighted DI, and the Share Weighted DI can reflect changes in inequalities in access to higher education as a result of impact of the reform.

The national test presents an opportunity to apply in many of universities and makes academic achievements in secondary school significant for entering the university. The vouchers provide distribution of the central budget among public and private colleges according to their attractiveness and give real value to academic achievements on the market of higher education.

All households, including most disadvantaged, should have an equal access to higher education through the equal access to educational loans.

By 2007 the test is being used in all but three of Russia's 88 regions. The initiative with the vouchers has failed and by now is already forgotten. Vouchers for higher education remain a theory, a perfect plan that has yet to be implemented successfully anywhere in the world. While the theory itself is sound, the necessary mechanisms for successful voucherization have yet to be developed and tested. Other former Soviet republics watch cautiously the Russian reform. In Kyrgyzstan—a small republic in Central Asia—standardized test brought some fruits. Anecdotal evidence indicates reduction in corruption in admissions to higher education institutions. However, sustainability of the test as well as its positive impact remains an issue (BPC, 2007). In Ukraine the standardized test is now being introduced in some of the largest cities, while universities run admissions based on the old system of oral and written examinations.

Corruption will not be reduced with the introduction of the national test. Instead, access to corruption will broaden with shift from higher education to secondary education. Higher education institutions will prefer to continue taking part in the selection process. A certain compromise will be found in the near future. Undoubtedly, college faculty will retain at least partial discretion over the admissions and hence access to higher education.

The national test has experienced numerous problems so far and will likely have even more problems in the future. However, the old system of admissions is morally outdated and has to be replaced. One should not exclude the chance that once implemented nationwide and become predominant form of admissions to higher education, the national test will be more successful than it has been so far.

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