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Does Private and Cost-Priced Higher Education Produce Poor Quality?

An Empirical Analysis Based On Labour Market Success
Indicators of Hungarian Higher-Education Graduates

PÉTER GALASI and JÚLIA VARGA

Labour Research Department, Institute of Economics,
Hungarian Academy of Sciences

Department of Human Resources, Budapest University of Economics
and Public Administration

Budapest

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Authors: Péter GALASI, Department of Human Resources Budapest University of Economics and Public Administration, Fővám tér 9. H–1093 Budapest, Hungary; E-mail: pgalasi@workecon.bke.hu

Júlia VARGA, Department of Human Resources Budapest University of Economics and Public Administration, Fővám tér 9. H–1093 Budapest, Hungary; E-mail: vargajulia@hotmail.com

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Abstract

Since the beginning of the transition, Hungarian higher education has been undergoing continuous transformation. The number of students in higher education more than doubled, and this was accompanied by the appearance of newly founded church-run and private higher education institutions and newly established cost-priced places. The paper focuses on the potential negative effects private and cost-priced higher education might have on the quality of the education and students by making use of labour market success indicators (wages and labour market status) with the help of multivariate estimation techniques. A unique data set, the Second Fidév Survey, is used which provides information about the September 2000 labour market situation of persons graduated from higher education in 1999. The results suggest that education at cost-priced, state funded places and private higher education institutions provides essentially the same level of knowledge or produces the same educational quality as measured by wages. No negative effect has been detected as for the labour market status of ex-students. Students from cost-priced places and private institutions experience the same unemployment probability, whereas the overall employment probability of students graduated from cost-priced places is higher than that of persons studied at state-funded places. One can conclude that although the opportunity of establishing more and more cost-priced places might have been advantageous for higher education institutions so as to increase their revenues, they have shown some self-restraint in this respect, and there is no sign that the increase in cost-priced places has led to lower quality workers.

Rontja-e a minőséget a magán és önköltséges felsőoktatás?

A felsőoktatásból kilépő hallgatók munkaerő-piaci sikermutatóinak empirikus elemzése

GALASI PÉTER – VARGA JÚLIA

Összefoglaló

A rendszerváltozás óta a magyar felsőoktatást szüntelen átalakulás jellemzi: a hallgatók létszáma több, mint kétszeresére nőtt, új egyházi és magán felsőoktatási intézmények alakultak, gyorsan emelkedett az önköltséges helyek száma. A tanulmány a magán- és az önköltséges felsőoktatásnak a felsőoktatás és a diákok minőségére gyakorolt potenciálisan negatív hatásával foglalkozik munkaerő-piaci sikermutatók (bér és munkaerő-piaci státusz) segítségével, többváltozós becslési eljárások felhasználásával. Egy egyedülálló adatbázist, a második FIDÉV felvétel adatait használjuk, amely információkat tartalmaz az 1999-ben a felsőoktatás nappali tagozatán végzett személyek 2000. szeptemberi munkaerő-piaci helyzetéről. A vizsgálódás eredményei arra utalnak, hogy az önköltséges, az államilag finanszírozott képzés, valamint a magán felsőoktatási intézmények lényegében egyforma színvonalú tudást, illetve oktatási minőséget nyújtanak, ha a tudást/minőséget a bérrel mérjük. Nem mutathatók ki negatív hatások akkor sem, ha a munkaerő-piaci státuszt vizsgáljuk. Az önköltséges helyeken, illetve magán intézményekben végzett volt hallgatók munkanélkülivé válásának valószínűsége nagyjából azonos, illetve az önköltséges helyeken végzett volt hallgatók elhelyezkedési valószínűsége magasabb, mint az államilag finanszírozott helyeken végzetteké. A kutatásból adódó legfontosabb következtetés: noha az intézmények számára bevételeik emelése céljából előnyös lehet az önköltséges helyek számának növelése, magatartásukat ebben a tekintetben valamelyes visszafogottság jellemzi, s ezért nincs jele annak, hogy az önköltséges helyek számának növekedése rontotta volna a kibocsátás munkaerő-piaci minőségét.

1.1. INTRODUCTION

The paper is intended to contribute to the debate about how rapid growth of students in higher education, increases in the number of students covering full cost of their education and the appearance of private institutions might affect education and student quality as measured by labour market success indicators. In *Section 2*, we present a description of recent changes in the Hungarian higher education system. Then with using some indicators for trends on the Hungarian labour market and examining admission criteria of different higher education institutions we look for signs that support or reject the hypothesis of devaluation of higher education diplomas. Finally we briefly discuss the relationship of labour market status and wages to types of higher education institutions, and ways of funding studies. *Section 3* contains a description of our data source, the Second FIDÉV Survey and some variables. In *Section 4* our estimation strategy is discussed, *Section 5* presents the results of the estimations. Section 6 concludes.

2.2. THE PROBLEM

Since the beginning of the transition, Hungarian higher education has been undergoing continuous transformation. The expansion and restructuring of higher education have become top priority for the succeeding governments. During the past ten years the number of students in higher education more than doubled. Though potential students' demand for higher education has also increased considerably there is still over-demand for higher education places. Since the second half of the '90s the system of Hungarian higher education has comprised public, church-run and private higher education institutions. In addition to state-funded places all the institutions may have cost-price places meaning that students have to cover the whole costs of their education. Private higher education is then a two-fold term in Hungary. First, non-public institutions might be considered private although some of their places are state-funded. Second, cost-priced places might be regarded as private for students covering the full costs. As mentioned before a considerable part of places in private institutions are

state-funded, that is the institutions are given the same sums public institutions get for the same type and level of education.

Currently there are 17 public universities, 11 public colleges, 9 private colleges and 26 church-run education institutions in Hungary. Most of the church-run institutions provide only theological courses, out of the 26 only two church-run universities and two colleges have degree programmes in other fields of study: law, teacher training and humanities. Private institutions are all colleges; they provide courses finishing with a BA degree. Currently private colleges provide courses only in few subject areas (for example business-management, and information technology).

The rapid growth of the number of students and the appearance of new private institutions raise the question of quality especially for the newly founded private institutions and cost-priced places. The research in this paper focuses on the quality of private and non-private higher education. The quality is interpreted in a human capital framework (*Becker* 1975, *Mincer* 1974), and measured by labour market success indicators (wages and labour market status).

Wage is here an indicator of the return to human capital the potential worker invested in by his/her schooling. In a simple beckerian setting the return depends on several labour-market- supply- and demand-side factors. On the supply side one can distinguish at least three of them. The first is the amount of schooling, traditionally measured by classes completed or highest degree obtained; the more classes the individual completed and/or the higher his/her degree is s/he will have higher amounts of human capital resulting in higher wages. The second is the quality of education provided by the educational institutions s/he attended; the better the school s/he attends the higher his/her human capital accumulation will be in the course of studies leading to higher wages on the labour market, ceteris paribus, that is, at given level of schooling. The third one is the earnings potential or labour market ability of the potential worker; higher earnings potential implies higher productivity and produces higher wages at a given level of education and given school quality. It is clear then that more classes or higher degrees might be associated with lower wages if the quality of education is low, or that the same number of classes and/or quality of education might result in different wages if individuals differ in their earnings potential. As for our cost-priced places/ private institutions problem this implies that – at given levels of education completed – even if cost-priced places and/or private institutions provide an education of lower quality the wage of their students might be higher if students with higher earnings potential choose cost-priced places or private institutions.

It is important to note, however, that in a life-time-income-present-value maximisation framework the schooling decision is solely directed by the relative expected wage gain and relative costs of attending a school. Then obtaining a higher degree might be advantageous for the potential worker even if the quality of education is deteriorating over time if the wage gain attainable by the higher degree is higher than the costs. This means that deteriorating educational quality might be coupled with increases in the number of applicants for the given school.

Finally, in a slightly more complex human capital setting where the number of applicants to be admitted is restricted, that is, where life-cycle wage-gain and admission probability are combined one can show that the quality of a cost-priced higher education diploma as measured by the wage gain attainable might be higher or lower than that of a state-funded one. When a potential higher education student makes his/her enrolment decision, assuming that s/he maximises the present value of his/her life-time income, and – for simplicity – assuming that s/he will be admitted to a higher education institution at the given probability of admission and the decision solely concerns the choice of a cost-priced or state-funded place, he/she will choose a cost-priced place if the present value of the lifetime wage gain due to the cost-priced diploma exceeds the additional costs of obtaining a diploma at a cost-priced place. She will choose a cost-priced place (institution) if the following inequality holds:

$$\sum_{t=k}^{T} \frac{(1-p)W_{CP} - pW_{SF}}{(1+i)^t} \geq \sum_{t=1}^{k-1} \frac{C_{CP} - C_{SF}}{(1+i)^t},$$

where C_{CP} and C_{SF} are the costs of a cost-priced and state-funded place for the potential student, respectively, W_{CP} and W_{SF} are the expected (annual) wage obtainable by graduating form a cost-priced or state-funded places, p denotes the probability of admission to a state-funded place, t is life-cycle time, the individual spends $k-1$ time periods on studies and k to T time periods on the labour market (with a final period of time T), and i is the individual's discount rate.

By assumption $C_{CP} > C_{SF}$, thus the potential student would choose a cost-priced place if $(1-p)W_{CP} > pW_{SF}$; therefore the decision will depend on the wages and the admission probabilities associated with the two kinds of places. p is a function of the criteria of admission (entry exams, admission restrictions in terms of the number of students to be admitted, entry scores,

etc). If the criteria of admission are much stricter for state funded than cost-priced places ($1 - p > p$) then the student might end up with a choice $W_{SF} > W_{CP}$. If the criteria of admission do not differ much or do not differ at all then choosing a cost-priced place will result in $W_{CP} > W_{SF}$. The result is then that stricter admission criteria for state-funded places make cost-priced places attractive even if the quality of its education and the expected relative wage is low, with applying similar criteria of admission for both kind of places results in choosing cost-priced places if the quality of education at the cost-priced place is high therefore the wage gain attributable to cost-priced education is considerable. This can easily be extended to the decision on attending private and non-private institutions and the choice between individual institutions, as well.

Note, however, that p might be also influenced by the potential student's ability so at given admission criteria students with heterogeneous abilities may differ as for the value of their ps. The better the student's ability the higher is his/her probability to be accepted at a state funded place at given admission criteria. In addition, if students are heterogeneous in terms of earnings potential then they might face different wage gains at given quality of education provided by the institution they choose. Finally, it is worth noting that since i might reflect either subjective time preference or access to funds, potential students may have different i values leading to different results in choosing the institution to study in.

As for the other labour market success indicator, labour market status is not as simply interpretable as the wage. We will distinguish three labour market states: employee, unemployed, full-time student. Employment might reflect better quality or/and higher earnings potential, but also depends on the reservation wages of potential workers. As regards our cost-priced/private institution problem it might also reflect the effect of differences in direct costs of education. Since the direct cost of cost-priced places and private institutions is much higher than that of state-funded ones, it might be that the willingness of would-be workers graduated from cost-priced places or private institutions is stronger to become employed for their stronger motivation of collecting the premia of their more costly education. Unemployment is a less unambiguous quality indicator because the unemployed is willing to enter the labour market but s/he does not find an acceptable job offer. Therefore, if his/her reservation wage is not lower than the going market wage, s/he might be unemployed from demand-side quality considerations. But if the reservation wage of the potential worker is higher than the going market wage, it is unclear whether lower earnings potential and/or education quality play a role in the unemployment s/he

experiences. Remaining a full-time student after graduating from a higher education institution is also hard to interpret unambiguously. It might be motivated by fear from unemployment or further human capital investment on the part of the graduate. But it might result from differences in education costs, as well. As regards our private institutions or cost-priced place problem where the differences in the cost of education are important, students graduated from cost-priced places or private institutions might be less willing to study further than those studied at state-funded places because they might consider the cost of their education high and thus more willing to enter the labour market so as to benefit from their human capital investments.

In Hungary several factors may cause differences in the quality of private and non-private diplomas, state-funded or cost-priced places. High demand for higher education on the part of the potential students might be coupled with lowering standards of entry on the part of institutions. This would lead to milder criteria of admission to cost-priced places and/or to private institutions since a cost-priced student is tantamount to higher revenues to the institution, and the number of students to be admitted to cost-price places are not regulated, whereas the number of state-funded places are fixed by the Ministry of Education on an annual basis. Some indicators suggest that lower standards of screening might be true of private institutions and cost-priced places. First in certain private institutions there are no entrance exams. Second the scores of admission to cost-priced places are usually lower than to state-funded places for the same higher-education institutions and the same type of education. In 1999 it was by some six per cent lower.[1] In addition, the ratio of the number of students admitted to the number of applicants is higher for cost-price places than for state-funded places. On average 17 per cent of the applicants were admitted to state-funded whereas the value of the same indicator was 26 per cent for cost-priced places in 1999.[2]

Weaker admission criteria might imply lower quality students and lower quality education, and both might lead to lower wages. Acquiring a lower quality higher education diploma, however, might be advantageous for the potential student from pure human capital considerations if the relative wage gain of young employees with a higher education degree has been increasing as compared their wages to the wages young employees with high school diploma might obtain. If this is so, being young with a higher

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[1] This figure comes from the data base of the Higher Education Admission Office and concerns the admission scores of the 1999/2000 school year.

[2] Source of data is the same as in *footnote 1*

education diploma leads to increasing wage gains even when the quality of diploma is relatively poor. Some indicators show that this might be the case in Hungary during the '90s. The ratio of monthly wages of young (20-34 years old) workers with higher education diploma to young workers with high school diploma has been continuously increasing (see *Figure 1*).

The wage gain due to higher education diploma as compared to a high school diploma has been doubled over the period in consideration, from about 36 per cent to 70 per cent. This might be related to the restructuring of the Hungarian economy due to its transitional period.

Lower labour market quality and cost-priced places or private institutions do not necessarily go hand in hand, however. As we have seen even if the quality of education is worse at these institutions/places and/or their criteria of admission are less strict, if the earnings potential (ability, productivity) of their students is better than that of persons graduated from state-funded places/state-run institutions, then the labour market quality of their students might be better in terms of either wages or employment probability. Second, since the direct cost of obtaining a higher education diploma at a cost-priced place is much higher than at a state-funded one, students might expect higher wage gain at higher costs so the quality of education provided to cost-priced students must be better in order to be attractive for potential students and the diploma must produce higher wages and/or better chances of employment, ceteris paribus, that is at a given earnings potential.

3. 3. DATA

The data we will make use of come from the Second Young Higher-Education Graduates Survey conducted by the FIDÉV Research Group at the Department of Human Resources of Budapest University of Economics and Public Administration, and financed by the Hungarian Ministry of Education. The aim of these surveys was to analyse the labour market trajectories of youth graduated from higher-education institutions. The population of the Second Survey consists of persons graduated from day classes of public and private universities and colleges in 1999, all of them having been full-time students. All such persons have received a short postal questionnaire between 1 May and 10 June 2001. The overall response rate was 22,8% (N. 5783). Since the structure of the sample

differs from that of the population we will use weighted data. The questionnaire has requested information on the type of high school and university/college education and the September 2000 labour market characteristics of graduates.

The composition and the size of the sample allow us to compare the labour market success of private and non-private students/institutions/di-plomas. About one-tenth of the respondents graduated form cost-priced places, the proportion attended private colleges, or church-run institutions is 5 and 3 per cent, respectively. About 18 per cent of those attended church-run institutions graduated from cost-priced places and the same proportion is 7,4 per cent among state-run institutions' graduates.[3]

On average, out of every ten graduates six have a BA and four an MA degree. Cost-priced places, however, provide mainly BA degree; the proportion of BA diploma holders among those occupied cost-priced places is 85 per cent. All the respondents graduated form private institutions have BA degree, and this holds true of more than 80 per cent for those attended church-run institutions.

The composition of graduates by types of education differs by institutions. Private institutions provide diploma mainly in informatics and business – two highly demanded specialisations on the labour market, the share of private education in informatics is important (46,4 %). Church-run institutions' diploma holders have specialised mostly in arts and humanities; they are overrepresented in social sciences as most of them have a social worker specialisation.

For some specialisations the number of graduates from cost-priced places exceeds the overall 12 per cent. These are informatics, business, teaching (BA), technical education.

As for our labour market success indicators we consider the labour market status and the monthly net (after tax) wage. Four labour market states are distinguished: employee (and self-employed), unemployed, full-time student, other inactive. In a human capital setting we expect more employees, less unemployed, full-time students and other inactives among cost-priced students since – ceteris paribus – they have higher education costs therefore at given wage levels they need more time on the labour market to make their extra investment profitable.

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[3] Note that there are very few cases at state-funded places in private institutions. These are omitted from the analysis.

Among the respondents graduated from private institutions the proportion of employees is higher and those of other labour market states are lower than the sample average. Persons who attended church-run institutions are worse off in terms of high unemployment and the proportion of other inactives are also high. The number of full-time students exceeds 9 per cent among state-run institutions' graduates whereas this value is 6 per cent for the whole sample.

The proportion of employees is higher and that of full-time students lower for cost-priced students but state-funded and cost-priced education produces similar levels of unemployment and about the same number of other inactives.

As for the other labour market success indicator, the average monthly net wage of the workers in the sample was HUF 66 thousand. This is 18 per cent higher than the average monthly wage observed in September 1999 for persons graduated from higher education institutions in 1998 (*Galasi* and *Timár* and *Varga*, 2000), and 16,5 per cent higher than that of the average Hungarian worker in 2000 (*Fazekas* 2001, *Table 7.1*). Obtaining a degree at cost-priced places leads to a 9 per cent high wage gain (cost-priced places: HUF 71 thousand, state-funded places: HUF 65 thousand) and that a private institutions' diploma implies 31 per cent higher wages than that from a state-run institution. We can see that workers with diploma from a church-run institution earn much less (HUF 43 thousand) than those graduated from a state-run one. Differences in wages, however, might be due to differences in specialisation structure of state-funded and cost-priced places or private, state- and church-run institutions.

4.4. ESTIMATION STRATEGY

We have to single out the "pure" cost-priced or private education effects either on the labour market status or the wage of respondents. For this reason we will apply multivariate regression techniques that allow us to control for relevant factors others than this effect.

As regards the labour market status of the respondents first we will run logits with a dichotomous dependent variable – the respondent is employed or not-employed – since employment is the most important outcome as for the labour market success of diploma holders or the labour market value of

diplomas. Then multinomial logits will be run with using the four-outcome classification used in the previous section.

We have considered several specifications as for the key explanatory variable(s) that would capture the private/cost-priced education effect(s). First, a single cost-priced dummy will be inserted into the equation that is we will distinguish cost-priced and state-funded places/dummies (*Model 1*). That would make it possible to analyse whether cost-priced places have an impact on labour market participation probability as compared to state-funded places. Second, we will use three dummies by distinguishing cost-price students in state-run, church-run and private institutions that might provide information about whether cost-priced places/students would differ by diploma-issuing institutions in terms of labour market participation probabilities (*Model 2*). Finally with the help of five dummy variables we will try to assess whether the three individual private institutions in our sample differ from one another as for the labour market participation probabilities of their students (*Model 3*).

Other explanatory variables that might affect labour market participation probability will be used, as well. Level of education (BA or MA) would be such a variable by having an effect on labour market participation independently of whether the respondent graduated from cost-priced or state-funded places, state-, church-run or private institution. It will be represented by a dummy variable (BA degree = 0, MA degree = 1). In-school labour market experience is also a promising candidate since it would result in – ceteris paribus – more human capital that might be related to labour market participation (*Light* 2001). This effect will also be captured by a dummy variable (0 = not worked regularly for payment during the studies, 1 = regularly worked for payment during the studies). Finally, a series of type of education/specialisation dummies is intended to control for heterogeneity of qualifications that might result in different labour market participation due to differences in labour demand or/and equilibrium levels of employment.

As for the wage equation the econometric difficulties are numerous and mostly related to self-selection (selectivity bias) problems or/and endogeneity of variables. We will use the natural log of monthly net wages as dependent variable by taking into consideration the lognormality of wage distribution. We will run simple OLS as a base-line model and for checking the impact and robustness of more sophisticated techniques.

A general selectivity-bias problem for wage equations detected, described and corrected by *Heckman* (1979) is that observed wages do not correctly

reflect the actual wage-offer distribution on the labour market because accepted (rejected) thus observed (unobserved) wage offers are not random. More exactly we cannot observe the low-wage tail/portion of the wage offer distribution since lower wage offers are systematically rejected. Then if we use simple OLS in estimating wage equations we would have overestimated coefficients. Heckman has shown that overestimation is correlated with labour market participation probability and proposes a selection correction variable the insertion of which into the wage equation corrects for this selectivity bias and, at the same time, the test of significance of the parameter estimate of this variable provides a statistical test for the presence of the selectivity bias. Technically this means that first we have to estimate a probit for participation probability and with the help of the estimated probit model we can construct a selection correction variable.[4] Finally this new variable has to be inserted into the wage equation as an explanatory variable and the significance of its parameter estimation means that the hypothesis of selectivity bias of such a form is present.

In the earlier human capital/ability-bias literature the original *Willis* and *Rosen's* (1979) ability-bias corrected wage model, a slightly modified version of the Heckman's selectivity-bias model, seems to be tailored to the needs of our data. *Willis* and *Rosen* argue that the observed highest degree of education is correlated with the ability of individuals obtaining the given degree therefore the estimation of returns to education will be biased if we estimate the wage equation with OLS since the parameters will reflect differences in ability among individuals, as well. In their original model they analyse two highest degrees (high school and college) and assume that less able individuals attend high school, whereas the more able obtain college degrees and because more (less) able persons are more (less) productive then persons with BA degree would have systematically higher wage offers than persons with high school diploma due to ability differences. Since high-school diploma holders are located in the low-wage part of the wage offer distribution and college degree holders are in the high-wage part, then it is possible to construct two selectivity-bias correction variables – using the same logic and technique as *Heckman* – considering that with OLS the coefficients of BA holders would be overestimated and those of high school diploma holders underestimated

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[4] The value of the selection correction variable (*m*) for the jth observation is $m_j = \dfrac{\varphi(\mathbf{Z}_j\beta)}{\Phi(\mathbf{Z}_j\beta)}$, where $\mathbf{Z}$ the variable matrix used in probit estimation, β is the vector of parameters estimated by probit, Φ standard normal cdf, φ standard normal pdf.

the returns to education, and run separate regressions for the two levels of education and getting unbiased coefficients.

In recent human capital/unobserved ability/endogeneity literature the instrumental variable technique is popular (*Bedi* and *Gaston* 1999, *Brunello* and *Miniaci* 1999, *Card* 1998, *Roope* 1999). It can handle ability and endogeneity biases due to unobserved ability, endogeneity of the schooling decision and so on. Unfortunately no IV method can be applied to our data for potentially endogenous variables has to be continuous whereas our such variables (BA or MA degree, cost-priced or state-funded places) are all dummies.

We have run several specifications for the *Heckman's* selectivity-bias model and all the parameter estimates for the selection correction variable have proven significant at the usual level (p = 0,05). Thus, in addition to the OLS, we will use wage equations with *Heckman's* estimator and also *White's* robust standard errors in order to correct for heteroscedasticity (*White* 1980).

We have also constructed selectivity correction variables in the spirit of the *Willis* and *Rosen's* model and run separate regressions for the two education levels, but these equations have all failed to produce significant parameter estimates for the selection correction variables therefore we will omit these results from the analysis.

It should be noted that making use of OLS and *Heckman's* estimators is tantamount to not correcting directly for ability bias, although the coefficient of *Heckman's* selectivity bias correction variable might capture an ability element as well, and the association of school types and labour market success indicators might simultaneously reflect educational and student quality.

As for our explanatory variables in the wage equations we will use almost the same specifications as in simple and multinomial logits. The first difference is that a working time variable (monthly hours) is inserted into all equations so as to control for differences in wages due to differences in hours of work. The second one is intended to measure the effect any firm-specific training might have on wages: whether the respondent has participated in firm-specific training or not (1 = participated, 0 = not participated). In order to capture the effects private, church-run or cost-priced education might have on wages our key independent variables will be specified in three ways: a single cost-price dummy (*Model 1*); three dummies for cost-priced students graduated from state-run, church-run and private institutions (*Model 2*); five dummies variables, three for the three

private institutions in the sample, and two for cost-priced students in church- and state-run institutions, respectively (*Model 3*).

The other explanatory variables that might have an impact on wages are level of education (BA or MA), in-school labour market experience, and type of education. Holding an MA degree might mean higher level of human capital resulted from longer education, in-school labour market experience also produces higher level of human capital via its learning-by-doing element (*Light* 2001). Types of education would absorb the effect actual equilibrium states of the labour market with heterogeneous jobs and workers would have on labour market success.

5. RESULTS

Table 1 presents significant (at the p = 0,05 level) coefficients of the key independent variables (funding of education and types of institutions) for all estimated models (*Tables* A1 to A9 in *Appendix* display the full estimation results).

The third column of the table contains three significant coefficients from the three logit models we have run for employed versus non-employed persons. The first coefficient shows that in general persons graduated from cost-priced places become employed with higher probability than those graduated from state-funded places. The second and third coefficients show that this only holds true of those who were cost-priced students at state-run institutions. In sum, the probability (willingness/op-portunity) of employment is higher for persons graduated from a cost-priced place at a state-run institution than for those graduated from a state-funded place at a state- or church-run institutions, whereas being a cost-priced student at a church-run or a private institution produces the same employment probability as being a state-funded student at a state- or church-run institution. That means that stronger willingness to work or better work opportunities are positively related to the covering of the full cost of higher education only in the case of students at state-run institutions.

The fourth column of the table presents five significant coefficients from the three multinomial logit models. Out of the three labour market states (unemployed, full-time student, other inactive) included in the models the estimations have produced significant coefficients for only one status: full-time student. That might be interpreted that funding of studies and type of

institutions (state-, church-run, private) do not have any impact on the probability of unemployment and being inactive (other than full-time student). From *Model 1* we can conclude that persons at cost-priced places become full-time students after graduation with a lower probability than those having studied at state-funded places. The results of *Model 2* and *3* show, however, that this is not the case for private institutions, although the chances of continuing higher education on a full-time basis are significantly worse for those who pay the full costs of education either at church- or state-run institution than for those having been at state funded places of state- or church-run institutions. State funded places thus provide less willingness to finish studies than cost-priced places at both state- and church-run institutions.

The results are clear. First, in terms of labour market success of the young graduates the quality of education might not differ at cost-priced and state-funded places or at state-run, church-run and private institutions as both ways of funding education and all types of institutions are associated with the same probability of unemployment. Second, private institutions, where all the students cover the full cost of education, do not exhibit any patterns different from either cost-priced or state funded places at state- or church-run institutions. Third, cost-priced students at state-run institutions are more likely to become employed and less likely to continue their studies on a full-time basis than students at state-funded places, and cost-priced students at church-run institutions are also less likely to remain students than those at state-funded places. This can be interpreted as a life-cycle returns to human capital investment effect. Since cost-priced students cover the full costs of education they are more likely to enter the labour market or enter the labour market earlier in order to collect the premia for their extra investment, and this would result in higher probability of employment and lower probability of remaining student.

Whether this extra investment would lead to higher wage premia, or whether cost-priced or private education are of poor quality and therefore persons graduated from cost-priced places and/or private institutions would earn less has been the focus of our wage equations. In general the answer is negative for both eventualities. The last two columns of *Table 1* shows that most of the coefficients have been non-significant for both the OLS and the *Heckman* models. *Model 1* and *2* have solely produced non-significant parameter estimations. This means that the wage of a cost-priced student does not differ from that of a state-funded one (*Model 1*), in addition the outcome is similar if we distinguish cost-priced students by institutions (church-, state-run or private) (*Model 2*). These results are

partly in line with those from *Model 3*: a person who studied at a cost-priced place at church- state-run institutions attains – ceteris paribus – the same level of remuneration as another person graduated from a state-funded place does. From *Model 3*, however, we have significant parameter estimates for all the three private institutions. These coefficients are all significant and essentially of the same magnitude for the OLS and *Heckman* model, implying that using OLS would not produce heavily biased results. Moreover, the parameters display striking intra-group differences among private institutions. A worker graduated from Dénes Gábor College earns about 14 per cent less than an ex-student graduated from a state-funded place at a state-run institution, whereas with the diploma isssued by Janos Kodolanyi College and School of Modern Business considerable wage premia can be obtained: 33 and 42 per cent, respectively. This shows the heterogeneity of the quality of education provided by the newly-founded private institutions and it is in line with our rudimentary model of *Section 3* about wages and admission criteria. As regards Denes Gabor College the scores of admission were much lower (73 points) and the ratio of persons admitted to those applied was much higher (49 per cent) in 1999 than the average values for private institutions (92 points and 29 per cent, respectively), whereas the same indicators display stricter admission criteria in terms of both admission scores and admitted to applied ratio for the other two institutions.[5] It is worth noting, however, that differences in admission criteria might lead to differences in ability of students therefore interinstitutional wage differences might reflect not only differences in education quality of institutions but also differences in students' ability.

We can conclude that in terms of returns to schooling, measured by the wages of young graduates, cost-priced and state-funded higher education does not differ, thus education at cost-priced and state funded places provides essentially the same level of knowledge or produces the same educational quality. This only holds if we assume that the ability composition of students is similar. We could not handle this problem but since admission criteria to state-funded or cost-priced places reflect similar requirements there is no sign that selection on the part of institutions would result in differences in students' quality. Self-selection of students is also a problem but it may be that this takes place via choosing types of education and in our models this potential effect is captured by type of education dummies. Ability composition putting aside, although the opportunity of establishing more and more cost-priced places might have

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[5] *Source* of data: National Admission Office Data Base

been advantageous for higher education institutions so as to increase their revenues they have shown some self-restraint and it seems that the increase in cost-priced places did not lead to lower quality workers. We have detected no differences in wages between private institutions and state-funded places at state- and church-run institutions, that is the newly founded higher education institutions in general do not have a negative impact on the quality of workers via education of poor quality. Private institutions, however, are heterogeneous in this sense. Out of the three institutions in our sample one provides low quality education and/or less able workers, the students of the other two, however, earn much more than a typical person graduated from state-funded places. This is consistent with a model where stricter/less strict admission requirements are coupled with higher/lower student and education quality that leads to a more/less productive workforce.

6. 6. CONCLUSIONS

We have investigated the labour marker success of young higher-education graduates in order to shed light on the potential negative effects the rapid growth of the number of higher education students, the newly founded private higher education institutions and/or the newly established cost-priced places might have on their labour market position via increasing labour supply and/or deteriorating student and educational quality.

We have seen that in terms of relative wages the position of young (20–34 year-old) workers with higher-education diploma does not exhibit a downward wage pressure over the '90s. Despite their increasing supply, their wage premia have been increasing when comparing their wages to the wages of workers of the same cohort with high school diploma.

There are some signs, however, that in the case of the newly established cost-priced places and newly founded private higher education institutions less strict admission criteria are applied; this is reflected in lower admission scores and higher number of admitted to applied students ratio. This might have led to lower quality students and education and therefore to less productive potential workforce, and that would result in lower employment and/or wage level among the young graduated from cost-priced places and/or private institutions. We have analysed two types of indicators (labour market status and wages) to see whether this is the case.

As regards employment probabilities we have detected few differences between cost-priced and state-funded students. The overall employment probability of students graduated from cost-priced places is higher but a more detailed analysis has shown that stronger willingness to work or better work opportunities are positively related to the covering of the full cost of higher education only in the case of students at state-run institutions. As for unemployment cost-priced and state-funded places, and state-, church-run and private institutions are associated with the same probability, thus the quality of education (students) might not differ across types of institutions and ways of funding. Finally, when examining the probability of remaining a full-time student after graduation we have seen that cost-priced students at state-run institutions are less likely to continue their studies on a full-time basis than students at state-funded places, and cost-priced students at church-run institutions are also less likely to remain students than those at state-funded places. This can be interpreted as a life-cycle returns to human capital investment effect. Since cost-priced students cover the full costs of education they are more likely to enter the labour market or enter the labour market earlier in order to collect the premia for their extra investment, and this would result in lower probability of remaining student.

As regards returns to schooling measured by wage level, it seems education at cost-priced and state funded places provides essentially the same level of knowledge or produces the same educational quality. Although the opportunity of establishing more and more cost-priced places might have been advantageous for higher education institutions so as to increase their revenues they have shown some self-restraint and there is no sign that the increase in cost-priced places has led to lower quality workers. We have detected no differences in wages between private institutions and state-funded places at state- and church-run institutions, that is the newly founded higher education institutions in general do not have a negative impact on the quality of workers via education of poor quality. Private institutions, however, are heterogeneous in this sense. Out of the three institutions in our sample one provides low quality education and/or less able workers, the students of the other two, however, earn much more than a typical person graduated from state-funded places. This is consistent with a model where stricter/less strict admission requirements are coupled with higher/lower student and education quality that leads to a more/less productive workforce.

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8.FIGURE AND TABLE

Figure 1

Ratio of monthly wages of 20-34 year-old workers with higher education to those with high-school diploma 1989–1998
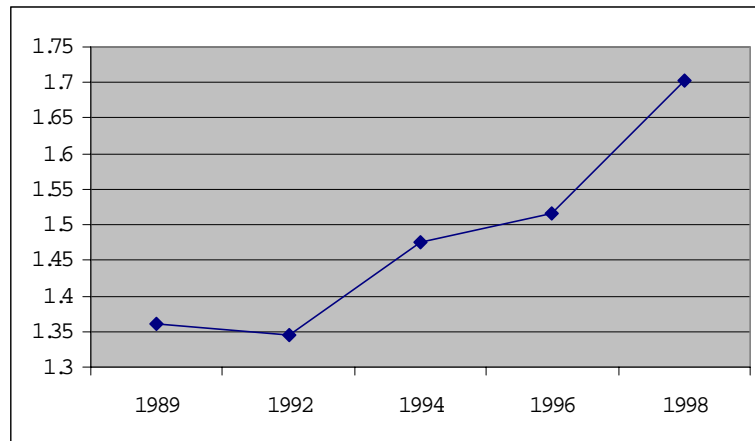
Data: Employment Office Data Base

Table 1

Funding and institutions' effects on labour market status and wages[1]

	Labour market status		Wages[10]	
	Employee[2]	Full-time student[3]	OLS	Heckman
Model 1 Cost-price student	0,324[4]	-0,838[7]		
Model 2 Cost-price students at				
chuch-run institution		-31,851[8]		
state-run institution	0,350[5]	-0,942[8]		
private institution				
Model 3 Cost-price students at				
chuch-run institution		-32,849[9]		
state-run institution	0,349[6]	-0,941[9]		
private institutions:				
Dénes Gábor College			-0,189	-0,156
János Kodolányi College			0,267	0,287
School of Modern Business			0,324	0,353

Notes: [1] significant parameter estimates; [2] from logit models; [3] from multinomial logit models; see [4] *Table* A1, [5] *Table* A2, [6] *Table* A3, [7] *Table* A4, [8] *Table* A5, [9] *Table* A6, [10] all significant coefficients are from *Table* A9.

9.APPENDIX

Tables A1-A9

Table A1

Probability of employment – *Model 1*

Variables	Coef.	z	P>|z|
Cost-priced student	0,324	2,82	0,005
University graduate (MA)	0,012	0,16	0,873
Paid work during study	0,442	5,09	0,000
Type of education			
Agricultural	-0,731	-5,15	0,000
Humanities	-0,400	-2,59	0,010
Foreign Languages	-0,603	-3,58	0,000
Small Languages	0,072	0,11	0,915
Physical Education	0,146	0,35	0,727
Informatics	-0,411	-2,13	0,034
Technical	-0,290	-2,05	0,040
Arts	-0,220	-0,62	0,534
Medical	0,133	0,67	0,500
Law	0,461	1,76	0,079
Business&economics	-0,264	-1,73	0,083
Social Sciences	0,711	1,69	0,090
Natural Sciences	-0,888	-5,51	0,000
Constant	1,519	13,67	0,000
Number of obs			5757
Wald chi2(16)			125,8
Prob > chi2			0
Pseudo R2			0,025

Logit, dependent variable: employee or self-employed

Reference: persons graduated from college (BA) at a non cost-priced place with a specialisation in teaching and not having worked regularly during study

Probability of employment – *Model 2*

Variables	Coef.	z	P>|z|
Cost-price students at			
chuch-run institution	0,052	0,09	0,925
state-run institution	0,350	2,73	0,006
private institution	0,305	1,24	0,214
Paid work during study	0,440	5,02	0,000
University graduate (MA)	0,015	0,20	0,844
Type of education			
Agricultural	-0,734	-5,17	0,000
Humanities	-0,397	-2,57	0,010
Foreign Languages	-0,606	-3,59	0,000
Small Languages	0,082	0,12	0,904
Physical Education	0,143	0,34	0,732
Informatics	-0,408	-1,99	0,047
Technical	-0,294	-2,08	0,037
Arts	-0,223	-0,63	0,530
Medical	0,129	0,65	0,513
Law	0,458	1,75	0,081
Business&economics	-0,267	-1,74	0,082
Social Sciences	0,717	1,70	0,088
Natural Sciences	-0,892	-5,53	0,000
Constant	1,520	13,65	0,000
Number of obs			5757
Wald chi2(16)			127,1
Prob > chi2			0
Pseudo R2			0,025

Logit, dependent variable: employee or self-employed

Reference: persons graduated from state- or church-run college (BA) at a non cost-priced place with a specialisation in teaching and not having worked regularly during study

Probability of employment – *Model 3*

	Coef.	z	P>|z|
Cost-price students at			
chuch-run institution	0,052	0,09	0,927
state-run institution	0,349	2,73	0,006
Dénes Gábor College	0,226	0,67	0,503
János Kodolányi College	0,339	0,81	0,420
School of Modern Business	0,530	0,84	0,398
Paid work during study	0,444	5,02	0,000
University graduate (MA)	0,015	0,19	0,848
Type of education			
Agricultural	-0,734	-5,17	0,000
Humanities	-0,398	-2,57	0,010
Foreign Languages	-0,607	-3,59	0,000
Small Languages	0,082	0,12	0,904
Physical Education	0,143	0,34	0,732
Informatics	-0,378	-1,73	0,084
Technical	-0,294	-2,08	0,037
Arts	-0,225	-0,63	0,527
Medical	0,129	0,65	0,514
Law	0,458	1,75	0,081
Business&economics	-0,274	-1,78	0,075
Social Sciences	0,716	1,70	0,089
Natural Sciences	-0,892	-5,53	0,000
Constant	1,519	13,64	0,000
Number of obs			5757
Wald chi2(16)			127,6
Prob > chi2			0
Pseudo R2			0,025

Logit, dependent variable: employee or self-employed

Reference: persons graduated from state- or church-run college (BA) at a non cost-price place with a specialisation in teaching and not having worked regularly during study

Determinants of Labour Market Status – *Model 1*

Labour Market Status	Coef.	z	P>|z|
Unemployed			
Cost-price student	-0,044	-0,23	0,815
University graduate (MA)	-0,431	-2,94	0,003
Paid work during study	-0,436	-2,65	0,008
Type of education			
Agricultural	1,044	5,12	0,000
Humanities	0,227	0,92	0,356
Foreign Languages	0,195	0,69	0,490
Small Languages	0,000	0,00	1,000
Physical Education	0,195	0,34	0,736
Informatics	-0,272	-0,73	0,465
Technical	-0,045	-0,20	0,845
Arts	0,292	0,54	0,589
Medical	-1,865	-3,03	0,002
Law	-0,871	-1,70	0,090
Business&economics	-0,487	-1,80	0,071
Social Sciences	-1,208	-1,62	0,105
Natural Sciences	0,308	1,09	0,277
Constant	-2,412	-10,83	0,000
Full-time Student			
Cost-price student	-0,838	-3,70	0,000
University graduate	0,067	0,59	0,553
Paid work during study	-0,663	-4,83	0,000
Type of education			
Agricultural	1,259	4,09	0,000
Humanities	0,990	3,17	0,002
Foreign Language	1,662	5,34	0,000
Small Languages	-29,319	-77,20	0,000
Physical Education	0,622	0,93	0,354
Informatics	1,513	4,30	0,000
Technical	1,032	3,44	0,001
Arts	0,540	0,87	0,383
Medical	0,444	1,21	0,226
Law	0,281	0,66	0,510
Business&economics	1,512	5,10	0,000
Social Sciences	-28,923	-98,64	0,000
Natural Sciences	2,074	6,95	0,000

Continued

Constant	-3,701	-12,33	0,000
Other inactive			
Cost-price student	0,280	1,23	0,219
University graduate	0,126	0,63	0,526
Paid work during study	0,016	0,08	0,933
Type of education			
Agricultural	-1,520	-3,46	0,001
Humanities	-0,091	-0,32	0,752
Foreign Language	-0,409	-1,12	0,263
Small Languages	0,714	0,82	0,411
Physical Education	-30,656	116,14	0,000
Informatics	-0,915	-1,89	0,059
Technical	-1,585	-4,11	0,000
Arts	-0,887	-1,30	0,193
Medical	0,064	0,19	0,849
Law	-0,791	-1,54	0,124
Business&economics	-0,937	-2,79	0,005
Social Sciences	-0,819	-1,11	0,268
Natural Sciences	-0,628	-1,54	0,124
Constant	-2,712	-9,20	0,000
Number of obs			5210
Wald chi2			89430,8
Prob > chi2			0,000
Pseudo R2			0,0603

Multinomial logit, dependent variable: labour market status, reference outcome: employed or self-employed.

Reference: persons graduated from college (BA) at a non cost-price place with a specialisation in teaching and not having worked regularly during study

Determinants of Labour Market Status – *Model 2*

Labour Market Status	Coef.	z	P>|z|
Unemployed			
Cost-price students at			
chuch-run institution	-0,086	-0,08	0,933
state-run institution	-0,193	-0,92	0,356
private institution	0,398	0,96	0,338
Paid work during study	-0,446	-2,68	0,007
University graduate (MA)	-0,415	-2,80	0,005
Type of education			
Agricultural	1,034	5,04	0,000
Humanities	0,204	0,83	0,406
Foreign Languages	0,157	0,56	0,576
Small Languages	-0,013	-0,01	0,990
Physical Education	0,180	0,31	0,756
Informatics	-0,484	-1,17	0,242
Technical	-0,056	-0,24	0,809
Arts	0,249	0,46	0,648
Medical	-1,881	-3,05	0,002
Law	-0,897	-1,75	0,081
Business&economics	-0,542	-1,91	0,056
Social Sciences	-1,220	-1,63	0,102
Natural Sciences	0,291	1,02	0,306
Constant	-2,386	-10,64	0,000
Full-time student			
Cost-price students at			
chuch-run institution	-31,851	-95,11	0,000
state-run institution	-0,942	-3,48	0,001
private institution	-0,408	-1,09	0,274
Paid work during study	-0,675	-4,88	0,000
University graduate (MA)	0,089	0,78	0,435
Type of education			
Agricultural	1,243	4,03	0,000
Humanities	0,984	3,14	0,002
Foreign Languages	1,642	5,26	0,000
Small Languages	-31,309	-81,68	0,000
Physical Education	0,604	0,90	0,368
Informatics	1,404	3,92	0,000
Technical	1,016	3,38	0,001

Continued

Arts	0,511	0,82	0,411
Medical	0,421	1,15	0,252
Law	0,255	0,60	0,550
Business&economics	1,479	4,97	0,000
Social Sciences	-30,907	-105,05	0,000
Natural Sciences	2,052	6,87	0,000
Constant	-3,679	-12,28	0,000
Other inactive			
Cost-price students at			
chuch-run institution	-0,470	-0,44	0,657
state-run institution	0,385	1,56	0,118
private institution	-0,092	-0,18	0,860
Paid work during study1	0,015	0,08	0,936
University graduate (MA)	0,118	0,58	0,560
Type of education			
Agricultural	-1,519	-3,46	0,001
Humanities	-0,058	-0,20	0,841
Foreign Languages	-0,383	-1,04	0,299
Small Languages	0,763	0,88	0,380
Physical Education	-32,645	-123,56	0,000
Informatics	-0,744	-1,80	0,071
Technical	-1,584	-4,11	0,000
Arts	-0,862	-1,26	0,208
Medical	0,073	0,22	0,829
Law	-0,776	-1,50	0,133
Business&economics	-0,909	-2,64	0,008
Social Sciences	-0,791	-1,07	0,286
Natural Sciences	-0,619	-1,52	0,129
Constant	-2,724	-9,19	0,000
N			5210
Wald chi2			108244,2
Prob > chi2			0,000
Pseudo R2			0,061

Multinomial logit, dependent variable: labour market status, reference outcome: employed or self-employed.

Reference: persons graduated from state- or church-run college (BA) at a non cost-price place with a specialisation in teaching and not having worked regularly during study.

Table A6

Determinants of Labour Market Status – *Model 3*

Labour Market Status	Coef.	z	P>|z|
Unemployed			
Cost-price students at			
chuch-run institution	-0,097	-0,09	0,926
state-run institution	-0,193	-0,92	0,358
Dénes Gábor College	0,794	1,07	0,283
János Kodolányi College	-0,099	-0,13	0,893
School of Modern Business	0,811	1,04	0,299
Paid work during study	-0,467	-2,77	0,006
University graduate (MA)	-0,417	-2,81	0,005
Type of education			
Agricultural	1,033	5,04	0,000
Humanities	0,215	0,88	0,377
Foreign Languages	0,188	0,67	0,500
Small Languages	-0,011	-0,01	0,992
Physical Education	0,179	0,31	0,756
Informatics	-0,690	-1,22	0,222
Technical	-0,055	-0,24	0,812
Arts	0,284	0,52	0,602
Medical	-1,879	-3,05	0,002
Law	-0,896	-1,74	0,081
Business&economics	-0,537	-1,87	0,062
Social Sciences	-1,218	-1,63	0,103
Natural Sciences	0,292	1,03	0,304
Constant	-2,380	-10,60	0,000
Full-time student			
Cost-price students at			
chuch-run institution	-32,849	-98,05	0,000
state-run institution	-0,941	-3,48	0,001
Dénes Gábor College	-0,441	-0,77	0,440
János Kodolányi College	-0,210	-0,40	0,692
School of Modern Business	-1,167	-1,15	0,250
Paid work during study	-0,674	-4,77	0,000
University graduate (MA)	0,090	0,78	0,432
Type of education			
Agricultural	1,242	4,03	0,000
Humanities	0,981	3,13	0,002
Foreign Languages	1,637	5,23	0,000
Small Languages	-32,311	-84,27	0,000

Continued

Physical Education	0,604	0,90	0,368
Informatics	1,404	3,89	0,000
Technical	1,015	3,38	0,001
Arts	0,506	0,81	0,416
Medical	0,420	1,14	0,252
Law	0,254	0,60	0,551
Business&economics	1,482	4,98	0,000
Social Sciences	-31,908	108,44	0,000
Natural Sciences	2,052	6,86	0,000
Constant	-3,680	-12,28	0,000
Other inactive			
Cost-price students at			
chuch-run institution	-0,485	-0,46	0,647
state-run institution	0,387	1,57	0,116
Dénes Gábor College	0,926	1,25	0,210
János Kodolányi College	-32,855	121,60	0,000
School of Modern Business	-32,731	-86,58	0,000
Paid work during study	-0,030	-0,16	0,874
University graduate (MA)	0,118	0,59	0,558
Type of education			
Agricultural	-1,521	-3,46	0,001
Humanities	-0,046	-0,16	0,874
Foreign Languages	-0,343	-0,93	0,350
Small Languages	0,766	0,88	0,377
Physical Education	-33,648	127,40	0,000
Informatics	-1,248	-2,21	0,027
Technical	-1,582	-4,10	0,000
Arts	-0,816	-1,19	0,234
Medical	0,074	0,22	0,826
Law	-0,777	-1,51	0,132
Business&economics	-0,845	-2,49	0,013
Social Sciences	-0,786	-1,06	0,289
Natural Sciences	-0,620	-1,52	0,128
Constant	-2,717	-9,18	0,000
N	5210		
Wald chi2	143026,01		
Prob > chi2	0,000		
Pseudo R2	0,062		

Multinomial logit, dependent variable: labour market status, reference outcome: employed or self-employed.

Reference: persons graduated from state- or church-run college (BA) at a non cost-price place with a specialisation in teaching and not having worked regularly during study.

Table A7

Wage Equations – *Model 1*

	OLS			Heckman		
	Coef.	t	P>|t|	Coef.	t	P>|t|
Selection correction variable				0,314	2,54	0,011
Working time (monthly, hours)	0,001	6,18	0,000	0,001	6,16	0,000
Cost-price student	0,011	0,47	0,640	0,019	0,79	0,431
University graduate (MA)	0,211	11,82	0,000	0,217	11,98	0,000
Participated in firm-specific training	0,033	2,04	0,042	0,036	2,26	0,024
Paid work during study	0,118	6,21	0,000	0,118	6,23	0,000
Type of education						
Agricultural	0,242	8,46	0,000	0,177	4,63	0,000
Humanities	0,082	2,82	0,005	0,052	1,68	0,092
Foreign Languages	0,187	4,60	0,000	0,141	3,20	0,001
Small Languages	-0,123	-1,50	0,132	-0,124	-1,56	0,119
Physical Education	-0,160	-2,37	0,018	-0,158	-2,37	0,018
Informatics	0,614	13,76	0,000	0,595	13,25	0,000
Technical	0,469	18,51	0,000	0,445	16,14	0,000
Arts	-0,116	-0,96	0,338	-0,033	-0,22	0,829
Medical	-0,001	-0,02	0,984	0,003	0,08	0,936
Law	0,171	4,27	0,000	0,189	4,69	0,000
Business&economics	0,684	23,80	0,000	0,664	22,16	0,000
Social Sciences	0,073	1,63	0,104	0,098	2,05	0,041
Natural Sciences	0,058	1,66	0,098	-0,021	-0,47	0,639
Constant	3,445	137,18	0,000	3,355	81,95	0,000
Number of obs			4037			4025
F			99,85			97,98
Prob > F			0			0
R-squared			0,311			0,311

OLS and Heckman with White's estimator (robust standard errors), dependent variable natural log of monthly wage (net of taxes).

Reference: persons graduated from college (BA) at a non cost-price place with a specialisation in teaching, not having worked regularly during study, and not having participated in firm-specific training.

Wage Equations – *Model 2*

	OLS			Heckman		
	Coef.	t	P>|t|	Coef.	t	P>|t|
Selection correction variable				0,338	2,78	0,005
Working time (monthly, hours)	0,001	6,16	0,000	0,001	6,15	0,000
Cost-price students at						
chuch-run institution	0,018	0,75	0,455	0,018	0,75	0,452
state-run institution	-0,097	-1,26	0,208	-0,071	-0,93	0,354
private institution	0,035	0,54	0,589	0,066	1,01	0,313
University graduate (MA)	0,214	11,99	0,000	0,221	12,20	0,000
Participated in firm-specific training	0,034	2,10	0,036	0,037	2,31	0,021
Paid work during study	0,115	6,11	0,000	0,115	6,09	0,000
Type of education						
Agricultural	0,240	8,38	0,000	0,170	4,48	0,000
Humanities	0,082	2,84	0,004	0,048	1,60	0,109
Foreign Languages	0,185	4,65	0,000	0,134	3,20	0,001
Small Languages	-0,118	-1,44	0,150	-0,121	-1,52	0,129
Physical Education	-0,162	-2,39	0,017	-0,160	-2,39	0,017
Informatics	0,602	11,14	0,000	0,570	10,33	0,000
Technical	0,467	18,45	0,000	0,440	16,08	0,000
Arts	-0,118	-0,97	0,332	-0,038	-0,25	0,802
Medical	-0,003	-0,09	0,924	0,000	-0,01	0,993
Law	0,169	4,21	0,000	0,187	4,62	0,000
Business&economics	0,680	23,39	0,000	0,657	21,62	0,000
Social Sciences	0,077	1,70	0,090	0,102	2,12	0,034
Natural Sciences	0,055	1,58	0,114	-0,030	-0,69	0,491
Constant	3,446	137,11	0,000	3,350	82,57	0,000
Number of ob			4037			4025
F			90,38			89,13
Prob > F			0			0
R-squared			0,311			0,311

OLS and Heckman with White's estimator (robust standard errors), dependent variable natural log of monthly wage (net of taxes).

Reference: persons graduated from state- or church-run college (BA) at a non cost-price place with a specialisation in teaching, not having worked regularly during study, and not having participated in firm-specific training.

Table A9

Wage Equations – *Model 3*

	OLS			Heckman		
	Coef.	t	P>|t|	Coef.	t	P>|t|
Selection correction variable				0,295	2,43	0,015
Working time (monthly, hours)	0,001	6,14	0,000	0,001	6,13	0,000
Cost-price students at						
chuch-run institution	0,018	0,73	0,468	0,018	0,73	0,465
state-run institution	-0,093	-1,21	0,225	-0,072	-0,93	0,352
Dénes Gábor College	-0,189	-2,51	0,012	-0,156	-2,05	0,040
János Kodolányi College	0,267	2,16	0,031	0,287	2,31	0,021
School of Modern Business	0,324	3,12	0,002	0,353	3,37	0,001
University graduate (MA)	0,213	11,99	0,000	0,220	12,18	0,000
Participated in firm-specific training	0,034	2,11	0,035	0,037	2,33	0,020
Paid work during study	0,127	6,69	0,000	0,126	6,67	0,000
Type of education						
Agricultural	0,241	8,44	0,000	0,180	4,74	0,000
Humanities	0,080	2,80	0,005	0,050	1,68	0,094
Foreign Languages	0,175	4,56	0,000	0,130	3,19	0,001
Small Languages	-0,119	-1,45	0,147	-0,122	-1,52	0,128
Physical Education	-0,163	-2,41	0,016	-0,162	-2,41	0,016
Informatics	0,707	12,52	0,000	0,676	11,71	0,000
Technical	0,467	18,50	0,000	0,443	16,21	0,000
Arts	-0,122	-1,00	0,318	-0,036	-0,23	0,815
Medical	-0,003	-0,08	0,935	-0,001	-0,02	0,982
Law	0,169	4,23	0,000	0,185	4,57	0,000
Business&economics	0,662	22,65	0,000	0,642	21,04	0,000
Social Sciences	0,077	1,69	0,091	0,098	2,03	0,042
Natural Sciences	0,056	1,59	0,112	-0,020	-0,45	0,656
Constant	3,445	138,16	0,000	3,361	83,02	0,000
Number of obs		4037			4025	
F		83,81			82,81	
Prob > F		0			0	
R-squared		0,318			0,317	

OLS and Heckman with White's estimator (robust standard errors), dependent variable natural log of monthly wage (net of taxes)

Reference: persons graduated from state- or church-run college (BA) at a non cost-price place with a specialisation in teaching, not having worked regularly during study, and not having participated in firm-specific training