REGIONAL DIFFERENCES IN THE STARTING WAGE OF MASTER'S VS. BACHELOR'S DEGREE GRADUATES: EMPIRICAL EVIDENCE FROM THE HUNGARIAN GRADUATE CAREER TRACKING SURVEY 2012

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Abstract
The study examines the wage gap between bachelor's and master's degree graduates in the Hungarian labour market by NUTS2 regions. The databases used in the study have been gained from the Hungarian Graduate Career Tracking Survey conducted in 2012 as well as from public regional data sources of the Hungarian Central Statistical Office. Relying on these databases independent *t*-tests, variance and regression analyses are performed to 1) identify the starting wage premium of those graduated at master's level compared to others owning only a bachelor's degree in the regions of Hungary, and to 2) define the role of regional factors (economic development, labour market indicators, demographic variables) in the wage differences. Major conclusions of the study are that 1) obtaining a master's degree forecasts a significantly higher starting wage in most of the observed geographical areas, but 2) the size of this positive contribution significantly differs region by region (partly depending on economic and labour market factors).

1. Introduction

The existence of wage differences (wage premium) between degrees gained from various levels of education is a well known fact (see among others Walker&Zhu, 2008; Fang, 2006). Regardless of exceptional cases, higher degree always goes with higher wage for several complexly overlapping reasons e.g. the lower labour market supply of higher degree owners (Maglen, 1990), the human capital increasing effect of education as well as its signalling function, and the different types of discrimination if there are any (Teixeira, 2000).

Current study does not wish to investigate the reasons of wage gaps but the methods of measurement and the geographical distribution. The existence of difference is not questionnable, however its extent can be diverse depending on several variables in different economies, geographical areas and times (see e.g. Fortin, 2006); this gives the relevance of the above questions. By the geographical effects of wage gaps, there will also be geographical discrepancy in the effects wages exert mainly on the labour market and the entire economy through that. E.g. it encourages the higher degree owners to migrate toward higher wage premium, thus reorganize human resources (Kennan&Walker, 2011). Geographical distribution of wage gaps is scientifically interesting (reveals how the labour

market forces operate), but being aware of it is important also from an economic policy perspective. In the current study relevance and actuality of this question is further confirmed by that it can shed light on the effects of the bi-level Bologna system as it has not beed a real possibility before in Hungary having 2012 the first year in the new MSc system when higher number of students graduated.

Taking all of the above into consideration current study defines the following aims: to 1) identify the starting wage premium of those graduated at master level compared to others owning only a bachelor's degree in every NUTS2 regions of Hungary, and to 2) define the role of regional factors (economic development, labour market indicators, demographic variables) in the wage differences.

In the next section a short literature review will provide a context for the empirical research in Section 3 (Data and method) and Section 4 (Results). The conclusions of the study will be presented in the last section.

2. Literature review

Wage differentials have an extensive, complex literature in labour economics, thanks to the fact that many factors can play a role in the determination of wages from the standard demand and supply forces, compensatory and efficiency wages through human capital accumulation and signaling to the many forms of discrimination (see e.g. Polónyi, 2002, pp. 190-205; Galasi&Varga, 2005; Ehrenberg&Smith, 2012). Among the various branches of the literature there are the areas of higher education (or college) wage premiums and the geographical (spatial) wage differences. The focus of this article is in the cross section of these two groups of phenomena. Lindley and Machin (2012, p. 1) states that spatial analyses are relatively scarce because wage differentials are within, rather than between, spatial units of observation, like regions or local areas. Still, there are some works contributing to the cross sectional area of regional effects on educational premiums.

Black et al. (2009) reported sizeable spatial disparities in education related wage differentials that tended to be persistent, until Moretti (2010) and later Lindley and Machin (2013) have found significant evidence – using U.S. data – on non-convergent changes of wage levels between workers with college and high school diploma. They have found that wages are increasing faster where the initial level was already higher. It seems now, that spatial dimensions (regions) matter in higher education wage premiums.

In the Hungarian the question of the economic value of the higher education became especially important after the higher education enrolment rates grew drastically in the 1990s. With that the need for measuring the higher education wage premiums as a proxy for the market value increased. A study by Galasi and Varga (2005) examined the wage difference between the pre-Bologna university and pre-Bologna college students based on two pilot Hungarian graduate career tracking surveys (Fidév 1 and Fidév 2). According to their findings the wage premium of the higher level induced a wage increase between 14-22% depending on the method of calculation. Because of the similarities between the pre-Bologna

and the existing higher education structure, we can expect a similar starting wage gap between current bachelor's and master's graduates.

Since Fidév 1-2 surveys were conducted only among graduates from Budapest, the capital city of Hungary, the regional dimensions were not analysed. However, their importance is obvious, because the geographical polarization of demand for labour in Hungary (Vincze, 2012). One of the newest analysis of the geographical dispersion of graduate earnings – implemented by Várhalmi (2013) – has found significant differences between regions taking into consideration among several demographical and industrial factors (unfortunately wage premium has not been calculated).

In an earlier analysis of the Hungarian Graduate Career Tracking Survey data Veroszta (2012) pointed out the existence of a raw (statistically not tested) difference between master's and bachelor's graduates but without taking into consideration regional differences.

Thus the main questions of the current study are pointing to a rarely researched combination of spatial and educational influences on wages, that is not standing without example in the international literature but it is never analysed on Hungarian data.

3. Data and method

The data source is a survey from 2012 part of the Hungarian Graduate Career Tracking System, named 'Firssdiplomások2012' (NewGraduates2012). According to Veroszta (2012:7), the data were gathered in Spring 2012 via an online questionnaire survey conducted by 32 higher educational institutions. Data recording was aimed to be wide and representative: the institutions approached all of their graduates who gained their absolutory in 2007, 2009 or 2011. Total number of the responders was 24,890, the average response ratio was 15.18%. The weighted sample[i] is representative by the responders' sex, year of absolutory (in Hungary, it is a pre-degree certificate stating that all course-units and other requirements have been completed except the thesis work and the state examination), area of education (professional or scientific) and being a full time or part-time (correspondence) student. Further details can be obtained from the survey's research report (Veroszta 2012). Only those questionnaires are selected into the sample from the total database where the responder justified that his/her place of work is within Hungary, furthermore degree, wage (full-time net hourly wage) and exact location of work (in order to identify the NUTS2 region) were provided. In the followings the study makes no difference between those earned their full degree or only the absolutory.

The newest available labour market and economic data are gathered from the sources of the Hungarian Central Statistical Office (KSH 2013, KSH 2014).

The study involves the data of the 7 NUTS2 regions of Hungary (Central Hungary

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[i]The weights were provided as a part of the database by the Educatio Kht.

– HU10, Central Transdanubia – HU21, Northern Hungary – HU31, Northern Great Plain Region – HU32, Southern Great Plain Region – HU33, Southern Transdanubia – HU23, Western Transdanubia – HU22). 6 of the NUTS2 regions contain 3 counties (or NUTS3 regions) and 1 (HU10) is composed of Budapest and one county (Pest). Unfortunately the sample size is too small – especially in the case of the master's graduates – for a county level analysis, thus this study focuses only on the NUTS2 level. In the empirical analysis the study uses independent sample *t*-tests, variance analysis and linear regression models.

4. Results
Results are presented in two subsections according to the two research questions. First subsection not only shows the wage gaps between BSc and MSc focusing mainly on starting wages countrywide and by regions, but also compares the effects of studying further with the impacts of work experience. The second subsection uses linear regression analyses to identify the regional factors affecting wage differences between bachelor's and master's level graduates.

4.1. Wage premiums by region
The main stream of this study investigates the dissimilarity of the wage gap between the two new educational levels (bachelor and master) generated by the Bologna system according to different geographical categories. In order to perform the investigation, first it needs to be checked on the two levels respectively, whether a detectable wage gap in the sample exists in each country region. For this reason, study presents descriptive statistics first (see the 'Bachelor' and 'Master' columns in Table 1), and then the detected differences between regions are double-checked with ANOVA (Table 2). Table 1 also presents (in the 'Difference' columns) independent samples *t*-test statistics for all the regions and years to check the significance of the earning difference between the two education levels.

Solely in the Central Transdanubian region is the raw wage premium of the master's level not significant on at least 1%, additionally this value reaches only 5% in the Southern Transdanubia, calculated from the total sample. There cannot be detected a significant wage gap within the regions in the 2007 and 2009 subsamples, however, there is a visible difference between those earning Bachelor and the ones with Master degree in the 2011 subsample, where there are six regions with 5% and one (Western Transdanubia) with 10% significance. The significant differences show discrepancy for the benefit of MSc without exception. If we take only the differences significant on at least 10% into account, there is an average 129.58 HUF of discrepancy among regions in the total sample (in case of graduates from 2011 net starting hourly wage of MSc graduates was 180.17 HUF higher).

Consequently, Master's level wage premium was detectable in all regions on at least 10% significance value on at least one subsample. Nevertheless, current study is seeking the answer not only for the existence of wage gap, but also for the question of whether it depends on belonging to a certain region. If we arrange regions in series with regards to where the highest the wage premium of Master's

level is (starting net hourly wage) among the 2011 graduates (that is the most numerous group), it will result in the following sequence: HU32, HU31, HU23, HU21, HU10, HU33, HU22. The same sequence that is this time independent from the year of graduation (here H21 is not present as the difference was not significant): HU31, HU23, HU32, HU22, HU33, HU10. The later ranking combines starting, 2 years and 4 years net hourly wages, thus having a difference between the two sequences (2011 vs. all years) is not unexpected.

Table 1. Net hourly wage from full-time job by education level, region and year of graduation/absolutory (thousand HUF)

NUTS2 region	Bachelor			Master			Difference	
	N	Mean	S. D.	N	Mean	S. D.	S. E.	t
HU10 total	1700	1.0267	0.5787	433	1.1214	0.6586	0.0321	-2.9530***
2007	141	1.2517	0.6597	25	1.2797	0.6044	0.1406	-0.1991
2009	565	1.0552	0.6213	55	0.9893	0.4557	0.0857	0.7693
2011	881	0.9736	0.5198	339	1.1373	0.6966	0.0417	-3.9236***
HU21 total	311	0.9097	0.5437	72	0.9538	0.3986	0.0678	-0.6515
2007	26	0.9387	0.3198	8	0.8449	0.2216	0.1222	0.7675
2009	128	0.9541	0.6830	16	0.8220	0.2590	0.1750	0.7548
2011	142	0.8486	0.4277	49	1.0134	0.4450	0.0716	-2.3004**
HU31 total	335	0.8321	0.4699	75	1.0053	0.4379	0.0594	-2.9163***
2007	12	0.7814	0.2524	3	0.7931	0.2673	0.1619	-0.0720
2009	100	0.8775	0.4675	15	0.9194	0.3521	0.1273	-0.3292
2011	118	0.8309	0.4611	50	1.0679	0.4695	0.0782	-3.0317***
HU32 total	548	0.7796	0.3961	91	0.9128	0.3474	0.0441	-3.0190***
2007	10	0.7805	0.1290	1	0.4123	–	–	–
2009	60	0.8509	0.3302	13	0.8756	0.2791	0.0981	-0.2511
2011	71	0.7308	0.2822	35	0.9899	0.3084	0.0598	-4.3335***
HU33 total	531	0.7788	0.3387	126	0.8743	0.3436	0.0337	-2.8355***
2007	74	0.8078	0.2698	13	0.7919	0.2608	0.0807	0.1963
2009	187	0.7896	0.3422	18	0.7724	0.3146	0.0830	0.2074
2011	237	0.7479	0.3505	90	0.9098	0.3621	0.0437	-3.7026***
HU23 total	284	0.8560	0.5143	69	1.0099	0.4860	0.0682	-2.2558**
2007	30	0.9673	0.5555	3	1.3950	1.4740	0.8023	-0.5331
2009	104	0.8783	0.4639	12	1.0114	0.4796	0.1427	-0.9331
2011	145	0.8179	0.5457	54	0.9851	0.3836	0.0809	-2.0661**
HU22 total	322	0.8338	0.3938	90	0.9608	0.3699	0.0463	-2.7387***
2007	13	0.9097	0.4050	2	1.6437	0.2944	0.2493	-2.9447
2009	161	0.8112	0.3790	16	0.8905	0.2874	0.0968	-0.8198
2011	137	0.8526	0.4132	72	0.9601	0.3746	0.0583	-1.8434*
Total	4031	0.9078	0.5109	957	1.0241	0.5372	0.0186	-6.2667***
2007	308	1.0408	0.5516	56	1.0783	0.6006	0.0815	-0.4596
2009	1306	0.9399	0.5452	145	0.9173	0.3846	0.0353	0.6421
2011	1731	0.8902	0.4829	690	1.0556	0.5682	0.0246	-6.7383***

Note: N = size of the sample; S.D. = standard deviation; S.E. = standard error; t = statistic of the independent samples t-test; *** $p \leq 0.01$; ** $p \leq 0.05$; * $p \leq 0.10$
Source: computed from the 'Frissdiplomások2012' database by the author

F-test results shown in Table 2 support the fact that there is a significant wage gap on 1% among bachelor's degree possessors with no regards to the year of graduation, and if we completely ignore the year (which actually gives interpretable results as the sample is representative regarding the year of earning absolutory) we will find wage gap among Master's graduates, as well. Among Master's graduates from 2007 and 2011, effect of belonging to a certain region can only be accepted at 5% and 10% significance level.

**Table 2. ANOVA tests for the homogeneity of regions
(dependent: full-time hourly net wage)**

	Bachelor		Master	
	N	*F*	*N*	*F*
Total	4031	30.9013***	957	5.2223***
2007	308	7.7514***	56	2.1395*
2009	1306	9.1282***	145	1.0775
2011	1731	10.5954***	690	2.8050**

Note: *N* = size of the sample; *F* = value of the *F* statistic; *** $p \le 0.01$; ** $p \le 0.05$; * $p \le 0.10$
Source: computed from the 'Frissdiplomások2012' database by the author

The database provides a chance – with the constraint of the small sample size – to analyse not only the premium in the starting master's graduate wages compared to the bachelor's hourly earnings in a given time, but also the difference of the wages in the same cohort between those invested into the master's degree and those left the education system after the bachelor's level. With other words, the question is: what is the yield – if there is any – of the educational investment over the yield of labour market experience? Since the duration of a typical master's programme is 2 years in Hungary, and it is impossible to control the likely variation in the length of the master's programme in the sample, two pairs of groups: 1) graduates with bachelor's degree obtained in 2007 vs. master's graduates from 2009 and 2) bachelor's graduates from 2009 vs. master's graduates from 2011. Thus effects of two years of – possible – work experience will be measured against the master's level education. Dependent variable is the full-time net hourly wage at the time of the survey conducted (2012), the method is two independent samples *t*-test. Table 3 contains the results of the analyses (frequencies, means and standard deviations are presented above in Table 1).

The country mean of the full-time net hourly wage of bachelor's graduates from 2007 was significantly higher than that of those absolved in 2009 on master's level. The mean of the difference is 124.19 HUF. Data from those absolved two years later (at both levels) shows a wage gap with the opposite direction: those absolved at master's level in 2011 earned a 118.42 HUF wage than those with bachelor's graduation from 2009. Unfortunately, data of this single survey is not enough to fully understand the reasons behind the different directions of the above mentioned wage differences. We can assume – with a good reason – that the structure of the

students is likely to be different in the previous years, as the Bologna process was initiated only in 2006 in Hungary, thus neither the first 'regular' bachelor's graduates should finish their studies before 2009 nor the 'regular' master's graduates before 2011. However, it is also possible that wage is not a linear function of time spent on the labour market and so the 3rd and 4th years increases it more than the first two, or simply the labour market situation was changed somehow. To find it out, new analysis on a longer sequence of data is needed.

Table 3. Two sample *t*-tests for comparing the effect of further education vs. 2 years of labour market experience

NUTS2 region	Bachelor 2007 vs.master 2009		Bachelor 2009 vs.master 2011	
	F	*t*	*F*	*t*
HU10	5.1601[**]	3.1754[***]	1.4254	-1.8349[**]
HU21	1.0261	1.2202	1.6699	-0.5631
HU31	0.4463	-1.1518	0.5213	-2.3476[**]
HU32	3.4469[*]	-1.0164	0.8448	-2.0359[**]
HU33	0.5158	0.4870	2.0702	-2.6914[***]
HU23	0.0942	-0.2397	0.3685	-1.4534
HU22	1.9900	0.1503	0.7112	-2.7824[***]
Total	6.7068[**]	2.8006[***]	0.4110	-4.5541[***]

Dependent: full-time hourly net wage between
Note: F = F statistic of the Levene's test for equality of variances; S.E. D. = standard error difference; t = statistic of the independent samples *t*-test; [***] $p \leq 0.01$; [**] $p \leq 0.05$; [*] $p \leq 0.10$; descriptive data of the groups are shown in Table 1.
Source: computed from the 'Frissdiplomások2012' database by the author

What this database is capable of is to highlight this paradox to compare the net hourly wages of bachelor's graduates from 2007 to master's graduates from 2011. There we can find no significant difference (the latter group earns 1.48 HUF more, the independent samples *t*-statistic is -0.4374). It makes at least one of the hypotheses unlikely: if the 4 years labour experience worth more than twice the 2 years experience then we should have found a greater significant advantage of the less educated group in this comparison than is the first one.

Spatial disparities are also identified. The bachelor's wage advantage in the 2007 vs. 2009 comparison exists significantly only in the Central Hungarian (HU10) region. In the other geographical areas there is no statistically acceptable difference. On the other hand the master's wage premium in the 2009 vs. 2011 comparison is significant in all but two regions (the exceptions are HU21 and HU23), and even in the those the master's means of wages are higher. In the latter comparison Northern Hungary (HU31) has the greatest master's premium (190.38 HUF), and it is followed by – in descending order – HU22 (148.94 HUF), HU32 (138.99), HU33 (120.19 HUF) and HU10 (82.04 HUF).

Eventually, Table 4 presents another – more widely used – measurement of the master's level wage premiums, the difference of median net hourly wages between bachelor's and master's graduates by region, without significance analysis. It

shows a great range of the master's wage premium from -17.03% up to +109.47% in the different cohorts. However, on the aggregate level – if we do not take the year of absolutory into consideration – the range is smaller: from 2.65% (HU10) up to 29.20% (HU31), the country scale premium is 9.53%.

Table 4. Differences of full-time median net hourly wages by level of education

NUTS2 region	Median of full time net hourly wage (thousand HUF)		Difference of medians	
	Bachelor	Master	Thousand HUF	ratio
HU10 total	0.9182	0.9425	0.0243	2.6519%
2007	1.0843	1.3087	0.2244	20.6947%
2009	0.9425	0.8655	-0.0770	-8.1655%
2011	0.8836	0.9425	0.0589	6.6667%
HU21 total	0.7658	0.8897	0.1239	16.1837%
2007	0.9366	0.7771	-0.1595	-17.0347%
2009	0.7737	0.8627	0.0890	11.4983%
2011	0.7424	0.8969	0.1544	20.8016%
HU31 total	0.7335	0.9477	0.2142	29.2014%
2007	0.7658	0.9852	0.2194	28.6514%
2009	0.7658	0.8836	0.1178	15.3846%
2011	0.7069	0.9847	0.2778	39.2998%
HU32 total	0.7382	0.9198	0.1816	24.6085%
2007	0.7658	–	–	–
2009	0.7493	0.8702	0.1209	16.1359%
2011	0.6932	1.0175	0.3244	46.7942%
HU33 total	0.7069	0.8112	0.1043	14.7526%
2007	0.7093	0.7773	0.0680	9.5886%
2009	0.7422	0.6922	-0.0500	-6.7383%
2011	0.6502	0.8347	0.1845	28.3695%
HU23 total	0.7363	0.8948	0.1584	21.5172%
2007	0.8836	0.7417	-0.1419	-16.0614%
2009	0.7433	0.8560	0.1127	15.1650%
2011	0.6669	0.9417	0.2748	41.2074%
HU22 total	0.7133	0.8969	0.1836	25.7349%
2007	0.8156	1.7084	0.8928	109.4679%
2009	0.7085	0.8969	0.1884	26.5940%
2011	0.7303	0.8969	0.1666	22.8057%
Total	0.8188	0.8969	0.0781	9.5332%
2007	0.9342	0.9154	-0.0188	-2.0109%
2009	0.8247	0.8247	0.0000	0.0000%
2011	0.7718	0.9396	0.1678	21.7357%

Source: computed from the 'Frissdiplomások2012' database by the author

The descending order of the regions according to their similarly calculated master's wage premiums: HU31, HU22, HU32, HU23, HU21, HU33, HU10. The first four

regions are the same in the order of means, thus these seem to be 'good' regions for investing into a master's degree, whilst Central Hungary was the last in both rankings, thus seems to be a 'bad' place for the same decision.

4.2. Analysing the role of regional factors in the master's wage premium

The current study builds up two linear regression models. In Model 1 the NUTS2 regions are presented as dummy variables, in Model 2 there are no region dummies but regional labour market indicators are involved instead. Otherwise the models are identical. Below, Table 5 presents both Model 1 and Model 2 to make comparison easier. Independent variables in the final models were selected by eliminating those that are not significant at least at a 5% level (according to the *t*-test). The independent variables are defined as follows:

MSc: 1 if a master's degree, 0 if bachelor's;

Sex: 1 if female, 0 if male;

Age: age in years;

WorkExp: number of years after the absolutory (0, 2 or 4);

ProfMatch: 1 if the area of the degree and the job are fitting, 0 if not;

FirmSize: number of workers at the employer firm, 1 if the responder chose category 1, 5.5 if category 2-9, 29.5 if category 10-49, 149.5 id category 50-249, 624.5 if category 250-999 and 2000 if category 'above 1000';

EduAgr: 1 if the field of the degree is agricultural, 0 if not;

EduInfo: 1 if the field of the degree is informatics, 0 if not;

EduLaw: 1 if the field of the degree is law, 0 if not;

EduPublAd: 1 if the field of the degree is public administration, 0 if not;

EduSport: 1 if the field of the degree is sports, 0 if not;

EduSoc: 1 if the field of the degree is social sciences, 0 if not;

SecAgr: 1 if the sector of the job is agriculture, 0 if not;

SecConst: 1 if the sector of the job is construction industry, 0 if not;

SecTradRep: 1 if the sector of the job is trade and repairing, 0 if not;

SecLogist: 1 if the sector of the job is logistics, 0 if not;

SecTour: 1 if the sector of the job is tourism and hospitality, 0 if not;

SecExp: 1 if the sector of the job is other professional and scientific work, consultancy, etc., 0 if not;

SecAdmin: 1 if the sector of the job is administration and services support, 0 if not;

SecPublAd: 1 if the sector of the job is public administration, 0 if not;

SecEdu: 1 if the sector of the job is education, 0 if not;

SecMed: 1 if the sector of the job is healthcare and medical, 0 if not;

SecArt: 1 if the sector of the job is arts, 0 if not;

SecServ: 1 if the sector of the job is other human services, 0 if not;

SecOth: 1 if the sector of the job is other than the selectable sectors, or mining or real estate, 0 if not;

HU10-HU33: 1 if the job is located in the given NUTS2 region, 0 if not;

RegGDP%: GDP growth rate of the region in percentage;

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RegE%: employment rate in the job's region in percentage;

The first model supports the previous findings, thus the region of the job was a significant factor in the regression. The second model also reinforces these result, moreover highlight which regional factor are important, and which are not. GDP growth and the employment ratio are contributing significantly to the wage level (while population, participation ratio and unemployment ratio are not). The regional variables do affect the standardised coefficient of the Master dummy. Before entering the regional variables *Std. B* of Master is 0.0907 in Model 1, that is decreased to 0.0787 (the change is -13.23%); and 0.0925 in Model 2 that is decreased to 0.0804 in Model 2 (-13.08%).

Table 5. Regression models (dependent: full-time net hourly wage)

Variables	Model 1			Model 2		
	B	*Std. B*	*t*	*B*	*Std. B*	*t*
Constant	0.6393		15.8296	0.7660		4.6040
Master	0.1041	0.0804	5.3306	0.1018	0.0787	5.2088
Sex	-0.1573	-0.1381	-8.8858	-0.1547	-0.1358	-8.7116
Age	0.0155	0.2333	14.8363	0.0157	0.2365	15.0144
WorkExp	0.0349	0.0840	5.7740	0.0345	0.0831	5.7156
ProfMatch	0.0957	0.0755	4.9997	0.0963	0.0760	5.0333
FirmSize	0.0001	0.0966	6.2829	0.0001	0.0981	6.3818
EduAgr	-0.1356	-0.0504	-3.1983	-0.1484	-0.0552	-3.5088
EduInfo	0.1392	0.0550	3.6612	0.1374	0.0543	3.6165
EduLaw	–	–	–	-0.0970	-0.0296	-2.0162
EduPublAd	-0.0711	-0.0352	-2.0778	-0.0818	-0.0405	-2.3846
EduSport	-0.1093	-0.0329	-2.2504	-0.1126	-0.0340	-2.3197
EduSoc	-0.0590	-0.0317	-2.1454	-0.0629	-0.0337	-2.2742
SecAgr	-0.1791	-0.0452	-2.8694	-0.1727	-0.0436	-2.7639
SecConst	-0.2106	-0.0601	-4.0445	-0.2106	-0.0601	-4.0469
SecTradRep	-0.1184	-0.0486	-3.1472	-0.1193	-0.0490	-3.1734
SecLogist	-0.1743	-0.0490	-3.3178	-0.1752	-0.0492	-3.3361
SecTour	-0.2326	-0.0506	-3.4512	-0.2332	-0.0507	-3.4600
SecExp	-0.1077	-0.0416	-2.7223	-0.1052	-0.0406	-2.6568
SecAdmin	-0.1988	-0.0566	-3.8048	-0.1935	-0.0551	-3.7011
SecPublAd	-0.2226	-0.1306	-7.0548	-0.2128	-0.1249	-6.6937
SecEdu	-0.2547	-0.1819	-9.4042	-0.2571	-0.1836	-9.4956
SecMed	-0.3355	-0.1620	-9.9547	-0.3333	-0.1609	-9.8962
SecArt	-0.2961	-0.0808	-5.3749	-0.2993	-0.0817	-5.4388
SecServ	-0.1646	-0.0386	-2.6275	-0.1709	-0.0401	-2.7306
SecOth	-0.1204	-0.0655	-4.0768	-0.1158	-0.0630	-3.9213

HU31	-0.1804	-0.0833	-5.5769	–	–	–
HU32	-0.2280	-0.0861	-5.8722	–	–	–
HU33	-0.2401	-0.1535	-9.9307	–	–	–
HU21	-0.1668	-0.0856	-5.7706	–	–	–
HU23	-0.1393	-0.0687	-4.6172	–	–	–
HU22	-0.1934	-0.1025	-6.9015	–	–	–
RegGDP%	–	–	–	0.0031	0.2587	8.1075
RegE%	–	–	–	-1.1742	-0.0961	-3.0299
N	4045			4045		
adjR²	0.1933			0.1933		
F	33.3064***			36.8953***		

Note: F = F statistic for goodness of model fit; N = sample size; $adjR^2$= adjusted R square; B = un-standardised coefficient; $Std.\ B$ = standardised coefficient; t = statistic of the independent samples t-test; *** $p \leq 0.01$; ** $p \leq 0.05$; * $p \leq 0.10$; descriptive data of the groups are shown in Table 1. Omitted variable from Model 1: HU10
Source: computed from the 'Frissdiplomások2012' database by the author

5. Conclusions

Within the limitations of the database (self selection bias, small sample, questions are not fully capable to capture the research problems of the current article) the main questions of the study are responded. In section 4.1 empirical evidences are shown that starting wage premiums exist for the Master's level in the Hungarian higher education system, however it is not significant in the Central Transdanubian region for the total of the graduation years, only for graduation year 2011. It was also supported that in all of the regions (see Table 3) the master's wage premium was big enough to at least counterweight the wage increasing effect of two year spent on the labour market with a bachelor's degree or absolutory. In 4 regions the wage premium of further learning was even significantly greater than the similar effect of the work experience. Nevertheless, the wage premium differs from region to region. In the aforementioned section multiple rankings were created to show the best and worst geographical area for investing into a master's level certificate. In section 4.2 two regression models were used to show how much the regional and other factors decrease the education wage gap. It was found that the geographical distribution was responsible for about 13% of the master's wage premium.

Acknowledgements

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