INSTITUTIONAL EFFECTS ON BACHELOR-MASTER-LEVEL TRANSITION

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Abstract:

The results presented are based on the analysis of transition from higher education to work or further training. The study is focused on exploring determinants of BSc graduates' decision to continue their studies at MA level or to enter the labour force in the context of the "Bologna-type" linear educational system introduced in Hungary in 2007. In our approach BA/MA transition is considered as an educational selection mechanism (Shavit and Blossfeld, 1993; Shavit et. al, 2007; Breen et. al, 2009) which is determined by several socio-demographic, meritocratic and institutional effects as it has been previously studied in the Hungarian context (Veroszta, 2013c). In the current study we focus on the institutional determinants of decision between further study or labour market transition. The main research question is that after controlling for several background variables (i.e. social composition of the student body, excellence of students, academic staff or faculties, marketability of training) how to identify the components of institutional effects on transition. During the study a number of indicators – such as regional characteristics, institutional structure and training supply – are considered as institutional background variables. The paper applies explanatory models in order to respond the research questions. Many of data of the Hungarian Graduate Career Tracking System was integrated into the model from different databases. The analysis of the institutional effects is based on the administrative dataset of the Hungarian Higher Education Information System (FIR) covering the entire population of BSc graduates in a given year. Other effects are operationalized as macro level variables, created from a number of parallel data sources and linked into pre-defined institutional and training subgroups. Some of these macro level variables come from online survey based graduate career tracking database, while others from the administrative dataset of the centralized Hungarian higher education admission system.

Keywords:

higher education, transition, bachelor, master, institutional effects

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During the analysis of factors that determine a student's progress within the system of higher education, there may be several explanatory powers that need to be taken into consideration. Accordingly, the way a student continues his or her studies within the system can be described in various ways. Our analysis specifies its focus from both aspects. When identifying the effects that influence a student's progress, we intend, above all, to reveal that specific features of a diversified structure of education, while students' progress is narrowed down to the Bachelor/Master transition. In the course of the investigation of institutional factors that determine the Bachelor/Master transition, our study's objective is, among others, methodological in nature. We are looking for the possible ways of using the data content of various databases of higher education study paths and outputs in a way that is relevant and, at the same time, as multifaceted as possible.

The first section of the study overviews the theoretical approaches to the transition/exit within the higher education system, in particular, the theories of diversification of the institutional background in higher education. An analysis focussed on the system of education calls for a summary outline of Hungary's system of higher education and its major determining factors. The section that describes the environment of our research serves this purpose. After the definition of the research questions, a separate section describes the databases used for analysis, the implemented methodology and the variables involved in the analysis. The section on analysis relies on the detailed presentation of the results of the explanatory model, which, in turn, was generated on the basis of the above. Our study concludes with the summary of these results and with the discussion of the direction of further research.

Theoretical background

The theoretical framework of the investigation of institutional factors that determine progress within the system of higher education is organized along to key aspects. On the one hand, we give insight into the theories that interpret determining factors of transition and the research that reveals them; on the other hand, we overview the theoretical basis needed for the identification of the institutional effect.

Transition between study programmes

Progress within or exit of the higher education system can be interpreted, among others, as a factor of selection. The role of the system of education as a tool to re-channel social inequalities (based on Bourdieu's theory; Bourdieu – Passeron, 1977) served as an adequate research aspect even after the expansion of higher education. It can be used as a theoretical framework for interpreting the Bachelor/Master transition of the linear system of education (introduced as a part of the Bologna system) as yet another level of educational selection, embedding the investigation of the re-channelling that occurs between the levels in the selection mechanism of the education system as a whole. The expansion of higher education –

which, in Hungary took place three decades later that in Western Europe – was fuelled by the expectations of the democratisation and the strengthening of meritocratic trends. Nevertheless, the empirical investigations of its results show social inequalities have not been eliminated; on the contrary, the inequalities were stabilized and, due to the diversification of the system of education, they have shifted to other levels (Koucký et al., 2009). Shavit and Blossfeld, in their international research published in 1993 performed the comparative analysis of the empirical data of thirteen industrialized countries, and they came to the conclusion that in industrialized societies – as opposed to Treiman's (1970) prediction of the strengthening of meritocratic trends – disparity has become entrenched (Shavit – Blossfeld, 1993). This means that while in quantitative terms the cohorts of new entrants have better access to each level, access to education still remains determined by social factors. This approach, based on Mare's theory of educational transition (1980) deals with the restructuring of opportunities separated from the fact of expansion and measures with through the changes of the rates of transition to other educational levels or of exists from the educational system. In relation to the theory of persistent inequality, several international researches examined the phenomenon of selection in higher education.

Breen and colleagues (2009), investigating the post-expansion development of inequalities, in their international research involving eight European countries, reacted to the research of Shavit and Blossfeld with the introduction of the term "nonpersistent inequality". Unlike Mare's transition approach, their research analysed the obtained qualifications in the countries under analysis and – on the basis of Boudon's theory (1974), which states that in the educational system there are primary and secondary effects that influence the attainments of various social classes – came to the conclusion that by the turn of the century inequalities had been reduced.

The dominant role of social background in educational progress was also detected in the educational systems of the Central Eastern European countries (Noelke et al., 2012). As for Hungarian research of educational selection, analyses of the massified higher education environment shed light on the new types of social inequalities generated by the restructuration of the system of education. These include analyses on the developments of the intention to study further and the chances of being admitted to higher education (Gábor – Dudik, 2000), the marketability of study programmes (Róbert, 2000), the hierarchical differences of between universities and colleges or the rank of a higher education institution as defined by the fact that more students apply for admission than the institution can absorb. With the introduction of the linear education system (with the elimination of the separation of college and university levels), the Bachelor/Master transition can be suitable for the examination of the educational selection in higher education, as its levels indicate an educational hierarchy that can be regarded as yet another selection phase in the system (Hrubos, 2012a). Accordingly, Hungarian research on the two-cycle education introduced in

2004 as a part of the Bologna process first dealt with the descriptive identification of BA/BSc students (Gábor–Szemerszki, 2006) and graduates (Kiss–Veroszta, 2011), then started to concentrate on the hierarchies, the academic and social background of students of the new educational levels (Szemerszki, 2012) or on the factors that define planned or actual transition (Veroszta, 2013c; Róbert – Veroszta, 2013).

Institutional background

For the institution-level approach applied in our research, investigations of the development of access to education are of paramount importance which take into consideration – in addition to socio-demographic differences – the effect of the restructuration of the institutional environment. In these approaches, the trends of institutional differentiation process, internationalization, employability as a demand and the increased heterogeneity of student population are focussed on. This extraordinary complexity of the interpretation of educational disparities in a post-expansion higher education (Goastellec, 2010) also facilitates the understanding of the seemingly paradoxical statement that the expansion of access brought about inequalities in higher education (Altbach, 2010). Previous research on selection evidences that the transition between the system levels is particularly appropriate for the examination of the social inequalities reproduced within the system of education. Still, as Shavit points out, Mare's model basically deals with the transition between the vertical levels of the education system and does not include the qualitative differences that grow stronger due to the differentiation process. The introduction of the aspect of the differentiation process into the investigation of the disparity of social opportunities related to the education system is an important development of Shavit's research published in 2007 (Shavit et al., 2007). The research of Shavit and colleagues (2007) on the consequences of the expansion of higher education is also useful in terms of the institution-focussed approach of our analysis. The research, based on the data of 15 countries, analyses – in addition to expansion – the effects the introduction of differentiation and private capital in higher education have on inequality.

This approach also evidences that the massification of higher education resulted in basic changes, one of them being the growing heterogeneity of students. With regard to their knowledge, social status, motivation and needs, students of a massified higher education form a much more heterogeneous group that students of the former elite education did. In Hungary the uneven distribution of institutions of higher education generates social and performance-based spatial mobility (including selective institution selection) (Nyüsti – Ceglédi, 2013). With the appearance, study progress and success of atypical student groups, higher education faces a new challenge, while researchers of higher education are inspired to adopt a more sensitive approach to thinking about selection in education: an approach based on students' socialization and the community environment of higher education (Pusztai, 2011). As the composition of the student population was changing, the system of

education was undergoing a differentiation process, too. Parallel with the massification of higher education, institution and programme types were generated that serve students' needs with a markedly labour market focussed approach and shorter training periods. The multi-sector higher education – generated along with the new types of institutions – became highly differentiated and hierarchical between and within the sectors (Neave, 1991; Hrubos, 2002). This differentiation process involves the most general aspects of institutional operation, such as size, mission, professional orientation or reputation. Massified universities, which were generated as a result of the expansion of education, differ from the institutions of former elite education (universities of sciences) not only in the values or mission, but in their institutional forms as well, thus adopting to a more mobile and fluid social environment and system of expectations (Scott, 2004). Although the processes of differentiation and diversification have always been characteristic features of higher education, they became key phenomena after the expansion. As defined by Huisman (1995), differentiation is the process whereby diverging structures are generated from a formerly integrated whole. In this sense, the growth of the number of departments, administrative levels and other organizational units in higher education can be regarded as differentiation. Diversity, being a static concept, refers to the various types or variety of units within a given system, while diversification is the dynamic process of the creation of these variegated types. Clark (1996), interpreting differentiation and diversity as basic features of higher education institutions, emphasizes that the expansion of higher education – and the differentiation process that accompanies it – is, in essence, a reaction to the change of the higher education environment. According to Clark, out of these external changes of the environment the growth the heterogeneity of the student population, the appearance of new fields of science and the strengthening of the role of the labour market are the most important.

The differentiation of higher education institutions can be interpreted horizontally and vertically alike (Clark, 1983). The latter approach focuses on the hierarchical differences between institutions, while the former is intended to grasp institutional diversity. Interpreting these two aspects as two types of approaches intended to grasp the differences between higher education institutions, it is possible to define the difference between hierarchy-based ranking and "mapping" (efforts made to describe the diversity of institutions) (Hrubos, 2009). The investigation of the effect of a differentiated higher education background on progress within the system shows that the Bachelor/Master transition is defined by the institutional framework of Bachelor studies. The greatest differences in opportunities are detected in the work schedule and funding of Bachelor programmes; structural differences such as the development of the Master programme offer or the institution type also play an important role (Veroszta, 2013c; Róbert–Veroszta, 2013). Other studies also evidence that a more detailed investigation of the background of the Bachelor/Master transition calls for the involvement of several international aspects which describe the transition between the levels through, among others, the continuity of the

programmes' content, the change of institutions or the context of international mobility (Westerhweijden et al., 2008).

Research questions

Falling in line with the above theoretical framework, our analysis centres around the following research questions:

- Is it possible to detect the effect of the institutional background independent of the individual's specific characteristics in the Bachelor/Master transition?
- In what dimensions can the institution's background effect on further studies be investigated?
- In what way does the institutional differentiation process of higher education affect the Bachelor/Master transition?

In order to answer these research questions, we rely on the data of the databases referred to in the section on methodology. These databases cover the categories of recent graduates, students and institutions, and differ in natures (research vs. administrative databases). As a result of this specific methodological feature, another research question related to the applied procedure is added to the above list:

- What are the opportunities offered by and the limitations of the integration of the data content of various higher education databases – in the form of macro-level variables – into statistical models that explain action at the individual's level?

Context: the Bologna process and the process of institutional differentiation in Hungary

The Bologna process, launched in 1999, resulted in a major restructuration of the higher education system in Hungary, just as in other European countries. For our purpose, out of three principles of the unified structure – the introduction of multi-cycle education of a similar structure, the generation of the credit system which guarantees the mutual recognition of study programmes, and the promotion of mobility between higher education institutions and countries – the first one needs to be investigated in detail. In the Hungarian higher education system, the multi-cycle education system replaced the dual system (based on the difference between college and university) in 2004, and the Bachelor, Master and PhD programmes, built on each other, gradually developed. Nevertheless in the Hungarian higher education there are some professional fields (basically medicine, law, arts and teacher training) where study programmes are still offered in the form of single-cycle unified programmes. The first Bologna-type Bachelor programmes were launched in 2004 and 2005 in the form of pilot programmes, mainly in the fields of engineering and information technology. At the Bachelor level, the full transition took place in 2006. Master programmes (constituting the second level of the Bologna system)

commenced somewhat later. Master programmes gained momentum in 2009, as with the progress of the accreditation process more and more study programmes were offered and as demand grew because of the growing number of Bachelor-level graduates (Kiss– Veroszta, 2011). The international objective of the introduction of the two-cycle education was to ensure simplification and comparability; at the same time – as an economic aspect – the demand occurred for qualification that can be obtained by large number of students during a reduced period of training (BSc programmes) (Kehm – Teichler, 2006). It was for this reason that the introduction of Bachelor programmes created high expectations with regard to the employability of the first great groups of recent graduates (for details on the measurement, see: Kehm, 2005; Teichler, 2011; on Hungarian results: Micsinai – Várhalmi, 2011).

The fact that – when compared to other countries – in Hungary the rates of the Bachelor/Master transition are very low can be due to many structural reasons (e.g. the timing of the introduction of the system, problems with the levels built on each other, inadequate programme offer, etc.) as well as to strong background selection mechanisms. As for the European comparison of the transition between the levels of education, the international data collection of Schomburg and Teichler (2011) discusses the data of ten Bologna countries. The results of career tracking analyses vividly illustrate that the ratios of the Bachelor/Master transition are lower in Hungary than in other European countries (Table 1).

Table 1.

Context – Bachelor/Master transition

Country	Population	Transition rate	Term
Hungary	Bachelor graduates in 2009	44%[1]	1 year after graduation
Austria	Bachelor graduates in 2008	63%	1.5 years after graduation
Czech Republic	Bachelor graduates in 2008 and 2009	72%	6–12 months after graduation
Germany	Bachelor graduates of univ. of applied arts in 2007 and 2009	75%/41%	1.5 years after graduation
Italy	Bachelor graduates in 2008	57%	1 year after graduation
Norway	Bachelor graduates of univ. in 2007	73%	1/2 year after graduation

Source: Schomburg – Teichler, 2011

[1] More recent Hungarian research results evidence that the ratio of those moving from the Bachelor level to the Master level is even lower, approximately one-third (according to our study, 39% among graduates of full-time programmes).

Moreover, when putting the interpretation of the Bachelor/Master transition in a wider context, it is important to mention Hungary's general demographic and socioeconomic processes that define higher education studies. For instance, such processes include the gradual decrease of the age groups of young persons who are potential entrants to the higher education system, the considerable regional disparities existing (among others) in the education system; the relatively low (albeit growing) rate of graduates, a phenomenon accompanied by the very high wage advantage enjoyed by graduates (OECD, 2013). While creating the context, we also have to make reference to the specific features of Hungary's institutional structure. The Hungarian system of higher education differentiates between the institutional types of universities and colleges, which can be maintained by the state, by churches or by private sources/funds. In the case of state-subsidized statuses, access to higher education is based on centralized planning that falls in line with centrally defined quotas. In all institution types, such quotas are augmented with fee-paying statuses. The majority (approximately two-thirds) of higher education students pursue their studies at public universities; one-fifth studies at public colleges and 6% of them studies at institution maintained by churches. Private institutions/institutions maintained by the foundations absorb approximately 7% of students. Hungary's seventy higher education institutions operate on 44 settlements (Fehérvári et al., 2011).

The differentiation processes of a massified Hungarian higher education started somewhat later than in developed European countries. The main features of the process was the expansion of the number of students (which started in the 1990s), the extension of the network of higher education institutions and – along with the introduction of new institutional forms – the process whereby several sectors appeared in higher education. Further steps of the differentiation include the introduction of new levels of education – such as PhD programmes (in 1993) and higher education professional programmes (1998) – and work schedules (distance education), and the growth of the number of study programmes. Parallel with the differentiation process, higher education is strongly affected by the trends of homogenization, which normally occur as the result of external effects. This can be detected at the level of national educational policy in the form of the institutional integration of the 1990s and, at the international level, in the higher education reforms of the Bologna process (Hrubos, 2002). Although due to the harmonization of the higher education systems the European reform facilitated homogenization and – with regard to the educational structure – unification, at the institutional level it did strengthen the processes of differentiation. This trend results from the key role of institutional autonomy that, within the framework of the implementation of reform demands, provides for the formulation of an institution's mission or development path (Hrubos, 2009).

The heterogeneity of Hungary's institutional background is accounted for with some statistical indicators of the faculty-level macro-variables applied in the present study's explanatory model. A detailed specification of the variables is given in the section on

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methodology, yet the data of Table 2 also illustrates that the median and the variance of the average values measured at the faculty level vary greatly along the various factors.

Table 2.

Institutional heterogeneity – overview of macro variables

Macro variables	Median (faculty means)	Deviation (faculty means)
BA entry level selectivity (%)	59.63	27.12
Academic staff's excellence (%)	47.78	21.56
Result of school leaving exam (%)	82.13	11.20
National Academic Competition (%)	0.76	2.36
Language exam (%)	50.80	29.21
Academic background (%)	41.28	18.28
Favorable financial background (%)	27.50	11.79
Favorable secondary educational background (%)	63.83	20.71
MA capacity (N)	56.00	126.60
MA variety (N)	13.00	17.05
MA entry level selectivity (%)	67.65	20.07
Income (HUF/month)	174,805	58,313
Professional experience (%)	44.67	14.95

Methodology and data

Databases

In Hungarian higher education, a student's study path is well documented from his or her entry until the period of graduate career tracking. This means that analyses of the institutional effects can rely on rich data content. An objective of our study is to utilize the data content of these databases to the fullest possible extent and to look for possible ways of using it for research purposes. Therefore, it is an important that the analysis should involve data from research databases and administrative databases alike. Having regard to the fact that our analysis works with the data content of several databases – some of which were created for administrative purposes – the interpretation of the resulting variables requires a summary of the main characteristics of the databases used for the measurement of institutional effects.

In Hungary, application to higher education study programmes is centrally coordinated. An individual can submit his or her application in a manner and time

frame defined by legislation, on a unified application form, indicating a rank of the choices. Consequently, two times a year and as a "by-product" of the application process, a database is generated, which, in an anonymous form can be used for other purposes as well (**Administrative database of Hungarian Higher Educational Admission System – Educational Authority – HEAS**). These administrative data, which consists of the data of more than 100,000 individuals every year, and other data required for the operation of the system (the programmes publishable for applications, capacity targets, entry requirements, etc.) serve as valuable material for researchers. For applicants of higher educational vocational trainings, Bachelor programmes and unified single-cycle programmes, the methodology of the calculation of score points that define access is also unified and centrally regulated.[2] Consequently, the data content of application and admission databases is suitable for the comparison of the applicants and admitted students of institutions or study programmes (e.g. study performance at secondary school, results of the centrally organized secondary school leaving examination, foreign language examinations, outstanding performance or extra scores given as a form of positive discrimination, etc.).

Falling in line with the target group of the analysis, our explanatory model derives the faculty-level macro-variables of Bachelor-level input from the administrative data of the normal application procedure of 2007 and the macro-variables of the Master programmes from the normal application procedure of 2010 (Table 3).

Table 3.

Administrative database of Hungarian Higher Educational Admission System – Educational Authority (HEAS)	
Description	Administrative database of the centralized Hungarian HE admission procedure
Specification	Administrative database, covers total population of applicants in 2007 and 2010
Size	Full coverage, more than 100,000 applicants per year
Variables built into the model	BA entry level selectivity, Result of school leaving exam, National Academic Competition, Language exam (2007, macro level) MA capacity, MA variety, MA entry level selectivity (2010, macro level)

As a result of the central electronic administrative database, generated as provided for by the Act of 2005 on Higher Education, there is detailed and unified data available not only on the entry but on the higher education as a whole as well. The **Higher Education Information System (HEIS)** is an up-to-date and complete

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[2] For details, see: http://www.felvi.hu/for_foreigners/higher_education/the_admission?itemNo=1

register of data of maintainers, institutions, students, teachers and other employees.[3] From HEIS, our analysis derives its macro-level variables for the second semester of academic year 2013/2014 on the regional location and type of the faculties and the academic excellence of their staff (Table 4).

Table 4.

Higher Education Information System – Educational Authority (HEIS)	
Description	Administrative database of Hungarian HE system
Specification	IT based register of HE educational system Data covered: institutions, maintainers, academic/non-academic staff, students
Size	Full coverage since 2006
Variables built into the model	Institution type, Institution location, Academic staff's excellence (2014, macro level)

Within the framework of an EU project[4], Educatio Public Services Non-profit LLC operates an extensive **Graduate Carer Tracking System (GCTS).** One of the pillars of GCTS is the yearly online data collection; another one is the use of existing administrative data content.[5]

During the analysis, the inadequacies of the content-related coverage of administrative databases are compensated by information available from the GCTS survey database. For this reason, the macro-variables of student's social background and professional experience are derived from the 2011 and 2012 cumulative databases of the Graduate Career Tracking System (**Graduate survey 2011, 2012 – Hungarian Graduate Career Tracking System – Survey–GCTS)** (Table 5). The data was collected by the 32 participating higher education institutions from their graduate students, one, three and five years after the acquisition of the pre-degree certificate. The base population is made up by all persons who obtained their pre-degree certificates between 2007 and 2011 in conventional university programmes, college programmes, single-cycle programmes, Bachelor programmes or Master programmes. Within the framework of the data collection, institutions contacted all graduates in the target group and invited them to fill in an central online questionnaire whose questions were augmented with the institutions' specific questions. The research database is representative for the base population in terms of the year of graduation, the respondent's gender, the study fields and work schedule of studies. The cumulative database contains 45,343 answers of graduates; the average response rate is 15–20%.[6]

Table 5.

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[3] For details, see: http://www.oktatas.hu/felsooktatas/fir/fir_mukodes_alkalmazas
[4] SROP 4.1.3-08/1-2008-0004 ("*Systemic development of higher education service*")

[5] For details see: Nyüsti – Veroszta, 2014
[6] For details see: Veroszta, 2013a; Veroszta, 2013b

Graduate survey 2011, 2012 – Hungarian Graduate Career Tracking System (Survey – GCTS)	
Description	Aggregated research database of Hungarian graduates based on online surveys carried out in 2011 and 2012
Specification	Population: Graduates in 2007 (5 years after graduation), 2008 and 2009 (3 years after graduation), 2010 and 2011 (1 year after graduation) Method: online survey conducted by Hungarian HE institutions Response rate (average): 20.29% (in 2011); 15.18% (in 2012) Weighting: by gender, year of graduation, fields of study, study programs
Size	N= 45,343 (aggregated database) N= 20,453 (in 2011); N= 24,890 (in 2012)
Variables built into the model	Academic background, Social background, Professional experience (macro level)

In addition to the yearly online surveys, in 2013 administrative data integration was performed for the second time: the educational data of students who acquired their pre-degree certificate in 2009/2010 was linked with the data of administrative labour market databases of May 2012 (**Graduate Follow-up 2013 – Integration of administrative databases – Hungarian Graduate Career Tracking System – Follow-up–GCTS**). The process entailed linking the data of the graduates available in the Higher Education Information System, the National Health Insurance Fund and the National Tax and Customs Administration of Hungary at the individual's level yet anonymously. HEIS – the database discussed above – contained the detailed data related to higher education studies, while the latter two offered the key indicators of the labour market status for the integrated database. The database generated in the manner serves as a basis for the analysis and provides the macro-variable of Bachelor students (Table 6).

Table 6.

Graduate Follow-up 2013 – Integration of administrative databases – Hungarian Graduate Career Tracking System (Follow-up – GCTS)	
Description	Integrated database of several administrative/public databases
Specification	Data sources: Higher Education Information System, National Health Insurance Fund and National Tax and Customs Administration of Hungary Population: Graduates in 2010 two years after graduation Method: Anonymised data linking at individual level
Size	N= 57,189
Variables built into the model	Income (macro level, independent) Gender, Age, Field of study (individual level, control) Bachelor/Master transition (individual level, dependent)

Target group and variables

The target group of the analysis was narrowed down in conformity with the research questions. The initial database, containing the dependent variable, is the database of the 2013 data integration (Follow-up – GCTS). More specifically, graduates are examined who acquired their pre-degree certificate on full-time Bachelor programmes. In order to get a clear picture of the factors that affect transition to Master programmes, individuals who obtained at least their second degree in academic year 2009/2010 were also excluded from the analysis. The data of the graduates of programmes in law, public administration, arts and art mediation were also omitted from the database, as the low number of persons transiting from the Bachelor level to the Master level and the low number of institutions make the detection of institutional effects impossible. After the narrowing down of the target group, the database contains the data of 16,725 persons who graduated from Bachelor programmes. As it is an administrative database, this scope means theoretical completeness for the base population.

Our dependent variable is measured at the individual's level and pertains to transition to Master programmes. Persons are regarded as 'long track' students who, after the acquisition of their pre-degree certificate, transited to any Master programme in Hungary in academic year 2009/2010.[7] The rate of those transiting from the Bachelor to the Master level is 39%.

The analysis investigates the effect of institutional features on transition to Master programmes along six dimensions. In all cases, the institutional effects are interpreted and the macro-variables are measured at the faculty level[8] (Table 7).

The first group of explanatory variables consists of the *structural features of the faculty* that offers the Bachelor programme. They give information on the faculty type (college or university), geographical location (Budapest and the country) and the degree of selectivity detected during the Bachelor entrance examination. The latter indicator was generated from the data of the 2007 admission procedure (HEAS) and related to individuals who applied to state-funded full-time Bachelor programmes as their first place. It gives information about the percentage of such individuals who were not admitted to the selected programme.

The second group of independent variables measures the *academic excellence* of the teaching staff: gives the rate of employees who, according to the data of Higher Education Information System (HEIS) have a doctoral degree.

The average performance and social background of the students of Bachelor programmes are regarded as institutional effects, as that is the environment where the full-time student develops and changes for years, collects information and makes decisions day by day. This atmosphere functions as a reference group in the course

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[7] The database used for our analysis is based on Hungarian administrative data, which means that no information is available about students who started their studies on a Master programme abroad, within the framework of degree mobility.
[8] The analysis covers the data of 107 faculties, which means that the background variable can have 107 different values.

of the acquisition of the first degree; consequently, it needs to be taken into consideration as one of the factors that potentially affect progress. For the analysis of *students' excellence,* the faculty macro-variable involved was the average results of students admitted to a state-funded full-time Bachelor programmes during the 2007 application procedure (HEAS). For this purpose, we used the average results of admitted students attained at the secondary school leaving examination in mathematics and Hungarian literature and language[9], and the rate of admitted students who passed, as a minimum, an intermediate foreign language examination or performed outstandingly in national academic competitions for secondary school students.

As indicators of atmosphere, macro-variables that contain the description of *social background* were also taken into consideration. These are data that is available in research databases yet not in administrative data sources. The section on social background contains the faculty average values of students who – according to the integrated research database of the 2011 and 2012 Graduate Career Tracking System (Survey – GCTS) – acquired their pre-degree certificate on their first full-time Bachelor programme. Within this framework, we analyze the ratio of students who studied at secondary grammar school and at least one of their parents has tertiary qualification, augmented with the rate of students at the faculty who perceive their own financial status as more favourable than the average.

An individual's decision about the continuation of his or her studies on a Master programme can be influenced not only by the characteristics of the institution or fellow students, but also by the space of opportunities they experience when they decide whether to study further or enter the labour market. Consequently, the faculty's Master programme offer and the labour market perspective of the institution's graduates are also investigated as potential factors. The measures of the *Master programme offer* were calculated from the data of the 2010 ordinary admission procedure (HEAS). In doing so, we took into consideration the number of applicants admitted to the state-funded statuses of the faculty's full-time programmes (educational capacity), the number of full-time Master programmes offered by the faculty (training diversity) and the average selectivity of the Master programmes, measured with the ratio of rejected first-choice applications to state-funded statuses on full-time programmes.

The marketability of the *labour market environment* and of the faculty's Bachelor programmes were characterized with two indicators. First, we took into consideration the rate of students who – according to the GCST research database (Survey – GCTS) – performed professional work during their Bachelor studies. Second, from the data content of the data integration we involved in the analysis the average gross

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[9] Hungary has a two-level system of secondary school leaving examination. Students who pass the advanced-level examination have an extra 40 score points at the entrance examination. Accordingly, when calculating the average results, the results of applicants who have taken the advanced-level secondary school leaving examination was given an extra 40 score points.

monthly wage earned by individuals with a Bachelor qualification and without further studies two years after their graduation (as a faculty macro-variable).

Table 7.
Set of background variables – macro variables at HE faculty level

Institutional effects	Variable	Description	Type/measurement	Source (year)
Structure	Institution type: college	Faculty of a college (ref.: university)	Binary	HEIS (2014)
	Institution location: province	Faculty located in the province (ref. capital)	Binary	HEIS (2014)
	BA entry level selectivity	Percentage of application not-accepted on state-funded and full-time Bachelor programs	Continuous/percentage	HEAS (2007)
Academic staff's excellence	Academic excellence	The rate of academic degree holders among teachers	Continuous/percentage	HEIS (2014)
Students' excellence	Result of school leaving exam	The average score of the centralized school leaving exam among admitted students	Continuous/percentage	HEAS (2007)
	National Academic Competition	The rate of finalists in National Academic Competition among students	Continuous/percentage	HEAS (2007)
	Language exam	The rate of students with foreign language certification at intermediate level or higher	Continuous/percentage	HEAS (2007)
Students' social characteristics	Academic background	The rate of students with at least one parent holding a degree	Continuous/percentage	Survey – GCTS (2011-2012)
	Favourable financial background	The rate of students with financial status above average	Continuous/percentage	Survey – GCTS (2011-2012)
	Favourable secondary educational background	The rate of students studied at secondary grammar school	Continuous/percentage	Survey – GCTS (2011-2012)
HE opportunities	MA capacity	Number of admitted students to Master programs (full-time, state-	Continuous/absolute value	HEAS (2010)

		funded)		
	MA variety	Number of master programs (full-time)	Continuous/absolute value	HEAS (2010)
	MA entry level selectivity	Percentage of application not-accepted on full-time Master programs	Continuous/percentage	HEAS (2010)
LM opportunities	Income	Average monthly gross income two years after graduation among Bachelor graduates	Continuous/absolute value	Follow-up – GCTS (2013)
	Professional experience	The rate of students working during studies in study related job	Continuous/percentage	Survey – GCTS (2011-2012)

Notes:

Survey – GCTS = Graduate survey 2011, 2012 – Hungarian Graduate Career Tracking System

Follow-up – GCTS = Graduate Follow-up 2013 – Integration of administrative databases – Hungarian Graduate Career Tracking System

HEAS = Administrative database of Hungarian Higher Educational Admission System – Educational Authority

HEIS = Higher Education Information System – Educational Authority

Method

To answer the research questions, we used binary logistic regression, where the output variable is the continuation of studies on a Master programme. Consequently, the odds ratios specified in the analysis always refer to the individual-level chances of pursuing further studies on a Master programme. During the generation of the model, we used the enter method, where the variable groups specified in Table 7 were involved in the analysis by blocks. The published results contain the estimations of the final model.

The objective of the study is to understand the institutional factors of the continuation of studies on Master programmes; therefore, the explanatory model contains variables measured at the individual and at the group level. Individual-level effects were incorporated in the model as control variables in order to guarantee that faculty-level effects are explored independent of the individual characteristics. For this purpose, we controlled the model by the graduate's demographic characteristics (gender and age) and – having regard to the fact that in Hungary the rates of individuals who pursue further studies on MA programmes vary greatly by study field – by the graduate's study field.

Still, the methods and databases applied have certain limitations. To investigate the effects the various levels of analysis have on each other, the use of multilevel models would be a better option than the use of our model. In our opinion, the most important

factor that needs to be developed in future research is the incorporation of multilevel method. The reason for this is that when macro-variables are included in logistic regression, there is a risk of the underestimation of standard errors, which, in turn, can lead to the erroneous rejection of the null hypothesis. However, we can be assured in this respect, as the data used for the analysis comes from an administrative data source, and, consequently, is free of sampling errors and is complete in terms of the base population. In addition, we checked the variation of our estimations with the bootstrap procedure: we run our model on 1,000 bootstrapped samples. The results did not indicate major bias.

Another weakness of our analysis results from the nature of the databases that we used. At the macro level it is possible to incorporate several effects in the analysis, yet due to the administrative nature of the data source the content of the scope of individual-level control variables is inadequate. For this reason, we could not control the individual's study performance or social background – factors which are known to exercise effect on the continuation of studies.

Results

The results of logistic regression show that in the course of the analysis of the determinants of the continuation of studies on a Master programme, significant faculty-level effects can be detected along all dimensions, even when the available individual-level variables (gender, age, study field) are controlled (Table 8). Although most estimated odds ratios indicate a weak effect, they are suitable for the exploration of the trends of macro-level effects.

A faculty's structural features constitute the strongest factor. In spite of the transition to the Bologna education system, the difference between the statuses of college students and university students remains considerable: persons who acquired their pre-degree certificate on college programmes have less than 50% chance of continuing their studies on Master programmes than their counterparts on university programmes are. The examination of the regions of the faculties' locations – after the variables incorporated in the model are controlled – shows that graduates of faculties located in country towns other than Budapest are more likely to pursue further studies, albeit a comparison of the raw rates brings the opposite result (38% as opposed to 45%).

The variables of a faculty's atmosphere related to teachers and students point to the same direction: an academic staff of higher qualification and a student population that performs better and comes from a more favourable cultural background – as institutional features – facilitate further studies on Master programmes. By contrast, the qualitative and quantitative indicators of the Master programmes of the faculty where the pre-degree certificate was obtained do not define further studies. The increasing selective effect of the entrance procedure of Master programmes, however, reduces the chances of entering the MA/MSc level. The labour market

opportunities of the graduates of Bachelor programmes also influence further studies. Although the faculty level monthly gross income available to holders of Bachelor degrees does not significantly affect the individual's decision about his or her further studies, professional work performed during one's studies at faculty level does. It seems that young persons who, during their Bachelor studies, experienced that a higher rate of their fellow students are capable of working in professional positions before graduation are less likely to continue their studies on Master programmes.

Table 8.
Explanatory model
Institutional effects on Bachelor/Master transition (odds ratios)

	Variables	Exp(B)
Structure	Institution type: college (ref.: university)	0.420***
	Institution location: province (ref.: capital)	1.373***
	BA entry level selectivity	0.991***
Academic staff's excellence	Academic excellence	1.004**
Students' excellence	Result of school leaving exam	1.007*
	National Academic Competition	1.034*
	Language exam	1.004**
Students' social characteristics	Academic background	1.012***
	Favourable financial background	0.999
	Favourable secondary educational background	1.014***
HE opportunities	MA capacity	1.000
	MA variety	1.001
	MA entry level selectivity	0.993***
LM opportunities	Income	1.000
	Professional experience	0.992***
Control variables (individual level)	Female (ref.: male)	0.876**
	Age	0.730***
	Field of study: agriculture (ref.: engineering)	1.030
	Field of study: humanities (ref.: engineering)	0.617***
	Field of study: economics (ref.: engineering)	0.959
	Field of study: IT (ref.: engineering)	1.149
	Field of study: health sciences (ref.: engineering)	0.284***
	Field of study: teacher training (ref.: engineering)	0.202***
	Field of study: sport sciences (ref.: engineering)	0.450
	Field of study: social sciences (ref.: engineering)	0.573***
	Field of study: natural sciences (ref.: engineering)	0.990
Constant		271.958***
Model	Cox & Snell R Square	0.215

| statistics | Nagelkerke R Square | 0.289 |
| | Number of cases | 16,725 |

Conclusions and further research

To conclude our analysis, we overview the results along the research questions formulated above.

The results indicate that the institutional background has an effect on Bachelor/Master transition that is independent of the individual characteristics. In the logistic regression model applied for the purposes of research and generated from the faculty-level macro-variables, the faculty-related effects significantly explain the continuation of studies at the Master level, even after control the effects of the individual-level control variables (gender, age, study field).

Although in our study's explanatory model the variable sets that describe institution/faculty-level features fell in line with the available databases and the data content extracted from them, during the interpretation of the results and the generation of the model they were categorized along the main dimensions of the institutional effect on further studies, ensuring harmony with the research approach discussed above. With regard to content, the structural differentiation of the institutional effects based on this differentiation in higher education proved to be applicable. In the course of the examination of the Bachelor/Master transition along these dimensions of institutional differentiation, we succeeded in identifying each effect that exercises significant influence on the odds ratio of the continuation of studies.

With regard to the Bachelor/Master transition, the institutional and structural features of faculties proved to be exceptionally strong, even after the individual factors were controlled. The dichotomies of college versus university and of Budapest versus country towns are strong determinants of an individual's study path. The "human resources" of a faculty – that is a more favourable atmosphere, and the composition of the academic staff and the student population – have a positive effect on the individual's chances to pursue further studies on Master programmes. The demand side in higher education was represented by the structure of Master programmes and, in the labour market (as the other option besides further studies) by professional correspondence between the individual's study field and job, and prospective income. As evidenced by the results, the educational system influences the chances of entry to the Master level basically not through the Master programme offer but through increasing selection. The proximity of a faculty to the labour market (measured with work performed by students in their respective study fields during their studies) has a negative effect on the continuation of studies.

The general approach of our research is characterized by a strong focus on higher education research and by a methodological approach. Our research questions were intended to define the opportunities for and limitations of the incorporation of the macro-level (faculty-level) integration of data extracted from various higher education databases into statistical models that explain action at the individuals' level. Accordingly, the variables of the explanatory model were generated from various administrative and research databases, in the form of macro-level values assigned to the faculties. Although the results make it possible to investigate with this method the effects of a differentiated institutional background on progress within the system, a deeper analysis of the correlations of institutional effects calls for the implementation of multilevel models.

Consequently, a step to move forward in the investigation of our research issue would be the implementation of the methodological toolkit referred to above: the multilevel analysis. As for a step forward in terms of content and looking for the possible ways to extend our model, we are planning to include further databases and variables describing institutional differentiation that are derived from such databases. With the adoption of an extended model with a strong methodological foundation and with an higher education research approach, it can become possible to identify the patterns of study paths which are describable along the institutional features.

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