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DEMAND FOR AND SUPPLY OF HIGHER EDUCATION IN LATVIA

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Abstract. An increase in the education level of the population is an important factor contributing to socio-economic development in regions, while the availability of human resources with higher education influences the regions both directly and indirectly. The research problem relates to the fact that demographic trends and socio-economic factors in Latvia contribute to changes in the quantitative demand for higher education at ISCED levels 5-8. The research has found that in Latvia the demand for undergraduate higher education (ISCED 5-6) is statistically significantly influenced by changes in the number of the working-age population, the number of students who are able to pay their tuition fees, gross domestic product in real prices per employee and average income per capita in cities, while such factors as GDP per capita, average net wage and salary income and average household income per capita in rural areas are statistically insignificant. The supply of higher education at ISCED levels 6-8 prevails in the total supply, while the supply of college education (ISCED 5) by the public and private sectors is underdeveloped outside Riga planning region.

Key words: demand for higher education, higher education infrastructure, wages and salaries, region.
JEL code: D02, H52, I21

Introduction

Quantitative changes in the demand for and supply of higher education in the knowledge services market take place in Latvia. The political priority to increase the number of students in higher education is inconsistent with the real situation in Latvia, as the number of residents in higher education decreases, and this is influenced by the on-going demographic and socio-economic processes. Higher education infrastructure in terms of number of educational institutions is concentrated in Riga region, while the supply of first level higher education is underdeveloped outside Riga region.

Research object: higher education.

Research aim: to identify and analyse changes in the demand for higher education and in the supply of higher education infrastructure in Latvia.

Research tasks

1) To examine theoretical findings on the role of higher education in the economy and society;
2) To analyse and assess the demand for higher education and the higher education infrastructure in Latvia and the regions.

Research methods

The research employed qualitative methods for theoretical literature review, while numerical data were processed using statistical analysis and multifactor regression analysis.

Theoretical background

Role of higher education in society

The influence of higher education on the economy and society is being extensively discussed in the public and scientific space. Such discussions mainly focus on two aspects: direct and indirect effects on the economy and society. The direct economic effects of higher education involve such categories as productivity, consumption and tax revenue (Yao Yao, 2015; Jarvis, Darryl S.L., 2014; Latvijas Universitasu asociacija, 2012; Library House, 2005; Aleksejeva L., 2011), which increase with the number of employees engaged in higher education and the number of employees with higher education rising in a region.

The availability of highly qualified specialists in the work environment increases opportunities for the commercialisation of knew knowledge and is an essential aspect of influence of higher education. The availability of such specialists in the national economy and the components of knowledge quality are appreciated by the government and the labour market, but in any case the direct buyer of knowledge in the knowledge market is a student whose demand for higher education does not depend on political

priorities but is the wish of the particular individual to sell the acquired knowledge in future at a high price (Sannikova A., 2014). Knowledge is formed in multifaceted institutional processes (Warhust Cr., Thompson P., 2012); therefore, there should be an opportunity in the regions to acquire sequential higher education at all its levels.

A few economists are sceptical about the widespread modern view that the problems of economic efficiency and social justice could be solved by means of highly qualified labour and high paid jobs (Brown, Ph., Lauder H., 2012). Besides, the entry of higher education specialists into the national economy in regions does not create equal economic returns and depends on a region's economic development stage (Sannikova A., Dobele A., Dobele M., 2015), which can cause discussions about the usefulness of an increase in the number of higher education specialists. There is also a critical view of the role of higher education in regions, which suggests that the use of higher education-related data in the context of a region's socio-economic characteristics is a way how higher education institutions and education as an industry of the economy try to attract more funds for their development.

However, most economists are of the opinion that positive changes in education contribute to tackling economic and social problems and reducing inequality among countries, regions and individuals (Rubinson R., Browne I., 1994), while the quality of labour may not be separated from the individuals' participation in education. At individual level, acquiring higher education influences the status of the individuals in the social stratification (Mensikovs V., 2007), creates favourable conditions for reaching a higher standard of life and for their competitive advantages in the labour market (Kassalis I., 2010) and contributes to employment as well as promotes the individuals' adaptation to new socio-economic circumstances, which is an indirect effect of higher education. The indirect effect manifests itself as social solidarity and increase in political participation (Library Hause, 2005), economic activity and crime reduction.

Politically, the strategy Europe 2020, which is an EU strategy for growth for the next decade, sets three interdependent priorities: smart growth, which is based on knowledge and innovation, and sustainable and inclusive growth (Eiropas komisija, 2016). Every Member State's strategy sets national-level targets in every particular area of the strategy. Latvia has made a commitment to achieve a target of 30-34 % of 30-34-year-olds with higher education (LR Labklajibas ministrija, 2010), which is lower than the EU headline target indicator (40 %) for ISCED levels 5-6 (Parresoru koordinacijas centrs, 2015). Latvia's target for higher education is consistent with its domestic political priorities that have been defined in Latvia's Sustainable Development Strategy until 2030 in the field of higher education – 40 % of individuals aged 30-34 should have higher education – and evidences political support for higher education in the Member States as a driving factor for socio-economic development.

Developed higher education, which is characterised by the population's education level and the supply of higher education, builds up human resources and raises regional competitiveness (Porter M., 2003; Judrupa I., Senfelde M., 2011), contributes to regional entrepreneurship and provides the transfer of scientific discoveries, knowledge and technologies, thereby fostering regional development. The percentage of residents with higher education increased in Latvia – in 2015, 27.0 % of 15-74-year-olds had higher education, which, compared with 2010, was an 11.0 %-point increase. However, a further increase in this indicator could be hindered by a decrease in the population's incomes, a mismatch between the educational programmes offered and the specifics of regions and the labour market needs, as well as the unavailability of education

infrastructure in a part of the country's territory (LR Ekonomikas ministrija, 2011).

In Latvia, most of the students in higher education are Latvia's residents. Higher education, attracting foreign students, makes a direct contribution to Latvia's national economy. Foreign students studying in Latvia pay higher tuition fees, cover other expenses related to their studies and indirectly promote the development of tourism in the country owing to the students' social and family ties. However, only 42 % of foreign students are satisfied with their studies in Latvia, which indicates that the supply of higher education in Latvia has to be improved qualitatively and quantitatively (Domnica Certus, 2016).

In view of the fact that the higher the education level of individuals is, the higher the average hourly pay and the average monthly wage and salary are earned by them, it is more economically efficient for the country to contribute to increase in the number of residents with higher education, as it results in increases in tax revenues and GDP. The number of 15-74-year-old employees with higher education in Latvia increased from 31.1 % in 2010 to 35.1 % in 2015. However, the problem is that the number of residents decreased by 16.6 % in 2015 compared with 2000, which could decrease the quantitative demand for higher education in the knowledge services market and the supply of employees in the labour market. For this reason, the factors that promote the demand for higher education and the factors that hinder or do not influence it have to be analysed in order to maintain the demand for higher education in the national economy in the future.

Research results and discussion

Latvia's territory corresponds to the NUTS 2 classification, while the country's planning regions and statistical regions – to the NUTS 3 classification; accordingly, the present research analyses the demand for and supply of higher education in Latvia as a whole and by region.

The supply of higher education in Latvia may be classified as undergraduate studies (ISCED levels 5-6) and graduate studies (ISCED levels 7-8).

The demand for higher education at undergraduate level (ISCED 5-6) increased in Latvia in the period 2005-2007, while in the period 2008-2015 it was variable (LR IZM, 2015). In 2015, 84282 students studied at higher education institutions at undergraduate and graduate levels (ISCED 5-8) in Latvia (Table 1). Most students (81.72 %) studied in Riga region, while the smallest numbers were reported in Vidzeme region (1.03 %) and Pieriga region (1.58 %). In 2015, 83.31 % of the total number of students in higher education in Latvia studied in Riga planning region, which included the statistical regions of Riga and Pieriga, while the remaining students (16.69 %) studied in the other planning regions (which matched the statistical regions).

The concentration of students in Latvia's capital city does not contribute to balanced economic effects of higher education as a segment of the education industry on the development of Latvia's regions just because the engagement of labour in higher education, which depends on the number of students and the supply of study programmes at educational institutions, in Riga region is higher than in the other regions.

College education (ISCED 5) may be acquired in Latvia within 2-3 years, which is consistent with the target set in the strategy Europe 2020 to reduce the duration of studies for some student groups. However, despite the low total cost of acquiring this kind of education, the demand for college education in Latvia was low in both 2010 and 2015 (12.79 % of the total students in higher education in 2015), compared with studies at ISCED level 6 (Table 1).

Table 1

Number and percentage of students at universities and colleges in the regions of Latvia in 2010 and 2015

No	Region	Number* of students (ISCED 5-8) at public educational institutions				Number* of students (ISCED 5-8) at private educational institutions				N	%
		Universities		Colleges		Universities		Colleges			
		N	%*	N	%*	N	%*	N	%*		
2010											
1	R	48373	72.52	4639	58.37	24967	98.06	4918	100	81908	79.01
2	PR	-	-	1287	16.19	495	1.94	-		1 782	1.72
3	K	4839	7.41	991	12.47	-		-		5 830	5.62
4	Z	6108	9.35	308	3.88	-		-		6 416	6.19
5	V	1313	2.01	-	0.00	-		-		1 313	1.27
6	L	5697	8.72	723	9.10	-		-		723	6.19
7	Total	65341	100	7948	100	25462	100	4918	100	103 669	100
2015											
8	R	44521	78.07	3841	58.21	16336	99.14	4179	100	68877	81.72
9	PR	-	-	1194	18.09	141	0.86	-	-	1335	1.58
10	K	3261	5.72	760	11.52	-	-	-	-	4021	4.77
11	Z	4353	7.63	196	2.97	-	-	-	-	4549	5.40
12	V	867	1.52	-	-	-	-	-	-	867	1.03
13	L	4025	7.06	608	9.21	-	-	-	-	4633	5.50
14	Total	57027	100	6599	100	16477	100	4179	100	84282	100
15	DF	-8314	-	-1349	-	-8985	-	-739	-	-19 387	-18.70

Designations: N- Number; R- Riga region; PR – Pieriga region; K- Kurzeme region; Z- Zemgale region; V- Vidzeme region; L- Latgale region; % - number of students as a % of the total number of the group; DF – difference in the number of students between 2015 and 2010, number*
Source: authors' calculations based on LR IZM, 2015

The calculations (Table 1) allowed concluding that in Latvia:

- the demand for long-term studies at higher education levels (ISCED 6-8) was the highest;
- the demand for higher education at lower levels (ISCED 5-8) declined both at public and private higher education institutions.

Most of the demand for higher education (ISCED 5-8) is made up of the demand for it by Latvia's residents, while a small share of the demand is comprised by foreign students who mainly concentrate in Riga region. Although the percentage of foreign students at Latvia's higher education institutions rose by 7.0 %-points in 2015 compared with 2008, yet their total number in 2015 was not large – 2918, and the percentage of this student group was not greater than that in 2000 (8 %). Besides, the real number of foreign students decreased in 2015 compared with 2000 (by 1418 or 18 %), while no decrease in higher education infrastructure was reported. The number of individuals employed in higher education did not decline; on the contrary, the number of individuals at the main job, including those with a scientific degree, increased (Table 2).

Table 2

Change in the number and percentage of personnel in higher education in Latvia in 2015 compared with 2000 and 2010

No	Group	Change 2015/2000*		Change 2015/2010**	
		N	%	N	%
1.	PM	924	23.18	194	4.11
2.	ZG	968	49.64	751	34.66

Designations: PM- personnel at the main job; ZG – personnel with a scientific degree; N- Number; 2015/2000 - change in the number and proportion of personnel in 2015, compared with 2000; 2015/2010** - change in the number and proportion of personnel in 2015, compared with 2010*
Source: authors' calculations based on LR IZM, 2015

One can conclude that the higher education attractiveness increase in the composition of personnel is not the only factor that affects the

exports of higher education services. Strategic support by the government is necessary, as studies show that the current government support is insignificant in this area (Domnica Centus, 2016) despite the fact that higher education exports are an important segment of the national economy.

In 2010 and 2015, the supply of higher education in Latvia was provided by 56 public and private universities and colleges and two foreign university affiliates.

In 2015 compared with 2010, changes in the number of higher education institutions were observed only in Riga region where their number increased by one such institution and in Latgale region where there was a decrease by one institution. In 2010 and 2015, Riga region's universities and colleges met most of the demand for higher education in Latvia; besides, there was an increase in the demand (2.71 %). In the other regions of Latvia, the quantitative demand for higher education decreased (-2.62 %) in 2015 compared with 2010, which indicated a decrease in the influence of Latvia's regions (except Riga region) on the economy.

A distinctive feature of Latvia's higher education infrastructure is the lack colleges founded by legal entities in the regions of Kurzeme, Zemgale, Vidzeme and Latgale and the lack of colleges in Vidzeme region (Table 3).

The demand for undergraduate higher education by Latvia's residents is shaped by individuals who have graduated from secondary schools and are aged 17-19 and older. However, given the available data of the Central Statistical Bureau on demographic and socio-economic processes and of the Ministry of Education and Science on education, as well as the incompatibility of the data in respect to their division by age group, the data were recalculated for the following age groups: 15-24, 25-39 and 39-64 for the purpose of an examination of changes in the demand for higher education by age group.

Calculations were performed to identify the changes for the working-age groups as well as a related trend was identified, which was possible because the time series yielded a long-term trend and trend models could be employed to make necessary forecasts. The examination revealed that the number of residents decreased across all the working-age groups in Latvia in the period 2010-2015:

3) the decrease in the number of residents for the age group 15-24 showed a linear trend (R^2=0.9955):

$$y=-17424x+314206 \quad (1)$$

4) the decrease in the number of residents for the age group 25-39 was described by a quadratic equation (R^2=0.8091):

$$y=-11886x^2+57433x+375907 \quad (2)$$

5) the decrease in the number of residents for the age group 39-64 also had a linear trend (R^2=0.9506):

$$y=-3224x+702201 \quad (3)$$

where:

x - periods (x=t+n), R – determination coefficient.

The decreases in the working-age population as a whole and across the above-mentioned age groups (LR VARAM, 2010; LR CSP, 2016) in Latvia can influence the demand for higher education by these age groups.

Table 3

Higher education infrastructure and the number and percentage of students in higher education in Latvia's regions in 2010 and 2015

No	Region	2010					2015					2015/2010
		Public, number		Private, number		%*	Public, number		Private, number		%*	
		A	K	A	K		A	K	A	K		
1.	R	10	8	14	7	79.01	10	9	12	9	81.72	2.71
2.	PR	-	3	1	-	1.72	-	3	1	-	1.58	-0.14
3.	K	3	1	-	-	5.62	3	1	-	-	4.77	-0.85
4.	Z	1	1	-	-	6.19	1	1	-	-	5.40	-0.79
5.	V	1	-	-	-	1.27	1	-	-	-	1.03	-0.24
6.	L	2	4	-	-	6.19	2	3	-	-	5.50	-0.60

Designations: Private – number of universities and colleges founded by legal entities; public – number of universities and colleges founded by the government; R- Riga region; PR – Pieriga region; K- Kurzeme region; Z- Zemgale region; V- Vidzeme region; L- Latgale region; A- universities, K- colleges, 2015/1010 – change in the number of students in 2015, compared with 2010, %; % - number of students as a % of total; 2015/2010 - change in the number of students in 2015, compared with 2010, %-points*

Source: authors' calculations based on LR IZM, 2015

Table 4

Demand for higher education by age groups in Latvia in 2010-2015, % and number

No	Age group	Percentage of students (ISCED 5-8) in the age group, %						Change in the number of students, 2015/2010	
		2010	2011	2012	2013	2014	2015	Number	%
1.	15-24	22.62	23.12	23.39	23.26	23.11	23.26	-18409	-27,15
2.	25-39	6.47	6.26	6.54	6.67	6.90	7.21	1227	4.33
3.	39-64	1.10	0.88	0.90	0.76	0.75	0.78	-2318	-30.28

Source: authors' calculations based on LR IZM, 2015

Nevertheless, the present research found that in Latvia in the period 2011-2015, the changes in the demand for higher education were not equal (as a % of the total number of the group) across the age groups of 15-24, 25-39 and 39-64 (Table 4):

- positive changes in the demand for higher education were observed for the age groups of 15-24 and 25-39 – the proportion of both groups rose by 0.74 %-points in 2015 compared with 2010;
- a small but negative change in the trend was identified for the age group 39-64 old ones – their proportion in the total number of students decreased by 0.32 %-points in 2015 compared with 2010.

However, despite the increase in the proportion of the age group 15-24 with regard to the demand for higher education, the real number of students aged 15-24 decreased by 27.15 % in 2015 compared with 2010 (Table 4). The number of students aged 25-39 increased by 4.33 %, whereas the number of those aged 39-64 decreased by 30.28 % in 2015 compared with 2010.

According to CSB data (LR CSP, 2016), the labour market demand for human resources with higher education increased in 2015. If individuals acquire a higher level of education, the wages and salaries of the employed individuals increase in all the industries of the economy.

Nevertheless, the average wage and salary for employees with higher education was not equal across all the age groups in 2014. At ISCED levels 5-8, the average wage and salary for the age group 30-39 was considerably higher than for the age group 20-29.

However, there were differences in the average maximum wage and salary among the age groups (LR CSP, 2016): higher average

hourly wages were earned by individuals with a doctor's degree (EUR 10.20) at the age of 50-59 years and those with a master's degree (EUR 7.35), level 1 higher education (EUR 5.16) and a bachelors' degree (EUR 5.97) at the age of 30-39. At an older age, the mentioned age groups earned lower average hourly wages.

The present research allows concluding that:

- in the labour market, higher education level knowledge is bought at a higher price;
- if acquiring higher education at OECD level 6 earlier, it contributes to a greater increase in wages and salaries, and this explains the low demand for college education in Latvia;
- an increase in the participation of the age group 25-39 in higher education, acquiring a higher level knowledge, is in line with the increase in labour costs for this age group.

A research study on factors hindering individuals from participation in higher education in Latvia found that:

- in 2014, wages and salaries for employees being participants in higher education in the following industries: education (P), arts, entertainment and recreation (R) and accommodation and food service activities (I) were two times lower than in financial and insurance activities (K) and almost 1.5 times lower than in the entire economy;
- wages and salaries in the national economy were diverse – not always higher education level knowledge (according to the OECD classification) resulted in higher earnings. The average wage or salary income (EUR 927) for an individual with a doctor's degree engaged in construction (F) in 2014 could be mentioned as an example – the income was even lower than for those with first level higher education who worked in manufacturing (EUR 948).

This fact shows that pay may be both a promoting and a hindering factor for the demand for higher level knowledge.

The demand for education by households is influenced by the industry the household members are engaged in and their age group, at least because these factors influence their economic ability to cover the costs related to the acquisition of their education. In the period 1998-2015 in Latvia, according to data of the Ministry of Education and Science (LR IZM, 2015), the number of students in undergraduate studies, which result in acquiring a bachelor's degree or level 1 higher education, who covered their studying costs by their private funds was greater than the number of those whose costs were cover by government funding. Even though the number of students covering their costs by their private funds decreased in recent years (in 2012-2015), yet their percentage was still high – 58 % of the total undergraduate students in 2015 (compared with 2010, it was a decrease by 5 %-points).

An essential aspect in the demand for higher education could be whether households live in a city or in rural areas, as the average income per household member in cities was higher than in rural areas in the period 2010-2015 (LR CSP, 2016).

The present research has found that the demand for higher education could be influenced by the number of working-age residents as well as economic factors that affect the residents' ability to participate in higher education and cover their studying costs. To statistically verify the mentioned finding and determine the influence of the factors on the demand for higher education in Latvia, calculations were performed employing multifactor regression analysis, and the results acquired were tested for multicolinearity. To technically perform a regression analysis, the backward elimination method was chosen in order to exclude statistically insignificant factors from the model and the stepwise elimination method was chosen, which is the most widespread method employed in multifactor regression analysis and allows

consecutively including the variables examined in a regression equation.

Since the backward elimination method yielded better results in terms of p-value, the equation for the demand for undergraduate higher education (the variable) was based on the results acquired by this method:

$$y = -30985.216 + 0.024x_1 + 1.067x_2 - 0.0658x_3 - 38.155x_4 \quad (4)$$

where:

y – demand for undergraduate higher education, the number of students; x_1 – number of working-age residents; x_2 – number of students covering their studying costs by their private funds; x_3 – GDP per employee, EUR; x_4 – average household income per member in cities, EUR.

The parameters of Equation 4 were as follows: n=11, R^2=0.996, F=236.074, p=0.000. The regression model included statistically significant factors (p<0.05) and excluded statistically insignificant variables: GDP per capita (x_5; p=0.074), average net wage and salary in Latvia, EUR (x_6; p=0.055) and average household income per member in rural areas (x_6; p=0.061).

The regression equation (4) allows concluding that the number of students in higher education could increase with the numbers of working-age residents and households that can cover their higher education tuition fees by their private funds rising. In contrast, change in GDP per employee and change in the average household income per member in cities are the factors that do not contribute to an increase in the number of students, which might be explained by a considerable increase in (direct and indirect) studying costs, insignificant changes in household incomes, changes in the employment rate and disparities among Latvia's regions.

Conclusions

- The role of higher education is extensively researched by scientists, and, at regional level, it is mainly associated with the effects of increase in productivity in the national economy, consumption and tax revenue;
- in Latvia, the demand for higher education by the age groups of 15-24, 25-39 and 39-64, as a percentage of the total number of the group, changed insignificantly; however, due to the negative demographic trends, the number of students at public and private universities and colleges decreased by 18.70 % in 2015 compared with 2010, which was determined by the decrease in the numbers of students in higher education in the age groups of 15-24 and 39-64;
- the multifactor regression analysis showed that the demand for undergraduate higher education is statistically significantly influenced by such factors as the number of working-age residents, the number of students who can cover their higher education tuition fees by their private funds, GDP per employee and average household income per member in cities;
- Latvia's higher education infrastructure has little changed in 2015 compared with 2010, while the supply of college education in Latvia's regions is insignificant and there is no supply of this kind of education at all in Vidzeme region.

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