Social and economic determinants
of higher education choices in Poland

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Abstract

The aim of this paper is to find determinants of the choice of the field of study made by individuals undertaking higher education in Poland. One the most striking elements of the Polish transition process is a fundamental change of the conditions of the tertiary education market. With growing popularity of higher studies, choices related to this aspect of educational paths of young people gain more and more importance. In this empirical study we apply conditional multinomial logit model in order to find predictors of choices of different study profiles. Unobservable characterises for alternatives, regarding wages and probabilities of employment, were estimated using standard linear regression with Heckman selection procedure. The data used in the analysis come from the Polish General Social Survey for the period 1997-2010. General conclusion from our analysis is that economic factors are insignificant predictors of choice of the type and profile of higher education institution. Instead, social aspects, particularly related to the family background, seem to be key factors driving decisions of those individuals who decided to continue their education beyond secondary level.

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Introduction

One the most striking elements of the transition process that started in Poland in 1989 is a significant change in the educational paths of young Poles. It was demonstrated, most of all, in a declining number of young people choosing vocational education and growing popularity of general education at a secondary level, usually followed by tertiary level education. At the same time, the supply side of higher education market evolved significantly. The most important phenomena observed during the last two decades include massification of tertiary education, the emergence, rise and decline of private higher education institutions (HEIs), the development of paid part-time studies and the implementation of the Bologna process leading to a division of the most of the study programmes into first and second-cycle studies. All these factors have led to a fundamental change of the conditions of the tertiary education market in Poland.

The aim of this paper is to present the results of a study on the determinants of the choice of the study field in Poland. With growing incidence of tertiary education, choices related to this aspect of educational paths of young people gain more and more importance. Most of the previous studies in this area in Poland have been devoted to a question of undertaking higher education ('to-study-or-not-to-study'). Nowadays, when for the majority of the secondary school leavers the decision to continue their education is obvious, a question of what to study and where to study (which city, which higher education institution) becomes crucial. It is often overlooked that it is a choice important not only for their personal contentment, but it is also an economic decision in which total costs and benefits should be weighted. With growing number of study programmes and HEIs, the higher education products have become more and more differentiated, also in terms of its costs and future benefits. The amount of the resources devoted nowadays in Poland for tertiary education (both from private and public sources) makes the determinants of people's decisions concerning field of study (and type of HEI) a crucial economic issue.

The article consists of three parts. The first part documents the motivation and formulates research question of the paper. In particular, it shows changing structure of the fields of higher studies in Poland and differences in the labour market position of graduates of different study programmes. The second part is devoted to the review of the literature on the choice concerning the field of tertiary education, both in theoretical and empirical terms. The third part presents an empirical study of determinants of higher education choices. In the study we apply conditional multinomial logit model. The data used in the analysis come from the Polish General Social Survey. The article ends with conclusions and suggestions for further research.

Motivation for study and research questions

Since the beginning of the 1990s, a growing percentage of the Polish population, particularly aged 19-24, continue their education at HEIs. Higher education became a mass phenomenon and was commonly regarded as a guarantee of the labour market success, both in terms of chances of getting a job and the wage level. In 1990 the total number of students of HEIs accounted for 403 thousand, with gross tertiary education enrolment rate reaching almost 13% (Figure 1). Fifteen years later, the number of students reached almost 2 million and their share in the population aged 19-24 reached almost 50%. Noticeable gradual decline in the number of students that started in 2006, may be explained by demographic changes (fall in the number of the secondary school leavers) and also by falling demand for tertiary education generated by elder persons, who continued their education in part-time mode of study, while gaining experience in professional work at the same time. Currently (in 2013) the total number of students exceeds 1.6 million. We have also observed a slight decline in a tertiary education enrolment rates, which accounts for 40.2% in net terms and for 51.8% in gross terms (academic year 2012/2013).
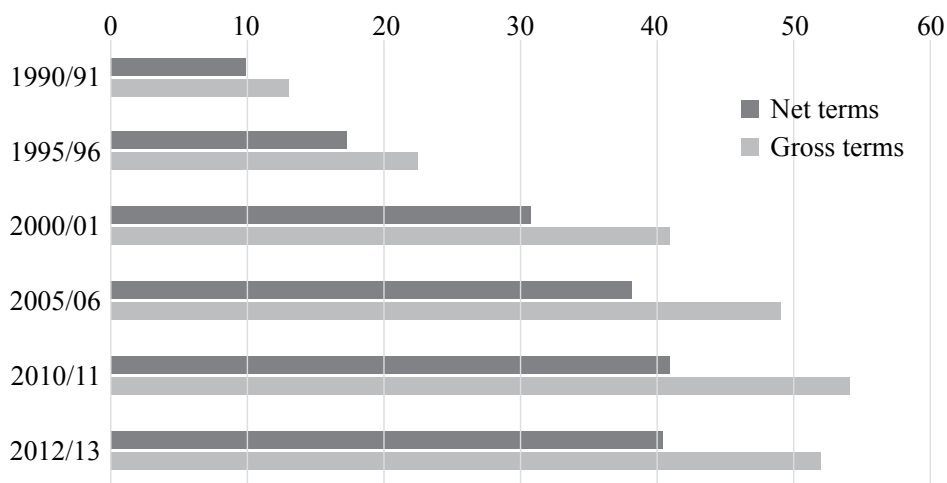

Figure 1. Participation rates in tertiary education, 1990-2013
Source: *Higher Education Institutions and their Finances*, CSO 2013.

It is believed that such a rapid growth of the propensity to continue education at the tertiary level, particularly in the first years after the beginning of transition, was mainly driven by the signals form the labour market. In fact, the probability of getting a job and the expected wage remain the highest for HEIs' graduates (comparing to persons with lower level of education). However, a significant growth of the supply of tertiary education graduates must have had an adverse effect on the labour market for high skills. Although with development of the Polish economy,

the structure of labour demand has gradually changed, favouring labour force with highest level of education, it was not possible to easily absorb all HEIs' graduates that entered the labour market during the last two decades. As a result, the growth of the relative unemployment rate for the entire period was observed accompanied by a fall of a relative wage of persons with HEI's diploma from early 2000s (Figure 2). In 2009 (the last year included in the analysis in this article), the relative unemployment rate of persons with tertiary education (comparing to all persons with lower levels of education) was equal to 0.42 and their relative wage – to 1.63. Fourteen years earlier, in 1995, the analogous statistics were equal – respectively – to 0.21 and 1.74. It is also worth noticing that last economic downturn (2009-2010) was particularly unfavourable for persons with tertiary education. Earlier (for instance during the 2000-2002 economic downturn) they were partly "protected" from negative labour-market-related results of the crisis. A decade later, it was no longer the case.
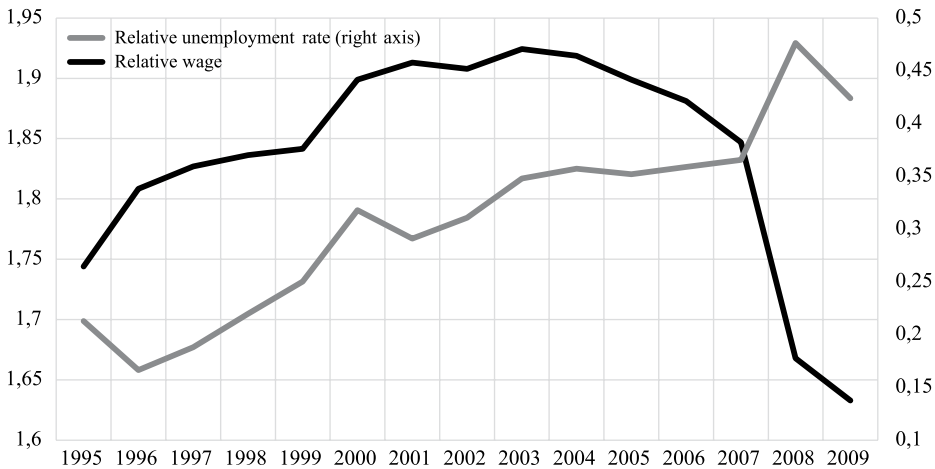

Figure 2. Relative situation of higher education graduates (higher education versus lower levels of education)

Source: Own calculations based of the LFS individual data, 1995-2009.

The boom for higher education in Poland has also had its impact on the structure of education, both in terms of fields of study and types of HEIs. In the first years of transition, the growth of tertiary education enrolment rates was mainly related to the development of the private HEIs and was concentrated in those fields where costs of running study programmes were relatively low (e.g. social sciences, business, marketing, pedagogical studies). In the second decade after the beginning of the transition, situation changed significantly (Figure 3). The share of four most popular groups of fields (business, economics and administration, social sciences, teacher training and education science and engineering and engineering trades), in

students' population fell from 64% down to 47% between 2002 and 2012. At the same time, we observed substantial growth of a share in students' population in five other groups of fields (health, architecture and building, computing, manufacturing and processing and personal services). Their share in total students' population doubled, growing from 11% to 22%.
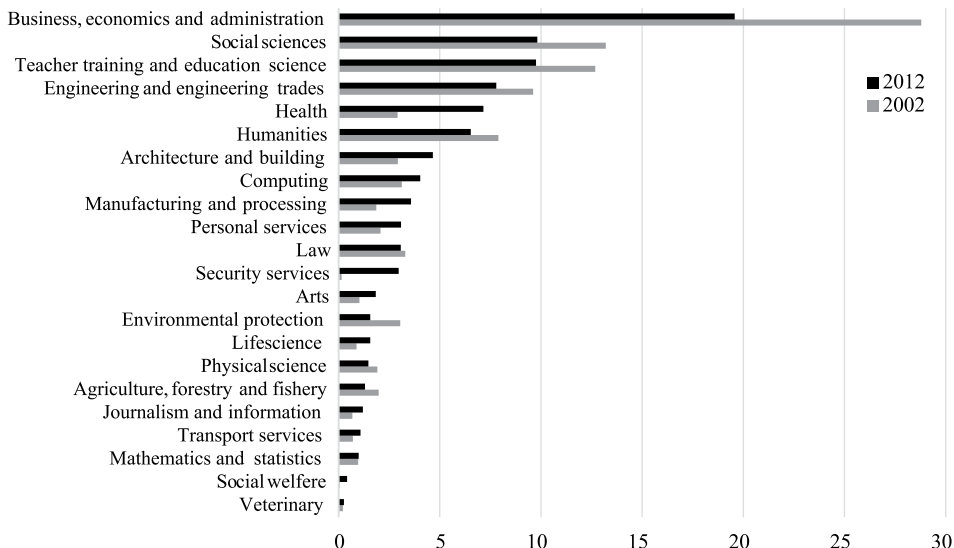

Figure 3. Changing structure of the population of students in Poland: shares of different groups of fields of studies in the total number of students (in %)
Source: *Higher Education Institutions and their Finances*, CSO 2003 and 2013.

Significant changes in the structure of students' population in Poland raises a question concerning mechanisms that are behind the observed phenomenon. It is a part of a more general issue of determinants of choices concerning educational paths. According to the literature, they may be explained by a number of factors, including both social and economic determinants. One of the most important potential economic determinants of the decision on the field of study is the expected professional career after graduation from the given study programme.

Indeed, population of tertiary education graduates in Poland is quite heterogeneous in terms of their labour market position. Study programmes (that differ both in a field of study and a HEI) result in different labour market situation of its graduates, both in terms of their unemployment rate and the average wage. Table 1 presents basic indicators of labour market positions of different groups of higher education graduates. Data in this table come from a Survey *Study of Human Capital in Poland* (*Bilans Kapitału Ludzkiego – BKL*), which is one of the few data sources where both information on respondent's educational path and labour market position may be found. For the purpose of constructing the Table 1 the sample was restricted to the group of respondents aged up to 30 years. According to the

BKL, the best labour market position is enjoyed by the graduates of engineering, manufacturing and construction. Their unemployment rate is equal only to 9.5%, while the average net income form work is equal 2415.30 PLN (which is almost 18% more than the average). At the same time, almost ¼ of the graduates from study programmes in services, remains unemployed and their average income is almost 8% lower than the average for total graduates' population. Table 1 also shows that generally, the labour market position of the public HEIs' graduates is better than their counterparts from the private HEIs, although the difference, both in their unemployment rate and the average wage, is relatively low.

Table 1. Selected indicators of higher education graduates' labour market position, 2012

Groups of higher education graduates aged 22-30		Unemployment rate (%)	Average net income (PLN)	Median net income (PLN)
Field of education	Education	16.0	1769.30	1600
	Humanities and Arts	14.7	1859.90	1700
	Social sciences. business and law	16.3	2011.00	1800
	Science	11.1	2245.10	2000
	Health and welfare	10.4	2184.60	1800
	Engineering, manufacturing and construction	9.5	2415.30	2200
	Agriculture	21.4	1898.10	1300
	Services	23.0	1890.90	1700
Ownership sector	Public HEIs	14.9	2079.20	1850
	Private HEIs	15.5	1956.60	1800
	Public HEIs. full-time studies	14.8	2133.20	1900
	Private HEIs. full-time studies	18.0	2050.00	1800
Total		14.8	2052.30	1800

Source: Own calculations based on: *Bilans Kapitału Ludzkiego* 2012.

The stylised facts presented above suggest that a choice of field of study has significant consequences in terms of future labour market position. One might expect that labour market signals are important factors influencing higher education candidates' decisions concerning the choice of their study programme. In this article we aim at establishing factors determining the choice of the field of higher studies. To what extent is this choice economically driven? In particular, it is interesting to assess what is the role of study programme attributes, both in terms of HEI's characteristics and expected future labour market outcome.Furthermore, it is also worth to examine the role of personal characteristics, both in terms of the individuals and their family background.

Literature review

Modern econometric models of educational choices are built on the assumption that young people make rational choices, and so their decisions maximize their lifetime utility (Becker 1994, Mincer 1974). Most of the literature focuses on the question of the factors determining the choice of the level of education, usually measured by the number of years devoted to education, or a kind of diploma obtained. The object of our interest is not the choice of the level of education, but the choice of the field of study for an individual who has decided to get a higher education diploma. This topic is much less represented in the literature. For example, in the article by Meghir and Rivkin where a comprehensive survey of econometric methods used in educational research is presented, models of this type have not been discussed at all (Meghir, Rivkin 2011).

The first analyses of the choice of occupation or field of study were made by Boskin (Boskin 1974) and Berger (Berger 1988) who introduced the basic model of choice of study programme. In basic terms, the econometric model of choice implies that while choosing between college majors, a candidate takes into account the expected utility obtained during the study period, as well as the benefits expected to be enjoyed after completing education in the field.

Costs and benefits taken into account may be both in cash and in kind. As for financial costs, tuition fee is the most often taken into account, together with potential earnings lost due to a decision about undertaking studies and the cost of travel and living in the place of study. The most important benefit related to the decision about undertaking studies is the increase in expected earnings. Non-financial benefits associated with the decision about continuing of education up to a tertiary level is usually referred to as consumption value of higher education (Alstadsæter and Sievertsen 2009). On the other hand, non-monetary costs associated with studying are also considered. They result from the time and effort that need to be devoted in order to successfully complete higher studies (Becker 1994). Moreover, getting information on this effort is also costly and time-consuming. A risk of failure in a recruitment process for studies in the selected fields or a risk of non-completion of the studies may be treated as an additional non-cash cost as well (Varga 2006, Montmarquette et al. 2002).

In respect of non-pecuniary benefits and costs related to the given study programme, in the majority of literature, it is assumed that they are unobservable. Usually they are modelled using a set of social and demographic variables or using unobservable individual effects for candidates and fields of studies. However, it should be noted that, if we introduce an unobservable individual effect into the model (so-called fixed effect), it is impossible to estimate the parameters of the non-financial factors determining attractiveness of a field of study.

Another aspect that may affect educational choices, is the level of wage risk associated with the selection of a specific career path. It has been shown that the

dispersion of wages for graduates of various disciplines is different, therefore the choice of a particular field of study can be affected by the level of risk aversion, which is specific for individuals. It is assumed that the level of this aversion depends on social and demographic characteristics, such as individual's parents' affluence or their gender. The high dispersion of wages, however, can also be a factor attracting outstanding candidates for a given field of study, because it may signal good career prospects and opportunities for wage increase.

The standard econometric model used in modelling a choice of a field of study is conditional logit model (McFadden 1973). However, original form of the model works well only in the case where individual fields of study differ significantly from each other. In other cases, a nested conditional logit model should rather be used (Kirkeboen 2012).

Application of the conditional logit model for the problem of choice of a field of study is also additionally complicated by the fact that one of the most important variables used in the model, i.e. the amount of expected salary after graduation, is difficult to measure and potentially endogenous (Willis, Rosen 1979). The endogeneity of wage in the choice equation comes from a potential correlation of unobservable factors influencing the choice of field of study and the success in the labour market, measured by the wage.

In the literature, one may find several strategies concerning how to obtain data on the expected level of earnings received by graduates of a given study field. Probably the most frequently used option is to assume that the candidates are rational, which allows for the use of the estimates obtained from the wage equation. These estimates may be treated as a basis to calculate the amount of the expected financial benefits arising from the graduation from a study programme in a given field. However, in the case of the application of this methodology, one should take into account the potential endogeneity of wages in the selection equation (Berger 1988, Meghir Rivkin 2011).

An additional difficulty in estimating wage models implicitly assuming the rationality of forecasts, is related to a question of the extent to which the candidates are forward looking when estimating the financial benefits received as a result of obtaining a diploma in a given field of education. If we assume that they are forward looking, consequently, in the utility function we should include a value of a discounted flow of future earnings. While computing this value we should take into account the fact that wages depend on the employee's age and cohorts he/she belongs to. However, other authors suggest that the candidates are myopic and propose to take earnings received directly after graduation as a determinant of choice of the study programme (Manski 1993).

Another approach to the problem of choosing the variable representing the financial benefits that influence the decisions of HEIs' candidates, is to insert into a model a measure of wage received after graduation from given field of stud-

ies, which can be realistically assumed to be known to candidates and may have impacted their decisions. When this approach is applied, usually the amount of average earnings for certain occupations, published and commented on in the media is used (Kirkeboen 2012). Other authors propose the use of subjective expectations of candidates, revealed in the responses to the survey questions (Arcidiacono 2012).

Empirical study

From the short literature review, we may conclude that the ideal set of information that would allow for a fully-fledged estimation of the model of educational choices at tertiary level should include data on the following characteristics of an individual, usually referring to the moment when they were making a choice of the field of study (study programme):

a) information on the ranking of the individual's preferred study programmes (fields of study),

b) the result of the previous stages of individual's education (results of the exams that allow them to undertake higher studies),

c) individual's household characteristics at the time of taking a decision concerning field of study and HEI (including income),

d) the individual's expectations regarding wage, which they will receive after graduating from the study programme(s) under consideration,

e) evaluation of financial and non-financial costs (time and effort) associated with undertaking study programme(s) under consideration,

f) the level of non-financial benefits (consumption value) associated with studying programme(s) under consideration.

At the present moment none of the surveys regularly conducted in Poland offers such broad range of information. It is mainly a result of a fact that no study conducted in Poland was specifically aimed at investigation of the determinants of educational choices[1]. As a result, the data sources currently available in Poland allow for the estimation of a very restricted version of the model of educational choices. The available data sources for Poland may be limited to the following surveys:

a) Polish Labour Force Survey (LFS) conducted by the CSO since 1992 (in the quarterly cycles, the current sample size of about 100 thousand persons per quarter),

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[1] This shortage is to be filled by the project "Social and economic determinants of choices for people aged 19-30 years for the study" carried out by the Faculty of Economic Sciences on behalf of the Educational Research Institute.

b) Social Diagnosis (Diagnoza Społeczna - DS) conducted by the Higher School of Finance and Management and Council for Social Monitoring since 2000 (now two-year cycle with a sample of 12 thousand households per year),

c) Study of Human Capital in Poland (Bilans Kapitału Ludzkiego – BKL) carried out since 2010 by the Polish Agency for Enterprise Development and the Jagiellonian University (annual cycle, the sample size of 17 thousand individuals),

d) Polish General Social Survey (PGSS) conducted by the Institute for Social Studies, Warsaw University since 1992 (with approximately 3-year cycle and sample of about 1200-2400 individuals).

All of these surveys have an extensive section containing questions on social and demographic individuals' characteristics and other information useful for analysis of choices concerning tertiary education. Nevertheless each of the databases has also some drawbacks, which does not allow them to be used in a full model of educational decisions. LFS is probably the most complex data source concerning Polish labour market. Indeed recent editions of the LFS include the questions on type of completed education (in terms of level and field of education). However, its classification of the fields of education contains quite aggregated categories that do not allow for precise representation of individuals' preferences and choices. It also contains a question on the amount of earnings.

On the other hand, both the LFS and the BKL, focus on the current situation of the respondent. However, the educational choices concerning higher education are usually made at the time of graduation from secondary school and are largely determined by the situation of the respondents at this moment of life. A set of respondent's characteristics that might have affected their educational choices in LFS and BKL is very limited. For individuals who have already finished studying, it includes only gender and age. On the other hand, BKL is the only survey in which there is detailed information on the HEI and study programme undertaken by an individual.

The PGSS is the only regularly conducted survey in Poland in which one can find information on the individual's place of residence during his adolescence and on the education and occupational status of their parents. Similar questions were included in the BKL Survey, but only in its first edition.

In any of the available surveys, there is no information on the candidates' expectations concerning salary after completing given study programme. It means that the expected wage must be modelled on the basis of observations for graduates, which may affect the accuracy of the estimation results.

A very important limitation of the databases that are currently available in Poland is that there is no information concerning individual's educational situation

at the time of undertaking higher studies. Since the educational system reform in 1999, the educational options available to secondary school graduate are largely determined by the result of the A-level (*matura*) exam. As a result, the selected study programme may be not so much a chosen field of study, but simply the one that was available for high school graduate.

The final limitation of available databases is a fact that there are no information on the process of studying, in particular the amount of time and effort necessary for graduation of a particular study programme. It seems that these also may be important factors determining the choice of field of study.

Data source and sample characteristics

Due to the specifics of the decision process concerning choice of the study programme (field of study and HEI) all individuals' characteristics should refer to the period when the decision was taken. It means that we should use retrospective questions or have a sample of secondary-school leavers or first-year students. In the study presented below, we used data from the Polish General Social Survey (PGSS). The general goal of the PGSS is a systematic measurement of the trends and consequences of social change in Poland. The PGSS studies individual attitudes, values, orientations and social behaviour, as well as measurements of socio-demographic, occupational, educational and economic differentiation in Poland. Period covered by the survey is relatively long and ranges from 1992 up to year 2010. PGSS is the only regularly conducted survey where one can find information concerning the place of residence of the respondent in their youth (at the age of 14), and educational and occupational status of their parents and wealth of their household. It is not exactly the time period in which decisions on the choice of a field of study are usually taken (which is around the age of 18), but one can realistically assume that household's conditions do not change significantly during these 4 years in most cases.

PGSS data allow us to grasp the several important determinants influencing the choice of the field of study (place of residence, and social and demographic status of parents). On the other hand, in PGSS there are no questions concerning earlier educational attainment. The other disadvantage of this data source is a fact that the information on the study programme is highly aggregated and is given in a form of the type of HEI completed.

For the purpose of our study, the period covered included years 1997-2010, i.e. 6 waves of the survey. The total number of respondents identified as higher education graduates was equal to 1352.

Dependent variable in our study is a discrete variable coding twelve types of HEIs (see: Table 2). It should be noted that the classification of HEIs in PGSS is very specific and combines two different criteria, out of which only one refers

to the field of education and the other one to the academic/vocational orientation of the HEI. Universities and polytechnic HEIs are the most popular choices for respondents undertaking tertiary education. They constitute almost half of the sample.

Table 2. Structure of the sample by type of HEI type (alternatives in the educational choices model)

Type of HEI	N	(%)
Agricultural HEIs	79	5,84
Business vocational schools	128	9,46
Economic HEIs	60	4,43
Education and arts vocational schools	149	11,01
Higher vocational schools	51	3,77
Humanities and social sciences HEIs	31	2,29
Medical HEIs	70	5,17
Military HEIs	34	2,51
Physical education HEIs	38	2,81
Polytechnic HEIs	237	17,52
Technical vocational schools	43	3,18
Universities	433	32,00
Total	1353	100

Source: own calculations based on PGSS data, 1997-2010.

As for explanatory variables, they belong to one of two groups: HEI's characteristics and individual's characteristics. The former include:
- graduate's expected wage (specific for a given individual),
- graduate's probability of getting a job (specific for a given individual),
- prestige related to occupations specific for a given type of HEI.

They main problem related to this group of explanatory variables is the fact that expected wage and probability of employment are not directly observable. Therefore an auxiliary model has been formulated, where both employment probability and wage were determined. As for prestige related to occupations, its measure is based on the methodology proposed by Treiman and Ganzeboom (1996). It is a standard way of prestige measurement used in PGSS.

As for the individuals' characteristics, they include:
- gender,
- year of birth and square of the year of birth (impact of those variables is related to changes in accessibility of different types of study programmes, i.e. changes on the supply side),
- the place of residence at the age of 14 (which is a proxy for cost of access to higher education),
- type of both parents' education (which is supposed to represent

reproduction of preferences for different types of education which may be related to the influence of the parent's expectations and their role in the forming individuals' educational path)
– region of residence (voivodeship).

The basic descriptive statistics of the explanatory variables are presented in Table 3.

Table 3. The descriptive statistics of the sample: explanatory variables

Number of observations	N=1352	
Gender (%)		
Women	59.65	
Men	40.35	
Place of residence (%)		
Rural areas	21.71	
Size of city <10 thousand	7.34	
Size of city (10 000-24 999)	9.79	
Size of city (25 000-49 999)	9.15	
Size of city 50 000-99 999)	10.29	
Size of city (100 000-249 999)	14.21	
Size of city (250 000-499 999)	9.53	
Size of city 500 000+	17.97	
Parent's educational level (%)		
	Mother's	**Father's**
Primary	48.50	38.12
Lower secondary	16.30	28.77
Upper secondary	12.71	5.83
Post-secondary non-tertiary	12.67	15.96
Short-cycle tertiary	2.78	0.97
Bachelor or equivalent	1.93	1.51
Master or equivalent or higher	5.11	8.84

Source: own calculations, based on PGSS, 1997-2010.

Econometric model and estimation procedure

On the theoretical basis, the model applied in our analysis is a model of optimal consumer's choice, in which the utility function may be represented as follows:

$$u_{ik} = x_{ik}\beta + z_i\gamma_k + \varepsilon_{ik},$$

where x_{ik} denotes characteristics of an alternative k (which influence financial and non-financial costs and benefits related to studying) and z_i denotes individuals' characteristics (which influence preferences). We assume that the consumer

chooses an alternative k, which is characterised by the highest level of utility: $\max_k\{u_{i1},...\ .\ u_{iK}\}$, where K = 12. As for econometric form of the model, a conditional multinomial logit was used. It is assumed that ε_{ik} residuals are independently and identically distributed with the Type 1 extreme-value distribution. Random errors for different alternatives are assumed to be independent (IIA assumption).

In the first step of the estimation procedure, a Heckman model was used (Heckman 1979). It was necessary to estimate the expected wage and the probability of having a job since both variables are directly unobservable. In this model we assume that individuals form their expectations rationally and we are able to reproduce their decisions. The following variables were used in the wage equation: gender, age, age squared (and their interactions), education level, size of the place of the residence, year of the survey and region. The variables used only in selection equation were the following: household income derived from sources other than the respondent's work and interaction between respondents' gender and the number of children living with the respondent. Heckman procedure has generally brought coefficients in accordance with expectations and the literature on wage determinants (see: Table 1 in Annex for the results). There is also a positive, but insignificant estimate of coefficient of correlation between unobservable factors in the selection and wage equations, which suggests that the non-random selection problem is not significant. To verify the validity of the functional form of the wage equation in the Heckman model the link test was used. The value of this statistic ($z=2.41$, p-value=0.016) means that for the 1% significance level the null hypothesis that the functional form is correct cannot be rejected albeit for 5% this hypothesis can be rejected. Given the number of observation used in the regression, this result suggests that functional form of the wage equation is approximately correct.

In the second step of estimation procedure, a conditional multinomial logit model was used (see: Table 2 in Annex for the results). All characteristics of the alternatives appeared to be statistically insignificant. This result may be interpreted that expectations concerning future career path do not have impact on educational choices. The only variables that were found significant were gender, living in the countryside at the age of 14 and parents' education level.

As for gender, women are more likely to choose educational HEIs (odds ratio equal to 1.860), while men are more likely to choose technical vocational schools (odds ratio equal to 0.179), polytechnic HEIs (0.149), higher vocational schools (0.347), military schools (0.028), physical education schools (0.365) and agricultural schools (0.502). Living in the countryside at the age of 14 is apparently positively correlated with choosing vocational HEI (odds ratio equal to 3.323). The detailed results for link between different types of mothers' and fathers' type of education and their children educational choices are presented in the Table 2 in Annex. Generally, a support for the hypothesis of reproduction of parents' education profile by the offspring was found. LR test for null hypothesis of the insignificance

of fathers', mothers' and both parents' education type indicated that we should reject that hypothesis[2].

Finally, the link test was used to check if the functional form of the conditional logit model was correctly chosen. The value of this statistic ($z = 0.55$, p-value = 0.585) suggests that the functional form of the choice model is correct.

Conclusions

This article is one of the very few attempts to study determinants of educational choices at tertiary level in the Polish economic literature. Despite large resources devoted to higher education in Poland, still very little is known about the mechanism that drives young people's preferences in this respect. The above study, although limited in a number of aspects by the nature of the data available, brought some interesting insights into our understating and stimulates further research on the topic.

General conclusion from our study is that economic factors proved to be insignificant predictors of educational choices. Empirical results indicate no significant effect of the level of the expected wage, probability of having a job and prestige of the profession, which is a very surprising result. Instead social aspects, particularly related to the family background, seem to be key factors driving educational decisions of those individuals who decided to continue their education beyond secondary level. Results show significant role of the place of living at the age of 14, of gender and type of parents' education.

One of the possible explanations of this result is a fact that the sample was quite heterogeneous in terms of respondents' age. It included respondents that were taking educational decisions in dramatically different institutional circumstances, both in terms of higher education market and labour market opportunities.

This study proved to be an interesting starting point for further research. It indicates a need for access to better data covering different aspects of determinants of educational choices. It should include not only information on individuals' choices, but also their earlier educational paths, household characteristics at the time of taking a decision, individuals' wage expectations and non-financial benefits associated with higher education, and its financial and non-financial costs.

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[2] LR Test for H0 about insignificance of fathers' education type $\chi 2(66) = 95,57$ [0,0101],
LR Test for H0 about insignificance of mothers' education type $\chi 2(66) = 101,11$ [0,0035],
LR Test for H0 about insignificance of both parents' education type $\chi 2 (132) = 215,29$ [0,0000].

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Annex

Table 1. Heckman model of wages: estimates' results

Variable	Wage equation	Selection equation
Year 1999	0,219***	-0,065
Year_2002	0,380***	-0,236**
Year 2005	0,367***	-0,125
Year 2008	0,638***	-0,041
Year 2010	0,877***	0,027
Gender (f)	0,659*	-3,291***
Age	0,080***	
Gender*Age	-0,057***	0,151***
Age2	-0,001***	
Gender*Age2	0,001***	-0,002***
Technical vocational schools	0,308***	0,055
Education and arts vocational schools	0,217***	0,483***
Economic HEIs	0,430***	0,262
Humanities and social sciences HEIs	0,143	0,555
Higher vocational schools	0,314***	0,083
universities	0,378***	0,709***
Polytechnic HEIs	0,349***	0,437***
Medical HEIs	0,470***	0,785***
Business vocational schools	0,676***	0,934***
Agricultural HEIs	0,478***	0,610**
Physical education HEIs	0,231**	0,388
Military HEIs	0,452***	0,915
Size of city <10 thousand	0,166***	0,203*
Size of city (10 000-24 999)	0,172***	0,103
Size of city (25 000-49 999)	0,207***	-0,043
Size of city 50 000-99 999)	0,218***	0,017
Size of city (100 000-249 999)	0,208***	0,242**
Size of city (250 000-499 999)	0,252***	0,139
Size of city 500 000+	0,367***	0,159
Region (wielkopolski)	-0,054	-0,040
Region (slaski)	-0,020	0,051
Region (zachodni)	-0,026	-0,159
Region (pomorski)	0,012	0,013
Region (polnocno-wschodni)	-0,082*	0,127
Region (wschodni)	-0,162***	-0,373***
Region (malopolski)	-0,067*	-0,173*
cons	4,920***	3,264***

Gender*Children		-0,229***
Non-wage income		-0,353***
N	2915	
N_censored	576	
Chi2	1467,097	
LL	-2963,571	

Source: Own calculations based on PGSS data, 1997-2010.
Note:
* - statistical significance at 10% level,
** - statistical significance at 5% level,
*** - statistical significance at 1% level.

Table 2. Estimates (odds ratios) of the conditional multinomial logit model for educational choices

Variable	Technical vocational schools	Education and arts vocational schools	Economic HEIs	Humanities and social sciences HEIs	Higher vocational schools
Gender (f)	0.179***	1.860***	0.859	1.141	0.347***
	(0.065)	(0.442)	(0.194)	(0.479)	(0.110)
Birth year	0.992	1.006	0.954	0.977	0.968
	(0.500)	(0.243)	(0.617)	(0.683)	(0.619)
Rural provenience	1.362	1.323	0.848	1.253	3.323***
(when 14 years old)	(0.552)	(0.309)	(0.221)	(0.542)	(1.112)
Maternal education	0.729	0.861	0.978	0.748	1.793
Lower secondary	(0.428)	(0.269)	(0.343)	(0.428)	(1.004)
Maternal education	0,000	0.000	0.218	0.588	0.000
Upper secondary	(0.000)	(0.000)	(0.244)	(0.714)	(0.000)
Maternal education	1.136	0.284	0.293*	0.000	1.508
Post-secondary non-tertiary	(0.948)	(0.227)	(0.193)	(0.000)	(1.211)
Maternal education	1.102	0.861	0.688	0.213*	0.982
Short-cycle tertiary	(0.660)	(0.286)	(0.271)	(0.185)	(0.655)
Maternal education	1.654	0.000	0.940	0.000	0.000
Bachelor or equivalent	(1.688)	(0.000)	(0.725)	(0.000)	(0.000)
Maternal education	4.578**	0.608	0.307	0.000	3.262
Master or higher	(3.260)	(0.346)	(0.257)	(0.000)	(2.636)
Paternal education	1.153	0.503**	0.798	0.698	1.107
Lower secondary	(0.691)	(0.154)	(0.298)	(0.407)	(0.631)
Paternal education	0.000	0.000	0.000	2.388	0.000
Upper secondary	(0.000)	(0.000)	(0.000)	(2.341)	(0.000)
Paternal education	0.439	0.165**	0.757	0.000	0.958
Post-secondary non-tertiary	(0.533)	(0.134)	(0.484)	(0.000)	(0.933)
Paternal education	0.607	0.437**	0.612	0.000	0.214
Short-cycle tertiary	(0.489)	(0.179)	(0.302)	(0.000)	(0.246)
Paternal education	7.221*	1.172	0.000	0.000	12.031**
Bachelor or equivalent	(8.432)	(1.469)	(0.000)	(0.001)	(14.086)
Paternal education	1.074	0.808	1.087	1.848	1.127
Master or higher	(0.876)	(0.377)	(0.601)	(1.487)	(0.917)
Fitted log (wage)	1				
	(0.000)				
Fitted probability	0.509				
	(0.639)				
Occupational prestige	0.318				
	(29.731)				
N	16236				
Number of cases	1353				
LL	-2571.453				
chi2	1143.812				

Source: Own calculations based on PGSS data, 1997-2010.
Note: * - statistical significance at 10% level, ** - statistical significance at 5% level,
*** - statistical significance at 1% level; table presents coefficients and standard deviations in parenthesis.

Polytechnic HEIs	Medical HEIs	Business vocational schools	Agricultural HEIs	Physical education HEIs	Military HEIs
0.149***	0.819	0.769	0.502***	0.365***	0.028***
(0.028)	(0.225)	(0.229)	(0.128)	(0.128)	(0.020)
1.005	1.041	1.012	0.992	0.987	1.004
(0.060)	(1.120)	(0.071)	(0.510)	(0.013)	(0.184)
0.726	1.452	0.723	1.541	0.527	0.527
(0.165)	(0.484)	(0.282)	(0.449)	(0.250)	(0.264)
0.600*	1.488	2.390*	0.543	0.342**	0.306*
(0.167)	(0.674)	(1.207)	(0.218)	(0.185)	(0.191)
0.138**	0.792	5.548**	0.316	0.000	0.000
(0.117)	(0.935)	(4.754)	(0.358)	(0.000)	(0.000)
0.391**	1.994	0.959	0.355	0.661	0.505
(0.185)	(1.322)	(0.881)	(0.263)	(0.518)	(0.477)
0.513**	1.370	2.210	0.614	0.469	0.692
(0.154)	(0.645)	(1.151)	(0.270)	(0.262)	(0.400)
0.246	3.746	3.988	0.564	0.627	0.000
(0.210)	(3.034)	(3.860)	(0.641)	(0.731)	(0.000)
0.417*	1.093	1.047	0.000	0.000	0.373
(0.220)	(0.836)	(1.178)	(0.000)	(0.000)	(0.448)
1.053	1.175	0.320**	0.834	0.741	0.872
(0.311)	(0.558)	(0.152)	(0.327)	(0.403)	(0.508)
0.428	1.180	0.374	1.373	0.000	0.000
(0.315)	(1.076)	(0.343)	(1.061)	(0.000)	(0.000)
1.224	0.615	0.590	0.764	0.000	0.584
(0.610)	(0.495)	(0.410)	(0.578)	(0.000)	(0.716)
0.798	0.605	0.505	0.172**	0.662	0.646
(0.295)	(0.383)	(0.279)	(0.137)	(0.464)	(0.471)
0.845	4.375	0.545	0.000	0.000	0.000
(1.043)	(4.469)	(0.722)	(0.000)	(0.000)	(0.001)
1.685	1.357	0.104**	0.000	2.550	1.324
(0.721)	(0.898)	(0.117)	(0.000)	(1.779)	(1.131)