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(Un)Able to handle disadvantageous socio-demographical processes?

Analysis of the performance of development policy – a case study of Hungary

(RESEARCH REPORT 1.)

Abstract for the conference

In our planned presentation we wish to introduce some empirical results of our research concerning the social effects of development policy.

It is regarded obvious that the EU-accession of Hungary in 2004. seemed – and still may seem – to be a remarkable opportunity and a great challenge at the same time: the transferred and modified development policy and the related funds becoming available made it possible for the governments of the country to reach different kind of objectives. Some of these objectives concerned (1) different aspects of the economy (e. g. increasing competitiveness), the (2) development of physical infrastructure (e.g. ICT-accessibility, public traffic network development), (3) environmental issues (e.g. building/developing wastewater-management systems in small settlements) and directly the (4) human resources (e.g. increasing the level of employment, education or special training of the disadvantaged social groups) of the country. We found it interesting to explore empirically the effects of these governmental objectives – paying special attention to the social dimension of the results: we wish to analyze the composition of the development funds allocated in the light of social-demographical indicators. The analysis is conducted on different territorial levels (micro-regions and counties of Hungary), and we investigate the effect of different socio-demographical factors on the capacity to attract development funds – on the project level, too. In the course of data analysis we employ on the one hand regression estimation models to estimate the effects, and – on the other hand – different indicators of concentration (e.g. Hirschman-Herfindahl Index, Robin Hood Index) in order to explore and demonstrate the differences – inequalities – of the patterns of development fund absorption.

According to the results the development funds tend to be allocated with higher possibility and higher amount to territories with more developed human infrastructure, that is, the development policy can not be regarded successful in reaching the objective of helping to catch up disadvantaged social groups.

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Table of contents

1. INTRODUCTION – RESEARCH QUESTION 4
2. OUTLINING THE THEORATICAL FRAME 4
3. DATA AND METHODS 5
4. DATA ANALYSIS 6
4.1 County-level analysis 6
4.1.1 Development projects 6
4.1.2 Development funds 7
4.2 Micro-regional level analysis 8
4.2.1 Development projects 8
4.2.2 Development funds 9
4.2.3 Level of inequality 10
4.3 Factors of development fund allocation 11
4.3.1 Comparison of different micro-region groups 11
4.3.1.1 Differences of inequalities 15
4.3.2 Factors determining fund absorption 16
4.3.3 Control-variable models 19
5. CONCLUSIONS 21
6. SELECTED BIBLIOGRAPHY 22
7. APPENDIX 24
7.1 List of variables 24

List of tables

1. table: Hoover (Robin Hood) Index of development funds 11
2. table: Regression model results for development funds allocated (1) 14
3. table: Hoover (Robin Hood) indexes in micro-region groups 15
4. table: Correlation table for development funds and HDI 17
5. table: Correlation table for development funds and HDI (without Budapest) 17
6. table: Regression model results for development funds allocated (2) 18
7. table: Descriptives of Micro-Regional HDI 18

8. table: Correlation table for development funds and human share of development funds 18
9. table: Regression model results for share of human development funds (1) 19
10. table: Regression model results for share of human development funds (2) 19
11. table: Regression model results for share of human development funds (3) 20
12. table: Regression model results for share of human development funds (4) 20
13. table: Regression model results for share of human development funds (5) 21

List of graphs

1. graph: Distribution of projects (education level) 6
2. graph: Distribution of funds (education level) 7
3. graph: Distribution of projects (HDI) 8
4. graph: Distribution of funds (HDI) 10
5. graph: Differences of developed and disadvantageous micro-regions (1) 12
6. graph: Differences of developed and disadvantageous micro-regions (2) 12
7. graph: Differences of developed and disadvantageous micro-regions (3) 13
8. graph: Differences of developed and disadvantageous micro-regions (4) 13
9. graph: Differences of developed and disadvantageous micro-regions (5) 14
10. graph: Differences of developed and disadvantageous micro-regions (6) 15
11. graph: Scatter of development funds and HDI 16
12. graph: Scatter of development funds and HDI (without Budapest) 17

1. INTRODUCTION – RESEARCH QUESTION

In this first report of our research planned to explore the social factors determining the possibilities of social development we wish to shed some light on the connection between social inequalities and development policy. We introduce below some empirical results of our preliminary analysis about the capacity to spend or absorb development funds – especially aimed at human or social objectives – to territories with less developed (e.g. education, unemployment, enterprises, taxpayers, HDI) population. In this stage of our research we used secondary data analysis as research method and as it proved to be impossible to gain official data on project level it was necessary to use aggregated data. That is why we carried out the analysis on territorial level of Hungary. It may not be a great problem as in this case (1) we can consider the different territorial levels to be the aggregations of social inequalities and (2) we can carry out the analysis on a dimension regarded as important by the Hungarian development policy itself.

In this context our main research question is whether the socially underdeveloped territories have an advantageous position in the European Union projects- and funds absorption.

2. OUTLINING THE THEORATICAL FRAME

To embed the problem theoretically we interpret the system of development policy as something that intends to help common goods to come into existence (Olson 1997) – or rather to prevent the situation of *common bad* (Hirschman 1995) to come into existence – when it employs *institutional devices* (Elster 1997, North 1990) in order to enforce territorial equalization principle (Batterbury 2006) in the central regulation (Stigler 1989) of the resources' allocation (Martin 2000). Our preliminary assumption is however that the state fails to succeed (Tullock 2005) causing counterproductive effects (Szántó 2006). In this concept we build on previous studies which discuss (Konrád–Szelényi 2000) and empirically unveil (Vági 1991, 1982) the reproduction of inequalities of (territorial) development policy (Bradley 2006, Crescenzi 2009, Esposti–Buselotti 2008, Martin–Tyler 2006). We

argue that institutional changes of development policy (Davey 2003) in Hungary caused by joining the EU (Stead–Nadin 2011, Kengyel 2008) can be considered a strong institutional rearrangement (see Csite–Kovách 2002, Kovách–Kučerová 2006) but the main characteristics and patterns of *competing for development resources* (Vági 1982) have not changed considerably (Voszka 2006). So a distinctive feature of this research might be that the problem is examined from an *institutionalized* point of view, i.e. we study whether the institutional regulations and classifications *generated* and *applied by the regional policy itself* reach their aim. According to our assumption they do not, so we expect the institutional regulation of regional development policy to be counterproductive.

3. DATA AND METHODS

To carry out the analysis we have built complex databases aggregated on county and/or micro-regional level. The main source of our databases is the statistical information webpage www.regionaldata.org and into the tables collected at this system we integrated some additional information (e.g. information on micro-regional classification from official governmental decree, development funds absorption statistics from the webpage of the former National Development Agency).[2]

On the one hand we apply simple methods to investigate the territorial distribution of development projects and funds in the light of social development. In this case we edited graphs to illustrate and computed inequality measures (Hoover (Robin Hood) index) to quantify the differences.

On the other hand we use multi-variable statistical test to analyze the significant differences between certain types or groups of micro-regions and to empirically reveal some possible explaining factors of social development capacity. In the course of this data analysis we employed linear regression models in order to reach higher level of internal validity (Moksony 1985), i. e. to control the estimation for as many alternative and potentially distorting explaining factors as possible and to measure the net effect of the actual explaining factor (Moksony 2006).

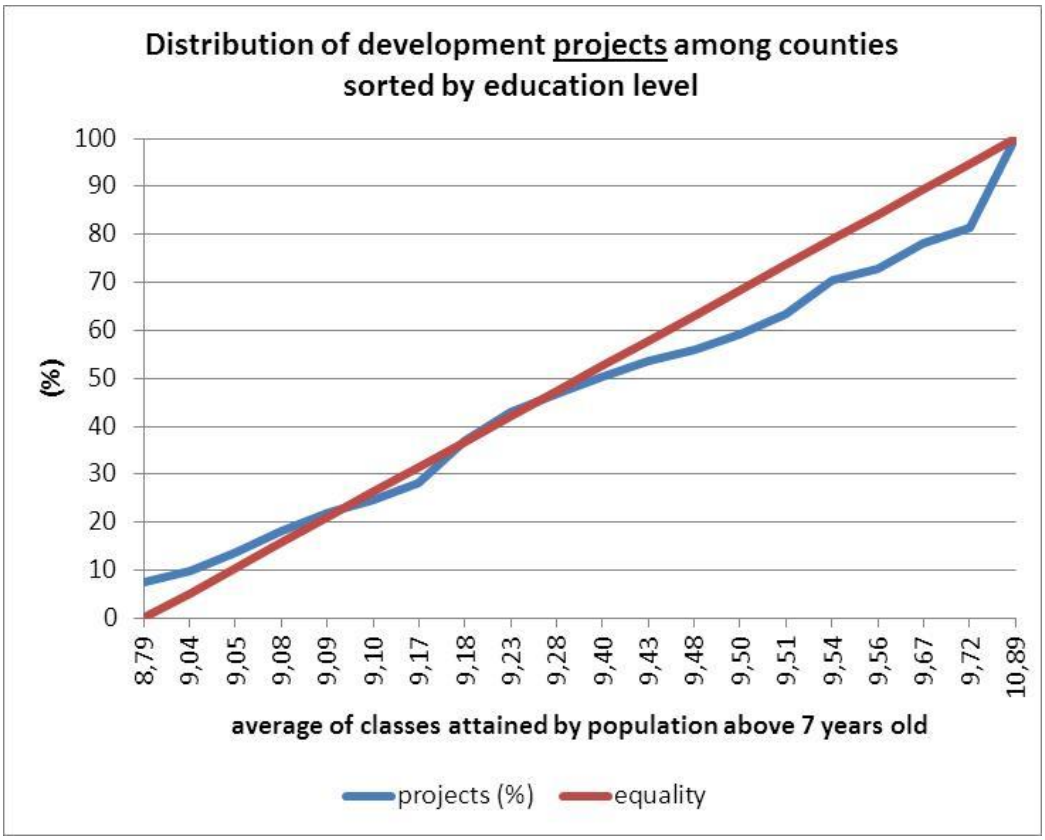
[2] The list of variables is included in the appendix.

4. DATA ANALYSIS

4.1 County-level analysis

4.1.1 Development projects

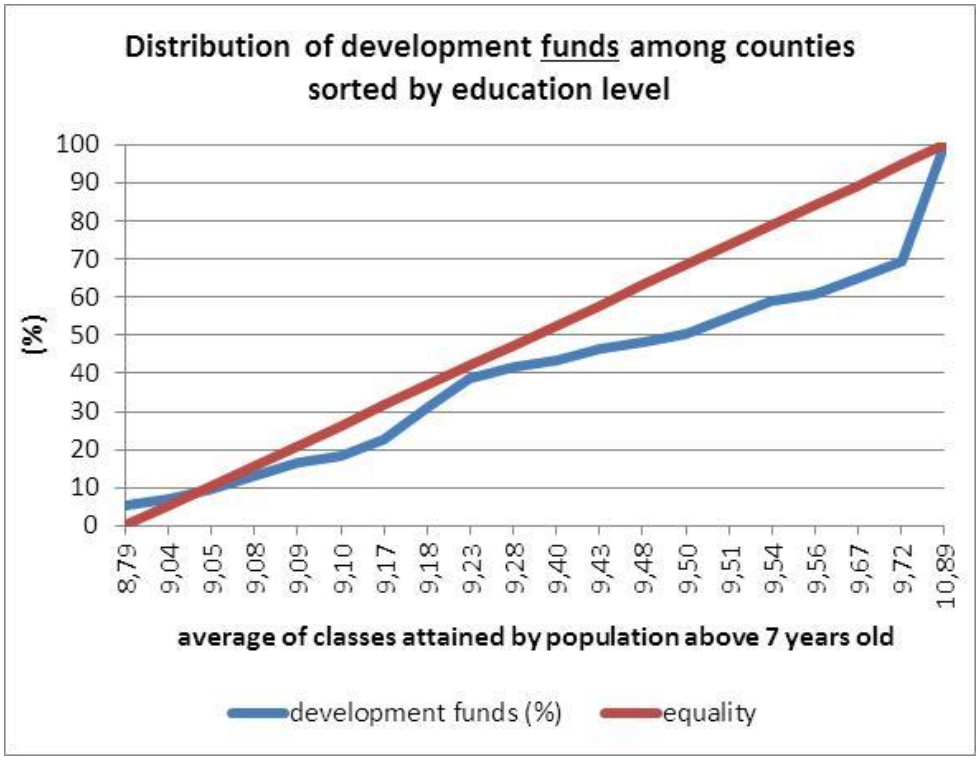
The distribution of development projects among counties with different level of education is rather unequal (see graph 1.): in the case of counties characterized by population of lower education level (less than 9,09-9,10 classes attained on average) seems to be a shortage in the share of projects, and in the counties with more highly-skilled inhabitants the cumulative percentage of development projects is higher.



1. graph: Distribution of projects (education level)

4.1.2 Development funds

Not only the projects, but the funds also seems to be unequally allocated (see graph 2.): the development funds are concentrated in the counties with more educated population. In the case of funds the correlation between the relative frequency of the variable and the average of classes attained by the population above 7 years old is higher (r=0,77) compared to the share of projects (r=0,65). That is on county level there seems to be an advantage in the case of territorial units with more skilled population: if the education level is higher, there can be measured a higher level of project application activity and a higher level of absorbed development funds.



2. graph: Distribution of funds (education level)

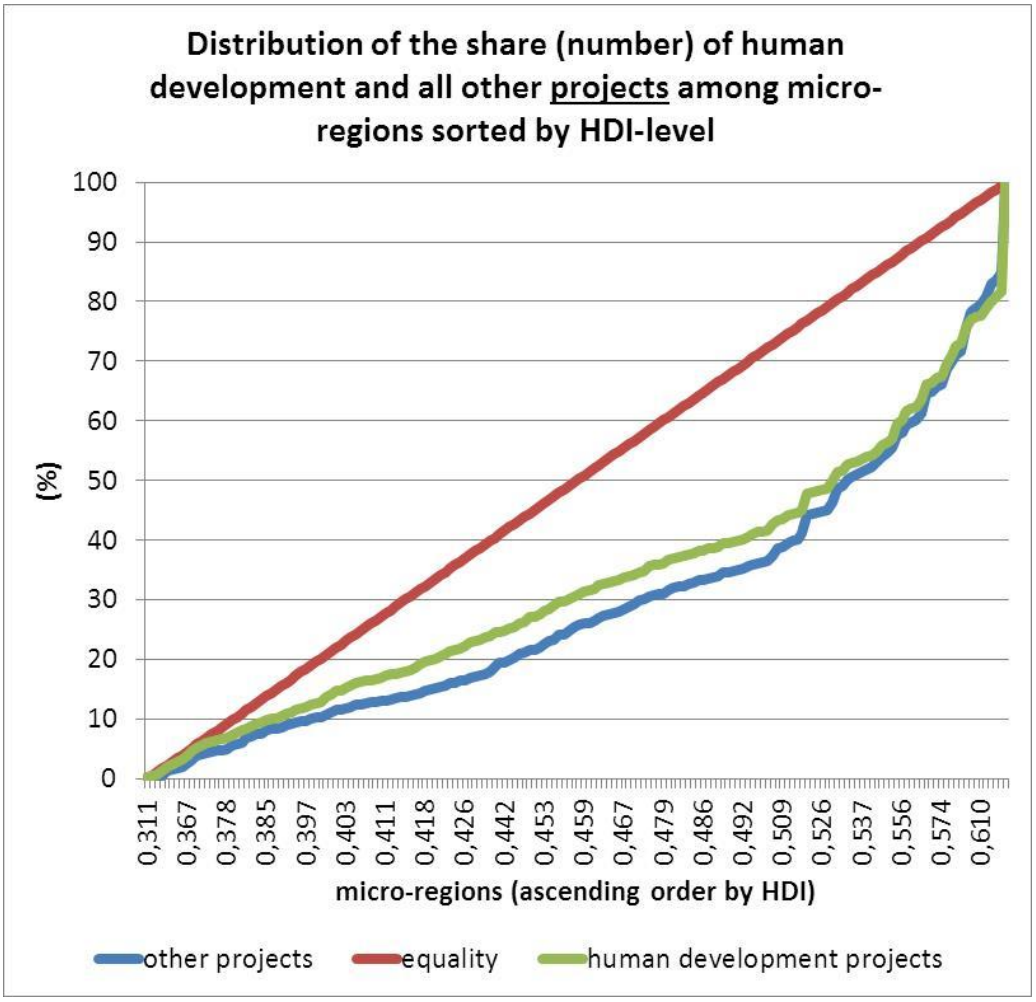
As an additional information it can be noted that the concentration of the funds among counties is low: the value of the normalized Hirchman-Herfindahl Index (HHI*=0,079) is below 0,1 i.e. the distribution is rather fragmented (Szakálné Kanó 2011: 85).

Next we step down to micro-regional level as that dataset enables us to separate the projects and funds directly intended to help carry out objective connected to human development.

4.2 Micro-regional level analysis

4.2.1 Development projects

In the case of the analysis of micro-regional level data the comparison of human development objective and other development objectives is highlighted.

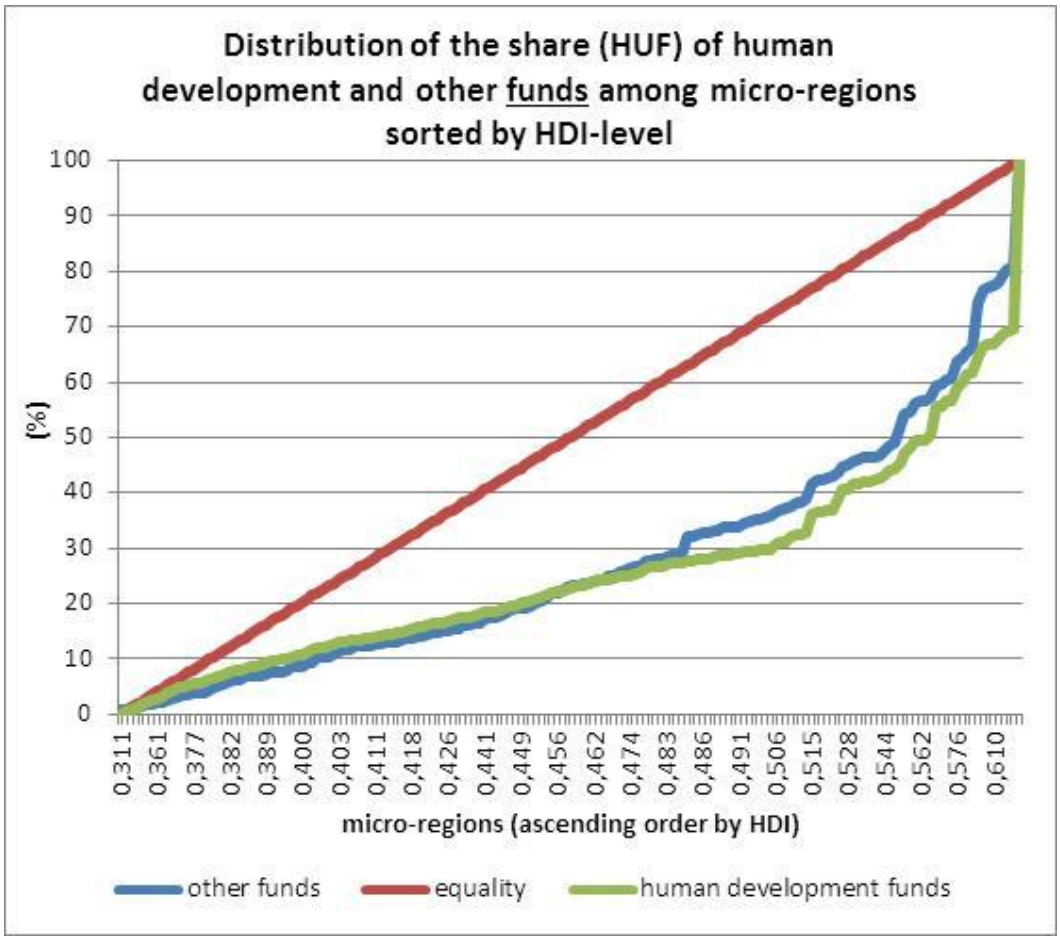


3. graph: Distribution of projects (HDI)

There can be measured a positive relation between the number of projects and HDI on micro-regional level: the higher the HDI – the more developed of the human infrastructure in the micro-region is – there can be registered more development projects – it is illustrated by the graph 3.: both (green and blue) curves show a higher amount of cumulative share of the number of projects in the case of the micro-regions with higher level of HDI. In the case of the human development projects the difference seems to be smaller compared to all other projects: the correlation level between the HDI value of the micro-regions and the number of projects in the micro-regions is lower (r=0,33) than in the case of the other (not human development) projects (r=0,42). That is the distribution of the human development projects is less depended on the level of the development of the human resources. The difference between the two groups of projects is statistically significant (p<0,000).

4.2.2 Development funds

The same pattern can be observed in the case of the allocated development funds (see graph 4.): in both groups of the grants allocated in human projects or other projects the higher the actual development level of the population in the micro-region, the higher share of development funds is. This connection is also stronger in the case of other (not human development) development funds (r=0,36) compared to the group of human development funds (r=0,26) which imply that the funds devoted to develop the social dimensions of the micro-regions are less depended on the human infrastructure itself. The illustration however also show that in the case of human development funds compared to the other group can be registered a smaller difference from equality *in the range of smaller values of HDI* (the green curve runs closer to the red line than the blue curve), and above a certain level of HDI (approximately 0,45-0,46) the pattern of inequality is changed: the cumulative deviation from the equality is higher in the case of human development funds.



4. graph: Distribution of funds (HDI)

So both the projects and funds of human and other development are depended on the human infrastructure on micro-regional level, but the level of this dependence is lower in the case of human thematic group.

4.2.3 Level of inequality

In order to quantify the extent of inequality we calculated from micro-regional level data the Hoover (Robin Hood) index of development funds in the light of the distribution of the population (table 1). The overall value is 22,5%, i.e. nearly one-fourth of the development funds should be re-allocated among the micro-regions in order to fit the pattern of population distribution. Investigating it separately in the two groups of development objectives, the value of Hoover (Robin Hood) index is higher in the case of human development (H(RH)I=26%). This pattern of difference can be also registered if the data is cleaned from and recalculated without the values of

Budapest: the overall measure of inequality decreases, but the human development funds seem to be more unequal.

1. table: Hoover (Robin Hood) Index of development funds

Inequalities of allocated funds	Hoover (RH) Index of funds	Hoover (RH) Index of funds*
total	22,5	19,2
human development funds	26,0	22,1
other (not human) development funds	23,5	18,9

* the values of Budapest excluded

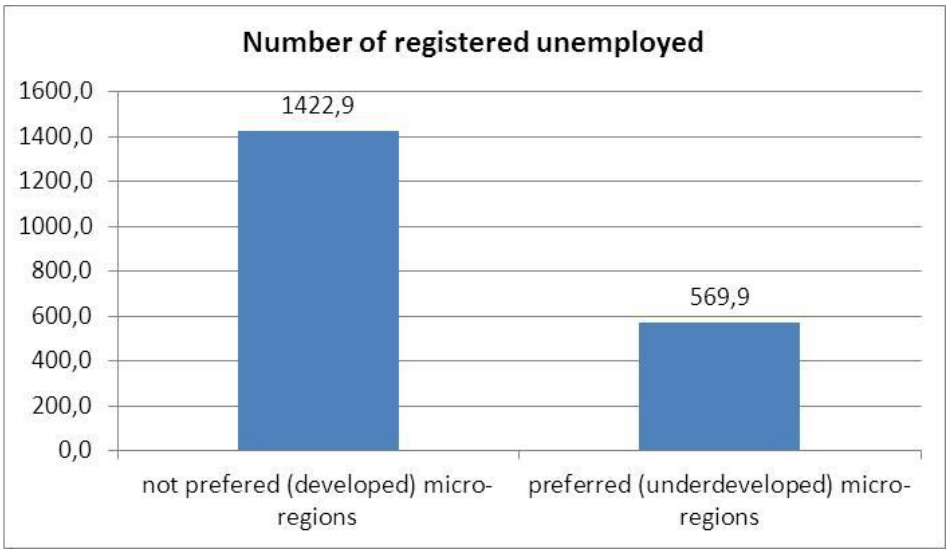
In the further analysis we investigate *some possible* factors which may have some role on the possibility to successfully absorb development fund – with special attention on human development and social factors.

4.3 Factors of development fund allocation

At first we investigate the allocation of development funds on micro-regional level by the aggregation of micro-regions in the light of their level of development defined by the development policy itself: for every EU programming period the micro-regions are classified by governmental decree into groups according to their specific measure of multiple statistical data and under a certain value of this complex score the underdeveloped (and developed) micro-regions are nominated and listed as (to be) preferred territories in development policy. It may be fruitful to apply this classification as it enables us to integrate the view of the official development policy.

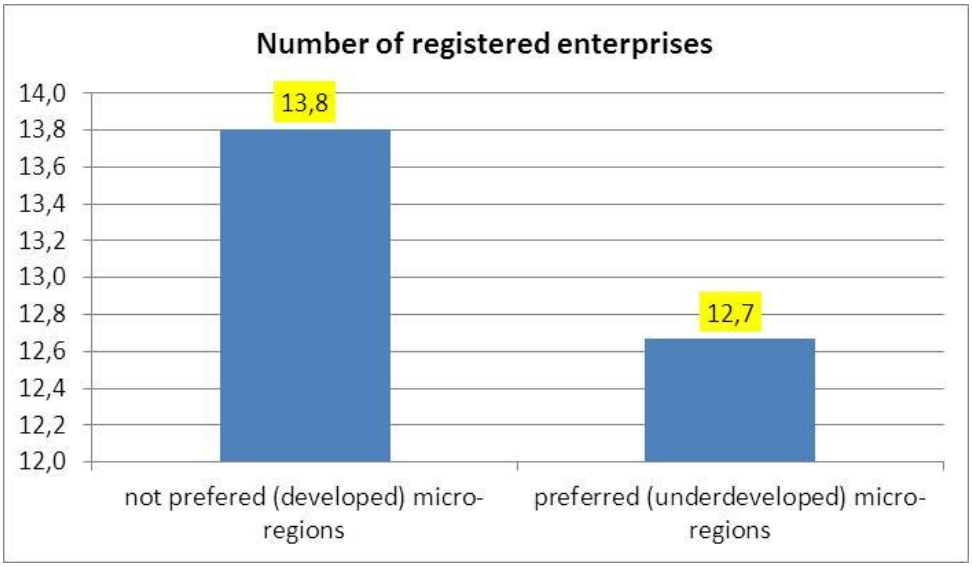
4.3.1 Comparison of different micro-region groups

In this classification there can be measured significant differences (see graph 5.) in the case of several social factors: nearly 2,5-times higher ($p<0,05$) is the average number of registered unemployed inhabitants in the more developed micro-regions ($p<0,05$).



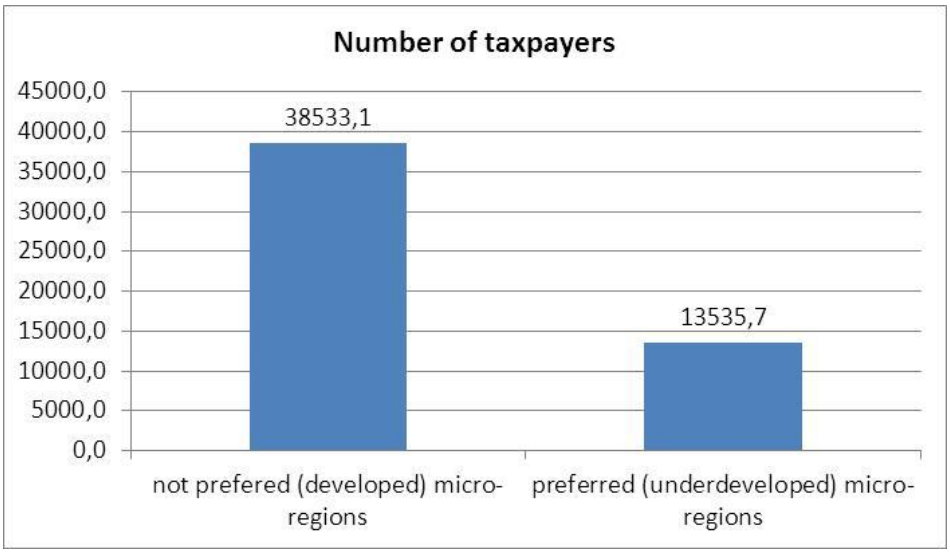
5. graph: Differences of developed and disadvantageous micro-regions (1)

The enterprises are more frequent in the developed micro-regions ($p<0,05$):



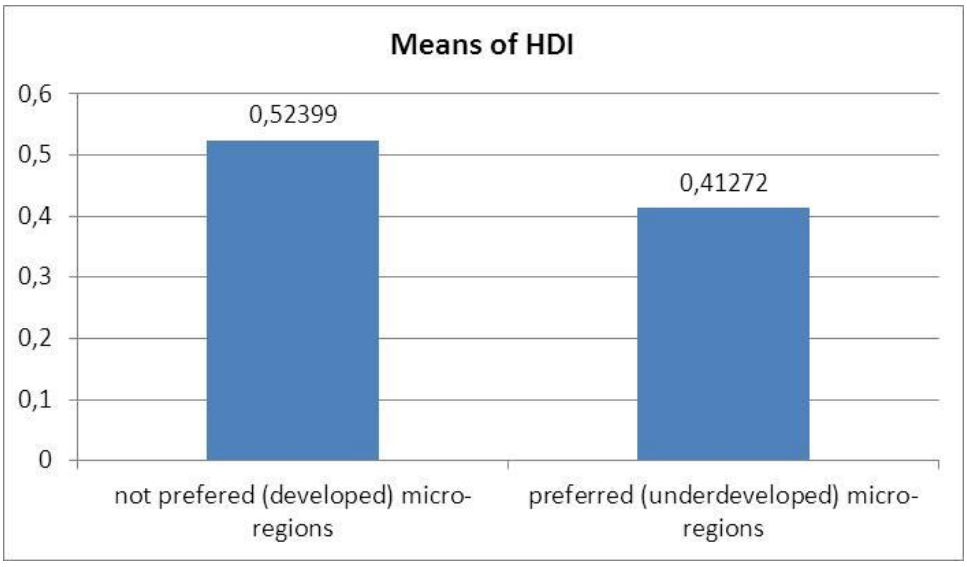
6. graph: Differences of developed and disadvantageous micro-regions (2)

There can be measured a great difference in the number of taxpayers, too (see graph 7.): it is (nearly three times) more probable to find a taxpayer in the population of the group of more developed micro-regions ($p<0,01$).



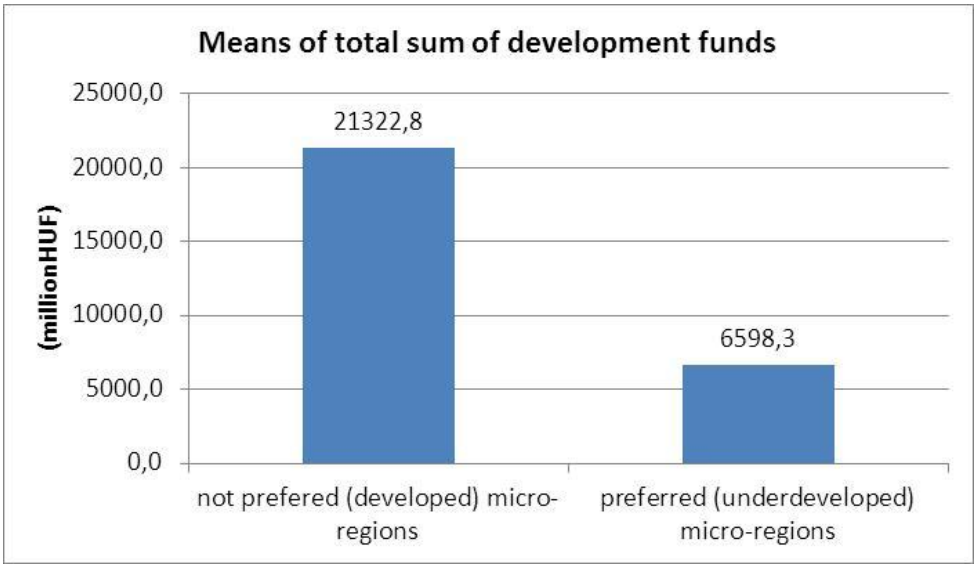
7. graph: Differences of developed and disadvantageous micro-regions (3)

And the population of the less developed micro-regions proves to be less developed (see graph 8.): the average value of human development index in the developed micro-regions is significantly higher compared to the population in the underdeveloped micro-regions.



8. graph: Differences of developed and disadvantageous micro-regions (4)

This dichotomous classification brings forth great differences ($p<0,05$) also in the allocation of funds (see graph 9.). In the group of developed micro-regions the average sum of development funds allocated is more than three times as high as in the group of disadvantageous micro-regions.



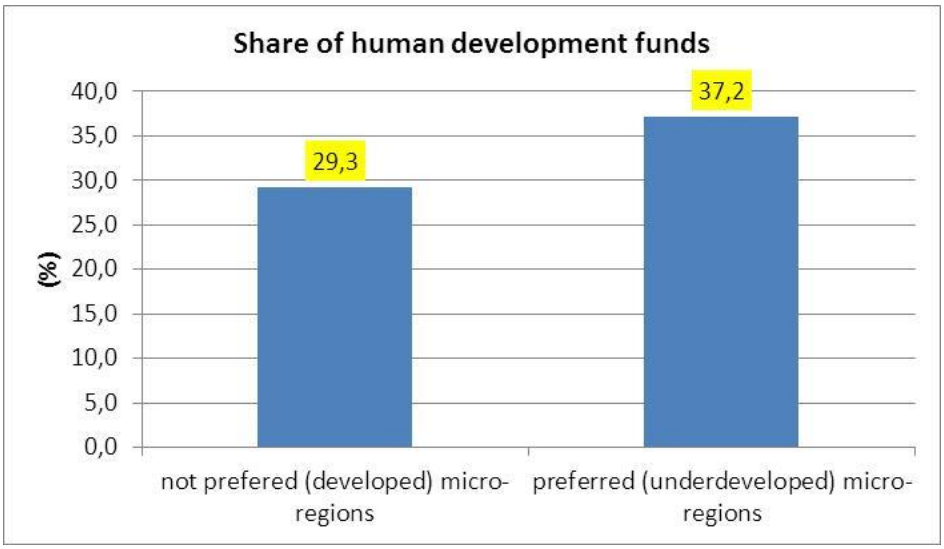
9. graph: Differences of developed and disadvantageous micro-regions (5)

In other words if we step from the group of developed micro-regions into the group of underdeveloped ones, the total sum of development funds allocated decreases with 14724,5 millions HUF:

2. table: Regression model results for development funds allocated (1)

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	21322,77	4731,960		4,506	,000
	Preferred micro-regions(=1)	**-14724,49**	6493,275	-,169	-2,268	,025
a. Dependent Variable: total_sum_of_dev.funds (Millions HUF)						

However if we investigate the percentage of human development funds in the total sum of development fund allocated to the micro-regions difference is changed (see graph 10.): in the group of the underdeveloped micro-regions the average share of funds spent to projects or objectives aimed to develop the human infrastructure is higher ($p<0,01$) compared to the developed micro-regions.



10. graph: Differences of developed and disadvantageous micro-regions (6)

4.3.1.1 Differences of inequalities

If we investigate the Hoover (Robin Hood) indexes of the development funds allocated in the two groups of micro-regions it can be said that the distribution of both the total sum of development funds and the human development funds are more unequal in the group of developed micro-regions compared to the underdeveloped micro-regional group (see table 3.): in the micro-regions in better position 23% of the overall development funds should be redistributed in order to fit the population structure, and in the disadvantageous micro-regions the concentration is smaller; only the 17% of the funds should be reallocated.

3. table: Hoover (Robin Hood) indexes in micro-region groups

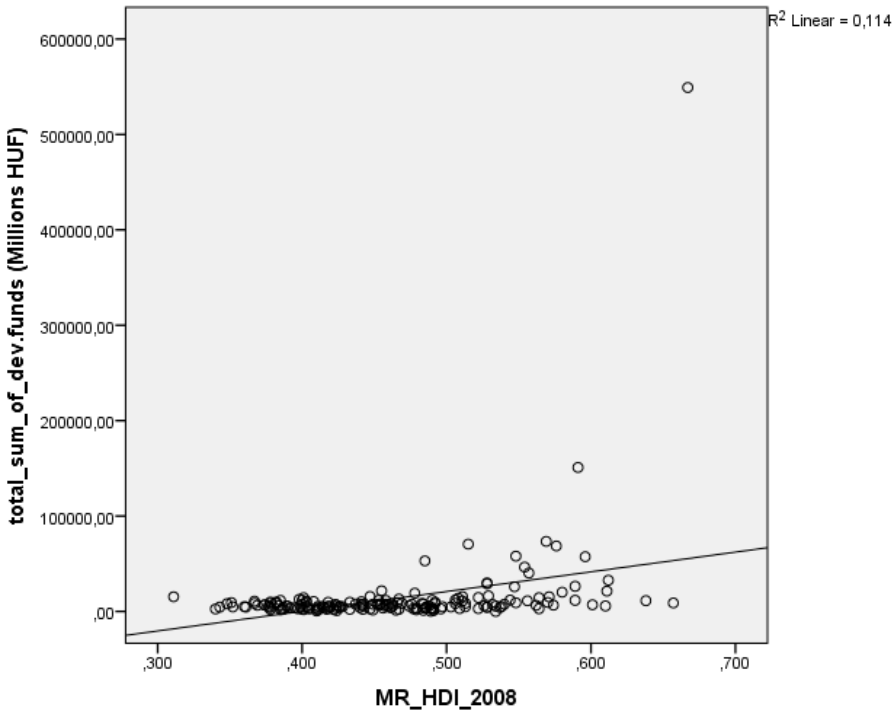
Hoover (Robin Hood) Index (%)	Total sum of development funds	Total sum of human development funds
not preferred (developed) micro-regions	23,35	26,57
preferred (underdeveloped) micro-regions	16,96	21,62

In the case of the funds aimed to reach objectives related to human development the inequalities are generally higher – in both groups of the micro-regions, but the tendency explored above appears as well: in the group of underdeveloped micro-regions a lower concentration can be measured; only ~22% of the funds should be redistributed.

However it may be also noted that the difference of the level of inequality between the developed and underdeveloped micro-regions is higher in the case of human development funds: the multiplier between overall funds and human development funds in the group of developed micro-regions is smaller (1,1) compared to the other group: in the case of the group of disadvantageous micro-regions the extent of inequality is 1,3-times higher for the human development funds.

4.3.2 Factors determining fund absorption

On micro-regional level there seems to be a relation also between the total sum of allocated European Union development funds and the micro-regional level of Human Development Index. The association is positive (see graph 11.), i.e. if the level of the human development of the population is higher, then a bigger amount of funds allocated can be measured:



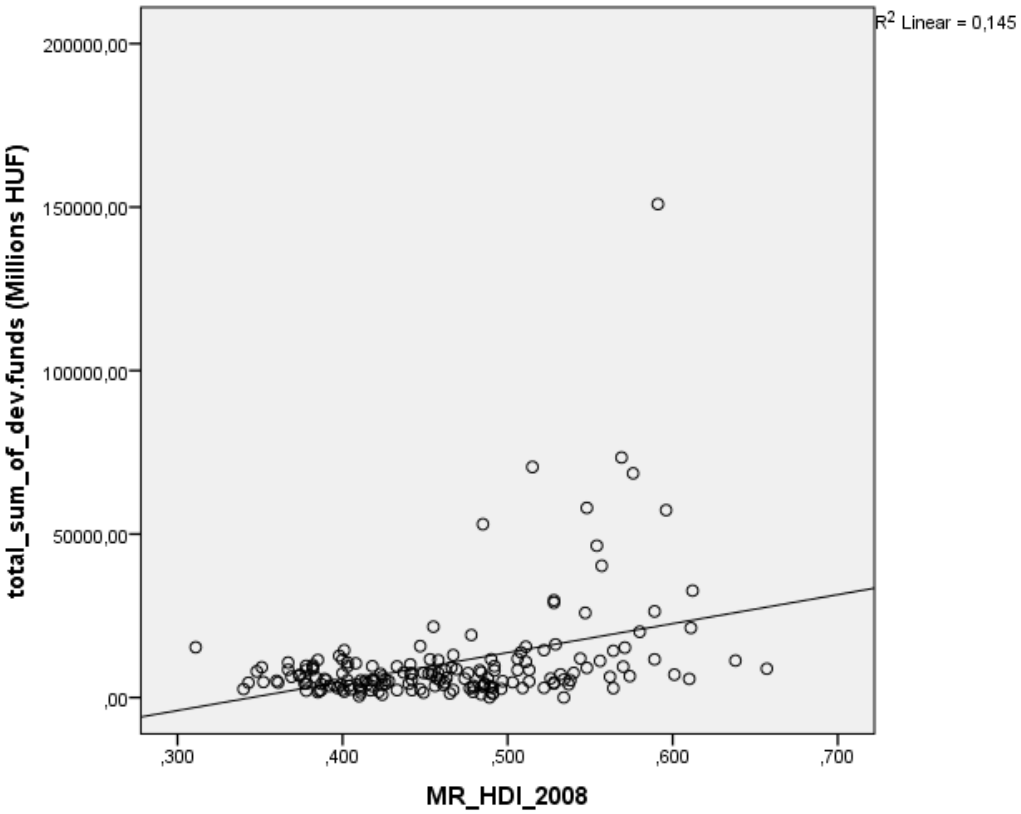
11. graph: Scatter of development funds and HDI

The value of Pearson correlation reflects and expresses with a single numerical value association of the graph above (see table 4.): r=0,34 and significant (p=0,000).

4. table: Correlation table for development funds and HDI

Correlations		total_sum_of_dev.funds (Millions HUF)	MR_HDI_2008
total_sum_of_dev.funds (Millions HUF)	Pearson Correlation	1	,338**
	Sig. (2-tailed)		,000
	N	177	176
**. Correlation is significant at the 0.01 level (2-tailed).			

Excluding Budapest, the relation essentially proves to be the same (see graph 12., table 5.) (r=0,38; p=0,000), so in further analysis we include Budapest also so as to work with the 'total' or 'real' picture.



12. graph: Scatter of development funds and HDI (without Budapest)

5. table: Correlation table for development funds and HDI (without Budapest)

Correlations		total_sum_of_dev.funds (Millions HUF)	MR_HDI_2008
total_sum_of_dev.funds (Millions HUF)	Pearson Correlation	1	,381**
	Sig. (2-tailed)		,000
	N	176	175
**. Correlation is significant at the 0.01 level (2-tailed).			

Applying regression model estimation the average effect of micro-regional level HDI on the total sum of development funds allocated to the micro-regions can be quantified. The results of the test imply a relatively small portion of explained variance (Adj. R^2=11%), however this portion provides to be high enough for the model to be considered significant (F=22,379, p=0,000):

The estimated – of course significant (p=0,000), as the whole model itself is significant – effect of the increase of the level of micro-regional HDI is b=206680,42 (see table 6.), which essentially (considering the range of the micro-regional HDI (see table 7. below)) means that if the value of micro-regional HDI is higher with 1 unit (providing that we multiply the HDI value with 100), the total sum of development funds on average is 2066,804 millions HUF higher.

6. table: Regression model results for development funds allocated (2)

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-82443,98	20533,518		-4,015	,000
	MR_HDI_2008	206680,41	43689,240	,338	4,731	,000
a. Dependent Variable: total_sum_of_dev.funds (Millions HUF)						

7. table: Descriptives of Micro-Regional HDI

Descriptive Statistics						
	N	Range	Min.	Max.	Mean	Std. Deviation
MR_HDI_2008	176	,356	,311	,667	,46456	,071425
Valid N (listwise)	176					

The share of human development funds is independent from the total sum of development funds allocated in the micro-regions (see table 8.): there can not be measured a significant correlation between the two variables.

8. table: Correlation table for development funds and human share of development funds

Correlations		total_sum_of_dev.funds (Millions HUF)	percentage_of_human_dev_funds_of_total_sum_of_dev_funds
total_sum_of_dev.funds (Millions HUF)	Pearson Correlation	1	-,013
	Sig. (2-tailed)		,867
	N	177	174

At the next steps we include some of the previously investigated variables as control variables in order to measure the net effect of the explaining factors on human development fund absorption.

4.3.3 Control-variable models

In the first model we estimate the effects of total sum of development funds allocated and the number of unemployed population. In this model (see table 9.) both factors are significant – although the total variance explained is small (Adj. R^2=3,3%) but significant (p<0,05): on the one hand it can be said that the higher the sum of development funds allocated is, the higher the share of human development funds is – controlled for the measure of unemployment. And on the other hand the number of unemployed also proves to be a positive factor – controlled for the total sum of realized funds.

9. table: Regression model results for share of human development funds (1)

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	32,845	1,286		25,548	,000
	total_sum_of_dev.funds (Millions HUF)	,000	,000	-,657	-2,717	,007
	Number of unemployed (2009)	,004	,001	,678	2,801	,006
a. Dependent Variable: percentage_of_human_dev_funds_of_total_sum_of_dev_funds						

In the case of the registered enterprises (see table 10.) the model is insufficient in estimating the dependent value of share of human development funds (Adj. R^2=1,1%, F=0,023, p=0,978) as the variables have not significant effect:

10. table: Regression model results for share of human development funds (2)

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	33,062	4,539		7,284	,000
	total_sum_of_dev.funds (Millions HUF)	-5,440E-006	,000	-,015	-,191	,849
	Number of registered enterprises (2009)	,044	,337	,010	,131	,896
a. Dependent Variable: percentage_of_human_dev_funds_of_total_sum_of_dev_funds						

Considering the role of the number of taxpayers as additional explaining variable similar results can be seen (see table 11.): with small portion of explained variance the model is not significant (Adj. R^2=0,8%, F=1,693, p=0,189).

11. table: Regression model results for share of human development funds (3)

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	32,368	1,447		22,373	,000
	total_sum_of_dev.funds (Millions HUF)	,000	,000	-,577	-1,814	,071
	Number of taxpayers (2009)	,000	,000	,581	1,827	,069
a. Dependent Variable: percentage_of_human_dev_funds_of_total_sum_of_dev_funds						

The human development index as included variable proves to be important when estimating the average value of the percentage of human development funds (Adj. R^2=7,6%, F=8,118, p=0,000). The results of the model (see table 12.) imply that – as the variable of the total sum of funds realized is not significant (p>0,1) – if we consider the fund-absorption level to be constant in every single micro-regions, the share of human development funds proves to be significantly lower on average (b=-70,2; p<0,000) when the HDI increases with one unit.

12. table: Regression model results for share of human development funds (4)

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	65,658	8,050		8,157	,000
	total_sum_of_dev.funds (Millions HUF)	3,432E-005	,000	,094	1,208	,229
	MR_HDI_2008	-70,172	17,432	-,313	-4,025	,000
a. Dependent Variable: percentage_of_human_dev_funds_of_total_sum_of_dev_funds						

In the final – unified – model including all of the variables (Adj. R^2=14,2%, F=6,710, p=0,000) above the estimation shows (see table 13.) that the number of taxpayers in the population, and the frequency of the enterprises do not have a significant effect on the dependent variable – taking into consideration all the factors investigated. The share of human development funds is effected by the total sum of funds allocated

itself, the number of unemployed in the micro-regions and the HDI-level of the population.

13. table: Regression model results for share of human development funds (5)

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	66,809	8,212		8,135	,000
	total_sum_of_dev.funds (Millions HUF)	,000	,000	-1,049	-3,331	,001
	Number of unemployed (2009)	,003	,002	,535	2,080	,039
	Number of registered enterprises (2009)	,393	,319	,091	1,231	,220
	Number of taxpayers (2009)	,000	,000	,662	1,919	,057
	MR_HDI_2008	-88,348	17,953	-,394	-4,921	,000
a. Dependent Variable: percentage_of_human_dev_funds_of_total_sum_of_dev_funds						

According to these results the allocation of human development funds is more successful in micro-regions where the fund absorption capacity is generally higher (dominantly developed micro-regions), where the unemployment is bigger problem and the human development level is lower. The role of the two latter variables can be regarded as advantageous factors in the problem of social development possibilities.

5. CONCLUSIONS

According to the results of the exploratory analysis the answer(s) for the question whether the socially underdeveloped territories have an advantageous position in the European Union projects- and funds absorption prove to be rather controversial as summarized below:

1. Both on county-level and micro-regional level data the distribution of development projects and development funds proves to be unequal: the territorial units characterized by better position of their population (e.g. education, human development index) gain a greater cumulative share of projects and funds.
2. On micro-regional data differentiated by the thematic objective of human and other development projects and funds the difference was smaller in the case

of the previous one: the projects and funds of human development are less depended on the human infrastructure on micro-regional level.

3. The Hoover (Robin Hood) indexes calculated for the overall, and separately for both the human and other development funds indicate a higher level of inequality of the funds.
4. Using aggregated data of the developed and the underdeveloped groups of micro-regions significant differences could be measured in the case of several socio-demographic indicators (number of unemployed, taxpayers in the population, frequency of enterprises, human development index) and there could be registered a great difference (shortage) of total sum of development funds and a higher share of human development funds.
5. Values of Hoover (Robin Hood) index confirm the association that the human development funds are less unequal in the group of underdeveloped micro-regions compared to the advantageous micro-regions.
6. According to the results of the multi-variable estimation models (only) the general fund absorption capacity and the socio-demographic factors of the number of unemployed and the HDI influence the average extent (share) of human development fund absorption (direction of effects respectively: positive, positive, negative).

In the light of the results it seems necessary and important to carry on the research applying expanded data sources containing more indicators and explaining variables, preferably by multi-level comparisons of territorial units. These can (and will be) the possible directions for the future of this research.

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7. APPENDIX

7.1 List of variables

to be edited here