

THE CAPACITY OF THE MARKET OF EDUCATIONAL SERVICES IN KRASNOYARSK TERRITORY IN THE FIELD OF HIGHER EDUCATION

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Abstract

In the article we have presented the result of forecasting of potential and actual capacity of the market of educational services in Krasnoyarsk Territory in the field of higher education taking into account studying and evaluating the influence of different factors on this criterion. We have revealed the essential factors defining the development of the market of educational services and we have determined projected values of the capacity of this market for the foreseeable future. The received projected values allow us to make a conclusion about positive budding tendencies in the development of the criteria being analyzed.

Keywords: higher education, educational services, capacity of the market of educational services, potential capacity of a market, actual capacity of a market.

Introduction

The tendency of changing of supply and demand at the labour market and at the education market as well as continuous reforming of the system of higher education cause the necessity to study the behaviour and the development of the market of educational services as a whole, as well as the market of educational services in the field of higher education. Under the conditions of decreasing number of school leavers, higher education institutions should evaluate the number of people being enrolled for the first year if they want to use their resource potential efficiently. Taking into consideration the estimates of their contingent strength, higher educational institutions should develop the strategy at the market of educational services in accordance with the demand and the potential market; that will allow to increase their competitive advantages.

The main goal of our study is to estimate potential and actual capacity of the market of educational services in the field of higher education in the near future.

The study of essential factors that influence actual and potential capacity of the market of educational services in the field of higher education

In the frame of the study, we have collected data on the criteria characterizing potential and actual capacity of the market of educational services in Krasnoyarsk Territory in the field of higher education, as well as the data on the essential factors that influence the market. The data on the values of the criteria being

analyzed are presented in Table 1.

Table 1: criteria characterizing actual and potential capacity of the market of educational services in Krasnoyarsk Territory in the field of higher education (thousand people).

Years	Potential capacity of the market of educational services in Krasnoyarsk Territory in the field of higher education			Actual capacity of the market of educational services in Krasnoyarsk Territory in the field of higher education		
	Total number	Number of learners that have received general secondary education	Producing qualified workers, employees and middle-level professionals	Total number	Acceptance of students by means of allocations of the federal budget	Acceptance of students according to contracts for paid educational services
2008	56,7	25,3	31,4	27,1	13,0	14,1
2009	50,7	21,1	29,6	27,4	13,6	13,8
2010	47,0	17,4	29,6	25,5	13,5	12,0
2011	38,2	11,7	26,5	22,9	12,1	10,8
2012	43,1	18,5	24,6	25,4	12,5	12,9
2013	38,6	17,7	21,0	22,5	11,6	10,9
2014	37,5	16,1	21,4	21,1	11,1	10,0
2015	37,3	15,0	22,4	20,1	12,0	8,1
2016	28,5	14,8	13,7	21,1	11,6	9,5
2017	29,8	14,5	15,3	19,2	11,0	8,2

The presented data reflect a steady trend of decreasing both potential and actual capacity of the market of educational services in Krasnoyarsk Territory in the field of higher education. The exception to the general trend is the year 2011 when we can see a sharp drop in the number of school leavers that was caused by the transition from 10-year education to 11-year education. We can notice some insignificant deviation from a general trend of potential capacity in 2017 and actual capacity of the market of educational services in Krasnoyarsk Territory in the field of higher education in 2016.

The demand at the market of educational services is connected to the trends of population growth; the population is a consumer of these services. In Table 2 we have presented the factors connected to the number of different population groups of Krasnoyarsk Territory that influence actual and potential capacity of the market of educational services in the field of higher education.

Table 2: factors connected to the number of different population groups of Krasnoyarsk Territory that influence actual and potential capacity of the market of educational services in the field of higher education (thousand people).

Years	Population	Urban population	Rural population	Population under working age	Population of working age	Population of retirement age	Population aged 17-19 years old	Labour force	Employed in the economy	Unemployed
2008	2832,6	2146,3	686,3	479,1	1821,7	531,8	143,2	1501,4	1405,6	95,8
2009	2832,9	2153,4	679,5	483,8	1802,3	546,7	133,3	1540,8	1395,3	145,5
2010	2829,1	2161,6	667,5	485,8	1782,6	560,7	121,5	1555,2	1458,1	97,1
2011	2838,4	2170,2	668,2	494,5	1769,2	574,6	109,5	1511,3	1420,8	90,4
2012	2846,5	2181,6	664,9	506,8	1751,1	588,6	100,8	1512,7	1428,8	84,0
2013	2852,8	2180,8	672,0	520,4	1729,8	602,6	94,0	1516,0	1429,9	86,1
2014	2858,8	2193,7	665,1	533,7	1707,2	617,9	90,9	1524,3	1448,0	76,3
2015	2866,5	2206,0	660,5	548,8	1683,9	633,8	85,9	1500,8	1407,4	93,3
2016	2875,3	2220,1	655,2	561,1	1666,2	648,0	83,4	1482,0	1391,8	90,2
2017	2876,5	2226,1	650,4	560,9	1668,4	647,2	81,3	1494,2	1408,9	85,2

As we can see, the total population of Krasnoyarsk Territory has been increasing since 2011; in this context urban population has been rising as well, but rural population has been decreasing. The distribution of the population according to age group demonstrates a trend of decreasing of the population of working age while the population of non-working age is increasing at the same time. As consumers of educational services in the field of higher education are young people, it makes sense to analyze the dynamics of the population aged 17-19 years old; they are school leavers and graduates of secondary vocational education institutions. The dynamics of this factor corresponds to the trends in terms of the capacity of the market of educational services in Krasnoyarsk Territory in the field of higher education. It is impossible to identify any steady trend while analyzing trends in the numbers of employed and unemployed population.

In the conditions of budget constraints of higher education and provision of paid educational services by higher education institutions, another important factor at the market of educational services is the living standard of the population. On the one hand, quality higher education allows to increase the living standard of the population; on the other hand, for the applicants who were not admitted to state-financed student places it is possible to receive educational services on a fee-paying base only. In Table 3 we have presented the factors connected to the income of the population of Krasnoyarsk Territory that influence actual and potential capacity of the market of educational services in the field of higher education.

Table 3: factors connected to the income of the population of Krasnoyarsk Territory influencing actual and potential capacity of the market of educational services in the field of higher education

Years	Average per capita monetary income (per month) (rubles)	Nominal average monthly wage of employees of organizations (rubles)	Minimum subsistence level, average per capita (rubles per month)	Real disposal money income (%)	Proportion of population with income below the subsistence minimum (%)	Ratio of average per capita monetary income with minimum subsistence level (%)
2008	15908,7	18934,7	5144	109,1	16,2	309,3
2009	17008,7	20277,0	5897	94,8	17,7	288,4
2010	18261,6	23254,2	6417	102,9	17,9	284,6
2011	20145,5	25658,6	7127	101,7	18,1	282,7
2012	22524,3	28672,4	7426	103,1	15,6	303,3
2013	24921,7	31622,6	8138	103,7	15,2	306,3
2014	24806,2	34178,2	8987	93,0	16,7	276,0
2015	27102,2	36070,8	10799	98,6	18,9	251,0
2016	28009,5	38473,5	10992	98,3	18,4	254,8
2017	27853,6	41111,4	11349	95,6	18,7	245,4

While increasing both average per capita monetary income and nominal average monthly wage in Krasnoyarsk Territory, there has been irregular decrease of real per capita income expressed as a percentage of the previous year's level. This in turn leads to the increase of the proportion of the population with income below the subsistence minimum and to the decrease of the ratio of average per capita monetary income with the minimum subsistence level.

The factors connected to the education performance in Krasnoyarsk Territory influence potential and actual capacity of educational services as well (Table 4).

The chosen factors in this area show a negative trend, excluding the number of students at general-education institutions; it is connected to the increase in the birth rate and the increase in the number of students at primary and secondary levels at schools. The decrease of the number of general-

education institutions, professional education institutions and higher education institutions leads to the decrease of number of students at these institutions.

Table 4: factors connected to education performance of Krasnoyarsk Territory influencing actual and potential capacity of the market of educational services in the field of higher education

Years	Number of general education institutions	Number of students at general-education institutions (thousand people)	Number of professional education institutions providing training of qualified workers, employees and middle-level professionals	Number of students at professional education institutions providing training of qualified workers, employees and middle-level professionals (thousand people)	Number of higher education institutions	Number of students at higher education institutions (thousand people)	Number of students fully reimbursed for education costs (thousand people)
2008	1208	296,3	139	80,8	13	131,9	70,4
2009	1150	293,9	138	75,4	13	125,8	66,1
2010	1102	294,8	135	74,4	12	121,8	64,4
2011	1068	301,2	134	70,6	12	111,9	60,1
2012	1044	300,3	134	69,0	11	110,0	59,0
2013	1054	299,7	122	63,1	11	102,5	54,8
2014	1052	303,1	124	67,6	10	96,1	51,5
2015	1034	311,5	96	65,9	10	89,7	46,4
2016	1017	321,3	71	63,2	9	81,2	38,9
2017	1010	331,1	80	68,4	9	76,9	34,4

One more factor at the market of educational services in the field of higher education is budget financing of higher education. The existence of limitations of state-financed places requires the determination of appropriate amount of tuition fee by people with the full cost recovery. We calculate federal budget expenditure per student (Table 5).

Table 5: factors connected to the federal budget expenditure per student influencing actual and potential capacity of the market of educational services in the field of higher education

Years	Funds of the federal budget for higher education (billion rubles)	Number of students funded with resources from the federal budget (thousand people)	Expenditure of the federal budget per student (thousand rubles)
2008	280,02	2791,6	100,3
2009	334,8	2691,1	124,4
2010	364,48	2541,8	143,4
2011	403,07	2382,5	169,2
2012	448,13	2262,9	198,0
2013	495,59	2120,1	233,8
2014	498,18	1990,5	250,3
2015	498,56	1859,9	268,1
2016	485,84	1838,5	264,3
2017	480,26	1837,1	261,4

As the increase of the expenditure of the federal budget per student inevitably causes the increase in fees for students who have been paying, the reverse impact of this factor on the capacity of educational services in the field of higher education is readily apparent.

Thus, to build forecasting models with the use of tools for correlation and regressive analysis, we can previously choose the following factors for the more detailed study of their influence on carrying and actual capacity of the market of educational services in the field of higher education:

- working-age population;
- population aged 17-19 years old;
- real disposable income;
- proportion of population with income below the subsistence minimum;
- ratio of average per capita monetary income with minimum subsistence level;
- number of general education institutions;
- number of professional education institutions providing training of qualified workers, employees and middle-level professionals;
- number of students at professional education institutions providing training of qualified workers, employees and middle-level professionals;
- number of higher education institutions;
- number of students at higher education institutions;
- number of students fully reimbursed for education costs;
- expenditure of the federal budget per student.

Moreover, it makes sense to include potential capacity of the market of educational services in the regressive model of actual capacity of the market.

The selection of essential factors in the regressive model of potential and actual capacity of the market of educational services in Krasnoyarsk Territory in the field of higher education

For more detailed and more justifiable introduction of factors in the regressive models, it is necessary to estimate their influence on outcome indicator, as well as to exclude close link between the factors. Since the data used for modeling reflect a short period of time (it is caused by the unevenness of processes of the educational system in Russia), we restrict ourselves to the construction of linear models; the accuracy of these models is sufficient to forecast for the near future (2 years). On the basis of the selected data, we have created a correlation matrix for the factors. The factor selection comprises the exclusion of interdependent subjects similar in their economic sense.

On the basis of the received pair correlation coefficient and the estimate of their interdependence, to make the further analysis and to build the regressive model of potential capacity of the market of educational services in Krasnoyarsk Territory in the field of higher education it makes sense to keep on the following factors:

- population aged 17-19 years old;
- ratio of average per capita monetary income with minimum subsistence level;
- number of general education institutions;
- number of professional education institutions providing training of qualified workers, employees and middle-level professionals;
- number of higher education institutions;
- expenditure of the federal budget per student.

This selection of factors is proved by the values of correlation coefficient between the indicators characterizing potential and actual capacity of the market of educational services and the following factors (Table 6).

Thus, to build the regressive models, we will use seven factors. However, it doesn't mean that all these factors will be included in the final model selected for forecasting, since for each model it is necessary to evaluate the significance of the coefficient of regression equation and the adequacy of the model.

Table 6. Correlation matrix of assessing the impact of factors on potential and actual capacity of the market of educational services in Krasnoyarsk Territory in the field of higher education

Indicators	Designation	Factors					
		X_2	X_5	X_6	X_7	X_9	X_{12}
Potential capacity of the market of educational services in the field of higher education	Yp_1	0,941	0,741	0,937	0,829	0,916	-0,905
including: number of learners that have received general secondary education	Yp_2	0,745	0,649	0,830	0,505	0,625	-0,667
producing qualified workers, employees and middle-level professionals	Yp_3	0,911	0,677	0,850	0,899	0,950	-0,907
Actual capacity of the market of educational services in the field of higher education	Yr_1	0,921	0,781	0,845	0,800	0,901	-0,927
including: acceptance of students by means of allocations of the federal budget	Yr_2	0,861	0,507	0,756	0,653	0,841	-0,865
acceptance of students according to contracts for paid educational services	Yr_3	0,888	0,849	0,830	0,812	0,870	-0,895

Building regressive models of potential and actual capacity of the market of educational services in Krasnoyarsk Territory in the field of higher education

On the basis of the selected factors we have built both single-factor regressive models and multi-factor models. However, the evaluation of the significance of the coefficient of regression equation on Student's t-test for these models allows to choose the following models of potential and actual capacity of the market of educational services in Krasnoyarsk Territory in the field of higher education (they are presented in Table 7).

In Table 7 the regressive models are highlighted in bold type; they describe an output indicator to the fullest extent possible taking into account the degree and the direction of influence of factor subjects. These models have been taken as a basis to forecast potential and actual capacity of the market of educational services in Krasnoyarsk Territory in the field of higher education.

Forecasting potential and actual capacity of the market of educational services in Krasnoyarsk Territory in the field of higher education

To forecast outcome indicators, it is necessary to forecast factors available in these models. These factor indications include:

- population aged 17-19 years old;
- ratio of average per capita monetary income with minimum subsistence level;
- number of general education institutions;
- number of professional education institutions providing training of qualified workers, employees and middle-level professionals;
- number of higher education institutions;
- expenditure of the federal budget per student.

We calculate the number of inhabitants aged 17-19 years on the basis of the population aged 15-18 years taking into consideration the present trend of transition from one age group to another.

Table 7: analytical form and evaluation of regressive models of potential and actual capacity of the market of educational services in Krasnoyarsk Territory in the field of higher education

Outcome indicator	Regression equation	Probability of significance of all regression coefficients on Student's t-test	Value of coefficient of determination	Probability of adequacy of regressive model on F-test
Potential capacity of the market of educational services in the field of higher education	$\widehat{Yp}_1 = 0,1322 \cdot X_6 - 101,2198$	0,99899	0,8779	0,99994
	$\widehat{Yp}_1 = -0,1264 \cdot X_{12} + 66,2002$	0,99947	0,8191	0,99968
	$\widehat{Yp}_1 = 0,0985 \cdot X_6 + 0,1186 \cdot X_7 - 78,9905$	0,96402	0,9376	0,99994
	$\widehat{Yp}_1 = 0,7347 \cdot X_2 + 0,1209 \cdot X_7 + 0,1619 \cdot X_{12} - 82,7074$	0,90842	0,9471	0,99968
including: number of learners that have received general secondary education	$\widehat{Yp}_2 = 0,0508 \cdot X_6 - 37,3663$	0,97622	0,6886	0,99703
	$\widehat{Yp}_2 = -0,0404 \cdot X_{12} + 25,3389$	0,96094	0,4451	0,96491
	$\widehat{Yp}_2 = 0,0847 \cdot X_5 + 0,0844 \cdot X_6 - 2,5343 \cdot X_9 - 69,2355$	0,93065	0,8607	0,99441
producing qualified workers, employees and middle-level professionals	$\widehat{Yp}_3 = 0,0814 \cdot X_6 - 63,8535$	0,98745	0,7229	0,99817
	$\widehat{Yp}_3 = 3,8213 \cdot X_9 - 18,4831$	0,99303	0,9034	0,99998
	$\widehat{Yp}_3 = -0,0860 \cdot X_{12} + 40,8613$	0,99951	0,8232	0,99971
	$\widehat{Yp}_3 = 0,0415 \cdot X_6 + 0,1404 \cdot X_7 - 37,5301$	0,96780	0,9050	0,99974
	$\widehat{Yp}_3 = 0,1139 \cdot X_7 - 0,0496 \cdot X_{12} + 20,1690$	0,95445	0,9097	0,99978
Actual capacity of the market of educational services in the field of higher education	$\widehat{Yp}_4 = 0,1243 \cdot X_2 + 10,2582$	0,99873	0,8483	0,99985
	$\widehat{Yp}_4 = 0,0925 \cdot X_7 + 12,3758$	0,99301	0,6397	0,99453
	$\widehat{Yp}_4 = -0,0431 \cdot X_{12} + 31,9144$	0,99978	0,8590	0,99989
including: acceptance of students by means of allocations of the federal budget	$\widehat{Yp}_5 = 0,0367 \cdot X_2 + 8,3652$	0,99800	0,7412	0,99862
	$\widehat{Yp}_5 = 0,5250 \cdot X_9 + 6,4250$	0,99681	0,7067	0,99768
	$\widehat{Yp}_5 = 0,0239 \cdot X_7 + 9,3954$	0,95535	0,4270	0,95954
	$\widehat{Yp}_5 = -0,0127 \cdot X_{12} + 14,7621$	0,99818	0,7475	0,99875
	$\widehat{Yp}_5 = 0,3565 \cdot X_2 - 0,0525 \cdot X_6 + 0,0610 \cdot X_{12} + 19,0988$	0,98466	0,9395	0,99953
acceptance of students according to contracts for paid educational services	$\widehat{Yp}_6 = 0,0285 \cdot X_6 - 19,5300$	0,96858	0,6884	0,99702
	$\widehat{Yp}_6 = 0,0783 \cdot X_5 - 10,9067$	0,94111	0,7210	0,99812
	$\widehat{Yp}_6 = -0,0304 \cdot X_{12} + 17,1482$	0,99924	0,8006	0,99953
	$\widehat{Yp}_6 = 0,0498 \cdot X_5 + 0,0167 \cdot X_6 - 20,8229$	0,96795	0,8617	0,99902

We consider the ratio of average per capita monetary income with minimum subsistence level according to the basic version of "Forecast of socio-economic development of Krasnoyarsk Territory in 2018 and the planning period 2019–2020". The number of education institutions of all levels will not change according to "Forecast of socio-economic development of Krasnoyarsk Territory in 2018 and the planning period 2019–2020". We forecast the expenditure of the federal budget per student on polynomial trend of the second degree on the basis of the present tendency of the development of this indicator. On the basis of the data obtained, we calculate the forecast of potential and actual capacity of the market of educational services in Krasnoyarsk Territory in the field of higher education in Table 8.

Table 8: forecast of potential and actual capacity of the market of educational service in Krasnoyarsk Territory in the field of higher education

Factors	Designation	2017	Forecast		Forecast error
			2018	2019	
Population aged 17-19 years old (thousand people)	X_2	81,3	82,1	82,4	-
Ratio of average per capita monetary income with minimum subsistence level (%)	X_5	245,4	249	250,0	
Number of general education institutions	X_6	1010	1010	1010	-
Number of professional education institutions providing training of qualified workers, employees and middle-level professionals	X_7	80	80	80	-
Number of higher education institutions	X_9	9	9	9	
Expenditure of the federal budget per student (thousand rubles)	X_{12}	261,4	274,9	274,7	-
Potential capacity of the market of educational services (thousand people)	Yp_1	29,8	30,0	30,0	2,5
including:					
number of learners that have received general secondary education	Yp_2	14,5	14,2	14,3	1,7
producing qualified workers, employees and middle-level professionals	Yp_3	15,3	15,7	15,7	2,0
Actual capacity of the market of educational services (thousand people)	Yr_1	19,2	20,5	20,5	1,2
including:					
acceptance of students by means of allocations of the federal budget	Yr_2	11,0	12,1	12,2	0,3
acceptance of students according to contracts for paid educational services	Yr_3	8,2	8,8	8,8	1,0

According to the results of the forecast, in the present circumstances we expect insignificant increase of both potential and actual capacity of the market of Krasnoyarsk Territory in the field of higher education. The calculation of forecast values of the models of potential and actual capacity of the market as a whole shows deviation from forecast total values on components of the capacity within the forecast error; that allows us to consider the forecast rather reliable. Taking into account the results of the verification of regressive models of Student's t-test and F-tests, the probability of reliability of the forecast is not less than 0,93.

In accordance with the forecast, the value of potential capacity of the market of educational services of Krasnoyarsk Territory in the field of higher education in 2018 and 2019 will be 27,5 - 32,5 thousand people with the probability 0,93. This forecasting interval is not accidental: the volume of potential capacity of the market in the field of higher education is influenced by the factors that are rather difficult to monitor or to predict, e.g. the number of people that completed education at general educational institutions or professional educational institutions in previous years and they wish to pursue university studies.

The volume of actual capacity of the market of educational services of Krasnoyarsk Territory in the field of higher education in 2018 and 2019 will be 19,3 - 21,7 thousand people with the probability 0,98. In this context the number of students studying according to contracts for paid educational services will be 7,8 - 9,8 thousand people.

Results

Thus, the conducted analysis and the calculations allow to estimate the development of the market of educational services in Krasnoyarsk region in the near future. The use of the provided data and forecast will allow higher education institutions to objectively estimate their development prospects and to allocate efficiently available resources for education service delivery while assessing their place at the market of educational services in Krasnoyarsk Territory. Prospects for the increase of both potential and actual capacity of the market in the field of higher education should encourage higher education institutions to enhance their competitiveness at the market.

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