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Educational Aspirations in a Comparative Perspective

**The role of individual, contextual
and structural factors in the
formation of educational aspirations
in OECD countries**

Petr Matějů, Petr Soukup, Josef Basl

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Contents

Abstract	7
Abstrakt	8
Abstrakt	9
1. Prior research on the role of socio-psychological and structural factors in the formation of educational aspirations	11
2. Hypotheses, data, analytical strategy, and methodology	16
2.1. Hypotheses	16
2.2. Data	17
2.3. Analytical strategy and methodology	20
3. Results	21
4. Conclusions	35
Appendix	37
References	43
Summary	47
Shrnutí	49
Zusammenfassung	51
About the authors	53

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The role of individual, contextual and structural factors in the formation of educational aspirations in OECD countries

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Abstract

Research on social stratification has brought overwhelming evidence that the educational aspirations of adolescents are one of the strongest predictors of educational and occupational careers. The most recent comparative analyses have revealed that educational aspirations are shaped not only by parental socio-economic status, measured ability and values shared by a family (individual level), and the quality and type of attended schools (contextual level), but also by the structure of the whole education system, the degree of its stratification, its orientation to vocational training, its permeability, and its links to the labour market (structural level). This is why research on the interplay between individual, contextual and structural levels in the formation of educational aspirations has become such a promising stream of current stratification research.

The aim of the paper is to assess the effect of education system stratification, its vocational specificity and permeability on the formation of educational aspirations in OECD countries participating in PISA 2003. Particular emphasis is placed on the role of ability, gender, and socioeconomic background.

The results confirm previous analyses showing that the more stratified the system of secondary education, the stronger the effect of socio-economic background on educational aspirations, even after controlling for students' ability. This finding holds both at the individual and the school level. However, the results of our analysis do not support the hypothesis that more stratified systems enhance the realism of pupils towards their educational aspirations. At the individual level the net effect of ability turned out to be uniform across the types of countries defined by different levels of education system stratification, whereas the net effect of social background on aspirations turned out to be significantly stronger in more stratified education systems.

Keywords

Education, educational aspirations, inequality, social stratification, socio-economic status, educational ability, education system stratification, PISA

Vzdělanostní aspirace ve srovnávací perspektivě

Role individuálních, kontextových a strukturních faktorů při formování vzdělanostních aspirací v zemích OECD

Petr Matějů, Petr Soukup, Josef Basl

Abstrakt

Dosavadní výzkum zabývající se problematikou sociální stratifikace přinesl zjištění o tom, že vzdělanostní aspirace dospívajících jsou jedním z nejsilnějších predikátorů jejich vzdělávací a profesní dráhy. Nejnovější srovnávací analýzy odhalily, že vzdělanostní aspirace jsou utvářeny nejen socioekonomickým statutem rodičů, schopnostmi a hodnotami sdílenými rodinou (individuální úroveň) a kvalitou a typem navštěvované školy (kontextuální úroveň), ale rovněž strukturou celého vzdělávacího systému, stupněm jeho stratifikace, mírou orientace na odborné vzdělávání, prostupností a vazbami na trh práce (strukturální úroveň).

Proto se v rámci současného stratifikačního výzkumu pozornost věnuje zkoumání vzájemného působení individuální, kontextuální a strukturální úrovně při formování vzdělanostních aspirací. Cílem tohoto textu je odhadnout vliv stratifikace vzdělávacího systému, míry jeho orientace na odborné vzdělávání a propustnosti, na formování vzdělanostních aspirací v zemích OECD, které se zúčastnily projektu PISA 2003. Pozornost je věnována především roli schopností, pohlaví a socioekonomického prostředí.

Naše zjištění potvrdila dřívější analýzy ohledně toho, že čím více je stratifikován systém sekundárního vzdělávání, tím silnější efekt má na vzdělanostní aspirace socioekonomický původ studenta, i při kontrole schopností studenta. Výsledky naší analýzy nepodporují hypotézu, že více stratifikované systémy zvyšují míru „realismu“ žáků, co se týká jejich vzdělanostních aspirací.

Klíčová slova

vzdělání, vzdělanostní aspirace, nerovnosti, sociální stratifikace, socioekonomický status, studijní schopnosti, stratifikace vzdělávacího systému, PISA

Bildungsaspiration in der Vergleichsperspektive

Die Rolle von Individual-, Kontext- und Strukturfaktoren bei der Formung von Bildungsaspirationen in den OECD-Ländern

Petr Matějů, Petr Soukup, Josef Basl

Abstrakt

Die bisherige Forschung zur sozialen Stratifizierung brachte die Erkenntnis, dass die Bildungsaspirationen von Heranwachsenden einen der stärksten Prädiktoren ihrer Bildungs- und Berufslaufbahn darstellen. Neueste Vergleichsanalysen zeigten, dass die Bildungsaspiration nicht nur vom sozio-ökonomischen Status der Eltern, von den geteilten Fähigkeiten und Werten der Familie (Individualebene) sowie von Qualität und Art der besuchten Bildungseinrichtungen (Kontextebene), sondern gleichfalls auch von der Gesamtstruktur des Bildungssystem, dessen Stratifizierungsstufe, Orientierung auf Fachbildung, Durchlässigkeit und Arbeitsmarktbindung (Strukturebene) beeinflusst wird.

Deshalb wird im Rahmen der Stratifikationsforschung dem gegenseitigen Wirken der Individual-, Kontext- und Strukturebene bei der Formung von Bildungsaspirationen besondere Aufmerksamkeit gewidmet. Ziel dieses Textes ist es, den Einfluss der Stratifizierung des Bildungssystem, dessen Orientierung auf Fachbildung und Durchlässigkeit, auf die Formung von Bildungsaspirationen in den am Projekt PISA 2003 beteiligten OECD-Ländern abzuschätzen, wobei die Aufmerksamkeit insbesondere auf die Rolle der Fähigkeiten, des Geschlechts und des sozio-ökonomischen Umfelds gerichtet ist.

Unsere Feststellungen haben frühere Analysen bestätigt, nach denen bei einem besonders stratifizierten sekundären Bildungssystem die sozio-ökonomische Herkunft des Studenten, auch unter Berücksichtigung seiner Fähigkeiten, besonders starke Auswirkungen auf seine Bildungsaspiration haben. Unsere Analyseergebnisse konnten die Hypothese, dass stärker stratifizierte Systeme den „Realismus“ der Schüler in Bezug auf ihre Bildungsaspirationen erhöhen, nicht bestätigen.

Schlüsselworte

Bildung, Bildungsaspiration, Ungleichheit, soziale Stratifikation, sozio-ökonomischer Status, Studienfähigkeit, Stratifikation des Bildungssystem, PISA

1. Prior research on the role of socio-psychological and structural factors in the formation of educational aspirations

From its very outset, social stratification research has produced overwhelming evidence that the educational aspirations of adolescents are one of the strongest predictors of educational and occupational careers [e.g. Hyman 1953; Reissman 1953; Kahl 1953; Herriott 1963]. Since the early 1950s, the development of student aspirations has been one of the most frequent topics in research on social stratification and the intergenerational transmission of social status. Thus, in the early 1970s, Williams [1972] was already able to identify more than four hundred studies relating to educational aspirations alone. Taking into account only articles in professional journals, by 2004 there were as many as 1100 papers dealing with this topic.¹

Many of the pioneering studies on educational aspirations that significantly influenced further research on the reproduction of inequality, social stratification and mobility emerged from the research guided by William H. Sewell and his colleagues, who laid the foundations of the so-called social-psychological school in social stratification research (Archibald O. Haller, Vimal P. Shah, Alejandro Portes, Ottis D. Duncan, Robert M. Hauser – to name just some of the most important). Early works by these scholars [Sewell, Haller, Straus 1957; Sewell 1961; Sewell 1963; Sewell, Hauser 1972; Sewell, Shah 1967; Sewell, Shah 1968a, b] presented empirical evidence that parental socio-economic status, measured ability, academic performance, parental expectations and encouragement, peer aspirations, etc., contribute significantly to the explanation of variance in the educational aspirations of adolescents.

The late sixties saw the emergence of a new impetus to research on aspirations, particularly owing to the seminal work by Peter Blau and Ottis D. Duncan [Blau and Duncan 1967; Duncan 1968], whose model of the social-stratification process offered a new theoretical and methodological context for research on the role of educational and occupational aspirations. Partly in response to a certain simplicity in the original model by Blau-Duncan, aspirations – previously studied primarily as a dependent variable – were placed at the very centre of the so-called Wisconsin social psychological model [Sewell, Haller, Portes 1969; Haller, Portes 1973; Sewell, Haller, Ohlendorf 1970; Hauser 1972; Sewell, Hauser 1972; Sewell, Hauser 1975; Hauser, Tsai, Sewell 1983]. The study of social-psycho-

1 According to the research database EBSCOhost.

logical dimensions of the stratification process, based on one of the most extensive longitudinal research projects (Wisconsin Longitudinal Study), has proven that educational aspirations – shaped primarily by measured ability, academic performance, parental socio-economic status, teachers and peers – play the key role in explaining later educational and occupational attainment. In this sense, educational aspirations have become “the strategic centre of the model” [Haller and Portes 1973: 68].

Research on educational aspirations has been carried out not only using the social-psychological approach to the study of social stratification, but also using other approaches that eventually challenged some of its core assumptions. Alan C. Kerckhoff, in his first critical analysis of the “socialisation model” [Kerckhoff 1976], emphasised that even though scholars who subscribed to the socialisation perspective achieved impressive results in explaining the processes of educational and occupational attainment, they did not pay adequate attention to the structural constraints that individuals take into account (more or less consciously) when making important decisions about their future educational and occupational careers. Kerckhoff argued that that is why a good deal of the variance in aspirations had not been explained by the social-psychological model [Kerckhoff 1976].

Therefore, without questioning the true achievements of the research carried out under the socialisation perspective, the advocates of the “allocation” perspective [Kerckhoff 1976; Kerckhoff and Campbell 1977a, b; Wilson and Portes 1975; Simmons and Rosenberg 1971; Alexander and Eckland 1975; Karabel and Astin 1975; Jencks et al. 1972; Han 1968, 1969] suggested that the research on aspirations and their role in the attainment process underestimated the vital role of contextual and institutional effects in which pupils’ unconstrained “wishes” transform into “realistic” plans. The allocation model was not intended to replace the socialisation model; it was rather meant to go beyond it by taking into consideration and analysing additional factors that could help explain the attainment process and, in particular, the formation of educational aspirations. “The socialization model interprets the strong association between ambition and attainment as indicating that the goals direct and motivate the child’s efforts during the formative years and thus determine the level of attainment he reaches later. (..) this interpretation implies an open system within which the major determinants of attainment are motivation and ability. (...) It seems reasonable to argue that expectations of the future are affected by observed structural constraints, and thus they reflect more than pure motivation” [Kerckhoff 1976: 371].

The real effect of the different characteristics of education systems on the formation of educational aspirations could only be properly assessed in cross-national comparative analyses. Among the first studies to pursue this goal was the well-known comparative analysis of aspirations formation among 13-year-old boys in the United States and England [Kerckhoff 1977], which built on the distinction between “contest” and “sponsored” mobility proposed earlier by Turner [1960]. Following Turner’s argumentation, Kerckhoff pointed out that the English education system forced adolescents to make irreversible decisions about their educational careers.² Both authors emphasised that the American system was much more open to the “contest” type of mobility, “providing more opportunity for adolescents to change course throughout secondary school and encourages the belief that such a change is possible” [Kerckhoff 1977: 564]. Thus, as Turner concludes, “the earlier

² At the age of eleven or twelve, English boys had to choose between an “elite” grammar school, with a more demanding and academically oriented curriculum preparing students for post-secondary education, and a more popular and academically less demanding “modern secondary school”.

1. Prior research on the role of socio-psychological and structural factors in the formation of educational aspirations

that selection of elite recruits is made, the sooner others can be taught to accept their inferiority and to make 'realistic' rather than fantasy plans" [Turner 1960: 859].

Kerckhoff's comparative analysis confirmed that social origin and ability contributed to the explanation of educational aspirations more significantly among British boys than among their American counterparts. In the interpretation of these results, in conformity with Turner's main argument, Kerckhoff attributed the more structurally constrained aspirations in Britain, compared to the US, to the greater "realism" of British adolescents.

Further comparative research has revealed that educational aspirations are shaped not only by parental socio-economic status, the measured ability and values shared by a family (i.e. at the individual or social-psychological level), and the quality and type of schools attended (contextual level), but also by the structure of the entire education system, the degree of stratification in it and its orientation towards vocational training, its permeability, and its links to the labour market (structural level). At the structural level, research on the determination of educational aspirations has largely drawn on the typology of education systems introduced by Müller and Shavit [1998] and further elaborated by Kerckhoff [2001]. This typology is based on three dimensions according to which education systems can be classified: *stratification*, *vocational specificity* and *standardisation*.

Stratification, most often used to classify secondary schools, "refers to the degree to which systems have clearly differentiated kinds of schools whose curricula are defined as 'higher' and 'lower'. (...) In stratified systems, the program offerings in the types of secondary schools are associated with different degrees of access to opportunities for additional, more advanced schooling. So, the term *stratification* refers to both the kind of programs offered and their links to future opportunities." [Kerckhoff 2001: 4] *Vocational specificity*, another relevant dimension often used in the analysis of education systems, is the degree to which curricula are designed to prepare students for particular vocations. In terms of statistical indicators, it can be represented by the proportion of students leaving the education system with specific skills [see, e.g., Buchmann and Dalton 2002]. A high degree of vocational specificity very often indicates also a high degree of system stratification, because schools providing training for specific occupations usually co-exist with schools preparing for further, more academic types of education at a higher level. In other words, high vocational specificity goes hand in hand with high stratification, usually within the so-called dual system of secondary education (for example in Germany). *Standardisation* refers to the degree to which governments create conditions (e.g. teachers' education, financing, etc.) and control mechanisms (nationwide testing, school-leaving examinations, etc.) to achieve certain standards of quality in education provided by different schools.

The above-mentioned classification of education systems, together with the highly standardised statistical data on education systems published every year by the OECD (Education at a Glance), and data from large-scale comparative surveys of adolescents assessing various aspects of their ability and skills, socio-economic background, values and aspirations (such as TIMSS, PISA, and PIRLS) provide unusually strong empirical evidence enabling the use of multi-level analytical strategies to explain educational aspirations in different institutional settings and societal contexts. In other words, these very rich sources of data can be used to explain the formation of educational aspirations and educational attainment by factors on different levels: *individual* (parental SES, measured ability), *contextual* (school level differentiation) and *structural* (institutional characteristics of education systems).

Research on the interplay between the individual, contextual and structural levels in the formation of educational aspirations has already brought valuable results. Buchmann and Dalton [2002] used data from one of the large-scale student assessment projects (TIMSS 1995) to identify differences between selected countries in the effect of parents' and peers' attitudes towards education on the educational aspirations of 13-year-olds. First, the study has confirmed that, after controlling for the effect of ability (math achievement), the effect of parents' education on the educational aspirations of adolescents is significantly higher in countries with highly stratified education systems than in countries with relatively undifferentiated systems of secondary education. Conversely, parents' and peers' attitudes towards education more significantly affect the educational aspirations of adolescents in countries with less stratified systems. The authors, although they acknowledge that their evidence is not strong, come to the conclusion that in more differentiated systems aspirations are largely determined by the type of school students attend, so there is little room for interpersonal effects [Buchmann and Dalton 2002: 99].

The most recent comparative analysis of educational aspirations [Buchmann and Park 2005] draws on PISA 2003 data, a large-scale student assessment project targeting 15-year-olds enrolled in school (regardless of the grade or type of institution in which they are enrolled). Using the typology of education systems developed by Müller and Shavit [1998], the authors focused primarily on the formation of educational and occupational expectations. Building on prior research on the impact of institutional settings for the formation of aspirations, they predict that the degree of stratification of a country's education system significantly impacts the formation of students' educational and occupational expectations. Referring to Kerckhoff's comparison of Great Britain and the United States [Kerckhoff 1977], they predict that the "realism" of students' educational expectations depends on the degree to which the education system provides feedback to students about their future. In other words, they hypothesise that in highly-stratified education systems students' educational expectations would be more "realistic" than those of students in less stratified systems [Buchmann and Park 2005: 8].

The assumption that educational aspirations depend on students' social and personal characteristics – such as parental socio-economic status, gender, and measured ability – in highly-stratified education systems more than in less stratified systems is plausible and well grounded in theory as well as in previous research. However, associating these relationships with the "realism" of aspirations seems to be less grounded and could even be misleading. It depends, of course, on the operational definition of "realism". We would argue that interpreting the relationship between the degree of education-system stratification, on the one hand, and the effect of social background on aspirations, on the other, in terms of "realism" may detract attention from the fact that this relationship may be a typical result of the "internalisation" of structural constraints, which make children from lower social strata less ambitious and thus less likely to follow more demanding educational pathways than equally gifted children from more favourable social backgrounds. Therefore, while the strong effect of measured ability on aspirations, net of parental socio-economic background, could be explained in terms of "realism", this may indicate a *constrained* rather than a *realistic* choice. This is because children who do not feel intellectually strong enough to compete for more academic types of higher education may "*realistically*" choose a less demanding vocational track, school or programme (if it is available), making exactly the same choice as that of a child who shows a high level of competence (measured ability) but whose parental socio-economic status is lower and who has less favourable background conditions. In keeping with Turner's distinction

1. *Prior research on the role of socio-psychological and structural factors in the formation of educational aspirations*

between contest and sponsored mobility, we should distinguish between one's capacity to realistically evaluate chances for success in structural settings, allowing an open "contest" on the one hand, and decisions formed in reaction to a highly stratified (selective) school system resulting in "sponsored" mobility on the other ("adopted discrimination").

The aim of this paper is to take a few steps further in the empirical elaboration of the relationships between educational aspirations and the structural (institutional) characteristics of education systems. More specifically, in the first step, statistical data portraying systems of secondary and tertiary education in OECD countries are used to assess relevant structural characteristics of education systems (degree of stratification, vocational specificity, selectivity, openness, etc.). In the second step, survey data from the OECD international student assessment (PISA 2003) are analysed to assess the degree to which the educational aspirations of 15-year-olds are determined by measured ability, gender, and socio-economic background. Finally, in the third step, the results from the previous two steps are entered into a multi-level analysis designed to test relevant hypotheses about the determination of educational aspirations at the individual level (ability, gender, parental SES), the contextual level (characteristics of schools), and the societal level (relevant characteristics of the education system).

2. Hypotheses, data, analytical strategy and methodology

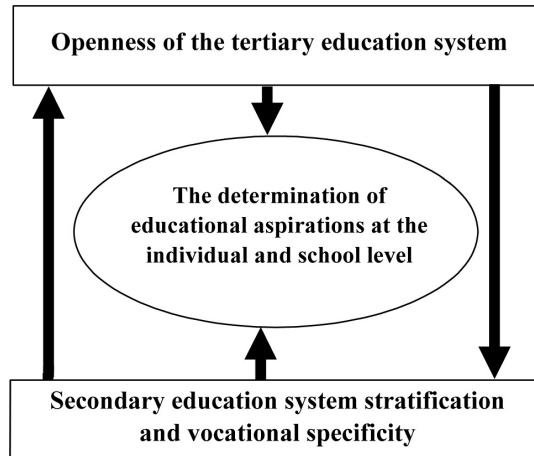
2.1. Hypotheses

Drawing on previous comparative research on the institutional embeddedness of educational aspirations, five main hypotheses were set for the analysis:

- H1. The degree of stratification and vocational specificity, two closely related characteristics of secondary education systems, form one dimension that indicates the “openness and permeability” of the systems.
- H2. The openness and permeability of secondary education is strongly associated with the openness of tertiary education.
- H3. The greater the openness of secondary and tertiary education, the less educational aspirations are determined by social origin, ability and gender.
- H4. The greater the openness of secondary and tertiary education, the weaker the effect of attended school on educational aspirations.
- H5. The stronger determination of educational aspirations in more stratified education systems is not due to the higher degree of “realism” of the pupils in those systems (carefully considering their ability), but due to the stronger effect of the socio-economic status of their parents (adapting to the observed structural constraints).

The basic relationships between these variables are illustrated in Diagram 1.

Diagram 1. Hypothesised relationships between the characteristics of an education system and educational aspirations



Source: developed by Petr Matějů.

2.2. Data

The statistical data used to describe education systems and to define relevant dimensions of their stratification are drawn from the OECD yearbook *Education at a Glance* [OECD 2003, 2004 and 2005c].³ This rich source of data provides information about the basic characteristics of education systems, access to education, participation and progress, financial and human resources invested in education, the learning environment and the organisation of schools, etc. Most of the indicators published in the 2005 edition of the yearbook describe the situation in 2003, when the PISA 2003 survey data was collected in participating countries.

Two sets of statistical indicators were used to describe the education systems of individual countries in terms of their stratification, openness, and permeability. The following four indicators were used for secondary education:⁴

- a) GENSEC: Upper secondary education enrolment in general educational programmes (2003);
- b) NUMPRG: Number of school types or distinct educational programmes available to 15-year-olds (2003);

³ Some indicators that were not available in the most recent edition of *Education at a Glance* [OECD 2005c] were obtained from earlier editions [OECD 2003 and 2004].

⁴ The acronyms for the statistical indicators (i.e. the names of the variables used in analyses) and the values of the indicators in individual countries are presented in the Appendix (Tables A1 and A2).

- c) VOCAT: Proportion of 15-year-olds enrolled in programmes that offer access to vocational studies at the next level of education or direct access to the labour market (2003);
- d) EXPSEC: Expenditure on educational institutions of primary, lower secondary and primary education as a percentage of GDP from public and private sources (2002).

The openness of the tertiary education system was also indicated using four variables:

- a) TERENR: Entry rates into tertiary education (sum of net entry rates into type A and/or type B forms of tertiary education, 2003);
- b) PRIVSRC: Relative proportion of private sources of funding on institutions of tertiary education (percentage of total expenditure);
- c) FINASS: Financial aid to students: public subsidies for households and other private entities as a percentage of total public expenditure on tertiary education (percentage of total expenditure on tertiary education);
- d) EXPTER: Expenditure on tertiary educational institutions as a percentage of GDP from public and private sources.

To test our hypotheses about the determination of educational aspirations by ability, parental socio-economic status, gender and type of school, we used the international data file from PISA 2003 (Programme of International Student Assessment). Though PISA 2003 focused mainly on mathematical literacy, other three dimensions, i.e. reading literacy (covered mainly in PISA 2000), science literacy (covered mainly in PISA 2006), and problem solving were also tested. The target population of PISA surveys is 15-year-olds enrolled in school, regardless of the grade or type of institution in which they are enrolled.

PISA surveys use a two-stage stratified sampling design. At the first stage, schools are sampled systematically from a comprehensive national list of all eligible schools with probabilities that are proportional to a measure of size.⁵ Within sampled schools, students are selected with equal probability from a list of 15-year-old students in each selected school.⁶ From the 41 OECD and non-OECD countries participating in the 2003 PISA data collection, we selected for our comparative analysis only 30 OECD countries for which we can also obtain statistical data regularly published in the OECD statistical yearbook *Education at Glance* [OECD 2005c].

⁵ The measure of size was a function of the estimated number of eligible 15-year-old students enrolled. Individual schools in which students of this age can be enrolled were selected systematically with probabilities proportionate to size, the size being a function of the estimated number of eligible (15-year-old) students enrolled.

⁶ See OECD [2005b: Chapter 4] for a detailed description of PISA sampling procedures and target population coverage.

The following variables were used in analyses based on data from PISA 2003:

- a) EDUASP – aspirations to attain tertiary (i.e. college or university) education (0=no, 1=yes);⁷
- b) SEX (1=female, 2=male);
- c) HISEI – the highest occupational status of parents; ⁸
- d) ESCS – index of socio-economic and cultural status;⁹
- e) M_ESCS – average value of ESCS in the school attended by the respondent;
- f) ABIL – index of measured ability (derived from five plausible values for each literacy domain);¹⁰
- g) M_ABIL – average value of ABIL in the school attended by respondent;
- h) M_ELITE – attended type of school can be classified as an academically oriented school preparing students especially for the entry to college or university (0=no, 1=yes);¹¹
- i) PARCOL – parents have a college education (ISECD 5 and higher) (0=no, 1=yes).

7 This means category 5 or 6 in the ISCED coding.

8 Occupational data for the student's father and mother were obtained by asking open-ended questions. The responses were coded into four-digit ISCO codes and then recoded to the international socio-economic index of occupational status (ISEI) [Ganzeboom et al. 1992]. HISEI corresponds to the higher ISEI score of either parent or to the only available parent's ISEI score. Higher ISEI scores indicate higher levels of occupational status.

9 The ESCS Index was derived from three variables related to family background: the index of the highest level of parental education in terms of the number of years of education according to the ISCED classification (PARED), the index of highest parental occupation status (HISEI) and the index of home possessions (HOMEPOS). Prior to using them, these variables were transformed into Z-scores and then used for a principal component analysis in order to obtain ESCS scores using an OECD population weight that gives each OECD country a weight of 1000.

10 Students' achievements in mathematics, reading, science and problem solving are reported on standardised composite scales (the average score is 500, standard deviation is 100 across all students of the OECD countries in PISA). Since the creation of scales was based on Item Response Theory, the data set contains five plausible values for each student instead of one fixed value. When achievement scores are used in analyses as dependent variables, all five plausible values should be used simultaneously to obtain the estimates of population parameters [OECD 2005b]. We only use achievement scores as independent or control variables, so the scale of "ability" could also have been created by averaging five plausible values for each literacy domain (obtaining four variables: MATH for mathematics, READ for reading, SCIE for science, and PROB problem solving) and computing an additive scale (MATH + READ + SCIE + PROB/4). The analysis of reliability confirmed that these variables clearly form one scale (Cronbach's $\alpha = 0.9672$).

11 We attempted to define the type of schools for just the six countries that represent the individual types of education system (Czech Republic, Germany, France, Great Britain, Sweden and the United States). However, only in three countries could such schools be defined on the basis of the PISA 2003 classification (variable PROGN), namely, in the Czech Republic (multi-year gymnasias and traditional 4-year gymnasias, attended by 14% of respondents in the PISA 2003 sample), Germany (gymnasias, 29% in the PISA 2003 sample), and in France (upper secondary general schools – 52% in the PISA 2003 sample).

2.3. Analytical strategy and methodology

To define composite variables to represent stratification, vocational specificity, permeability, and openness of the education system, we applied the principal component analysis of the OECD statistical indicators to the data for the subset of OECD countries participating in PISA 2003. These composite variables were then used to define groups of countries to be used in multi-level analysis. To assess the degree of determination of educational aspirations at the country level for each OECD country in the PISA 2003 data set (30 countries out of 41 participating in PISA 2003), for each country we conducted an individual logistic regression of educational aspirations (EDUASP) on parental socio-economic status (HISEI), child's measured ability (ABIL) and gender (SEX). Standardised (centred) model coefficients of determination (Nagelkerke R^2) for these countries then entered the analysis of the relationships between stratification, openness and selectivity of education systems, and the degree of determination of educational aspirations. Finally, we conducted a multi-level analysis of factors determining educational aspirations (EDUASP) at the *individual level* (ability, parental SES, gender), the *contextual level* (effect of inter-school variation, average SES and ability in school) and the *system level* (type of education system). For six selected countries representing three individual types of education system (typical education systems) we assessed the role of "elite" schools (if they exist) in generating intra-class variation in educational aspirations.

The software program HLM 6.02 was used to estimate both two-level (individual-school) and three-level (individual-school-country) models. Since the dependent variable (college aspirations) was binary, we defined the outcome variable as Bernoulli (0 or 1). All analyses were weighted at the first level by the weight used in PISA (variable W_FSTUWT). The restricted maximum likelihood method (REML) was used to estimate the models and their parameters.

3. Results

Principal component analysis was applied to the full set of eight statistical indicators and separately to the two subsets depicting secondary and tertiary education. The results displayed in Table 1 confirm that the stratification of the secondary system of education (indicated by NUMPRG) goes hand in hand with its vocational specificity (indicated by VOCAT and GENSEC). Another well-defined dimension of a country’s education system comprises enrolment rates, expenditure on tertiary education, financial assistance to students, and the system’s openness to private resources (indicating a demand driven system). Though the correlation of the two dimensions (SCND, TERT) is very high and significant ($r = 0.627$, $p < 0.001$), and the analysis of the full set suggests that there is clearly one strong dimension that consistently describes a country’s education system as a whole (component DIM1 in Table 1), for descriptive and analytical purposes we decided to keep the two dimensions separate (SCND, TERT). For the sake of simplicity we refer to them as the “openness of secondary education” and the “openness of tertiary education”.

Table 1. Principal component analyses of the openness of secondary and tertiary education

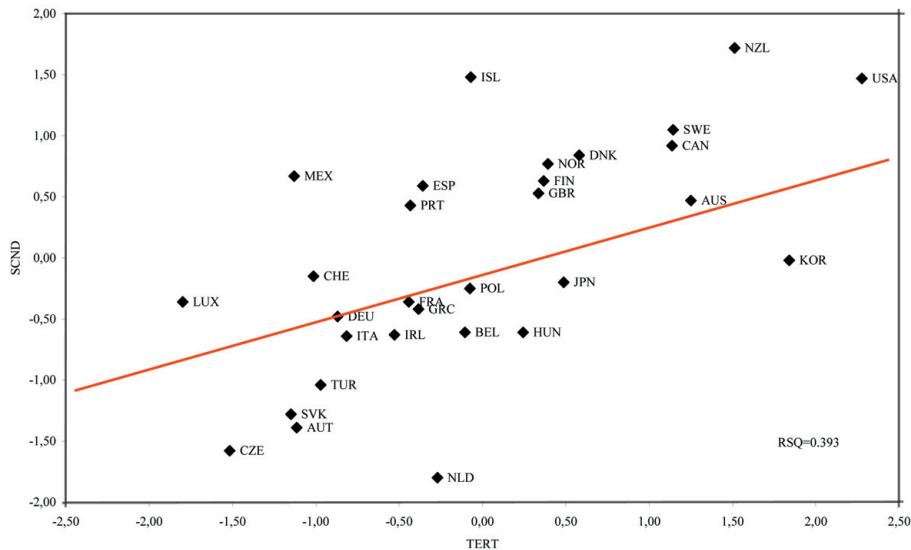
Variable	DIM1	DIM2	SCDN	TERT
GENSEC	0.638	0.455	0.650	–
NUMPRG	-0.922	0.177	-0.853	–
VOCAT	-0.520	0.486	-0.702	–
EXPSEC	0.668	-0.310	0.705	–
TERENR	0.721	-0.031	–	0.720
PRIVSRC	0.339	0.882	–	0.615
FINASS	0.681	-0.238	–	0.618
EXPTER	0.741	0.294	–	0.793
% of VAR	45.3	18.6	53.5	47.7

Source: *Education at a Glance data [OECD 2005c] and authors’ analysis.*

Since the OECD statistical data we used to describe the openness and permeability of education systems contains missing values, and since dropping the countries with the missing data from the analyses would have reduced the number of units for multi-level analysis below a critical level, we decided to use the regression method of imputation for the missing data.¹² Since the correlation between TERT and SCND was not affected by the imputation, we decided to use imputed data for further analysis.

The values of the two dimensions (principal components) in OECD/PISA countries¹³ are displayed in Figure 1. At first glance, most European countries (except the Scandinavian countries) show low levels of openness in both the secondary and tertiary systems of education (e.g. the Czech Republic, Netherlands, Austria, Slovakia, Germany, Italy, Ireland, France, Belgium, etc.). The United States, Canada, New Zealand, and Australia, on the one hand, and Sweden, Norway, Denmark, and Finland, on the other, show consistently greater openness in both segments of the education system.

Figure 1. Openness of secondary and tertiary education systems in OECD countries (dimensions SCND and TERT)



Source: *Education at a Glance data [OECD 2005c] and authors' analysis.*

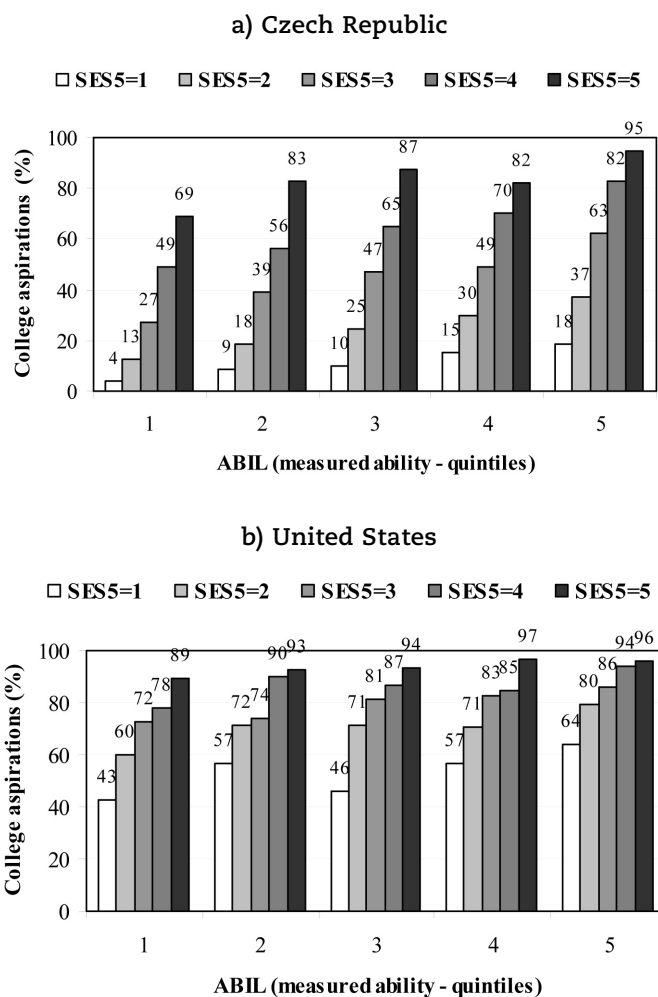
The results of a simple descriptive analysis of the effects of ability and parental socio-economic status in three selected countries exhibiting different levels of stratification in the education system (the Czech Republic, the United States and Sweden) are displayed in Figures 2a, b, and c and reveal

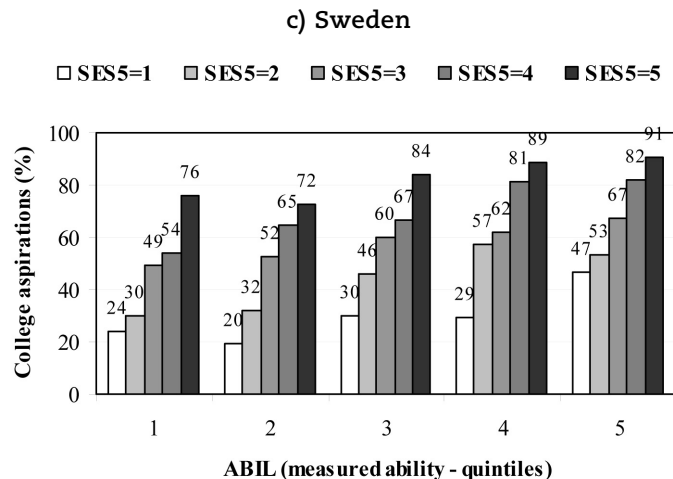
12 SPSS Missing Value Analysis was applied (a regression method augmenting estimates with random components). For details see: <http://www.siu.edu/IUR/SPSS/SPSS%20Missing%20Value%20Analysis%207.5.pdf>

13 Hereinafter, "OECD/PISA countries" refers to the OECD countries that participated in the PISA 2003 project.

the different effects of socio-economic background in these three countries. In the Czech Republic, a country with one of the most stratified systems of secondary education and one of the least accessible systems of tertiary education (see Figures 1 and 2), only 18% of the most competent 15-year-olds from the lowest SES group (SES = 1) expect to achieve education at the tertiary level, while in the highest SES group the figure is 95% (ratio 0.18). In the United States and Sweden – the countries with the least stratified secondary education and the most open tertiary education – highly capable adolescents from lower strata are much more likely to continue on to college than their Czech counterparts (18% in the Czech Republic, compared to 64% in the US and 47% in Sweden). Thus the contrast between the lowest and highest quintile of SES are much smaller in those countries (US: 64/96, ratio 0.66, Sweden 47/91, ratio 0.51).

Figure 2. Educational aspirations by measured ability (quintiles) and parental SES (quintiles)





Source: PISA 2003 data and authors' analysis.

Logistic regressions of educational aspirations on ability (ABIL), parental socio-economic status (HISEI) and gender (SEX),¹⁴ which were applied to assess the net effect of ability and parental socio-economic status on educational aspirations and the degree to which educational aspirations are determined by ability, gender and parental socio-economic status, revealed significant differences between countries, especially in the net effect of socio-economic background. Figure 3 displays the odds ratios of educational aspirations for groups defined by quintiles of parental SES after controlling for the effect of ability.¹⁵ Consistent with the results of the descriptive analysis and with hypothesis H5, the decline in the odds of aspiring to attend college is much steeper in the Czech Republic, Germany, Hungary, Poland and other Central European countries than in the US, Sweden, Canada, Australia, France and other countries with more open education systems.

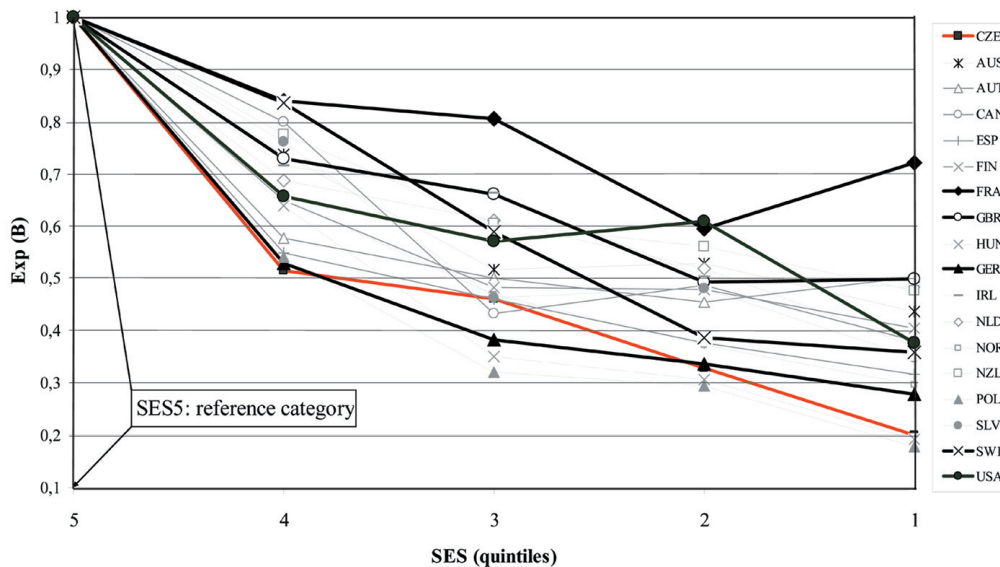
The overall degree to which educational aspirations are determined by ability, gender and parental socio-economic status was assessed by the model coefficient of determination (Nagelkerke's R^2).¹⁶ The values of the coefficient rank from more than 0.40 (Hungary, Czech Republic, Slovakia, Portugal, Belgium, Netherlands, Poland, and Spain) to less than 0.25 (Denmark, New Zealand, France, United States, Korea, Canada, Australia, and Finland). These results also support hypothesis H3 ("The greater the openness of secondary and tertiary education, the less educational aspirations are determined by social origin, ability and gender."). For more rigorous tests we transformed the values of Nagelkerke's R^2 to their Z-scores. The values of the new variables Z-DETASP are displayed

14 The SPSS binomial logistic regression procedure was applied. See the SPSS command file in the Appendix.

15 Owing to the parameterisation of the logistic regression model, the highest quintile (SES=5) serves as a reference category with the odds ratio (e^B) = 1.

16 Nagelkerke's R-Square is a modification of the Cox and Snell coefficient of determination. It divides Cox and Snell's R^2 by its maximum in order to attain a measure that ranges from 0 to 1. Therefore, Nagelkerke's R^2 will normally be higher than the Cox and Snell measure but will tend to run lower than the corresponding OLS R^2 . Nagelkerke's R^2 is part of the SPSS output in the "Model Summary" table and is the most reported of the R-squared estimates [see Nagelkerke 1991].

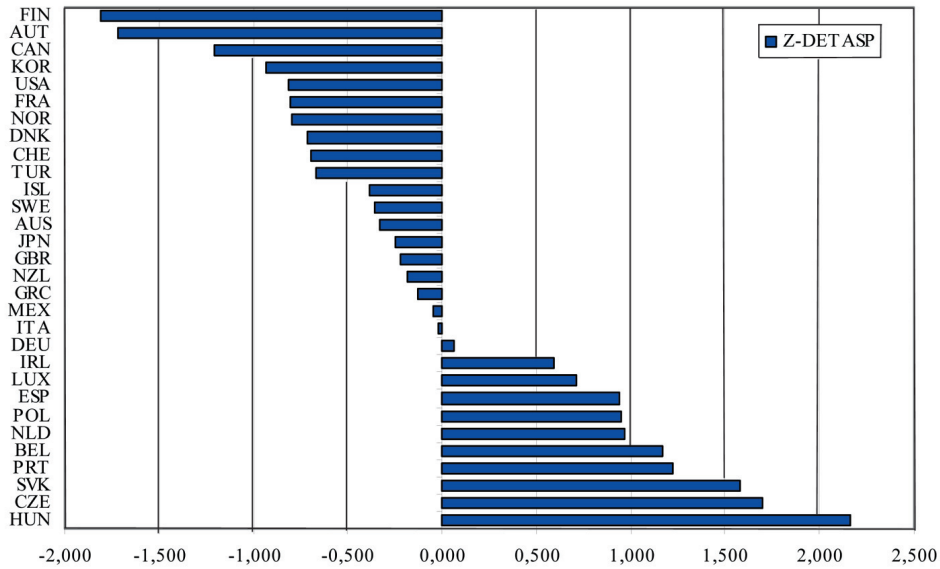
Figure 3. Odds ratios (e^B) of college aspirations for individuals from different social backgrounds (quintiles of parental SES) after controlling for the effect of ability (ABIL) in selected OECD countries. Results of logistic regression



Source: PISA 2003 data and authors' analysis.

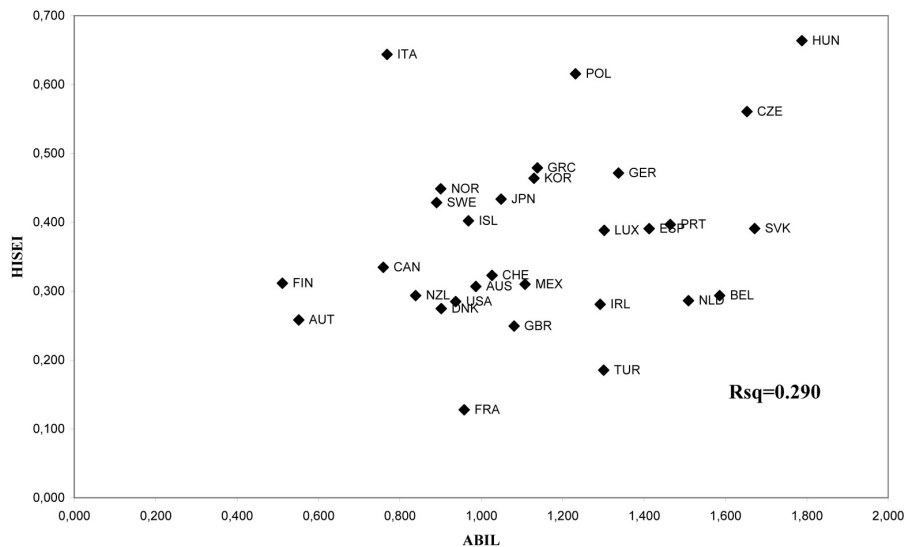
in Figure 4. Values of logistic regression coefficients (B) for variables ABIL and HISEI are displayed in Figure 5. In general, the net effects of ability and parental socio-economic status tend to be consistently high or low (R^2 for coefficients is 0.29). Hungary, Czech Republic, Poland and Germany show the high effects of both variables, while, for example, in Finland, Canada, France, New Zealand, Denmark, the United States, Australia and Great Britain, both the child's ability and parental socio-economic status show much weaker net effects on aspirations. It is interesting to see that Norway and Sweden, typical representatives of the so-called Scandinavian model, show a stronger net effect of parental socio-economic status than some typically "liberal" countries (US, Australia and Canada). Countries like Italy, Turkey, Ireland, the Netherlands and Belgium seem to be the "outliers" with regard to the otherwise strong tendency of a positive correlation between the effects of ability and parental socio-economic status.

Figure 4. Standardised values (Z-scores) of the model coefficient of determination (Nagelkerke R²) from the logistic regression of educational aspirations on ability, gender and parental socio-economic status



Source: PISA 2003 data and authors' analysis.

Figure 5. Logistic regression coefficients (B) of aspiration on ability (ABIL) and socio-economic status of parents (HISE), controlling for gender. Variables ABIL and HISEI are standardised



Source: PISA 2003 data and authors' analysis.

For the sake of simplicity, we conducted second-level principal component analysis from two dimensions (SCND and TERT), which identified a single dimension representing the openness and permeability of the education system on the whole (variable OPENNESS).¹⁷ This dimension has been used to define three main types of countries (see Figure A4 in the Appendix for the definition of individual types). As the third hypothesis (H3) predicted, we found a significant relationship between the determination of educational aspirations at the individual level (Z-DETASP) on the one hand, and each of the composite variables indicating the openness and permeability of the education system (SCND, TERT, OPENNESS) on the other.¹⁸

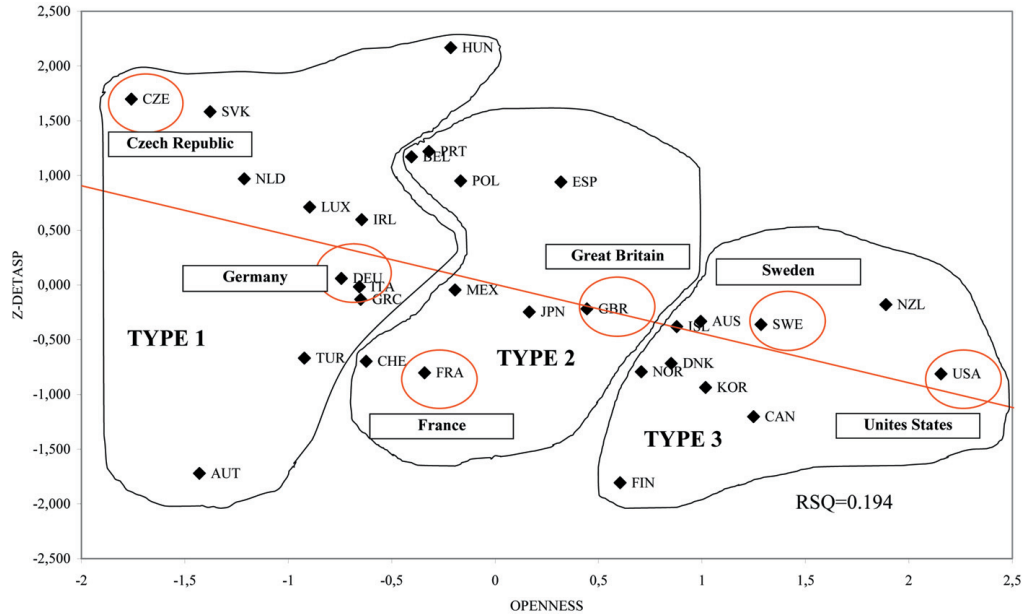
Figure 6 displays individual OECD/PISA countries in a two-dimensional space defined by the determination of educational aspirations (Z-DETASP) and the openness and permeability of the education system (OPENNESS). It affirms the existence of the effect of the openness and permeability of the education system, assessed at the country level, on the degree of determination of educational aspirations, assessed at the individual level. The figure also presents the definition of the three main types of countries we used for further analysis (Type 1, Type 2, and Type 3), along with six typical countries (two for each type). The Czech Republic and Germany were chosen to represent Type 1, the group of countries with highly stratified and highly selective education systems.¹⁹ Our classification of France in Type 2 (moderately stratified systems) is entirely consistent with previous analyses [Müller and Shavit 1998; Buchmann and Dalton 2002; Buchmann and Park 2005]. As for Great Britain, some analyses [see e.g. Buchmann and Park 2005] locate it among countries where there is little stratification in the system. Our decision to rank Great Britain among the countries with moderately stratified systems is based on the OECD data that we used to define the dimensions of education-system stratification and openness. This decision is supported by the analyses of Turner [1960] and Kerckhoff [Kerckhoff 1977, 2001], which contrasted the United States and Britain as countries with different levels of “tracking” in their education systems (the American system being less stratified than the British). Type 3 is composed of countries with somewhat different education systems: the liberal and demand-driven Anglo-Saxon systems on the one hand (United States, Canada, Australia, New Zealand), and the welfare and supply-driven Scandinavian systems on the other (Sweden, Denmark, Finland). Therefore, we decided to represent this type by taking the United States as a typical example of the former group and Sweden as a typical example of the latter. We will focus on these countries in our analysis to demonstrate some specific features of education systems and their effects on the educational aspirations of adolescents.

17 One identified component, OPENNESS, accounted for 81% of the variance with loadings 0.902 for both SCND and TERT.

18 The regression coefficients of DETASP on SCND, TERT and OPENNESS (b/se/sig) are: SCND (-.452/0.188/0.023), TERT (-.375/0.172/0.038), OPENNESS (-.441/0.170/0.015).

19 The choice of the Czech Republic and Germany to represent Type-1 countries is consistent with the findings of some previous analyses [see, e.g., Buchmann and Park 2005].

Figure 6. The relationship between the determination of educational aspirations (Z-DETASP) and the composite variable indicating the openness and permeability of a country's education system (OPENNESS). The figure also shows three types of countries and typical countries used in the multi-level analysis



Source: Education at a Glance data [OECD 2005c] and authors' analysis.

The final step of the analysis involves conducting a multi-level analysis of educational aspirations. Table 2 displays a two-level analysis applied to six typical countries: the Czech Republic, Germany, France, Great Britain, Sweden and the United States.²⁰

Three coefficients presented in Table 2 may need a brief explanation, namely ICC_0 , ICC_f and Pseudo R^2 . ICC is the intra-class correlation, which indicates the degree to which aspirations vary between schools. Statistically, the intra-class correlation takes inter-school variance in aspirations as a proportion of their total variation. Thus, in highly stratified education systems, particularly in those with elite schools or special “academic” tracks, the intra-class correlation would be much greater than in less differentiated education systems. In our analysis, ICC_0 is the intra-class correlation for the null (empty) model, that is, for the model with no predictors at either level. The general formula for ICC_0 is:

$$ICC_0 = \frac{\sigma_u^2}{\sigma_e^2 + \sigma_u^2},$$

²⁰ See Figure 6 for the location of these countries in a two-dimensional space defined by the openness of the education system and the degree of determination of educational aspirations.

where ICC_0 is the intra-class correlation for the null model, σ_u^2 is the variance at the second (school) level, and σ_e^2 is the variance at the first (individual) level. For models with binary dependent variables (which is our case) the formula for the intra-class correlation coefficient is slightly different [see, e.g., Snijders and Bosker 1999, or Hox 2002]:

$$ICC_1^{21} = \frac{\sigma_u^2}{\pi^2/3 + \sigma_u^2},$$

where $\pi^2/3$ is the variance at the first level, and σ_u^2 is the variance at the second level. ICC_f is the intra-class correlation for the final model, that is, for the model with all predictors at all levels. Pseudo R^2 is the measure of the explained variance at the second level, and the formula for it is:

$$\text{pseudo } R^2 = \frac{ICC_0 - ICC_f}{ICC_0}$$

The results of the first step of multi-level analysis are displayed in Tables 2 and 3. The results for the countries in which the PISA data enabled the identification of “elite” secondary schools in the structure of the school system (Czech Republic, Germany and France) are presented in the bottom panels of these tables.

Table 2. The results of the multi-level analysis of educational aspirations in typical countries without first-level predictors

a) Czech Republic, Germany, and France without M_ELITE

	Czech Republic			Germany			France		
	A	B	C	A	B	C	A	B	C
ICC_0	0.410	0.410	0.410	0.380	0.380	0.380	0.210	0.210	0.210
ICC_f	0.158	0.153	0.117	0.123	0.100	0.080	0.112	0.043	0.044
Intercept	-0.741	-11.480	-6.774	-2.121	-10.900	-7.643	-0.036	-6.322	-6.147
M_ESCS	2.879	–	1.564	2.065	–	0.918	1.249	–	0.055
M_ABIL	–	0.022	0.012	–	0.018	0.011	–	0.012	0.012
Pseudo R^2	61	62	71	67	73	79	46	79	79

Source: PISA 2003 and Education at a Glance data [OECD 2005c] and authors' analysis.

ICC_f is the intra-class correlation for the full model with second-level predictors (i.e. M_ESCS, M_ABIL).

21 Snijders and Bosker use the symbol ρ_i instead of our ICC_i [Snijders and Bosker 1999: 224].

b) Great Britain, Sweden, USA

	Great Britain			Sweden			USA		
	A	B	C	A	B	C	A	B	C
ICC ₀	0.150	0.150	0.150	0.060	0.060	0.060	0.103	0.103	0.103
ICC _f	0.076	0.064	0.060	0.020	0.034	0.018	0.020	0.027	0.014
Intercept	-0.704	-7.145	-5.213	-0.0190	-4.928	-2.042	0.831	-3.850	-1.349
M_ESCS	1.331	–	0.514	1.200	–	0.935	1.223	–	0.799
M_ABIL	–	0.013	0.009	–	0.010	0.004	–	0.010	0.005
Pseudo R ²	50	58	61	67	46	70	80	73	86

Source: PISA 2003 and Education at a Glance data [OECD 2005c] and authors' analysis.

ICC_f is the intra-class correlation for the full model with second-level predictors (i.e. M_ESCS, M_ABIL).

c) Czech Republic, Germany, and France with M_ELITE

	Czech Republic			Germany			France		
	A	B	C	A	B	C	A	B	C
ICC ₀	0.410	0.410	0.410	0.380	0.380	0.380	0.210	0.210	0.210
ICC _f	0.158	0.153	0.240	0.123	0.100	0.055	0.112	0.043	0.030
Intercept	-0.741	-11.48	-0.732	-2.121	-10.900	-2.493	-0.036	-6.322	-1.026
M_ESCS	2.879	–	–	2.065	–	–	1.249	–	–
M_ABIL	–	0.022	–	–	0.018	–	–	0.012	–
M_ELITE	–	–	3.173	–	–	2.459	–	–	1.73
Pseudo R ²	61	62	40	67	73	85	46	79	85

Source: PISA 2003 and Education at a Glance data [OECD 2005c] and authors' analysis.

ICC_f is the intra-class correlation for the full model with second-level predictors (i.e. M_ESCS, M_ABIL, and M_ELITE).

It is immediately clear that the intra-class correlation for the model with no predictors (ICC₀) is by far the largest in the Czech Republic and Germany (0.410 and 0.380), followed by France (0.210). In other countries, particularly in Sweden and the US, it is significantly weaker.

To assess the role of socio-economic status and ability as contextual variables (school level) we introduced the average of socio-economic status (M_ESCS) and the average score in tests (M_ABIL) for individual schools as the only predictors. The values of ICC_f in Table 2 for Model A (with M_ESCS) and Model B (with M_ABIL) show that the introduction of one or another of these two contextual variables results in a significant reduction in the intra-class correlation. Consistent with our hypotheses, these two contextual variables have a stronger impact in systems with greater strati-

fication.²² The effect of “elite” schools (M_ELITE) on aspirations was found to be much stronger in the Czech Republic (1.539) and Germany (1.228) than in France (0.706). Unfortunately, the data does not allow a similar variable to be defined for other typical countries (United States, Sweden and Great Britain). However, the results for Model C reveal that the net effect of average social status (M_ESCS) on aspirations is also significant in the countries with formally much less stratified secondary school systems and higher accessibility of tertiary education. In other words, “elite” schools attracting students from higher social strata certainly exist in all education systems, but their role in the formation of aspirations is much stronger in countries where these schools form a special segment of the education system.

Table 3. The results of the multi-level analysis of educational aspirations in typical countries

Model A: only M_ESCS as the second level predictor. **Model B:** only M_ABIL as the second level predictor. **Model C:** for the Czech Republic, France and Germany M_ELITE as the second level predictor, for other countries both M_ESCS and M_ABIL used as second level predictors)

a) Czech Republic, Germany, and France without M_ELITE

	Czech Republic			Germany			France		
	A	B	C	A	B	C	A	B	C
ICC ₀	0.410	0.410	0.410	0.380	0.380	0.380	0.210	0.210	0.210
ICC _f	0.170	0.186	0.165	0.078	0.089	0.079	0.060	0.057	0.060
Intercept	-0.102	-3.232	0.540	-2.038	-5.218	-2.504	-0.052	-1.535	-1.641
M_ESCS	1.200	–	1.332	0.859	–	0.776	0.220	–	-0.034
M_ABIL	–	0.006	-0.001	–	0.006	0.001	–	0.003	0.003
SEX	-0.609	-0.610	-0.611	-0.160	-0.160	-0.157	-0.191	-0.174	-0.178
HISEI	0.023	0.025	0.023	0.017	0.018	0.017	0.002	0.003	0.003
ABIL	0.015	0.015	0.015	0.010	0.010	0.010	0.010	0.009	0.009
PARCOL	0.802	0.845	0.799	0.617	0.639	0.618	0.441	0.433	0.444
Pseudo R ²	59	54	59	79	76	79	69	72	79

Source: PISA 2003 and Education at a Glance data [OECD 2005c] and authors’ analysis.

Coefficients not in bold type are not significant at the level < 0.05 (for interaction effects < 0.1).

22 The relative decrease in intra-class correlation due to M_ESCS defined as $(ICC_0 - ICC_f) / ICC_0$ was 61% in the Czech Republic, 67% in Germany, 46% in France, 49% in Great Britain, 66% in Sweden, and 58% in the United States. Similarly, M_ABIL itself caused a reduction of intra-class correlation by 54% in the Czech Republic, 77% in Germany, 73% in France, 46% in Great Britain, 39% in Sweden, and 66% in the United States.

b) Great Britain, Sweden, USA

	Great Britain			Sweden			USA		
	A	B	C	A	B	C	A	B	C
ICC ₀	0.150	0.150	0.150	0.060	0.060	0.060	0.103	0.103	0.103
ICC _f	0.081	0.081	0.081	0.041	0.043	0.038	0.043	0.038	0.035
Intercept	-0.610	-1.058	0.050	0.240	0.343	2.433	1.499	2.271	3.986
M_ESCS	0.186	–	0.299	0.420	–	0.693	0.145	–	0.572
M_ABIL	–	0.001	-0.001	–	0.000	-0.004	–	-0.002	-0.005
SEX	-0.516	-0.516	-0.518	-0.635	-0.635	-0.641	-0.588	-0.590	-0.592
HISEI	0.005	0.005	0.005	0.020	0.020	0.018	0.005	0.006	0.004
ABIL	0.012	0.012	0.012	0.010	0.011	0.011	0.010	0.011	0.011
PARCOL	0.866	0.870	0.865	0.720	0.727	0.712	1.133	1.159	1.118
Pseudo R ²	47	47	47	34	31	39	58	63	66

Source: PISA 2003 and Education at a Glance data [OECD 2005c] and authors' analysis.

Coefficients not in bold type are not significant at the level < 0.05 (for interaction effects < 0.1).

c) Czech Republic, Germany, and France with M_ELITE

	Czech Republic			Germany			France		
	A	B	C	A	B	C	A	B	C
ICC ₀	0.410	0.410	0.410	0.380	0.380	0.380	0.210	0.210	0.210
ICC _f	0.170	0.186	0.150	0.078	0.089	0.030	0.060	0.057	0.040
Intercept	-0.102	-3.232	-0.103	-2.038	-5.218	-2.229	-0.052	-1.535	-0.439
M_ESCS	1.200	–	–	0.859	–	–	0.220	–	–
M_ABIL	–	0.006	–	–	0.006	–	–	0.003	–
M_ELITE	–	–	1.539	–	–	1.228	–	–	0.706
SEX	-0.609	-0.610	-0.599	-0.160	-0.160	-0.125	-0.191	-0.174	-0.144
HISEI	0.023	0.025	0.025	0.017	0.018	0.017	0.002	0.003	0.002
ABIL	0.015	0.015	0.015	0.010	0.010	0.017	0.010	0.009	0.008
PARCOL	0.802	0.845	0.833	0.617	0.639	0.619	0.441	0.433	0.439
Pseudo R ²	59	54	63	79	76	91	69	72	80

Source: PISA 2003 and Education at a Glance data [OECD 2005c] and authors' analysis.

Coefficients not in bold type are not significant at the level < 0.05 (for interaction effects < 0.1).

These results confirm that the effect of the school adolescents attend on their aspirations is much stronger in countries representing Type 1 (the Czech Republic, Germany), where “elite” secondary schools form a special segment of the education system, preparing them for highly selective

tertiary education, than it is in countries of Type 2 (France, Great Britain) and especially in countries of Type 3 (United States, Sweden), where elite secondary schools undoubtedly exist, but do not constitute a special type of education that prepares students for an extremely competitive entry into more accessible tertiary education.

As for the effects of gender, ability, parental education and socio-economic status (Tables 4 and 5), consistent with our hypotheses we found that – after controlling for other relevant variables – the net effect of a student’s ability on aspirations is quite homogeneous across countries (in other words, countries do not differ much in terms of the effect of “realism”). However, this is not the case of the net effect of social background (the effect we call “adopted discrimination”). The coefficients for Models A and B in Table 4 show that the net effects of parental socio-economic status and education are as strong as the net effect of ability.²³ If all first-level variables are included in the model (see Table 4, Model C), the net effect of the parents’ education (after controlling for the effect of ability) is stronger than their socio-economic status. The results also confirm that, after controlling for ability and social background, boys show systematically lower aspirations than girls.

Table 4. The results of the multi-level analysis of educational aspirations in OECD countries (two-levels)

	Model A		Model B		Model C	
	coefficient	t-value	coefficient	t-value	coefficient	t-value
Intercept	0.992	–	0.674	–	0.734	–
ABIL	0.012	21.0	0.012	20.8	0.012	22.1
SEX	-0.527	-16.0	-0.573	-16.3	-0.583	-16.0
SEX*type1	0.164	1.4	0.187	1.5	0.209	1.9
SEX*type2	0.081	0.6	0.108	0.8	0.100	0.7
HISEI	0.016	24.6	–	–	0.006	4.4
HISEI*type1	0.005	1.8	–	–	0.010	3.5
HISEI*type2	0.002	0.3	–	–	0.005	0.8
PARCOL	–	–	1.094	15.5	1.053	12.1
PARCOL*type1	–	–	-0.348	-3.1	-0.483	-4.2
PARCOL*type2	–	–	-0.327	-1.7	-0.412	-2.9

Source: PISA 2003 and Education at a Glance data [OECD 2005c] and authors’ analysis.

Coefficients not in bold type are not significant at the level < 0.05 (for interaction effects < 0.1).

The differences between types of countries are also consistent with our assumptions. The effect of parental socio-economic status is significantly stronger in countries where education systems are more stratified, while the role of parents’ education (cultural capital) is relatively stronger in countries with undifferentiated systems.

23 Since these three variables (ABIL, HISEI, PARCOL) have different distributions, these conclusions are based on t-values (for ABIL: 21.0, HISEI 24.6, PARCOL 15.5).

With regard to the effect of school context, the results presented in Table 5 finally corroborate the hypothesis that the net effect of the social composition of the school is significantly stronger in countries with highly stratified systems (Type 1) than in other countries. The results for Model A with interactions in Table 5 show that the net effect of M_ESCS is significantly stronger for Type 1 countries (the interaction coefficient 0.512), while the differences between Type 2 and Type 3 are not significant (the interaction coefficient 0.242 is not significant).²⁴ The overall net contextual effect of ability (coefficients for M_ABIL in Model B, Table 5) is not significant. However, the results suggest that there are significant differences between countries: it tends to be lower in countries with formally undifferentiated systems (Type 3) than in other countries (Type 1 and Type 2).²⁵ These results do not change anything about the conclusion that, after controlling for parental socio-economic status, the net effect of ability measured at the individual level (ABIL) is uniform across types of countries. The coefficient for the overall net effect of ability is 0.011, and the interaction effects for ABIL with the type of countries were found insignificant in all models. This means, in other words, that the overall net effect of ability is constant across types of countries *regardless of whether we do or we do not control for the interaction effect between parental socio-economic status and the type of country.*

Table 5. The results of the multi-level analysis of educational aspirations in OECD countries (three levels) with type intercepts and with/without interactions

	Model A w/o int.	Model B w/o int.	Model A w int.	Model B w int.
Intercept	0.430	-0.663	0.463	0.790
type1	-0.221	-0.321	-0.232	-3.405
type2	0.003	-0.073	-0.043	-2.223
M_ESCS	0.428	–	0.240	–
M_ESCS*type1	–	–	0.512	–
M_ESCS*type2	–	–	0.242	–
M_ABIL	–	0.002	–	-0.0005
M_ABIL*type1	–	–	–	0.006
M_ABIL*type2	–	–	–	0.004
ABIL	0.011	0.011	0.011	0.011
HISEI	0.008	0.009	0.006	0.007
HISEI*type1	–	–	0.007	0.007
HISEI*type2	–	–	0.004	0.003
SEX	-0.505	-0.5049	-0.582	-0.579
SEX*type1	–	–	0.238	0.234
SEX*type2	–	–	0.106	0.106
PARCOL	0.806	0.824	1.030	1.046
PARCOL*type1	–	–	-0.502	-0.500
PARCOL*type2	–	–	-0.414	-0.415

Source: PISA 2003 and Education at a Glance data [OECD 2005c] and authors' analysis.

Coefficients not in bold type are not significant at the level < 0.05 (for interaction effects < 0.1).

²⁴ Type3 is a reference category.

²⁵ See interaction effects M_ABIL*type1 (0.006) and M_ABIL*type2 (0.004) in Model B with interactions.

4. Conclusions

The analysis of the OECD data confirmed the hypothesis that the degree of stratification in the secondary education system and its vocational specificity constitute one dimension indicating the permeability of the secondary education system (hypothesis H1). We also found that there is a strong association between the permeability of secondary education and the openness of tertiary education (H2). These two intertwined characteristics of an education system strongly predict the degree to which educational aspirations are determined by socio-economic background, ability and gender (H3).

The results of the multi-level analysis also confirmed previous analyses showing that the more stratified the system of secondary education is, the stronger the effect of socio-economic background on educational aspirations, even after controlling for students' ability. This finding holds both at the individual and the school level. In other words, in more stratified secondary education systems and less open tertiary systems, the net effect of the social composition of the school and the net effect of the average performance of students in tests (ability) are significantly stronger than in less stratified and more open systems (H4 and H5).

The Czech Republic and Germany are countries typified by an extremely high determination of aspirations by social origin and attended school. These effects are enhanced in those countries by the existence of "elite" schools with very restricted and competitive access (academic gymnasia). The United States and Sweden are countries that represent the opposite end of the spectrum (i.e. countries with the lowest determination of aspirations by socio-economic origin), where the system of secondary education is formally undifferentiated and tertiary education is much more open than in other countries. We also found that in countries with more stratified education systems the effect of parental socio-economic status is relatively stronger than the effect of parents' education, while in more open systems it is the other way around.

In our view, these results do not confirm previous analyses – in the sense that more stratified systems enhance realism of educational aspirations – because adolescents are guided to a more realistic evaluation of chances for success in different types of schools. Though we found some differences between types of countries in the effect of ability on aspirations at the school level, at the individual level the net effect of ability turned out to be uniform across the three types of countries that we defined for our analysis. However, this is not the case for the net effect of social background on aspirations, which – unlike the net effect of ability – is significantly stronger in more stratified education systems. In our view, these results testify to the presence of "adopted discrimination", generated by mechanisms described previously as "sponsored mobility", rather than

the existence of “more rationality”. Our analysis also confirmed that in general – all other variables being constant – boys show lower aspirations than girls. However, in more stratified systems, the differences between the aspirations of boys and girls are smaller.

As for the main message of our analysis for educational policy, we believe that we have gone a step further in assessing the role of the institutional structures of education systems and the degree of their openness and permeability in the formation of educational aspirations of pupils. The next step should be to carry out a thorough analysis of education systems, admission policies, and models of financing, particularly in countries representing different types of systems (Czech Republic, Germany, France, Sweden, United States, etc.). It would be helpful to identify the mechanisms whereby different structures of secondary and tertiary education act upon the decisions of individuals, and to design effective educational policies focused on reducing inequalities in access to higher education.

Appendix

Table A1. Statistical indicators used in the analysis of educational systems

	Acronym	Description	Source
a	GENSEC	Upper secondary education enrolment in general education programmes (2003)	EaG, C2.1
p	NUMPRG	Number of school types or distinct educational programmes available to 15-year-olds (2003)	EaG, D6.1
q	VOCAT	Proportion of 15-year-olds enrolled in programmes that give access to vocational studies at the next programme level or direct access to the labour market (2003)	EaG, D6.1
v+w	EXPSEC	Expenditure on educational institutions of primary, lower secondary and primary education as a percentage of GDP from public and private sources (2002)	EaG, B2.1
e+h	TERENR	Entry rates into tertiary education (sum of net entry rates into type A and/or B forms of tertiary education, 2003)	EaG, C2.2
r	PRIVSRC	Relative proportion of private sources of funding on institutions of tertiary education (percentage of total expenditure)	EaG, B.3.2
s	FINASS	Financial aid to students: public subsidies for households and other private entities as a percentage of total public expenditure on tertiary education (percentage of total expenditure on tertiary education)	EaG, B.5.2
x	EXPTER	Expenditure on tertiary educational institutions as a percentage of GDP from public and private sources	EaG, B2.1

Source: *Education at a Glance [OECD 2005c]*.

Table A2. Values of statistical indicators used in the analysis of education systems

Country	LABEL	Indicator									
		a	e	h	P	q	r	s	v	w	x
Australia	AUS	35.8		68	1	8.9	51.3	34.8	3.2	0.9	1.6
Austria	AUT	20.8	9	35	4	42.9	8.4	15.4	2.5	1.3	1.1
Belgium	BEL	29.7	33	34	4	22.8	14	15.1	1.5	2.8	1.4
Canada	CAN	84.8			1	0.0	41.4	19.2			2.5
Czech Republic	CZE	20.5	9	33	5	16.9	12.5	7	1.8	1.1	0.9
Denmark	DNK	46.4	11	53	1	0.0	2.1	31.3	3.0	1.2	1.9
Finland	FIN	41.2	0	73	1	0.0	3.7	17.8	2.5	1.4	1.8
France	FRA	43.6	34	39		9.5	14.3	8.7	2.7	1.5	1.1
Germany	DEU	37.8	16	36	4	0.0	8.4	16.6	2.2	1.2	1.1
Greece	GRC	64.0			2	19.9	0.4	5.5	1.2	1.4	1.2
Hungary	HUN	50.2	7	69	3	19.6	21.3	22.4	2.0	1.1	1.2
Iceland	ISL	64.9	9	83	1	0.0	4.4	21	3.5	1.5	1.1
Ireland	IRL	71.7	17	41	4	17.8	14.2	12.3	2.3	0.7	1.3
Italy	ITA	36.2	1	54	3		21.4	15.8	2.2	1.3	0.9
Japan	JPN	74.5	31	42	2	25.4	58.5	16.3	2.1	0.9	1.1
Korea	KOR	69.3	51	50	3	26.7	85.1	3.5	2.7	1.4	2.2
Luxembourg	LUX	35.3			4	4.6			2.1	1.8	
Mexico	MEX	89.1	2	28	3	5.8	29	5.1	3.3	0.8	1.4
Netherlands	NLD	30.9	1	52	4	61.3	21.9	22.3	2.7	0.8	1.3
New Zealand	NZL	100.0	53	81	1	0.0	37.5	44.2	3.1	1.5	1.5
Norway	NOR	40.8	1	68	1	0.0	3.7	32.9	2.8	1.4	1.5
Poland	POL	45.7	1	70	3		30.3	0.4	2.9	1.2	1.5
Portugal	PRT	71.5			3	8.8	8.7	4.9	3.0	1.2	1.0
Slovak Republic	SVK	24.6	3	40	5	2.7	14.8	17.5	1.6	1.2	0.9
Spain	ESP	62.8	21	46	1	0.0	23.7	7.9			1.2
Sweden	SWE	47.1	7	80	1	0.0	10	29.3	3.2	1.4	1.8
Switzerland	CHE	35.0	17	38	4	8.8	3.3	0.7	2.8	1.7	1.4
Turkey	TUR	62.0	24	23	3		9.9	12.6	1.8	0.8	1.2
United Kingdom	GBR	30.8	30	48	1		28	23.9	1.4	2.9	1.1
United States	USA	100.0	0	63	1	0.0	54.9	37.4	3.1	1.0	2.6

Source: Education at a Glance [OECD 2005c].

Table A3. Correlations between indicators used in the analysis of education systems

	GENSEC	NUMPRG	VOCAT	EXPSEC	TERENR	PRIVSRC	FINASS	EXPTER
GENSEC	1.000							
NUMPRG	-0.477	1.000						
VOCAT	-0.295	0.496	1.000					
EXPSEC	0.261	-0.612	-0.343	1.000				
TERENR	0.275	-0.672	-0.221	0.431	1.000			
PRIVSRC	0.531	-0.162	0.191	-0.054	0.240	1.000		
FINASS	0.268	-0.699	-0.314	0.302	0.460	0.050	1.000	
EXPTER	0.464	-0.580	-0.242	0.466	0.399	0.445	0.345	1.000

Source: Education at a Glance data [OECD 2005c] and authors' analysis.

SPSS commands use to run logistic regression of educational aspirations on ability, parental socio-economic status and gender.

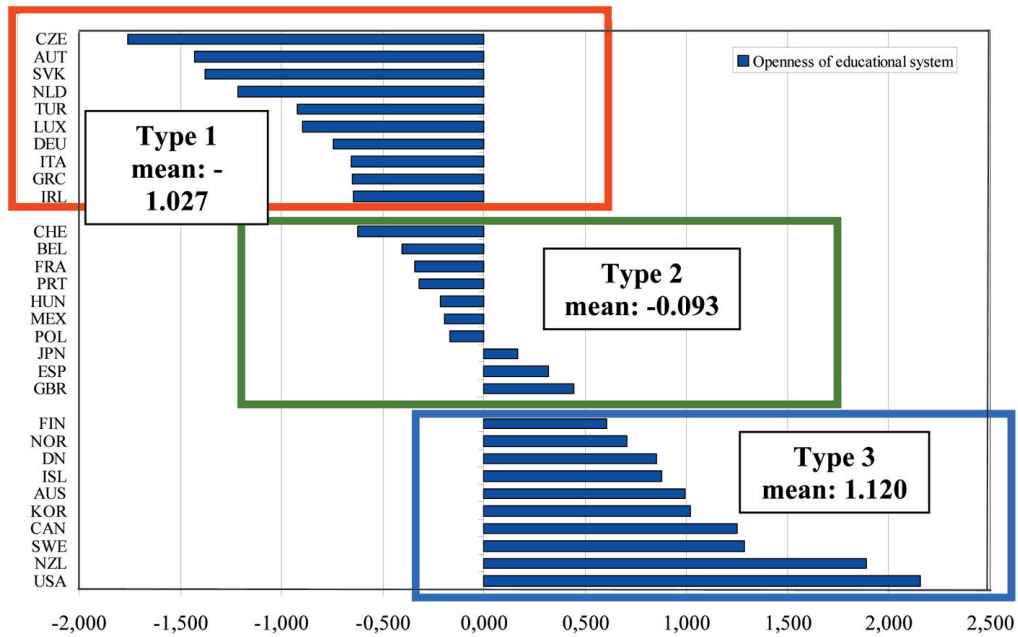
a) commands used to assess the coefficient of determination (Nagelkerke R²):

```
LOGISTIC REGRESSION VAR=eduasp
/METHOD=ENTER abil hisei sex
/CONTRAST (sex)=Indicator
/CRITERIA PIN(.05) POUT(.10) ITERATE(20) CUT(.5) .
```

b) commands used to assess the net effects of parental socio-economic status and ability for descriptive analyses (ABIL and HISEI transformed into quintiles):

```
split file by cnt2.
LOGISTIC REGRESSION VAR=eduasp
/METHOD=ENTER abil5 isei5 sex
/CONTRAST (isei5)=Indicator
/CONTRAST (abil5)=Indicator
/CONTRAST (sex)=Indicator
/CRITERIA PIN(.05) POUT(.10) ITERATE(20) CUT(.5) .
split file off.
```

Figure A4. Definition of types of countries by values of the variable OPENNESS



Source: Education at a Glance data [OECD 2005c] and authors' analysis.

Table A5. Classification of countries according to the degree of education-system stratification

Degree of stratification	Müller and Shavit [1998]	Buchmann and Park [2005]	Matějů, Soukup, Basl [2006]
Low	United States Australia Ireland Japan Sweden	United States Australia Canada Great Britain New Zealand Spain	United States New Zealand Sweden Canada Korea Australia Island Denmark Norway Finland
Middle	France Israel Italy Taiwan	France Italy	Great Britain Spain Japan Poland Mexico Hungary Portugal France Belgium Switzerland
High	Germany Netherlands Switzerland	Germany Netherlands Switzerland Austria Czech Republic Hungary	Ireland Greece Italy Germany Luxembourg Turkey Netherlands Slovakia Austria Czech Republic

Source: [Müller and Shavit 1998; Buchmann and Park 2005] and authors' analysis.

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Educational Aspirations in a Comparative Perspective

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Summary

Present research on social stratification has brought overwhelming evidence that the educational aspirations of adolescents are one of the strongest predictors of educational and occupational careers. The most recent comparative analyses have revealed that educational aspirations are shaped not only by parental socioeconomic status, measured ability and values shared by a family (individual level), and the quality and type of attended schools (contextual level), but also by the structure of the whole educational system, the degree of its stratification, its orientation to vocational training, its permeability, and its links to the labor market (structural level). This is why research on the interplay between individual, contextual and structural levels in the formation of educational aspirations has become such a promising stream of current stratification research.

Therefore, the aim of this paper is to assess the effect of educational system stratification, its vocational specificity and permeability on the formation of educational aspirations in OECD countries participating in PISA 2003. Particular emphasis is placed on the role of ability, gender, and socioeconomic background.

Drawing on previous comparative research on the institutional embeddedness of educational aspirations, five main hypotheses were used for our analysis. Two of them focus both on the degree of educational system stratification and vocational specificity (as two related characteristics of secondary educational systems that form one dimension indicating the ‘openness and permeability’ of such systems) and on the degree of openness between secondary and tertiary education. Other hypotheses deal with the issue of the ‘realism’ of educational aspirations and with aspects related to the determination of educational aspirations by social origin, ability, gender and attended school.

The first step of the analysis consists in the creation of composite variables representing the degree of stratification, vocational specificity, permeability, and openness of secondary and tertiary education. The composite variables are then used to identify distinct types of countries according to the degree of educational system stratification, openness and permeability. We conduct logistic regression of educational aspirations on parental socioeconomic status, child’s measured ability, and gender to assess the degree to which they determine educational aspirations at the country level for each OECD country in the PISA 2003 data set (30 countries out of 41 that participated in PISA 2003).

The results of the logistic regression are then entered into the analysis of the relationships between the degree of educational system stratification, openness and selectivity on the one hand, and the degree of determination of educational aspirations on the other. Finally, we conduct a multi-

level analysis of factors determining educational aspirations at the *individual level* (ability, parental SES, gender), *contextual level* (effect of between schools variation, average SES and ability in school) and the *system level* (type of educational system). The results confirm previous analyses showing that the more stratified the system of secondary education, the stronger the effect of socioeconomic background on educational aspirations, even after controlling for students' ability. This finding holds both at the individual and the school level. However, the results of our analysis do not support the hypothesis that more stratified systems enhance the realism of pupils towards their educational aspirations. At the individual level the net effect of ability turned out to be uniform across the types of countries defined by different levels of educational system stratification, whereas the net effect of social background on aspirations turned out to be significantly stronger in more stratified educational systems.

Shrnutí

Vzdělanostní aspirace dospívajících jsou jedním z nejsilnějších predikátorů jejich vzdělávací a profesní dráhy. Vyplývá to z dosavadního výzkumu v oblasti sociální stratifikace. Nejnovější srovnávací analýzy odhalily, že vzdělanostní aspirace jsou utvářeny nejen socioekonomickým statusem rodičů, schopnostmi a hodnotami sdílenými rodinou (individuální úroveň) a kvalitou a typem navštěvované školy (kontextuální úroveň), ale rovněž strukturou celého vzdělávacího systému, stupněm jeho stratifikace, orientace na odborné vzdělávání, prostupností a vazbami na trh práce (strukturální úroveň). Proto se v rámci současného stratifikačního výzkumu pozornost věnuje zkoumání vzájemného působení individuální, kontextuální a strukturální úrovně při formování vzdělanostních aspirací. V rámci tohoto textu jsme se zaměřili na zkoumání vlivu stratifikace vzdělávacího systému, míry jeho orientace na odborné vzdělávání a propustnosti, na formování vzdělanostních aspirací v zemích OECD, které se zúčastnily projektu PISA 2003. Pozornost byla především zaměřena na roli schopností, pohlaví a socioekonomického prostředí.

S ohledem na dosavadní srovnávací výzkum zaměřený na institucionální zakotvenost vzdělanostních nerovností bylo formulováno pět hlavních hypotéz. Dvě z nich jsou zaměřeny jednak na stupeň stratifikace vzdělávacího systému a míry jeho orientace na odborné vzdělávání jako dvě související charakteristiky systémů sekundárního vzdělávání, které utváří jednu dimenzi indikující otevřenost a propustnost těchto systémů, jednak na souvislost mezi otevřeností sekundárního a terciárního vzdělávání. Ostatní hypotézy se zabývají otázkou „realismu“ vzdělanostních aspirací a determinací vzdělanostních aspirací sociálním původem, schopnostmi, pohlavím a navštěvovanou školou.

První krok naší analýzy spočíval ve vytvoření kompozitních proměnných reprezentujících stupeň stratifikace, orientaci na odborné vzdělávání, propustnost a otevřenost sekundárního a terciárního vzdělávání. Tyto proměnné jsou potom použity k identifikování jednotlivých typů zemí podle stupně stratifikace vzdělávacího systému, otevřenosti a propustnosti. Dále byl prostřednictvím logistické regrese zkoumán vztah vzdělanostních aspirací a socioekonomického statusu rodičů, naměřených schopností žáka, pohlaví. Šlo o to odhadnout, do jaké míry jsou jimi vzdělanostní aspirace determinovány na úrovni jednotlivých států OECD v datovém souboru PISA 2003 (30 států z celkových 41, které se zúčastnily projektu PISA 2003). Výstupy z logistické regrese byly následně vstupem do analýzy vztahů mezi stupněm stratifikace vzdělávacího systému, otevřenosti a propustnosti na straně jedné a stupněm determinace vzdělanostních aspirací na straně druhé. Nakonec byla provedena víceúrovňová analýza faktorů určujících vzdělanostní aspirace na *individuální* úrovni (schopnosti, socioekonomický status rodičů, pohlaví), *kontextuální* úrovni (vliv odchylky mezi školami) a *systémové* úrovni (typ vzdělávacího systému).

Naše zjištění potvrdila dřívější analýzy ohledně toho, že čím více je stratifikován systém sekundárního vzdělávání, tím silnější efekt má na vzdělanostní aspirace socioekonomický původ studenta, i při kontrole schopností studenta. Platí to na individuální i na školní úrovni. Výsledky naší analýzy ale nepodporují hypotézu, že více stratifikované systémy zvyšují míru „realismu“ žáků, co se týká jejich vzdělanostních aspirací. Na individuální úrovni se čistý efekt schopností ukázal být stejnoměrný napříč jednotlivými typy zemí definovanými různou úrovní stratifikace vzdělávacího systému, zatímco čistý efekt sociálního původu na aspirace se ukázal významně silnější ve více stratifikovaných systémech.

Zusammenfassung

Die Bildungsaspirationen von Heranwachsenden stellen einen der stärksten Prädiktoren ihrer Bildungs- und Berufslaufbahn dar. Dies geht aus der bisherigen Erforschung der sozialen Stratifikation hervor. Neuste Vergleichsanalysen zeigten, dass die Bildungsaspiration nicht nur vom sozio-ökonomischen Status der Eltern, von den geteilten Fähigkeiten und Werten der Familie (individuelle Ebene) sowie von Qualität und Art der besuchten Bildungseinrichtungen (Kontextebene), sondern gleichfalls auch von der Gesamtstruktur des Bildungssystem, dessen Stratifizierungsstufe, Orientierung auf fachliche Bildung, Durchlässigkeit und Arbeitsmarktbindung (Strukturebene) beeinflusst wird. Deshalb wird im Rahmen der Stratifikationsforschung dem gegenseitigen Wirken der Individual-, Kontext- und Strukturebene bei der Formung von Bildungsaspirationen besondere Aufmerksamkeit gewidmet. Im Rahmen dieses Textes befassten wir uns mit dem Einfluss der Stratifizierung des Bildungssystem, dessen Orientierung auf Fachbildung und Durchlässigkeit, auf die Formung von Bildungsaspirationen in den am Projekt PISA 2003 beteiligten OECD-Ländern, wobei die Aufmerksamkeit insbesondere auf die Rolle der Fähigkeiten, des Geschlechts und des sozio-ökonomischen Umfelds gerichtet ist.

Im Hinblick auf die bisherige vergleichende Forschung der institutionellen Verankerung von Bildungsungleichheiten wurden fünf Haupthypothesen formuliert. Zwei dieser Hypothesen befassen sich zum einen mit der Stratifikationsstufe des Bildungssystem und dessen Orientierung auf Fachbildung als zwei zusammenhängender Charakteristika der sekundären Bildungssysteme, die eine der Dimensionen bilden, die die Offenheit und Durchlässigkeit dieser Systeme anzeigt, zum anderen mit dem Zusammenhang zwischen der Offenheit der sekundären und tertiären Bildung. Die übrigen Hypothesen befassen sich mit der Frage des „Realismus“ von Bildungsaspirationen und der Determinierung von Bildungsaspirationen durch soziale Herkunft, Fähigkeiten, Geschlecht und Schulbesuch.

Der erste Schritt unserer Analyse bestand in der Bestimmung von Komposit-Variablen, die die Stratifikationsstufe, die Orientierung auf Fachbildung sowie die Durchlässigkeit und Offenheit der sekundären und tertiären Bildung repräsentieren. Diese Variablen werden anschließend zur Identifizierung der einzelnen Ländertypen nach Stratifikationsstufe des Bildungssystem, Offenheit und Durchlässigkeit verwendet. Des weiteren wurde mit Hilfe der logistischen Regression die Beziehung von Bildungsaspirationen und sozio-ökonomischem Status der Eltern, der gemessenen Fähigkeiten des Schülers und des Geschlechts untersucht. Es ging darum abzuschätzen, in welchem Maße die Bildungsaspirationen auf Ebene der einzelnen OECD-Staaten im Datensatz PISA 2003 (30 Staaten von insgesamt 41, die am Projekt PISA 2003 beteiligt waren) determiniert sind. Die Ergebnisse der logistischen Regression wurden anschließend als Input für die Analyse der Beziehungen zwischen Stratifizierungsstufe des Bildungssystem, Offenheit und Durchlässigkeit auf der einen und der Determinierungsstufe der Bildungsaspirationen auf der anderen Seite verwendet. Abschließend wurde eine mehrstufige Analyse der bestimm-

menden Faktoren der Bildungsaspiration auf *Individualebene* (Fähigkeiten, sozio-ökonomischer Status der Eltern, Geschlecht), auf *Kontextebene* (Einfluss der Abweichungen zwischen den Schulen) und auf *Systemebene* (Typ des Bildungssystems) durchgeführt.

Unsere Feststellungen haben frühere Analysen bestätigt, nach denen bei einem besonders stratifizierten sekundären Bildungssystem die sozio-ökonomische Herkunft des Studenten, auch unter Berücksichtigung seiner Fähigkeiten, besonders starke Auswirkungen auf seine Bildungsaspiration haben. Dies gilt sowohl für die Individual- als auch für die Schulebene. Unsere Analyseergebnisse konnten freilich die Hypothese, dass stärker stratifizierte Systeme den „Realismus“ der Schüler in Bezug auf ihre Bildungsaspirationen erhöhen, nicht bestätigen. Auf der Individualebene erweist sich der Reineffekt der Fähigkeiten als gleichmäßig zwischen den einzelnen Ländertypen, die sich durch unterschiedliche Stratifizierungsebene des Bildungssystem auszeichnen, während der Reineffekt der sozialen Herkunft auf die Aspiration sich in stratifizierteren Systemen als erheblich stärker erwies.

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The role of individual, contextual and structural factors
in the formation of educational aspirations in OECD countries

Petr Matějů, Petr Soukup, Josef Bašl

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