University doctoral (PhD) dissertation abstract

EFFICIENCY STUDIES IN HIGHER EDUCATION

by
Réka Tóth

Supervisor:
Dr. Zoltán Bács
Associate professor

UNIVERSITY OF DEBRECEN
Károly Ihrig Doctoral School of Management and Business Administration

Debrecen, 2011

1. Introduction and setting of objectives

The European Council put the target to the European Union on its conference in Lisbon in March, 2000 for making Europe the world's most competitive and most dynamic knowledge-based economy. This new setting of objective has just even more valorized the relevance of human resources and along with this it also valorized the role of the institutes of higher education, which are the most important body of their education and new supplies. In our constantly changing world these institutes have to face with even more challenges. They have to fulfill the interest of even more interest-groups. Beside the increase in the number of students and the decrease of state funds they have to operate to maintain the proper quality, too.
They are only able to secure the competitiveness of Hungarian diplomas by this way, so it will become attractive for the foreign students. There is a stronger demand for the higher education to be a social subsystem, to be able to closely connect to the economy, and to facilitate its development. It is also important to ensure the equity of the students and to give the chance for life-long-learning. There is only one system, which is able to fulfill all these requirements and this should be varied, should have several sectors, should work flexible, and should be able to renew from time to time.

The Bologna Process, which was set for harmonizing the several systems of higher education of the member countries, started a radical process of reform in the European higher education and it also determined the last ten years of our domestic higher education, too. Several results were born, certain setting of objectives were however just partly fulfilled and realized. The convert of the distribution mechanism for the frame numbers, supported by the state can be considered as the first relevant change, which followed the introduction of the lineal education system. However, without any correction this can heavily change the scale of the institutes of higher education in the future. So accordingly I will approach the practical side of the provision in my dissertation regarding the plan of the new act of higher education: I will analyze the causes and effects of changes with the help of the latest facts and dates. In this framework I will summarize the setting of objectives of my dissertation as the followings:

- In the course of selected bibliography I will introduce the most important opinions, theories related to higher education and to its financing and the evaluation of viewpoints of the financing system. I will introduce the Hungarian financing system and its changes, and then based on the chosen viewpoint I will evaluate the actual financing system. As our system has been recently transformed to a complex one, the judgment of a provision would be wrong and would lead to false results. To avoid this I consider it necessary to review all the relevant problems and open questions of our higher education.

- As first I would like to find the answer for the question if the change of the distribution mechanism for the frame numbers would ever correct the allocated efficiency of the system with the help of considering the fact how the students are choosing out of the institutes.
- Related to the new distribution mechanism I will analyze if we can talk about a phenomenon of asymmetric information when students are about to choose from the institutes. Are they capable of measuring the certain institutes and the differences between the qualities for services of the institutes? To do this I would like to create a performance review model, which is more likely able to compare the performance of the certain institutional faculties and to show the causes for the performance gap.
- I will disclose how the institutes of higher education and so the tertiary education can contribute to the development of sub-regions. The aim of the investigation is to determine how the new distribution mechanism will affect the equity of the sub-regions.
- I will identify those personal and social facts, which are affecting the performance of the students from the University of Debrecen Centre for Agricultural and Applied Economics Sciences and I will analyze if the level of development of the permanent address for the sub-region would affect these factors or if the distribution mechanism has any indirect effect for the student dimension based on these theories.

By the checkout of the hypothesis, which support the realization of the above mentioned setting of objectives I am not only able to tell an opinion about the transformation of the distribution mechanism, but I will be able to judge the justness of certain parts of the plans for the act of the higher education. Besides I will make an offer for how to correct the system so the Hungarian higher education could be successful in complying with the altering conditions and in holding on in the global competition.

2. History and applied methods

In order to reach the setting of objectives mentioned in the introduction there was a need for a wide collection of data. About the database I used it is generally true that the data needed for the checkout of my hypothesis are mostly secondary data coming from an exterior numeric database. There is only one setting of objective, which realization is supported by information from interior numeric and text databases, primary data collected for the sake of the accomplishment of the given research questions and not by my own quantified data.

The investigation of the change of the allocated efficiency can be realized with concentration analysis. For this I used the recording statistics of the National Higher Education Centre for Information (OFIK) as a helping hand, which continually records the number of the admitted and applied students from 2001 according to work schedules, financing form, training area, institution, faculties and the residency of the applicants, as well. I analyzed the distribution of the number of admitted students between the institutes with the help of statistic tools used for the measure and demonstration of degree of concentration, such as the Lorenz diagram, the Hirschman-Herfindahl index and the Gini coefficient.

The so-called HVG-Felvi ranking, which published the summarized national ranking of the faculties, provided the date for me to evaluate the performance of the institutes and faculties of Hungarian higher education. The system gives two results for each faculty, one is for indicating the position in student's ranking, as the other is for doing it in tutor's ranking. As these factors are moving on an ordinal scale, I used the U-probe by Mann-Whitney to determine the difference between the individual faculties.

I used the Data Envelopment Analysis (DEA) as another method to evaluate the certain faculties. DEA is a non-parametric method, which applies mathematical programming, and is less known in our country, however outside of the country it is a popular and widely used method. Its basic aim is to determine, which units of the systems having several input and output variants are working less efficiently. Later on the need arose that the method should give us information about how the input units need to be changed in order to improve performance. (COOPER et al., 2007)

The DEA method can be applied in several areas of higher education. In my enquiry it first helped me with the quantifying of the efficiency of the faculties in higher education, for which I created a DEA model, which is output oriented and calculates with a variable rate of return. Figure 1 shows the structure of the model.

Figure 1: Performance review DEA model of the faculties for the individual training areas

Inputs	**Number of qualified tutors per 100 students***
	Point average of admitted students**
Outputs	**Rate of students acquiring a diploma***
	Prestige value of the individual faculties

* Under students are always meant the ones studying on full-time, state-sponsored faculties

**Only those who indicated the given faculty in the first place

Source: own combination

The base for analyzing the production efficiency are the statistics for the individual institutes and faculties, available on the OKM website. They give the input and output number of data for the developed models. I calculated the quality indicators based on the information form the HVG-Felvi ranking. The prestige value of the faculties was provided by the program developed for analyzing the employment of graduate entrants of MKIK Institute for Economic and Enterprise Research. The prestige value is currently available on four training areas, out of which I will calculate the DEA model for the faculties of two training areas: the economic and technical faculties. As the other two areas of science are lacking the faculties with the determined features, I am not able to make the comparison between the groups relevant for me. The efficiency factors, calculated by the models, are quantitative factors, so the comparison of the average efficiency of the individual group of institutes is with t-probe of independent pattern.

The raison d'etre of rural institutes of higher education is only proved if on rural level there can be a significant connection between the rate and level of development of the population which has a diploma and deals with research and development. However for this it is needed that out of the several indices, showing the level of development, you could filter everything, what is not relevant from the topic point of view and that you could compress the important ones based on certain aspect in order to let the new variants be able to make further calculations. To fulfill all my setting of objectives I used the principal component analysis as a help out of the multivariate statistic methods. Beside the determination of principal components I also had the aim to quantify the complex improvement principal component of rural level, which can be determined as the lineal combination of the individual main components. After this I grouped the Hungarian sub-regions based on their complex state of development with the help of cluster analysis and I used the correlation factor by Pearson for the analysis of the connection between the above mentioned alternates. In the course of my analysis about the sub-regions I leaned on the data collected and published by KSH (Hungarian Central Statistical Office).

My personal level of setting of objectives was realized among the students graduated in the University of Debrecen Centre for Agricultural and Applied Economics Sciences in the academic year of 2009/10.
The data needed for the analysis are coming from two sources: on one hand the questionnaire, on the other hand from the so-called Neptun (Information System for Students on the University of Debrecen) provide the numeric and text information.

Figure 2: The DEA models of the individual level of performance review

	model 1 (M1)	**model 2 (M2)**	**model 3 (M3)**	**model 4 (M4)**
inputs	Grade of entrance exam	Grade of entrance exam	Grade of entrance exam	Grade of entrance exam
	Time used for visiting classes (hour/week)	Time used for studying in the teaching period (hour/week)	Time used for studying, average (hour/week)	Time used for studying, weighted (hour/week)
outputs	The average of grade average in each semester	The average of grade average in each semester	The average of grade average in each semester	The average of grade average in each semester
	Grade of diploma	Grade of diploma	Grade of diploma	Grade of diploma

Source: own combination

To be able to determine the personal and social factors, which are affecting the efficiency, you need to analyze the performance of students, which method is the above mentioned DEA analysis. To test my hypothesis, applied for students, I created four DEA models, which are output oriented and work with changing rate return. Figure 2 shows its structure. The models only differ in the determination and calculation of the second input, because the bibliography does not give a correct offer for if the contact classes alone of the individual working hours should be considered in the course of such an analysis.

I applied variance-, discriminant- and correlation analysis after the transformation of the performance index of 309 students, who graduated on nine different majors and in order to determine the factors, which has an influence on the performance, as there were low and high levels of measurement among the variants.

3. The main statements of the dissertation

The distribution mechanism of the frame of numbers, supported by the state is of key importance in the Hungarian higher education, which does not only affect the life of colleges and universities. It gets even more important by the fact that the government is planning to drastically withdraw the sources regarding the higher education sector and it is not all the same, what criteria are deciding about the fact, which institutes and training are worthy getting the support and which are not. According to the traditional standpoint by the equity and efficiency Stiglitz dilemma, there is no way to consider both points of view at the same time neither by the economic policy decisions nor the education funding, so the measures, taken for higher efficiency are decreasing the extent of equity. This dilemma is shown in figure 1.

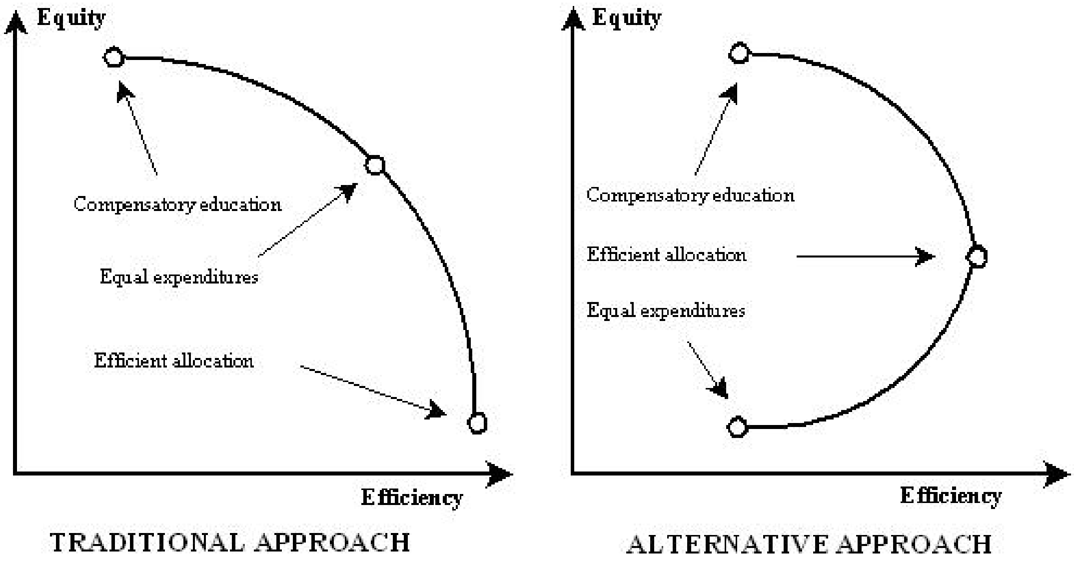

Figure 1: Relationship between efficiency and equity regarding the educational expenses

Source: STIGLITZ (2000, 386)

The Hungarian higher education has been significantly changed in the last decade. The state was not fully able to take over the financing of the student number, which was tripled in the 90s, so the fee-paying training appeared in the institutes of higher education. Institutional integration has taken place; the course structure and financing have been also changed. By means of the input-based distribution of supporting, the institutes of higher education got interested in admitting high number of students and in the prolonging of course time. The distorted training system, that took shape because of the mechanism of financing does not only degrade the quality of the training itself, but the accommodation of higher education to the labor market needs.

The distorted education system, which was developed because of the mechanism of financing, does not only degrade the quality of training but the adaptation of start of higher education to the demand of labor market. In case of some occupations there is a great over qualification, as others are lacking of professionals, which means that the system of higher education does not comply with the demand of labor market. The decision makers wanted to change this situation, when they decided to modify the distribution mechanism of the number of students admitted for state-sponsored faculties in 2006. The recruitment process has been changed, the number of admitted students was not limited by the faculties but by training areas – with this they wanted to orient the institutes of higher education and the students themselves for the occupations preferred more by labor market. Chart 3 clearly shows the aim of state regarding the period between 2007-2010, according to which they wanted to finance even less students on the training areas for agriculture, humanities, economics, social science and legal matters. However, on the areas for informatics, technical, medical, and science matters they allowed admitting more students. The tendency is even more emphasized with the labeled data coming from 2011.

Figure 3: The number of students who can be admitted for the state-sponsored faculties (2007-2011)

	Faculty	**2007**	**2008**	**2009**	**2010**	**2011**
Training	Agricultural	1900	1900	1800	1850	1850
	Human studies	4800	4800	4800	4450	4100
	Economics	6000	6300	5900	6250	4900
	Informatics	4600	4700	4700	4700	6400
	Legal	500	530	500	500	500
	Technical	9200	9600	9600	9850	9850
	Medical sciences	2000	2100	2000	2100	3100
	Educator training	2000	1900	1900	1800	2000
	Social sciences	3300	3200	3000	2750	2100
	Natural sciences	3900	4200	4200	4200	5200
	Art	450	450	450	520	570
Full undivided training	Agricultural	100	100	100	100	160
	Legal	1200	1100	1000	850	800
	Technical	200	400	200	200	200
	Medical sciences	1500	1400	1400	1500	1500
	Art	250	250	250	180	180

Source: 1108/2006. (XI.20.); 1077/2007. (X.4.); 1051/2008. (VII.28.); 1116/2009 (VII.23.); 1276/2010 (XII.8.) Kormányhatározatok az egyes években a felsőoktatásban felvehető, államilag támogatott létszámkeretekről.

It is an important change as well that the demand of students and the level of higher education became a deciding factor in determining, what amount from the state fund the universities can get. As a next step I will introduce my observations and conclusions made during my analysis.

3.1. The analysis of allocation efficiency in Hungarian higher education

The allocation efficiency means the best use and distribution of limited available resources in order to maximize the utility (consumer welfare). Regarding the higher education it will come true, if the amount and structure of training programs do not take shape based on a central design but the balance between the institute offer and student demand determine it. This has two preconditions: to create a free choice of students and to make the institutes interested for students' demand. (KOVÁTS, 2006) As the new distribution system puts more emphasis on students' demand and so it urges the institutes of higher education more for considering the "consumers" demand, regarding the allocation efficiency we can expect a positive movement. The values of the Gini coefficient and the Hirschman-Herfindahl index are according the expectation. (figure 4)

Figure 4: The change of the Gini coefficient and the Hirschman-Herfindahl index (2001-2010)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Number of institutes	43	43	45	46	49	49	49	47	47	47
Gini index	0,273	0,269	0,279	0,270	0,280	0,288	0,309	0,293	0,308	0,313
HH Index	0,049	0,047	0,048	0,045	0,044	0,047	0,054	0,050	0,054	0,056

Source: own calculations based on data from OFIK (2011)

Out of the two indices you can consider the Gini coefficient as the more accurate of the concentration, because it is able to consider the change in the number of elements, it is more sensitive for the inevitable changes, and it better approaches the size of area closed in by the Lorenz diagram. (JUHÁSZ et al., 2004) According to the Gini index the concentration of the admitted students between the institutes increased by 7,3 % after the introduction of the system, in 2010 it was higher with 14,6 % than the ones in 2011, which is an obvious proof for the rise of the allocation efficiency.

3.2. The analysis if the performance of the institutes of higher education

The new distribution mechanism forced and forces today, too the institutes of higher education, in which the ones with lower performance lose students but the ones with higher performance can admit a higher number of students. The predominance of capital city dominates in contrast of the rural ones from the local point of view of the institutes, which is increasing from year to year after the introduction of the measures. You can tell the same in case of the groups of the institutes, too, but the difference is simply bigger in favor of the universities in contrast of colleges. Based on these it is quite obvious that the biggest losers of these measures are the rural colleges, which number of students decreased with 42,6 % between 2006 and 2007. In 2008 however, the faculties of rural colleges suffered not only a quantity but a quality disadvantage, too because of the leaving of the more qualified students among the other faculties and this disadvantage remained until 2009. As long as the students are fully informed regarding the extent of their influence about the distribution of the financed number, it can be proved that the performance of faculties with greater disadvantage is worse and the level of their training is lower. To test this hypothesis I compared the performance of the institutes of Hungarian higher education.

For this I first used the ranking numbers of HVG-Felvi ranking. Based on the student choice of institutes and on the comparison of total ranking it can be determined, which institutes and faculties are the ones from which you can expect a higher level of training. Beside both the student and tutor rankings show that the lower level of performance of faculties of rural colleges arises from the fact that they are institutes and not from the fact that they are rural. This phenomenon is widely more available among the tutors, which is definitely shown by figure 2. The decline of the faculties of colleges is mostly the result of the so-called intercity-professor phenomenon. The government has namely taken the actions that a tutor can only be applied by one institute of higher education, so only one institute can get state aid after him or her. Therefore the professor stuff with academic recognition officially oriented to the university faculties with a greater history and prestige.

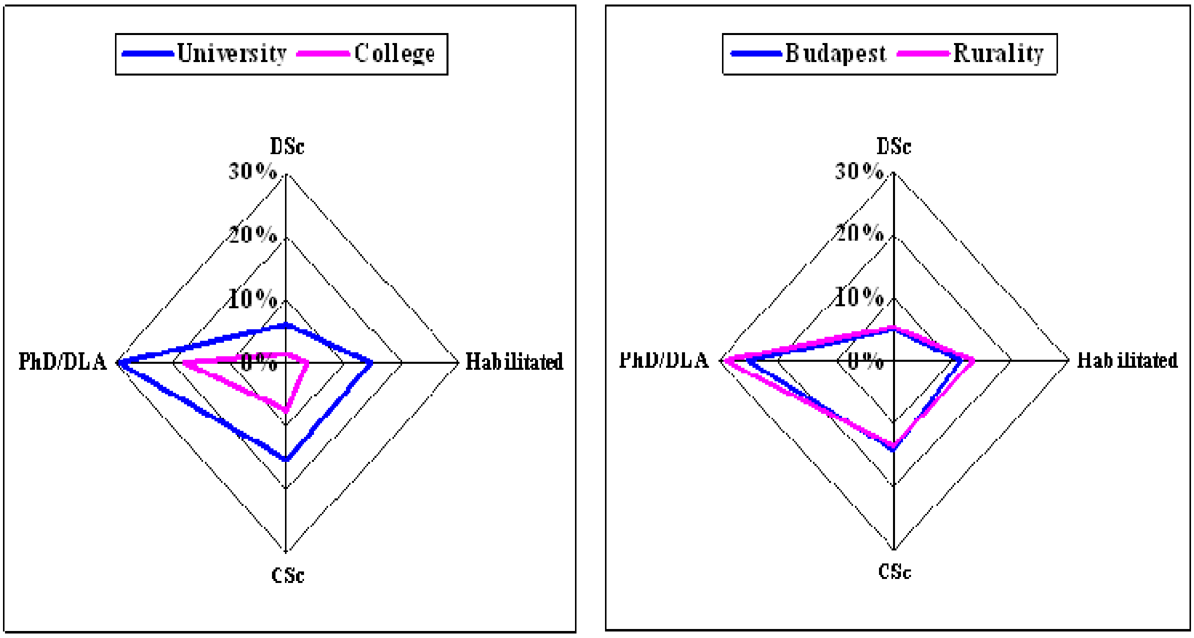

Figure 2: The difference between tutorial performance in the institutes of higher education in 2006

Source: own calculations based on data from NEFMI (2011)

The other method for measuring the performance of the faculties of institute is the Data Envelopment Analysis. The DEA calculations only partly support the conclusion based on the ranking, as they only confirm the full information of the students applied for state trainings regarding the judgment of faculties of rural colleges. Besides, out of the two areas it was only possible to prove in case of economic training places that the situation of rural colleges is the result of their institute nature. Based on the descriptive statistics of the input and output variants I could determine that the disadvantage of rural faculties can be explained by the relative number of the qualified teachers from the inputs, and this coincides with the results of total ranking. From the output variants it is the prestige value, which mostly justifies those differences. On an economic training area the geographical location differs more the prestige of the institutes than the state of being an institute, as on a technical and engineering area it is totally the opposite.

The conclusions show us that in a quality-oriented performance review both the judgment of how the students choose the institutes and faculties and the factors affecting the position of rural colleges can differ in the fact, which training location of science you would like to examine.

3.3. The relationship between the level of development in the sub-regions and the higher education

The results coming from the analysis of the total student and tutor ranking and the efficiency indices of DEA clearly show the lagging behind of the rural colleges behind the other institutes of the Hungarian higher education. However, it is not only the education analysts and decision makers are aware of these facts, but it is also sensible for the employers and the students, as well. The latter interest group is the one, which could reorganize the whole sector with the help of the more impressive decisions: the rate of students admitted for the rural colleges decreased from 22 % to 11,8 % in the last five years, their fate has been sealed.
The concept of the new act of higher education draws its attention more to the rural institutes; it handles them as a first priority. The decision makers think that no region should be deprived of its institutes, as they could increase the chance for making more workplaces and facilitating in keeping there the population and so they assure its economic and cultural development. The basic aim of my analysis on the sub-regions is to know the nature of this relationship from the domestic point of view.

Analyzing the geographical location of the institutes of higher education and comparing this with the state of the network after the change of system it can be determined that in the last twenty years the sector went through a significant institutional change, which resulted in the strengthening of the centers ruling the higher education of the region. (RECHNITZER, 2009)
As the rate of individuals within the sub-regions follow the regional concentration of the institutes, it clearly represents the presence of training areas and it can be applied for the analysis between the connection of the level of development in the sub-regions and the higher education.

I made the quantifying of the level of development in the sub-regions with the help of main component analysis. I classified the 23 development indices, which are the base for the analysis, into four homogeneous groups, which explains 80 % of the total variance. The first main component represents the employment and social status of the sub-regions, the second depicts their economic development, the third and the fourth compress the indices for quality of life and infrastructure. It is possible to determine a development factor compressing single multilayered information as a combination of the four main components, which values show great disparity in the sense of the level of development in the sub-regions. The most underdeveloped sub-regions are definitely the ones in the East from the Danube. Apart from some exceptions, it is only the regions around the town cities, which can reach the national level of development.

It was proved regarding the domestic sub-regions that the size of qualified human resources is in a measurable relationship with the complex development and with its entire main component. There is a medium strong of correlation with the employment and social main component and there is a strong correlation with the economic main component. Within that the correlation value, generated along with the relative number of joint venture, is extremely high (0,909), which refers to a strongly dependent relationship, however it was not possible to determine the direction of causal connection between them. (That is you cannot decide either a sub-region will be attractive for students because of its convenient economic level of development, or it is the ventures, which settle in an area, where the qualified human resource can be found. Probably both are true at the same time.) The crosstab, which shows the connection between the education and development, confirmed that the higher level of education has a significant role in reaching the high or even higher level of development.

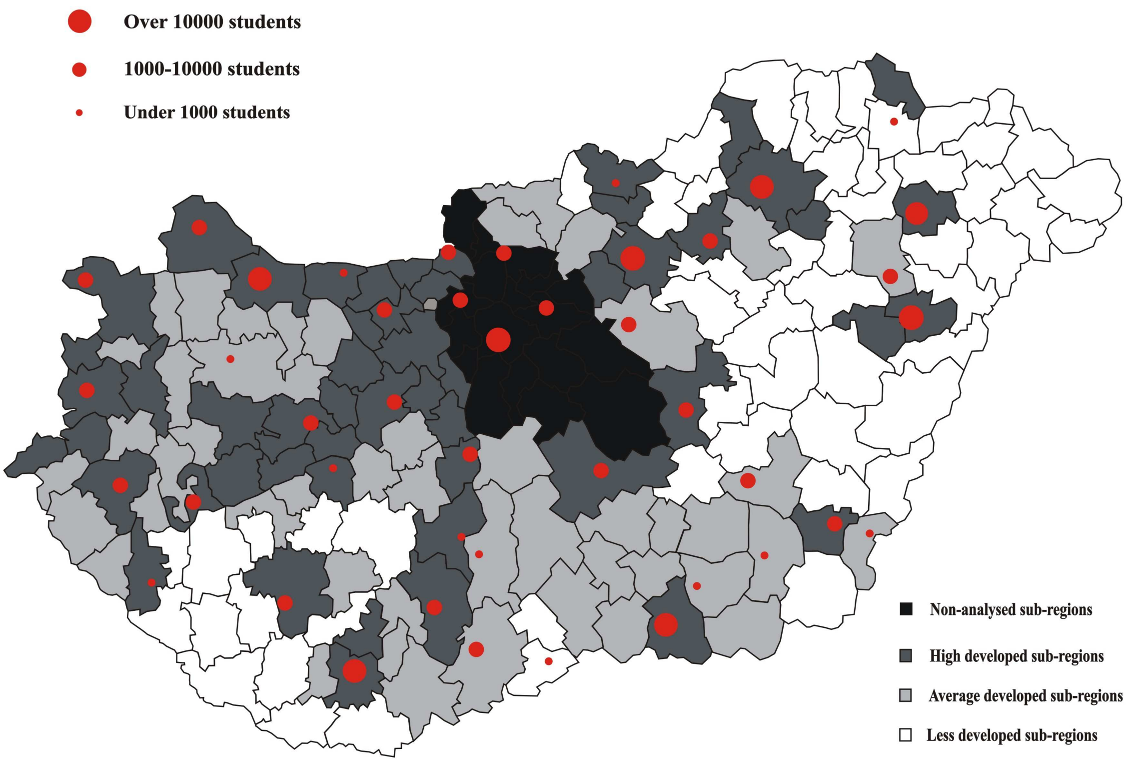

Figure 3: The development clusters of the sub-regions and the locations of higher education institutes

Forrás: saját szerkesztés

The effect of presence of the institutes in higher education can be clearly seen in figure 3. Out of the development groups of the rural sub-regions, which were formed by cluster analysis the seat of those institutes, which number is over one thousand, can be found in the highly developed sub-regions.

I could prove that those, who have higher education, can stimulate more the employment, can raise the standard of living and can improve the status of infrastructure in those sub-regions, which have no institute of higher education. I could also prove that the level of development of the Eastern region is more affected by the fact what percent of its population graduated on universities or colleges. As these areas are just the ones, which are the most underdeveloped, we can still determine that with the growth of the complex level of development the sub-regions are less dependent from the presence of graduated manpower. My observations are proved by the cluster analysis, which is based on the main component analysis, as in the underdeveloped sub-regions there is a correlation of 0,496 between the complex development and high level of education, as this correlation is 0,381 in the ones with higher education.

3.4. Analysis of individual efficiency and equity

There is a legal and validated expectation regarding the education system and any of its levels that the differences between the performances of students should arise from their skills, talent, and diligence and not from their fortune or power. (RADÓ, 2006) These are just the requirements, valid for the fairness of education, so the individual analysis of efficiency is the base in analyzing the equity of students. With the help of DEA models, which are operating with an output-oriented and changing rate return I could examine how efficient the study of the 309 students, graduated on the nine several faculties of DE-AGTC was during their education in the sense that compared to their admission score and to the time they used for learning what grade they could acquire at the end of the certain semesters and then the university itself.

Regarding the admission score you can clearly distinguish the students graduated on the full training time (5 years), the BSc and BA students, as there is an average of 10 point difference between the two kinds of training, the diffuse of relative input variant is however higher in case of the university education. Regarding the time spent on visiting the classes and on studying there is no big difference between the certain kinds of training and the students of faculties. Regarding the average grade there is a greater distribution in case of students with economic training as in case of the ones with agricultural training, which let us think that there is a big difference between the different levels of faculties in GVK. The average result and relative distribution of diploma however show a more even picture about the two faculties, which means, that the grade for the diploma work and the result of the final exam can compensate the differences in the performance during the training years. The worst final result belongs to the students who graduated on the finance and accounting faculties, the best ones belong to the graduates of environmental and agricultural engineer.

As the most important lesson of the individual analysis of efficiency I would mention that the students of DE-AGTC do not fully profit from their resources in order to reach as better performance. You can determine that the DEA indices are not significantly affected by the fact that according to what principles the time used for studying is built into the model. In case of economic trainings the consideration of individual preparation time decreased, as the exam period increased the number of students with performance above average. In case of the agricultural trainings it was just the opposite, so continuous learning is more important there.

With the help of performance indices I examined the influence of students' gender, their socio-economic background and the origin on their performance. One of these factors is the status of being employed during the education period. The 45 % of the students asked did not have any job next to their training. Most of them were not motivated by the fact that they can get some work experience before finishing the university, as 75 % of them were not applied for a job, which would be related to their studies. This fact only affects the time used for visiting the classes, and does not affect the working hours of self-preparation. Besides, it has a significant effect on both the average grade and the result of the diploma, and three models out of the four significantly affect the learning performance of students. The result of the variant analysis and the difference between the performances of the students can be seen on figure 5.

Chart 5: The effect of working under studying in the institutes on the performance

	M1		**M2**		**M3**		**M4**	
The result of the variant analysis	**F**	**Szig**	**F**	**Szig**	**F**	**Szig**	**F**	**Szig**
	3,756	0,054	4,674	0,031	6,939	0,009	5,699	0,018
The average performance of employed	0,988		0,986		0,983		0,985	
The average performance of the unemployed	1,010		1,011		1,014		1,012	

Source: own calculation

I emphasized while analyzing the chances of getting admitted to higher education that the social origin mainly affects the applications. The effect of cultural fund of the family however does not disappear without any trace, as the students are living together with their family until they are 14 or 18. The way of thinking, value judgment and vision of the parents form the way how the children approach studying, and their motivation, toughness, too. The cultural fund of a family can be best described with the rate of education level of their parents.

The variant analysis gives the result that it is only the effect of the father-side education, which affects the learning performances of the students, which is significant in the case of all four models. If regarding the qualification you only distinguish three levels, you can experience that those can give a performance above average, whose father has a diploma. If however within the middle level we distinguish the hand-workers and graduates, then the relationship is not fully the one you should expect, which is also clearly shown in chart 6.

Chart 6: The effect of father-side education on the performance

	M1		**M2**		**M3**		**M4**	
The result of the variant analysis	**F**	**Szig**	**F**	**Szig**	**F**	**Szig**	**F**	**Szig**
	3,247	0,022	3,755	0,011	2,758	0,043	3,267	0,022
Average transformed DEA indices according to the father-side education								
Primary school	0,917		0,919		0,928		0,924	
Trainee schools	1,015		1,016		1,013		1,016	
Secondary grammar school	0,977		0,975		0,978		0,977	
Secondary school total	0,995		0,995		0,995		0,995	
University/College	1,008		1,009		1,008		1,007	

Source: own calculation

The children of hand-worker fathers do not only accomplish above average but the value of their efficiency is even higher than the ones of the graduates. There are two possible explanation for that. One is that these students would like to exit their social-economic environment, in which they got raised, and they could estimate that diploma means a better job and higher salary even if they did not get employed in a graduated environment. From this you can tell that they have stronger motivation, which urges them for better performance. The other is that in spite of the education of the father the family of the student has a good income and the student thinks that the tool for keeping the position is the learning process resulting the applicable knowledge.

The above mentioned factors are independent from the level of development of the permanent address in the sub-regions; the latter fact however can all alone affect the efficiency of students. There is a significant relationship in all four models between the level of development of the sub-regions and the performance of students coming from those areas, which is actually generated by the employment-social and economic development.

3.5. Final consequences

Based on the results of my analysis I can state that regarding the new distribution mechanism of the student number of the Hungarian higher education, sponsored by the state could be proved by the Stiglitz dilemma. The allocation efficiency however increased, but in order to raise the productive and dynamic efficiency they could not take those actions, which could help in improving the economic efficiency and the quality of education. As the state aid is realized on an input base and not on the actual activity and results of the universities, you cannot be sure that the idea of equity predominates. However the new draft of the act of higher education takes care of the compensation of underdeveloped institutes and colleges, because of the fiscal restrictions it is getting doubtful what extent this compensation can take effect. This especially means a problem regarding the fact that the high education significantly affects the development of the sub-regions and regions, which are anyway underdeveloped than the others. On top of it the level of development and education simultaneously affect the chance of getting admitted to higher education and the performance of students. The equity of each and every affected people in the sector of higher education lose in quality.

So in my opinion the new distribution mechanism moved the system to a good direction and in the draft of the new act of higher education this good direction gets shape, too. It was perfectly thought that the underdevelopment of certain institutes also affects the development of the region, which affects the competitiveness of the whole country. I find it right that the government would like to make difference the certain kinds of institutes and their tasks, too, however this cannot be realized in the current institute structure. A new structure would need to be created and the place of colleges should belong there. For this it would be necessary to create the above mentioned academic and professional faculties and to determine their head quotes. The institutes are only able to suit to the needs of economy when they issue a faculty, which mirrors their quality. The rural institutes should be striving for profiting the market split in order to maintain. So they should have been issues faculties, in which the given region is interested more than nowadays do. However to find the reason for the shortages on professions it is necessary to calculate the labor force demand and to trace the occupation of graduates. Without the development of the system of this student-trace and its obligatory application there is no data base, which could be created. And this could not be the reliable base in the comparison of the institutes and in deciding about financing questions. The system for the up-keeper agreement with the institutes can be successful in the future, but only if it decides about financing questions exclusively based on uniform performance indices. I do not find it effective that 70 % of the pre-tendency of the institutes should take care about the financing of fix tasks because this could only be able to put an end to market competition, the institutes would not be forced to use the budget support effectively.

4. The new and novel results of the dissertation

I would like to list the new and new-like results of the results I made:

- With the help of the statistic tools which is for the measuring and demonstrating of concentration I could prove that with the higher respect of the fact that the student choose from the institutes and this could help in increasing the concentration of institutes, so the transformation of the distribution mechanism of the students number, supported by the state could fulfill its aim.
- While comparing the complex student and tutor ranking with the choosing of students I found out that the students are fully informed regarding the extent how they influence the financed number of limits. So they are able to measure the differences between the certain institutes.
- I created a performance analyzing (DEA) model, which is the most suitable for comparing the efficiency of the faculties based on the available data. The most important lesson for the application of this model that both the judgment about the institute and faculty choosing of the students and the factors affecting the position of the position of rural colleges can differ in the sense which training locations of the area of science you analyze.
- With the help of the main component and correlation analysis I could prove that the rate of graduates is connected with the complex level of development of the sub-regions and with its entire main component. I could also demonstrate the status of underdeveloped sub-regions are highly affected by the presence of labor force, which can be an important viewpoint in making the decision about the education policy.
- While doing the equity calculation based on the individual level of efficiency analysis I could identify the personal and socio-economic factors, which affect the performance of students on DE-AGTC, which are: working under studying, the education of the father-side and the level of the development in the region of the permanent address.

5. Practical utility of the results

In order to ease the decision making about the education policy the decision makers should foresee the consequences of their decisions for the whole system, for the performance of the system and the certain sub-regions.

The most important lesson of my analysis is that the new act of the higher education can only make the system of the Hungarian higher education more stable and flexible, if the government considers efficiency and fairness viewpoints, too, if they keep a constant contact with the affected people and if the introduction of the measures are preceded by reliable studies. For this it is a pre-requirement to develop the system of student tracking and its obligatory application. This would be a reliable base for the comparing of the institutes regarding the decisions about financing. The situation of rural colleges can only be better if they can find their place in the system, if they find the possibilities in the gap of labor force. The relationship between the high education and the level of development in the sub-regions affirmed that it is not advisable to handle the sector as a stand-alone and closed system. So the higher education should be the part of an integrated and complex policy, because they would be the ones who will employ the graduates and who have the sufficient resource for the development of analysis and for the creation of innovation.

The calculations on the individual efficiency and equity emphasized that the system of student financing system needs changes, as well. As it was only the father-side education, which affected the performance, it would be more advisable to support the students based on their performance and it would be necessary to offer a better chance for getting admitted to the institutes.

In order to accomplish this I would advise extending the analysis of the individual reviews for those students as well, who applied but were then rejected by all the state-sponsored faculties.

However the listed results and open questions leave an open room for the continuation of the analysis, which has a bigger relevance as anywhere else, as the education economic analysis do not have a long history in our country and the branch was never in a serious crisis like now.

6. Own publications

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9. **Tóth R.** (2009): *Analysis of the efficiency of higher education systems.* Think Together 2009 International PhD Research Conference, Chech University of Life Sciences Faculty of Economics and Management, Czech Republic, 2009
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11. **Tóth R.** (2009): *Production efficiency in higher education.* AVA Congress 4, International Congress ont he Aspect and Visions of Applied Economics and Informatics, University of Debrecen, Centre for Agricultural Sciences and Engineering, Faculty of Agricultural Economics and Rural Development, Hungary, 2009

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12. **Tóth R.** (2008): *A magyar felsőoktatásban bekövetkezett változások hatásának vizsgálata a felvételi statisztikák adatai alapján.* XI. Nemzetközi Tudományos Napok, Károly Róbert Főiskola, Gyöngyös, 2008. március 26-27. ISBN 978-963-87831-1-0

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