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'Non-Standard' Education Trajectories and Education Inequality: Do They Increase Equality? Evidence From Socialist Central and Eastern Europe

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ABSTRACT

Sociological literature offers two rather distinct interpretations of the potential role of non-standard educational careers on the overall level of education inequality. On the one hand, some scholars believe that non-standard careers promote equality because they offer a second chance to those students who dropped out earlier. Because drop-outs are heavily concentrated in the lower classes and minorities, disadvantaged students should be the primary beneficiaries of second chance education. On the other hand, other sociologists believe that entry into non-standard careers is as much contingent upon family resources as other educational transitions. Hence, non-standard careers are claimed to reinforce inequality, rather than diminish it.

This paper shows that non-standard education trajectories – represented by a non-standard sequence of educational transitions – were indeed stratified less on socioeconomic background variables than standard educational careers are. Nonetheless, the non-standard path was apparently so narrow that the students who progressed through the system following the standard path wouldn't have had a higher secondary education graduation and tertiary education entry rate had they opted for the non-standard path instead. Hence, the non-standard trajectory wasn't a rational choice for students concerned about their graduation prospects.

1 INTRODUCTION: UNDERSTANDING THE STRATIFICATION OF EDUCATIONAL TRANSITIONS

Stratification scholars have long been interested in how educational stratification changes over time and if and how it is impacted by ongoing modernization, industrialization and other changes contemporary societies are witnessing. Yet, the answers and empirical evidence they have been able to assemble depended to a larger extent on their conceptualization and measurement of educational attainment. In their groundbreaking book, Blau and Duncan (1967) measured educational attainment by years of schooling an individual had been able to obtain. They disregarded completely how and at what age one was able to secure his/her educational credential. Blau and Duncan's 'cumulative' view of education has long been considered a standard in stratification research and was widely applied to seek answers to the principal research questions of the field (e.g. Featherman, Hauser 1978; Treiman, Yip 1989). This eldest tradition of research uniformly emphasized the stability of estimated effects of socioeconomic background on educational attainment over time.

Mare (1980, 1981) extended and elaborated an earlier application of logistic regression to the study of educational progressions (Fienberg, Mason 1978). He proposed that education be viewed as a series of transitions from a lower educational level (grade, class, type of school) to another, higher one, while only individuals who completed earlier transitions are at risk of success in later transitions. Moreover, Mare systematized our understanding of how is this model related to earlier models of the highest completed grade and his estimates suggested, among other things, that the effects of socioeconomic background variables declined across successive transitions.

Mare's logistic transition model has become the most commonly and very productively applied technique for the analysis of education inequality over the last more than two decades. Using the logistic model, sociologists usually study how the relative chances of success in a given transition relate to various measures of socioeconomic background and other factors. In comparative studies, scholars have tended to make two sorts of comparisons using the Mare's model. They compared background effects across transitions within countries, and within transitions across countries and/or over time drawing important conclusions that significantly enhanced our understanding of inequality in access to schooling (see e.g. Ganzeboom, Rijken, Treiman 2003; Shavit, Blossfeld 1993; Hauser, Andrew 2005).

Recently, Breen and Jonsson (2000) proposed a multinomial extension of Mare's model. They pointed out that while Mare's model presumes unilinearity of educational trajectories, many educational systems are internally structured and contain parallel alternative paths from one level to another. Horizontal stratification within levels of schooling, particularly at the secondary level, but to some degree at tertiary level as well, is a notable feature of most educational systems in Europe – including former socialist countries examined in this paper – but some versions of tracking are also practiced in education systems elsewhere (Breen, Jonsson 2000; Gerber 2003; Gerber, Schaefer 2004; Jonsson, Erikson 2003; Lucas 1999, 2001; Kreidl 2004; Shavit, Blossfeld 1993; Shavit 1990; Shavit, Featherman 1988).

Breen and Jonsson (2000), among others, argue that a binomial logistic model with a dichotomous dependent variable is inadequate to represent educational choices in horizontally stratified educational systems. In many countries, including countries so diverse as the United States, France, Israel, and Taiwan, it has been found that educational tracks – though

differently organized and rather varied in character – are often differentially selective on both measured and unmeasured characteristic of individuals, exhibit different attrition and graduation rates, and have unique implications for students' cognitive development and their further educational and occupational careers (see e.g. Alexander, Cook, McDill 1978; Breen, Jonsson 2000; Broaded 1997; Gamoran 1992; Gamoran, Mare 1989; Heyns 1974; Hout, Garnier 1979; Kelly 2004; Morgan 2001; Shavit 1990; Shavit, Featherman 1988; Vanfossen, Jones, Spade 1987).

Clearly, the multinomial model is more adequate than the binomial transition model for some research questions and/or for some institutional contexts. Yet, some particularly thorny conceptual and methodological issues common in all non-experimental research seem to be accentuated in the context of Breen and Jonsson's multinomial transition model. Most notably, it highlights the need to explicitly handle unobserved heterogeneity in estimating and interpreting the effect of the attainment path on subsequent educational transitions (cf. Kubitschek, Hallinan 1999; Morgan 2001; see below for a fuller discussion of this issue).

The study of educational stratification is further complicated by the existence of non-standard progressions of individuals through the schooling system. There exist two substantively distinct types of non-standard paths to educational credentials. Firstly, some people break the age norms regarding education (non-standard timing, see e.g. Hauser 2002 for a review) and enroll at ages previously seen as a post-schooling life course stage, or progress through schools more slowly than was the standard previously (see also Kreidl 2005b).

Secondly, some students break the rules regarding the normative sequence of transitions (non-standard sequencing). For instance, students in systems with horizontally

stratified secondary education attend one type of secondary school (e.g. a vocational secondary school) and then yet another secondary school (e.g. an academic secondary school), before applying to enter university (see e.g. Jacob, Hillmert 2003; Kreidl 2005a). 'Non-standard' progressions through the school system seem to be on the rise and present new and/or highlight old thorny dilemmas for comparative stratification research (see below for details). While both types of non-standard careers share some common features, and therefore I consider both in the literature review below, I only investigate the latter type empirically in this paper.

This paper is organized as follows. I first summarize four theoretical explanations of the recently growing incidence of non-standard educational paths in contemporary societies (Section 2). In Section 3 I describe the education system of former socialist societies and define one particular and frequent type of a non-standard educational trajectory, which will be analyzed empirically in this paper. In Section 4 I review the literature concerning the relationship between non-standard educational trajectories and social inequality. I derive two opposing hypotheses about the impact of non-standard careers on education inequality – one stating that non-standard trajectories equalize access to schooling and another one claming that non-standard educational progressions widen inequality.

I review the implications of non-standard educational careers for comparative stratification research in Section 5 of the text. Section 6 summarizes theories and empirical evidence showing that our efforts to model statistically the effect of a non-standard attainment path on inequality in access to schooling might be significantly hampered by unobserved heterogeneity. Section 7 describes the data and the research strategy of this paper. Section 8 tests the hypotheses using multivariate statistical techniques, computer simulations,

and the propensity score matching method. In Section 9 I review the results and discuss their significance for the comparative study of social inequality.

2 THE GROWING INCIDENCE OF NON-STANDARD EDUCATIONAL CAREERS

There are four main theories explaining the burgeoning spread of non-standard educational careers in contemporary societies. First, scholars tend to position non-standard educational attainment in the larger context of proliferating life-course disorder, some emphasizing either the weakening of life course norms, others highlighting the process of economic restructuring and shifts in demand for skills that motivate people to seek further training. Second, the possibility of non-standard careers is increasingly embedded in the institutional design of the school system in order to enhance educational attainment of the disadvantaged. Third, it appears that students themselves favor non-standard careers because they might serve as an attractive risk-averse attainment strategy. Lastly, some students might favor non-standard careers because they might be the most rational status maximization strategy in their particular situation.

People increasingly often interrupt their schooling to devote more of their time to paid employment, child care, or some other activity (Bradburn, Moen, Dempster-McClain 1995; Chuang 1997; Entwisle, Alexander, Olson 2004; Rindfuss, Swicegood, Rosenfeld 1987; Upchurch, McCarthy 1990; Thomas 2001). For illustration, Manski and Wise (1983) investigated the U.S. data from the National Longitudinal Survey of the High School Class of 1972 and found that 24% of respondents returned to school after a break. Schömann and Becker (1993) document a similar and rising tendency to re-enter schooling among younger cohorts sampled in the West German Life History Survey. Analogously, the prevalence

of college enrollment in the population age 35+ has grown significantly in the United States since the 1970s (Jacobs, Stoner-Eby 1998; Tittle, Denker 1977). Furthermore, the growth of enrollment at older ages is faster then enrollment at younger ages (Corman 1983; Tittle, Denker 1997). A significant proportion of older college students are part-time students, which is a non-standard form of education in its own right, and even this proportion has been increasing since 1970 (Corman 1983).

A general individualization of life course patterns is one major force leading to the spreading de-standardization of the sequencing and timing of educational progressions. As societies modernize and progress from mechanical solidarity to developmental stages characterized by a more advanced division of labor and organic solidarity, the pattern and timing of life course events is less and less subject to normative pressures and expectations from socialization and norm-enforcing agents such as the family and the church (cf. Buchmann 1989; Hogan, Astone 1986). Two processes seem to shape this development. First, life course age norms are weaker and, second, agents are less capable of enforcing them. The idea of an ongoing erosion of life course norms and burgeoning individual choice is likewise elaborated within the framework of the second demographic transition theory (e.g. van de Kaa 1987; Lesthaege 1995) as well as by the heralds of the era of a second modernity (Beck 1992).

The rising demand for education in adulthood is often interpreted as a reaction among employees to economic restructuring, shifts in labor demand, and declining job security (e.g. Murnane, Willet, Boudett 1997). The use of new technology in the workplace (Hodson, Hooks, Rieble 1992; Kelley 1990), corporate reorganization (Salzman 1998), and global competition in production all contribute to changing patterns of job mobility, poorer career

prospects, and lower employment and earnings security and stability (Blossfeld et al. 2005; Mills, Blossfeld 2005). The restructuring process appears to influence even middle-aged and older workers (Bartel, Sicherman 1993; Couch 1998; Doeringer 1990; Gardner 1995; Hayward, Grady 1986), who were previously relatively shielded from labor market turbulence and enjoyed longer spells of employment (Belous 1990; DiPrete 1993; Elman, O'Rand 2002; Kalleberg 1996). The demand for education would, as a consequence, rise in all segments of society.

'Non-standard' educational careers are also promoted by changes in the design of the schooling system. Students increasingly proceed through the system following non-standard, previously less frequent, unknown, or even institutionally impossible trajectories. New pathways through the system were often established by the government with the aim to transform the landscape of educational stratification. For instance, the Swedish government introduced the Swedish Scholastic Assessment Test (SweSAT) in 1993 as an alternative to complete upper secondary school leaving certificate in order to open the system of tertiary education for high school dropouts. College enrollment was impossible without the secondary school leaving examination before the reform (Berggren 2005). Israel introduced similar reforms recently with the same rationale (Ayalon, Shavit 2004).

Yet another example of institutionalized possibility of a non-standard progression through the education system is the U.S. GED (General Educational Development diploma) certification. It was first established during Second World War, as an aid for veterans and service members seeking post-secondary education, but later it proliferated and today it serves as an important avenue towards the high school degree. While the nation-wide dropout rate decreased in the U.S. recently (Hauser, Simmons, Pager 2000; McMillan, Kaufman, Whitener

1994), more and more dropouts are re-entering school after an interruption. Most of them are obtaining GEDs in lieu of a regular high school degree and only a minority return to full-time education (Boesel, Alsalam, Smith 1998; Entwisle, Alexander, Olson 2004; Hauser, Simmons, Pager 2000; Maralani 2003).

Analogously, some socialist countries made an effort after 1960 to provide higher secondary education for all graduates of vocational secondary schools, who were previously formally ineligible for college entry, via an expansion of part-time, evening, and/or correspondence classes at existing or newly established educational institutions. Hence, a previously non-existing avenue towards a high school degree opened up for a significant proportion of the population.

However, some researchers suggest that people's appetite for non-standard patterns of school enrollment would grow even if the education system remained institutionally unaltered and labor market conditions did not change simply as a reaction among students to secular educational expansion at the tertiary level and uncertain graduation prospects at universities. Hillmert and Jacob (2003), for instance, document the rising tendency of German academic secondary school graduates to avoid a direct entry into university. Secondary school leavers increasingly opt for specialized vocational training first, and only after that enroll at the university level. Hillmert and Jacob report that the proportion of academic secondary school graduates who did not go directly to a university but to a vocational school first increased from 16% to 33% between 1976 and 1996. Furthermore, among college freshmen, the proportion of students with previously completed vocational training rose from 13% in 1983 to 29% in 1991. The authors maintain that this particular attainment path is a risk aversive strategy for students, who for some reason believe that, once admitted to college, they might

not be able to graduate successfully and yet they want to attempt obtaining university education (Hillmert, Jacob 2003). The rationale behind indirect entry routes into universities is that students want to be able to study at a university, but want to be able to enter the labor market immediately after dropping out, or even want to be able to study and work concurrently.

'Non-standard' attainment careers may serve as a rational attainment strategy for the disadvantaged students. Some students have to work to support themselves and/or their families and thus employment is not discretionary (Entwisle, Alexander, Olson 2000; Geronimus, Korenman 1992; Upchurch, McCarthy 1990). Yet, if they know or hope that their life situation is not permanent, they may welcome the opportunity to suspend their education without destroying their future prospect entirely. In such situations it would seem more rational to interrupt schooling and not waste resources in an effort that might be doomed from the very beginning.

3 'NON-STANDARD' EDUCATIONAL TRAJECTORIES UNDER STATE SOCIALISM

Secondary school tracking was a key feature of the education system in former socialist countries. Students leaving primary schools at the age of 14 had several different options, which I can cluster into three basic categories with profoundly distinct implications for further educational and occupational careers. Students could either (1) not attend any secondary school, or they could attend one of the following institutions. They could go to a (2) lower secondary vocational school (sometimes referred to simply as vocational schools, or as lower secondary schools) that lasted 2 or 3 years and did not enable the student to progress to the university level. Students could also attend a (3) variety of four-year

secondary schools, including various types of vocational schools, professional schools, and academic secondary schools[1], all of which terminated in a complete secondary school diploma (for a review of socialist education systems in individual countries see e.g. Matějů 1993; Szelényi, Aschaffenburg 1993; Kreidl 2004; Róbert 1991; Gerber 2003; Heyns, Bialecki 1993). Individual schools in this third track varied in terms of how much practical training and vocational preparation was provided, or how many academic, college preparatory classes were given. What fundamentally distinguished the third from the second track though, was eligibility for college enrollment. The right to apply to a university was not conferred upon vocational school graduates (Matějů 1993; Szelényi, Aschaffenburg 1993; Kreidl 2004; Róbert 1991; Gerber 2003; Heyns, Bialecki 1993).

The overall distribution of students into the basic tracks differed somewhat within cohorts across countries and within countries over time, yet there are some common trends (see Table 1). All former socialist countries expanded their education systems dramatically after World War II as is evident also from trends in enrollments at the secondary level. The percentage of students who never attended any secondary school declined, according to survey data (see below for details on the survey data used in this paper), in Bulgaria from

[1] The most important types of secondary schools in this category included vocational schools granting a complete secondary degree, professional secondary schools, and academic secondary schools. *Professional secondary schools and diploma-granting vocational schools* were oriented more towards immediate labor market entry and trained students in such diverse fields as electrical and civil engineering, administration, accounting, and agriculture, while *academic high schools* were designed to prepare students for tertiary study and represented the most natural, though not exclusive, steppingstone to university.

40% in the 1948 – 1959 cohort[2] to 15% in the 1976 – 1989 cohort, in the Czech Republic from 18% to 5%, in Hungary from 35% to 12%, in Poland from 39% to 7%, and in Slovakia from 28% to 5% (see Table 1). Comparatively, the complete secondary education sector accommodated increasing fractions of successive cohorts in each country (see Table 1). For instance, in Bulgaria the matriculation rate in complete secondary education went up from 51% to 82% from the 1948 – 1959 to the 1975 – 1989 cohort, in the Czech Republic it rose from 31% to 52%, in Hungary from 34% to 43%, in Poland from 36% to 40%, and in Slovakia from 30% to 50% (see Table 1).

Unlike the U.S. high schools (Hallinan 1996; Lucas, Good 2001), secondary schools in socialist countries witnessed very low mobility between tracks as well as low dropout rates. Overall 92% of all secondary school students graduated from the same type of secondary educational institution they first enrolled in. The graduation rate varied between 75% and 99% percent depending on cohort, country, and type of school (see Table 2). This percentage tended to be somewhat lower in Hungary and Poland, where the overall graduation rate across all cohorts varied between 84% (complete secondary education in Hungary) and 91% (vocational secondary schools in Poland), while it was higher in Bulgaria (92% in the vocational track and 91% in complete secondary education programs, see Table 2), and still higher in Slovakia and the Czech Republic, where the graduation rate exceeded 93% in all tracks (see Table 2).

The choice to pursue vocational training after the completion of elementary education was long considered a dead-end within the education system of socialist countries and was

[2] Unless explicitly specified otherwise, cohorts are based on the year of primary school (7^{th}, 8^{th} or 9^{th} grade depending on country and/or cohort) graduation throughout this paper.

believed to inevitably imply the impending termination of one's educational career (cf. Heyns, Bialecki 1993; Matějů 1993; Nieuwbeerta, Rijken 1996; Róbert 1991; Szelényi, Aschaffenburg 1993; Wong 1998). This assertion is underscored by the above-summarized data on low between track mobility. Yet, earlier investigations of detailed individual educational histories from former Czechoslovakia revealed that even this dead-end offered a way out. Approximately one in six of vocational school graduates turned out to be able to continue their educational career later in their lives at another secondary school offering complete secondary education and entitling students to university entry (Kreidl 2005a). Similar instances of secondary school re-entry are known from other Soviet bloc countries including Russia (Gerber 2003), and other former socialist countries (Róbert 1991, Kreidl 2005a)[3].

According to survey data 19% of all vocational school graduates re-entered complete secondary education at some point after graduation (see Table 3). Vocational school graduates in the Czech Republic, Hungary, Poland, and Slovakia in fact experienced startlingly high re-entry rates, which oscillated between 10% in the Czech Republic in the 1975 – 1989 cohort and 34% in Poland in the 1960 – 1974 cohort (see Table 3). The only exception to the rule is Bulgaria. It witnessed low re-entry rates, particularly in the youngest cohort, when only 3% of all apprentices re-entered some form of complete secondary education upon graduation (Table 3). Moreover, school re-entry will obviously be a phenomenon of lesser significance for social stratification in Bulgaria because only a small fraction of each cohort chose to study at vocational secondary schools and was thus at risk of re-entering complete secondary

[3] Róbert (1991) claims that non-standard educational paths were uncommon in Hungary; his claim is falsified by data reported here, though.

programs later (below 10% of each cohort enrolled in vocational programs – see Table 1). There is no perceptible trend in the re-entry rate in any country except in Bulgaria, where school re-entry became less common in the later decades of socialism (see Table 3).

Most re-entering students successfully graduated after re-enrollment. The overall graduation rate among matriculated students in all cohorts and countries was 81% (see Table 4). It varied somewhat across countries and cohorts. While in Bulgaria 100% of all re-entering students successfully graduated, only 90%, 88%, 76%, and 74% did so in the Czech Republic, Slovakia, Hungary, and Poland, respectively. The tendency to graduate seems to be declining over time. Whereas 92% of all re-entering students graduated in the 1948 – 1959 cohort, only 83% and 71% did so in the 1960 – 1974 and 1975 – 1989 cohorts, respectively. Yet, because the data studied in this paper come from a survey conducted in 1993, the graduation rate in the most recent cohort is likely to be downwardly biased due to unfinished schooling among the youngest respondents.

Some of the re-entering students were able to continue their education at the tertiary level after completion of their second secondary school. More than 12% of students who successfully graduated after secondary school re-entry were able to matriculate in a university program (see Table 5). However, the college entry rate in this group is significantly lower than among standard secondary school leavers, in which group around one in three students enrolled in college. This relationship holds across all cohorts and countries (see Table 5). Nonetheless, people obtaining secondary school diplomas in non-standard educational trajectories represented a significant proportion of all diploma holders as well as of university entrants.

The sequence of educational transitions described above (i.e. enrollment in vocational secondary education -> graduation from vocational secondary education -> enrollment in complete secondary education -> graduation from complete secondary education -> university entry) is referred to as non-standard attainment trajectory in this paper. It is contrasted and compared with the standard path which simply consists of progressions as they were studied and/or implicitly assumed in previous research (enrollment in a complete secondary program -> graduation from complete secondary education -> university entry).

Scholars investigating educational stratification under socialism have so far looked only at the highest completed level of schooling and have thus neglected the exact trajectory and timing of attainment. Therefore, secondary school re-entry among vocational school graduates has been overlooked by previous research as well. Consequently, we have remained uninformed about the social processes governing the decision of vocational school graduates to pursue further education as well as of the implications it has for social inequality. While Kreidl (2005a) provides answers to the first question, this paper focuses on a related issue: what was the impact of the possibility to proceed through the system following a non-standard path on the overall societal level of education inequality?

4 Non-standard Educational Careers and The Stratification of Educational Transitions

The consequence of a non-standard progression through the education system for education inequality is interpreted in two sharply distinct ways in the literature. Depending on the author's conceptualization of inequality, ideological background, and the socioeconomic context, it is seen alternatively as either a potentially very beneficial or

a rather harmful phenomenon. For instance Entwisle, Alexander, and Olson argue that a non-standard path to a high school equivalency diploma (the GED certificate) is beneficial for disadvantaged students in the U.S. because it allows them to "work or care for a child and concurrently achieve high school certification" (2004: 1182). Because of the life circumstances and living conditions of many disadvantaged students, work is often not discretionary, but necessary (Geronimus, Korenman 1992; Upchurch, McCarthy 1990). While they must work and contribute to the family budget (Entwisle, Alexander, Olson 2000), they may or may not continue their education. Then, having an option to obtain a credential with minimal or no coursework seems the only realistic path to attain an education.

Chaplin (1999) also shows that allowing teenagers to obtain the GED without parental consent increases the odds that they would do so. This again suggests that alternative routes to educational credentials indeed let some students escape the circumstances of their disadvantaged socioeconomic background, enhance their educational attainment, and thus contribute to the lessening of overall level of socioeconomic inequality in access to schooling.

Brinton (1993) uses a cross national comparison between Japan and the U.S. and maintains that the American 'diffuse' educational system gives students greater freedom than the Japanese system to follow unusual educational trajectories, re-enter school after a period of employment, or a withdrawal for another reason. Brinton claims that students whose educational chances were structurally constrained during childhood benefit from this model disproportionately. While one may not agree with Brinton's assertion, the argument per se seems to be theoretically plausible (cf. Rich, Kim 1999).

Astone et al. (2000) claim that they have found evidence confirming Brinton's assertion and show that school re-entry is a major opportunity to complete their training after

an interruption for urban ghetto's residents. In their sample of inner city African-Americans in Baltimore, 44% of women and 34% of men re-entered school at least once. In another study, Furstenberg, Brooks-Gun, and Morgan (1987) sampled African American teenage mothers who gave birth in Baltimore during the late 1960s and found that 56% of them re-enrolled for at least a part of an academic year later. In a more recent study Furstenberg and Weiss (1997) report that delayed educational trajectories enhanced educational attainment of a significant portion of the Baltimore teenage mothers. Between the 5th and the 16th year after the birth of their first child, 11 percent of them completed high school and another 6 percent both completed high school and enrolled in post-secondary education. Another 17% of the initial sample already possessed a high school diploma at the beginning of the follow-up period and completed some post-secondary training by the end of the observation period. In another longitudinal study, Horwitz et al. (1991) investigated educational and occupational outcomes for a sample of African American teenage mothers from New Haven first interviewed in the late 1960s and then again 20 year later, by which time 71% of the mothers had completed regular high school or obtained a GED.

A generalization derived from the theory of Maximally Maintained Inequality (MMI; see Raftery, Hout 1993) also supports the assertion that delayed transitions compensate for the initial degree of inequality. Because standard transitions are stratified on socioeconomic background variables, demand among the upper classes might be near saturated at that point already. Then it would be particularly lower class children who would take advantage of the

second chance. They would catch up with their socioeconomically advantaged peers and, as a result, education equality would increase (cf. Jacob, Hillmert 2003).[4]

A sharply contradictory interpretation of the possible effect of non-standard education in adulthood on the degree of educational stratification has become the canon among adult education specialists. They generally share what Tuijnman (1991) called the 'accumulation thesis'. It summarizes an earlier argument, put forward for the first time perhaps by Cross (1981), that participation in formal education in adulthood tends to be the highest among the best educated, while individuals with inferior initial human capital endowment participate the least.

The principle of the accumulation thesis seems to operate across generations as well. According to studies by several adult education specialists, a number of measures of parental socioeconomic status affect positively one's tendency to re-enter school in adulthood (Gorard, Rees, Fevre 1999a, 1999b). Similar evidence can also be found in some more sociologically grounded pieces of research, which employed rather detailed life course data and showed that parental socioeconomic status enhances the likelihood of school re-enrollment in a variety of rather different sociocultural contexts and historical periods (see e.g. Bradburn, Moen, Dempster-McClain 1995; Jacob, Hillmert 2003; Kreidl 2005a; Schőmann, Becker 1995).

[4] Obviously, this explanation is only valid under some circumstances. Only when is the initial distribution of students' attainments such that there are no upper class applicants left out of the system, can, other things being equal, delayed entries operate to reduce initial inequality. If, on the other hand, the demand among advantaged students is not saturated yet, then would additional entry routes most likely rather contribute to increasing inequality.

Some scholars even claim that the stratification of delayed and non-standard educational paths on socioeconomic background variables might be more salient than that of early transitions. It is argued that students as well as parents want to avoid downward intergenerational educational mobility (Davies, Heinesen, Holm 2002; Goldthorpe 1996; Breen, Goldthorpe 1997; Mare, Chang 1998). Then, especially parents with higher education or diplomas from the more prestigious secondary tracks would encourage their children to persist in their effort to be admitted to the desired type and/or level of education. This again would rather increase than decrease education inequality (cf. Jacob, Hillmert 2003).
If the accumulation thesis is true then the desired balancing-out of educational chances over the life course does not occur.

5 Implications of Non-standard Careers for Comparative Educational Stratification Research

As we have seen above, more and more people in many countries acquire their educational credentials following a non-standard attainment trajectory. At least some of the forces behind this transformation are likely to continue into the future, and, as a consequence, interrupted and non-standard educational careers are likely to gain even more importance for practical life and social sciences alike in the coming decades. As a result, the need to better understand their implications for educational stratification will become even more salient in the near future.

Can we expect that this development would, ceteris paribus, contribute to shrinking overall inequality in access to schooling, or would it, to the contrary, rather enhance inequality? Because there is, despite enormous research efforts in this area, little firmly

established knowledge about processes that govern the stratification of school re-entry, graduation rates after re-entry, and further educational paths of re-entrants (see above for details), we have a rather limited ability to make any reasonable predictions.

Yet, if it turns out that standard and non-standard paths to attainment are stratified differently, this finding would have profound implications for both trends in educational stratification and for cross-country comparisons. If, for instance, non-standard paths are as a rule less stratified and are becoming more and more prevalent, then we would, ceteris paribus, expect diminishing inequality in access to schooling over time. Similarly, if non-standard paths are less stratified in general, we would, under otherwise equal conditions, expect the level of educational inequality to be higher in a country where non-standard careers are a less common phenomenon.

Similarly, non-standard educational trajectories have implications for the degree of inequality along major stratification dimensions in society. While members of racial and ethnic minorities are over-represented among dropouts in the U.S. (e.g. Alexander, Entwisle, Horsey 1997), it is members of these traditionally disadvantaged groups – e.g. African Americans, women, etc. – who obtain GED certificates more often that whites and males (Entwisle, Alexander, Olson 2004; Maralani 2003). Then, non-standard paths might more than compensate for inequality in dropout rates and indeed shrink the attainment gap between various socioeconomic groups. Unfortunately, there has been little research addressing this issue and past analytic efforts in this area did not lead to unambiguous conclusions (see Hillmert, Jacob 2003 for an exception).

6 SELECTION, SELF-SELECTION, AND NON-STANDARD CAREERS

There is a vast literature both in sociology and economics showing that students in different parallel paths to attainment (e.g. high school tracks; regular diploma vs. GED, private vs. public schools, etc.) differ with respect to a number of socioeconomic and psychological characteristics. The processes governing the placement and/or selection of students into individual tracks might differ across tracks with some branches being more selective than other (e.g. Dauber, Alexander, Entwisle 1996; Heyns 1974; Kreidl 2004; Lucas 1999), or some paths might employ unique criteria in the selection process. For instance Kreidl (2004) shows that politically motivated interventions into high school high school admission procedures were limited only to some school types in socialist Czechoslovakia. Every track may witness different attrition rates (Gamoran, Mare 1989; Weber 1988; see also Table 2) and the social forces governing the dropout process are likely to differ across tracks as well.

Individual tracks also often differ in their curricula and/or quality of instruction. They may also vary in their implications for students' cognitive developments and academic performance (e.g. Gamoran, Mare 1989). Furthermore, track selection might be, to an unknown degree, affected by unmeasured and/or hard-to-measure individual characteristics including not only ability, motivation, and ambition, but also expected knowledge growth, anticipated graduation probabilities in each track (Cameron, Heckman 1993; Cao, Stromsdorfer, Weeks 1996; Gamoran, Mare 1989; cf. Willis, Rosen 1979), or noncognitive skills such as compliance with norms, tenacity, and trustworthiness (Heckman, Rubinstein 2001).

In standard multivariate models of educational progressions, investigators are likely to find non-zero and statistically significant estimates of the net effect of previous track placement – e.g. type of secondary school attended – on the probability of success in later transitions – e.g. college entry. Yet, it will be difficult to ascertain whether such estimates reflect track 'treatment' effects or '(self-)selection' effects only. Similarly, interaction effects between measures of socioeconomic background and previous track placement in models predicting later attainment might be hard to interpret to the extent that measured and unmeasured characteristics of students are correlated. Moreover, this correlation might exhibit a different correlation in each track.

Nonetheless, the dependence of later educational transitions on decisions made at earlier stages in one's educational career, as for instance in the models mentioned above, is of genuine interest to scholars of educational stratification. Sociologists and school administrators as well as decision- and policy-makers examine the implications of tracked educational systems and alternative pathways to attainment for, among other things, students' educational attainments at the tracked and subsequent levels of schooling. One prominent issue in those discussions is to what extent distinct educational careers increase or diminish gaps in educational opportunities and other outcomes between groups of students defined by various stratification dimensions of society such as class, gender, race, and/or ethnic background?

7 MAIN RESEARCH QUESTIONS, METHODOLOGY AND RESEARCH STRATEGY, DATA

I am addressing three related issues in this paper. I first build a series of multivariate statistical models to show whether non-standard careers are indeed less stratified on

socioeconomic background as some authors argue. I employ two types of models. I use multinomial logistic regression models, in which I distinguish the attainment paths at the secondary level (standard vs. non-standard) as two distinct categories of the dependent variable and compare the effects of socioeconomic background variables on the odds of obtaining the secondary school diploma either via the standard or the non-standard path as compared to not obtaining any secondary school diploma. Second, I also model the effect of the pathway to a high school credential on the subsequent transition – i.e. entry into university – using a binomial logistic regression model. I include a dummy variable for non-standard previous attainment among the explanatory variables and interact it with measures of the socioeconomic background.

Then document the impact of non-standard careers on inequality in the distribution of education by considering some alternative scenarios to see whether choosing a non-standard path was a rational attainment strategy from the point of view of individual students. I adopt the counterfactual approach to causality (Winship, Morgan 1999) and use computer simulations to build counterfactuals, such as:

a. What would have been the secondary school graduation rate among students from the non-standard path had they entered the standard path?

b. What would have been the college entry rate among students from the non-standard path had they entered the standard path?

c. What would have been the secondary school graduation rate among students from the standard path had they entered the non-standard path?

d. What would have been the college entry rate among students from the standard path had they entered the non-standard path?

Then I compare rates observed in the data with the simulated counterfactuals.

Finally, I document to what extent differential graduation and progression rates in non-standard education paths are attributable to the non-standard education itself ('treatment effect'), and to what extent they simply reflect (self-)selection of different types of individuals into each attainment path. I employ the propensity score matching method in this section of the paper as a diagnostic device to detect the potential confounding effect of unobserved variables. I give more details regarding methodology in the appropriate sections below.

I use the data from the 'Social Stratification in Eastern Europe after 1989' survey, which was conducted in six post-Communist countries in 1993 (see Treiman, Szelényi 1994 for details). However, I have only used data from the Czech and Slovak Republics, Hungary, Poland, and Bulgaria in this paper[5]. The educational roster of the survey contains all the information required for the dependent variables in my analysis, including a list of all schools that the respondent attended during his/her lifetime, the year attendance began and ended, and whether schooling was completed successfully, i.e. the relevant certificate was obtained.

The data set contains a total of 23,957 completed interviews. My analysis, however, includes only respondents who graduated from primary schools (7^{th}, 8^{th} or 9^{th} grade) and made the decision about post-primary schooling between 1948 and 1989. This limited the available sample to 17,942 respondents at risk of making decisions about their post-primary careers

[5] I can't use the Russian data because of a slight deviation in question wording in the education roster of the survey, which makes it impossible to distinguish complete primary and lower secondary education – a distinction crucial for my investigation.

during socialism[6]. Another seven cases, however, were lost because of missing information on respondents' gender, so all analyses reported here are based on a total of 17,935 respondents. Respondents with missing information on other explanatory variables were kept for the analysis; missing values on interval variables were substituted by the mean and a dichotomous identification variable was used to distinguish imputed values.[7]

Explanatory variables include father's and the mother's education (measured in years of school attendance) and the socio-economic status of the family of origin measured by the 'International Socio-Economic Index of Occupational Status' (ISEI, see Ganzeboom, De Graaf, and Treiman 1992) of the household head at the time the respondent was 14 years old. If the father was employed and his occupation was known, the father's occupation was used, otherwise the mother's occupation was substituted. Family size was measured by the number of siblings a respondent had. The original interval scale was topcoded so that all respondents with five or more siblings were assigned a value of 4 to minimize the influence of extreme

[6] A total of 3445 respondents never graduated from a primary school and were not analyzed. Another 2552 completed primary education before 1948 and 18 respondents did so after 1989. None of these cases was included in the analysis.

[7] Mean replacement of missing values was used for all interval variables in the analysis. For nominal variables with missing data I created a new category for all previously missing units and included it as an additional contrast on the right-hand side of each model.

values in the analysis[8]. There were 1938 respondents (6.5% of the sample) with five or more reported siblings.[9]

I used two explicit measures of family's cultural capital in some parts of the analysis. The scale measuring the reading climate in the family of origin is based on respondent's responses to five questions inquiring about the presence of a dictionary and an atlas at home at the time the respondent was 14 years old, how often parents read books and went to a library, and how many books were there at home. Participation in high culture was measured using three questions measuring how often parents went to museums, theatre performances, and how often they listened to classical music. Both scales were created similarly. I averaged all respective variables and then converted the scale to a new metric ranging from 0 to 1. I computed the value of the 'reading climate' variable for all respondents for whom data for at least three out of the five necessary variables were available. Similarly I obtained values for the 'high culture participation' variable for all respondents who answered at least

[8] Surprisingly few respondents in the analyzed data file reported more than 4 siblings – less than 9% among primary school graduates in each country/cohort subpopulation, and less than 5% among secondary school graduates.

[9] All interval variables were centered on their means. The mean value of years of schooling in the entire population (17,935 respondents) was 9.2 in the case of the father's education and 8.3 in the case of the mother's education; 867 respondents failed to state their father's education, and 434 their mother's education. The average socio-economic status of the main breadwinner was (34.6) and the ISEI was missing in 1124 cases. The average respondent had 1.96 siblings (measured on the transformed scale). The number of siblings was not reported by 373 respondents. Descriptive statistics for all explanatory variables are reported in Table 6. Descriptive statistics of the outcome variables are shown in Table 7.

two of the necessary three variables. For the remaining respondents the value of each scale was missing and was treated as all other missing data on other ratio variables.[10]

I used a dichotomous variable to distinguish between men and women (51% of the sample were women). In older cohorts I expect men to experience higher likelihood of success in all transitions, in the younger cohorts the gender gap is likely to disappear or even reverse (cf. Gerber, Hout 1996; Kreidl 2004). Furthermore, I used the parents' membership in the Communist Party as a measure of the political status of the family, which is known to be correlated with other background variables as well as with the odds of success in educational transitions (see e.g. Kreidl 2004, 2005e; Wong 1998). Because of the large number of missing responses to the question of the political status of the parents, in my analysis I differentiated between three groups of respondents: (1) those respondents who had at least one parent who was at some point a Communist Party member, (2) those respondents whose parents were never Communist Party members, and finally (3) those respondents who did not declare the political status of their parents in the survey. I used two dummy variables to contrast the first and the third group from the second. Finally, I divided the sample into three cohorts (1948 – 1959, 1960 – 1974, 1975 – 1989[11]) based on the year when respondents graduated from primary school (7^{th}, 8^{th} or 9^{th} grade depending on country and period) and used 4 dichotomous variables to control for country.

[10] There were 345 missing cases on the 'reading climate' scale and 495 missing cases on the 'high culture participation' variable.

[11] I define cohorts broadly in this paper to capture the educational expansion and some basic historical variation in the socioeconomic context.

8 RESULTS OF ANALYSES

8.1 Inequalities in the allocation of schooling in standard and non-standard educational trajectories

In the first part of the analysis I investigate socioeconomic inequality in the allocation of schooling in standard and non-standard attainment paths. I first model educational attainment at the secondary level and distinguish four possible outcomes: (1) no secondary education, (2) vocational secondary education, (3) complete secondary education in a standard trajectory, and (4) complete secondary education in a non-standard trajectory. I employ multinomial logistic regression and examine whether socioeconomic background variables influence the contrast between non-standard and standard pathways to a secondary school diploma. This multinomial logistic regression model contains three contrasts between categories of the dependent variable, but I am principally interested in the contrast between non-standard and standard trajectories. Hence, I report coefficients and standard errors for this contrast in Table 8 and I do not show the other coefficients at all.[12]

We see that every additional year of the father's education decreases, net of other factors, the log odds of choosing the standard trajectory as compared to the non-standard one by -0.05, every additional year of the mother's education by -0.09, and every additional point on the ISEI scale by -0.01. All these effects are statistically significant at the 0.01 level.

[12] Unlike later parts of the analysis, this section doesn't include cultural capital variables among the explanatory variables. While I need the best possible prediction of the outcome in the simulations, the following analysis relies on reduced-form models, which are the main analytic tool in the area of educational stratification.

Clearly, higher status children are more likely to choose the standard path rather than the non-standard one. Interestingly though, every additional sibling increases the log odds of following the standard path as compared to the non-standard path by 0.2. Again, this effect is highly statistically significant (beyond the 0.001 level – see Table 8).

Similarly, the effects of some socioeconomic background variables on the odds of entering the university seem to be significantly stronger among people who came at risk through the standard path than among those who followed the non-standard trajectory. The father's education, the mother's education, and main breadwinner's ISEI all positively and statistically significantly affect the odds of university entry among standard secondary school graduates. For instance among standard secondary school diploma holders[13], one additional year of the father's education increases, net of other factors, the log odds of college enrollment by 0.09, one additional year of the mother's education by 0.09, and one additional point on the occupational status scale by 0.02 (see Table 9). Yet, while the effect of the mother's education and main earner's ISEI do not differ significantly between standard and non-standard students, the effect of father's years of schooling is significantly weaker among non-standard students (interaction between non-standard attainment path and the father's education is -0.19, p-value < 0.001; see Table 9).[14]

[13] The population of this analysis includes all respondents who ever obtained complete secondary education – either in the standard or non-standard path – between 1948 and 1989.

[14] In fact for those in a non-standard path, one additional year of the father's education decreases the log odds of college entry by -0.096 (0.092-0.188). However, this effect itself is only marginally statistically different from zero (p-value=0.045).

Overall, this analysis seems to support the hypothesis that educational credentials are allocated in a more egalitarian fashion in non-standard educational trajectories than in standard pathways to attainment. At the secondary level, we have seen that all three socioeconomic background variables do have statistically significant effects on the contrast between standard and non-standard path to a secondary school diploma. At the tertiary level the results were a little bit less conclusive. Only one of the three socioeconomic background variables interacted statistically significantly with previous attainment path, its effect being smaller among people who came at risk of university entry through the non-standard path.

8.2 Simulation results

Now I want to show whether choosing a non-standard pathway was a rational attainment strategy. I use computer simulation techniques to model some counterfactuals and compare them to observed progression rates. First, I want to show how vocational school entrants (non-standard students, or Group A hereafter) would have fared in terms of high school graduation rate and college entry rate had they chosen the 'standard path' (i.e. had they attempted to enter a complete secondary educational institution directly). Second, I want to document the opposite counterfactuals, namely how would have standard students (i.e. those who chose complete secondary school directly; Group B hereafter) fared in terms of high school graduation rates and college entry rates had they chosen the non-standard trajectory.

Each simulation is based on the same principles. First, I estimate statistical models predicting success in each transition in the standard or non-standard path respectively based

on various measures of socioeconomic background for all students who were at risk of succeeding in that particular transition. This means that in the non-standard trajectory primary school graduates are at risk of entering either of the secondary school types (multinomial logistic regression), students who first enrolled in vocational secondary schools are at risk of graduating (binomial logistic regression), vocational school graduates are at risk of secondary school re-entry (binomial logistic regression), and re-entering students are at risk of graduating (binomial logistic regression). In the standard path, on the other hand, primary school graduates compete for placement in secondary schools (multinomial logistic regression), then they are at risk of graduating (binomial logistic regression). Upon graduation from complete secondary – either standard or non-standard – all students are at risk of matriculating in university studies (binomial logistic regression).

After estimating each model I obtain predicted probabilities of success (in case of the binomial logistic regression), or probabilities of each outcome category (when a multinomial logistic regression is employed) for all students. Furthermore, I compute the actual distribution of outcome variables at each transition (see Table 7). Information on predicted probabilities and observed distributions of students at each transition are inputs for the simulation exercise, in which I assign students to the track they in fact did not choose and let them compete with other students. I rank all students at risk according their predicted probability of success and 'let succeed' those with the highest predicted probabilities of success. Yet, I limit the number of 'successes' at each transition to the observed number of successful transitions. I repeat the simulation for each transition in the standard and non-standard path, respectively, and at each step only students who were predicted to progress from the previous level are considered for the simulation. Finally I compare actual

and simulated complete secondary education graduation rates and university entry rates in groups of standard and non-standard students.

Counterfactual 1: non-standard students in the standard trajectory

Multinomial logistic regression of first secondary school entry is reported in Table 10. The dependent variable has three categories (no secondary education, vocational, and complete secondary education), while the last category is the omitted one and the former two are contrasted with it. Not surprisingly, all socioeconomic background variables stratify the choice between secondary school types. Higher parental education and higher parental occupational status increase the odds of enrollment in complete secondary education as compared to no education or to vocational education. Furthermore, the effect of socioeconomic background is stronger for the contrast between no education and complete secondary education than for the contrast between vocational and complete secondary education.

At step 1, there were 17,935 primary school graduates at risk of entering either of the secondary school tracks in our sample. Of those only 14,777 ever began studying at any secondary school: 6,809 (38%) at a vocational school and 7,968 (44%) at a school offering complete secondary education (see Table 7). I ranked those 14,777 students by their predicted probability of entry into a complete secondary school and then let 7,968 of them with the highest predicted probability enter the upper secondary track. Table 11 shows the distribution of simulated entry by groups of students defined by the school choice. In Group A (vocational school students), 31% students were predicted to enter the complete secondary track directly even in competition with students who actually chose it. In Group B (complete secondary school students), 74% of students were predicted to enter this track in my simulation. This

indicates that a substantial fraction of students never applied and competed for admission to the better schools even though they had a realistic chance of being successful.

At step 2, I used 7,968 students who were predicted to enter the upper secondary track at step 1 (2,074 from Group A and 5,894 from Group B), ranked them by predicted probabilities from a binomial logistic regression model of complete secondary school graduation[15] (coefficients and standard error of this model are reported in Table 12). In reality, 7,216 students were able to graduate from complete secondary education once they enrolled. Thus, I let this exact number of students graduate based on the predicted probabilities from the model in Table 12. Of the 2,074 students at risk from Group A, 1,832 (88.3%) are predicted to graduate in this simulation. Of the 5,894 students at risk from Group B, 5,384 (91.4%) are predicted to graduate successfully (see Table 13). From steps 1 and 2 in this simulation we can clearly see that the real obstacle in the standard path was the admission to complete secondary schools, while once students were admitted, differences in the graduation rate by socioeconomic status were virtually nonexistent and essentially everybody was able to graduate.

A total of 8,192 students ever graduated from complete secondary education and were thus at risk of entering university: 7,216 came at risk via the standard path, and another 976 via the non-standard path (see Table 7). I considered all 8,192 students as competing for tertiary admission and estimated a binomial logistic regression model for the entire group (see Table 14). At step 3 of the simulation, I used predicted probabilities from this model to rank all 7,216 students who were simulated to come at risk through the standard path (see Tables 11, 13) and 'admit' 2,425 of them to college (33.6%, see Table 7). Table 15 then documents

[15] This model was estimated on the sample of 7,968 students who really studied in this track.

the simulated college entry among students at risk divided by the initial secondary school choice. Whereas in Group A (non-standard students), 442 individuals (24.1% of the 1,832 students at risk, see Table 15) would enter university according to the simulation, in Group B 2,103 (39.1% of the 5,384 at risk) students should matriculate in a university.

Obviously, non-standard students were less successful than standard students at each transition in the standard educational trajectory. Yet, this is not the crucial comparison we want to make. What we really want to see is a comparison of real and simulated secondary school graduation and college entry rate in the group of non-standard students. It is only this comparison that shows which of the attainment strategies would have been more rational for students. Table 16 summarizes the comparison succinctly. In reality, only 976 (14.3%) of 6,809 students entering the vocational track ever achieved a complete secondary school diploma. My simulations predict that had those students chosen the standard path through the education system, 26.9% of them – almost twice as many – would have accomplished this! Clearly, *the non-standard educational trajectory was not a rational way to obtain a complete secondary certification.* Similarly, whereas only 120 (1.8%) of the 6,809 students from the vocational track ever entered university, my simulations predict that 422 (6.5%) would have entered university had they decided to progress through the education system in a standard manner. As in the previous instance, *the non-standard trajectory was not an efficient pathway to matriculate in a university.*

Counterfactual 2: standard students in the non-standard trajectory

This simulation also beings with the multinomial logistic regression of the first secondary school placement at step 1 (Table 10). However, this time I simulate entry into the vocational track. Again, I consider all 14,777 students who ever enrolled in any secondary

school to be competing for the 6,809 places in the vocational track. As before, I ranked all students by their predicted probability of entering the vocational track and the 'admitted' exactly 6,809 of them. The distribution of simulated entry by real school choice is shown in Table 17. Overall, 4,699 (69%) of 6,809 students who really enrolled in vocational secondary programs were predicted to do so based on the simulations, and 2,110 (26.5%) of 7,968 students from the complete secondary track were in fact predicted to enroll in a vocational program.

At step 2 I employ predicted probabilities from a binary logit model of successful graduation from vocational secondary school conditional upon enrollment in it. Estimated coefficients and standard errors of this model are shown in Table 18. Parameters of the model were estimated on the entire population of real vocational school students. Then, I ranked all students who at step 1 were predicted to enroll in a vocational school by predicted probability from this binary logit model. Because in reality 6,305 (92.6%) of 6,809 students in the vocational track successfully graduated (see Table 7), I also let 6,305 students graduate in the simulation. The distribution of simulated graduation in groups defined by real school choice is reported in Table 19. Of the 4,699 students from Group A (vocational school students) at risk, 4,302 (91.6%) were predicted to graduate, while of the 2,110 students from Group B (complete secondary school students) at risk 2,003 (94.9%) were predicted to graduate (see Table 19). Clearly, once admitted students in both groups fare fairly similarly.

I repeat the same procedure at step 3 using parameters of the estimated binomial logistic regression model of school re-entry after completion of vocational training (model reported in Table 20), and then again at step 4 using parameters from a binomial regression model predicting successful graduation from complete secondary education conditional upon

re-entry into it (model reported in Table 22). At step 3 I let 1,198 apprentices re-enter secondary education. The distribution of simulated re-entry in Groups A and B is shown in Table 21. Simulated re-entry rates are 17.6% among students from Group A at risk and 21.9% among students from Group B at risk (see Table 21). At step 4 I let 976 re-entering students complete their secondary education successfully. In Group A 606 students (79.8% of students at risk in this group) would graduate based on the simulation, while in Group B 370 students (84.3%) would do so (see Table 23). As in the previous steps of this simulation there is little difference between Group A and Group B.

As the last step in this simulation I use parameters from a binary logit model of university entry estimated earlier (see Table 14) to simulate university entry among students who were in previous simulations predicted to obtain their high school credentials in a non-standard manner. The real college entry rate in the non-standard path was 12.3% (120 of the 976 students at risk in the data file, see Table 7). Of the 606 students from Group A (vocational school students) at risk, 60 (9.9%) would, based on this simulation, enroll at the university level, whereas of the 370 students from Group B (complete secondary school students) at risk, also 60 (16.2%) students would do so (see Table 24).

Overall, we have seen that non-standard students appeared to be less successful than their standard counterparts in all but the first transition. Yet, the key comparison is the real and simulated secondary education graduation rate and college entry among standard students. We can se in Table 25 that there is a noteworthy difference between the two sets of rates. While 90.6% of students in the standard path completed upper secondary education, my simulations suggest that only 4.6% of them would have obtained the upper secondary credential had they enrolled in a vocational school first. Similarly, almost one third (30.4%)

of standard students in reality entered tertiary education. My simulation indicates that only 0.8% of them would have proceeded this far in the education system had they opted for the non-standard path at the age of 14, when they made decisions about secondary school attendance. I conclude that *the non-standard path wouldn't have been a more efficient attainment strategy for the standard students.*

We have also observed that the most significant difference between the two groups of students was at the first hurdle – entry into secondary education – while they were fairly similar in the careers afterwards. Nonetheless, even after students entered secondary education, there were relatively smaller differences in the success rates between Groups A (vocational school students) and B (complete secondary school students) in their progression rates and these seem to cumulate over the entire career. This finding documents the importance of the secondary school placement for the entire subsequent educational career in former socialist nations. Students who chose the right path at this juncture had significantly better educational prospect than students who strayed from the direct path to the secondary education diploma. Interestingly, though, many students apparently underestimated their true chances of being successful in the competition for entry into the more prestigious secondary schools, never applied, and then faced severely limited option of upward educational mobility.

8.3 Propensity score matching

We have observed significant differences in secondary school graduation rates and college entry rates between groups of students defined by their choice of first secondary school. Students, who chose vocational secondary schools, graduated and then re-entered

another secondary school to obtain the complete secondary education certificate, had noticeably lower chances of progressing to the university level. This, some might argue, suggests that the system of adult education and evening classes was of poor quality that did not guarantee sufficient preparation for study at the tertiary level.

These results may be, as is often the case in non-experimental studies, biased by unobserved heterogeneity. Hence, it might be hard to conclude that the above reported differences in educational attainment in standard and non-standard paths represent a 'treatment' effect of the non-standard trajectory rather than a '(self-) selection' effect. Most sociologists tend to rely on the method of covariance adjustment (e.g. multiple regression) when trying to isolate the effect of one factor ('treatment'; here non-standard progression through the schooling system toward a complete secondary school certification) net of an array of potentially confounding variables, which are correlated with both assignment to treatment (see above for evidence showing non-random assignment to treatment) and the outcome variable (here – enrollment in college). Matching is yet another methodology that can be used productively for similar tasks. Matching often produces more efficient standard errors for the treatment effect (Smith 1997) and diminishes bias due to covariate imbalance between treatment and control groups (Rubin 1973). Matching on propensity scores is perhaps the most frequently employed matching strategy in contemporary social science (see e.g. Smith 1997).

Matching also provides a better estimate of the treatment effect and might be also used to check for the presence of unobserved heterogeneity (for an application in stratification research see e.g. Kurlaender 2004). The use of propensity score matching is recommended as a diagnostic device even if there may be important unobserved variables, for which the

method cannot account (Dehajia, Wahba 1999: 1062). Moreover, some scholars recommend the use of matching in order to bring the analysis to focus more narrowly on specific quantities of theoretical and practical interest (Morgan 2001).

I perform propensity score matching as implemented by the 'psmatch2' procedure in Stata (see Leuven, Sianesi 2003). This command by default uses a probit model to estimate the propensity score and one-to-one nearest neighbor matching with replacement to estimate the average treatment effect for the treated and the average treatment effect for the untreated. It is the former quantity, which compares the outcome for members of the treatment group with their matched controls, that is of most interest for us as. It is conceptually infeasible to assume that all untreated individuals could have followed the less frequent non-standard path and that this attainment path would have retained its characteristics under such circumstances. On the other hand, it is quite justifiable to assume the former counterfactual, namely that the treated individuals would have followed the standard path to educational credentials (cf. Morgan 2001).

I report parameters of the probit model predicting assignment to treatment in Table 26. Effects shown in this table are consistent with previous models reported in this paper, with other scholars' work, and with theoretically grounded expectations. Furthermore, they document that assignment to treatment (to a non-standard career) is indeed strongly determined by socioeconomic background variables (mother's education, father's education, parental occupational status etc.), which are known to also determine the outcome, i.e. the odds of university entry. Therefore, the use of the matching procedure is warranted.

The unmatched difference between college entry rates among standard and non-standard complete secondary school graduates is, as we have already seen and as is again shown in Table 27, 21.3 percentage points. While only 12.3% of students, who obtained their complete secondary school credential through the non-standard path, ever entered college, among the standard high school graduates 33.6% did so. Interestingly, most of this difference persists when we look at matched results. Based on the matching counterfactual simulation, 30.4% of the students in the non-standard path would have entered college had they followed the standard path (2nd row in Table 27), which implies an average treatment effect of 18.1 percentage points. Thus, matching reduces the original difference of 21.3 percentage points only very slightly to 18.1 percentage points. This is not a major reduction and the result suggests that the gap in college entry rates between standard and non-standard students is rather a treatment than a (self-)selection effect. We have seen that even if we limit our comparison of the odds of college entry only to 'standard' students who have been paired to 'non-standard' students based on the similarity of their propensity – as estimated from the probit model above – to enter the non-standard path, most of the difference between university entry rates between the two groups persists.

One may now only hypothesize about the exact mechanisms through which this treatment effect might be produced. Suitable theories might operate with differential quality of instruction in standard and non-standard paths, more labor market oriented training in adult education programs, as well as with classroom group effects and other factors. Clearly, there are many unresolved issues worth exploring in this area.

9 CONCLUSIONS AND DISCUSSION

I have identified one noteworthy example of a non-standard progression through the system of educational institutions in former socialist countries, namely the route that led graduates from lower secondary (vocational) schools to re-enter other secondary schools, obtain complete secondary education credentials necessary for university entry, and enter university. I have shown empirically that this particular non-standard pathway to educational credentials was rather frequent in former socialist countries, and have argued that it goes against assumptions embedded in earlier studies of educational stratification under socialism. Therefore, my paper extends earlier research by pointing out the need to study detailed educational careers rather than only the highest degree completed.

Furthermore, I considered several issues related to the existence of non-standard educational trajectories for educational stratification. First, I have shown that the choice between the standard and the non-standard educational pathway was strongly determined by some socioeconomic background variables such as the father's education, the mother's education, the main breadwinner's occupational status. We have seen that higher status children were less likely to enter the non-standard path than lower status children. Similarly, we have found some empirical evidence that the effect of father's education on the odds of entering the university was weaker among students who came at risk through the non-standard path than among students who followed the standard trajectory.

This finding sheds new light on many issues in comparative educational stratification research. For instance, because the incidence of non-standard careers is known to vary within countries over cohorts and within cohorts across countries, we are likely to get biased

conclusions regarding trends in inequality and/or cross-national difference in inequality if we fail to explicitly incorporate the distinction between standard and non-standard trajectories into our study design.[16]

Second, despite the weaker background effects in non-standard transition, choosing the non-standard path doesn't appear as a rational attainment strategy for those students who wanted to maximize their odds of completing upper secondary education and/or enter college. Students who actually followed the standard path would have faced a less competitive environment and would have been exposed to perhaps less intelligent and/or less motivated classmates in the non-standard path and thus should have faced better graduation prospects. Nonetheless, the non-standard path to educational credentials seems to be too narrow for this advantage to play out significantly. Similarly, students who actually followed the non-standard path would have been better off in the standard one, because their relatively disadvantaged socioeconomic background would have been more then fully compensated by the overall greater numbers of successfully graduating students. Hence, non-standard educational careers provided an attainment avenue for the disadvantaged students, but this avenue was much narrower than the standard one and was able to accommodate the demand for only a relatively small fraction of students.

I have also provided some evidence that lower odds of entering college in the non-standard path were a 'treatment' rather than a '(self-)selection' effect. This finding suggests that there was something about the functioning of the 'second chance in education' that

[16] Note that this is different from saying that the stratification principles governing the selection into and progressions through the non-standard career are different over time and across nations. If this was the case, my analysis shouldn't rely on country and/or period fixed effects.

reduced subsequent attainment of its graduates. Without a more detailed investigation of the curricula, the organization of, and interaction in those types of educational institutions one can only speculate what exact mechanisms stood behind this 'treatment' effect. Yet, this finding has significant policy implications. While every dollar spent on institutions providing education of the 'second chance' might contribute to socioeconomic equality among students, it seems that it is not a very efficiently spent dollar. Evidence from former socialist countries presented in this paper suggests that spending the same dollar on the expansion of standard secondary education would most likely result in more people obtaining secondary school diplomas. Yet, those diploma holders would be, on average, recruited from higher strata of society than students gaining diplomas in the non-standard path. Then, the criteria of equality and efficiency appear to be in a contradiction.

There are some issues that this paper did not explore due to space limitations, but which, nonetheless, merit our attention. First, I have studied only one type of non-standard careers specific of one education system, while there might exist other types of non-standard educational trajectories within the same system and/or other institutional contexts. Second, I haven't looked closely into the potentially variable effect of non-standard careers across cohorts. Yet, it seems reasonable to argue that it might be different in cohorts when it was less frequent and in cohorts when it was more dominant. Third, the dearth of data makes it virtually impossible to study individual countries in more detail. Nevertheless, one can foresee an array of hypotheses about the effects of political regimes, policy changes, and institutional contexts upon the standard vs. non-standard dichotomy, which would certainly be worth studying. Unfortunately, such an enterprise won't be feasible until more data similar to the Treiman and Szelényi (1994) study become available.

10 TABLES AND FIGURES

Table 1: Percentage distribution of first secondary school attended by country and cohort of primary school graduation, former socialist countries, 1948 – 1989. Number of cases at risk for each cohort/country combination in parentheses. Total N= 17,935.

	Cohort			
Bulgaria	1948-1959	1960-1974	1976-1989	Total
None	40%	21%	15%	24%
Vocational secondary educ.	10%	8%	3%	7%
Complete secondary education	51%	71%	82%	69%
Total	101% (935)	100% (1,361)	100% (978)	100% (3,274)
Czech Republic				
None	18%	11%	5%	12%
Vocational secondary educ.	51%	54%	43%	50%
Complete secondary education	31%	35%	52%	38%
Total	100% (1,321)	100% (1,879)	100% (1,139)	100% (4,339)
Hungary				
None	35%	21%	12%	21%
Vocational secondary educ.	33%	41%	44%	40%
Complete secondary education	34%	39%	43%	39%
Total	101% (830)	101% (1,496)	100% (1,108)	100% (3,434)
Poland				
None	39%	17%	7%	19%
Vocational secondary educ.	25%	47%	53%	44%
Complete secondary education	36%	36%	40%	37%
Total	100% (759)	100% (1,260)	100% (1,029)	100% (3,048)
Slovakia				
None	28%	13%	5%	14%
Vocational secondary educ.	42%	45%	45%	44%
Complete secondary education	30%	42%	50%	42%
Total	100% (861)	100% (1,774)	100% (1,205)	100% (3,840)

Table 2: Secondary school graduation rates by type of secondary school, country, and cohort, former socialist countries, 1948 – 1989. Number of cases at risk in parentheses.

	Cohort			
	1948-1959	1960-1974	1975-1989	Total
Bulgaria				
Vocational secondary educ.	96% (90)	91% (107)	88% (34)	92% (231)
Complete secondary education	85% (473)	92% (973)	93% (755)	91% (2,248)
Czech Republic				
Vocational secondary educ.	96% (668)	98% (1,018)	94% (494)	95% (2,180)
Complete secondary education	93% (409)	95% (651)	96% (591)	95% (1,651)
Hungary				
Vocational secondary educ.	93% (271)	89% (606)	86% (491)	89% (1,368)
Complete secondary education	81% (270)	85% (579)	84% (480)	84% (1,329)
Poland				
Vocational secondary educ.	87% (191)	92% (594)	90% (545)	91% (1,330)
Complete secondary education	75% (275)	86% (449)	90% (410)	85% (1,134)
Slovakia				
Vocational secondary educ.	94% (359)	94% (801)	95% (540)	94% (1,700)
Complete secondary education	87% (262)	94% (739)	99% (605)	95% (1,606)

Note: rates refer to each individual's first enrollment at secondary level, cohorts are based on year of graduation from primary education (7^{th}, 8^{th} or 9^{th} grade) as in the previous table.

Table 3: Secondary school re-entry rates among vocational school graduates by country and cohort, former socialist countries, 1948 – 1989. Number of cases at risk in parentheses.

	Cohort			
	1948-1959	1960-1974	1975-1989	Total
Bulgaria	12% (86)	18% (97)	3% (30)	13% (213)
Czech Republic	13% (643)	15% (965)	10% (459)	13% (2,067)
Hungary	24% (253)	25% (538)	17% (422)	22% (1,213)
Poland	28% (166)	34% (549)	29% (492)	31% (1,207)
Slovakia	17% (338)	16% (755)	14% (512)	16% (1,605)
Total	17% (1,486)	21% (2,904)	17% (1,915)	19% (6,305)

Notes: only enrollment in a complete secondary program is included, cohorts are based on year of graduation from primary education (7^{th}, 8^{th} or 9^{th} grade) as in previous tables.

Table is based on interviews conducted in 1993, so particularly rates for the most recent cohort are likely to be downwardly biased due to unfinished schooling in the youngest cohort.

Table 4: Graduation rates after re-entry into complete secondary schools among vocational school graduates by country and cohort, former socialist countries, 1948 – 1989. Number of cases at risk in parentheses.

	Cohort			
	1948-1959	1960-1974	1975-1989	Total
Bulgaria	100% (10)	100% (17)	100% (1)	100% (28)
Czech Republic	93% (85)	89% (148)	86% (44)	90% (277)
Hungary	92% (60)	79% (136)	55% (71)	76% (267)
Poland	87% (46)	75% (186)	68% (145)	74% (377)
Slovakia	95% (57)	88% (118)	82% (74)	88% (249)
Total	92% (258)	83% (605)	71% (335)	81% (1,198)

Note: graduation rates for complete secondary programs after school re-entry, cohorts are based on year of graduation from primary education (7^{th}, 8^{th} or 9^{th} grade) as in previous tables.

Table is based on interviews conducted in 1993, so particularly rates for the most recent cohort are likely to be downwardly biased due to unfinished schooling in the youngest cohort.

Table 5: University entry rates among complete secondary school diploma holders by country, cohort, and attainment path, former socialist countries, 1948 – 1989. Number of cases at risk in parentheses.

A. Obtained diplomas following a standard trajectory

	Cohort			
	1948-1959	1960-1974	1975-1989	Total
Bulgaria	33.9% (404)	32.1% (892)	26.7% (745)	30.5% (2,041)
Czech Republic	32.2% (382)	37.2% (619)	32.9% (569)	34.4% (1,570)
Hungary	44.3% (219)	39.4% (495)	36.8% (405)	39.4% (1,119)
Poland	40.1% (207)	32.7% (388)	32.1% (371)	34.1% (966)
Slovakia	35.1% (228)	34.2% (696)	29.4% (596)	32.4% (1,520)
Total	36.1% (1,440)	34.8% (3,090)	30.9% (2,686)	33.6% (7,216)

B. Obtained diplomas following a non-standard trajectory

	Cohort			
	1948-1959	1960-1974	1975-1989	Total
Bulgaria	10.0% (10)	0% (17)	0% (1)	3.6% (28)
Czech Republic	24.1% (79)	10.6% (132)	5.3% (38)	14.1% (249)
Hungary	23.6% (55)	14.8% (108)	10.3% (39)	16.3% (202)
Poland	25.0% (40)	5.7% (140)	8.2% (98)	9.4% (278)
Slovakia	22.2% (54)	8.7% (104)	6.6% (61)	11.4% (219)
Total	23.1% (238)	9.4% (501)	7.6% (237)	12.3% (976)

Note: graduation rates for complete secondary programs after school re-entry, cohorts are based on year of graduation from primary education (7^{th}, 8^{th} or 9^{th} grade) as in previous tables.

Table is based on interviews conducted in 1993, so particularly rates for the most recent cohort are likely to be downwardly biased due to unfinished schooling in the youngest cohort.

Table 6: Means and standard deviations (in parentheses) of explanatory variables used in analysis.

Variable	Country					Total
	Bulgaria	Czech Republic	Hungary	Poland	Slovakia	
Male	0.48	0.46	0.49	0.49	0.51	0.49
Father's Education	7.38 (4.24)	10.85 (2.55)	8.85 (3.58)	8.69 (3.42)	9.73 (2.72)	9.23 (3.50)
Father's Education missing	0.05	0.05	0.02	0.07	0.05	0.05
Mother's Education	6.72 (4.23)	9.59 (2.25)	7.72 (3.12)	7.97 (3.35)	8.80 (2.27)	8.26 (3.22)
Mother's Education missing	0.03	0.03	0.01	0.03	0.02	0.02
ISEI – main breadwinner	32.67 (14.42)	37.49 (14.42)	34.23 (14.48)	32.71 (13.06)	34.55 (13.77)	34.57 (14.18)
ISEI – missing	0.10	0.04	0.05	0.05	0.07	0.06
Number of siblings	1.55 (1.15)	1.70 (1.17)	1.90 (1.31)	2.33 (1.27)	2.33 (1.27)	1.96 (1.28)
Number of siblings – missing	0.05	0.01	0.03	0.02	0.01	0.02
Parents – CP members	0.23	0.30	0.19	0.19	0.18	0.22
Parents – CP membership missing	0.07	0.09	0.06	0.09	0.08	0.08

Table 6 – continued.

Reading climate	0.39 (0.23)	0.55 (0.19)	0.46 (0.22)	0.41 (0.20)	0.48 (0.19)	0.46 (0.22)
Reading climate missing	0.04	0.02	0.01	0.01	0.02	0.02
High culture participation	0.11 (0.16)	0.18 (0.18)	0.12 (0.17)	0.09 (0.14)	0.11 (0.15)	0.12 (0.17)
High culture participation missing	0.04	0.03	0.01	0.01	0.03	0.03
Cohort 1948 – 1959	0.29	0.30	0.24	0.25	0.22	0.26
Cohort 1960 – 1974	0.42	0.43	0.44	0.41	0.46	0.43
Cohort 1975 – 1989	0.30	0.26	0.32	0.34	0.31	0.30
Number of cases	3,274	4,339	3,434	3,048	3,840	17,935

Notes:

1. Standard deviations are not shown for dichotomous variables, because in that case is standard deviation simply a function of the mean.

2. All values are rounded to two decimal places. 3. Interval variables were centered on the mean before analysis. 4. Means and standard deviations were computed before substitution for missing values. 5. Variables 'reading climate' and 'high culture participation' are described in the text in detail.

Table 7: Percentage distribution of students at each transition conditional on completion of the previous level, Central and Eastern Europe, 1948 – 1989.

Transition	Rate	Number of cases at risk
Entry into secondary education (first choice)		
None	17.6%	17,935
Vocational	38.0%	17,935
Complete Secondary	44.4%	17,935
Graduation rates in secondary tracks (after first enrollment)		
Vocational	92.6%	6,809
Complete Secondary	90.6%	7,968
Re-entry rate after vocational training	19.0%	6,305
Graduation rate after re-entry	81.5%	1,198
College entry rate		
After a standard path to eligibility	33.6%	7,216
After a non-standard path to eligibility	12.3%	976

Note: only students at risk, i.e. those who successfully completed the previous level, are considered.

Table 8: Estimated coefficients and standard errors (in parentheses) predicting the non-standard pathway (as compared to a standard one) to complete secondary education in a multinomial logistic regression model of the type of secondary education attained. Central and Eastern Europe, 1948 – 1989. N= 17,935.

	Estimated coefficient	Standard error
Male	0.994	0.073
Father's education	-0.050	0.016
Father's education – missing	0.132	0.200
Mother's education	-0.092	0.017
Mother's education – missing	-0.143	0.296
Main breadwinner's ISEI	-0.011	0.003
Main breadwinner's ISEI – missing	-0.246	0.184
Number of siblings	0.213	0.031
Number of siblings – missing	0.358	0.255
Parents CP members	-0.123	0.088
Parents CP members – missing	0.160	0.137
Bulgaria	-2.590	0.212
Czech Republic	0.464	0.105
Hungary	0.293	0.110
Poland	0.682	0.103
Cohort 1948 – 1960	0.240	0.107
Cohort 1961 – 1975	0.382	0.089
Constant	-2.604	0.111

Note: the dependent variable – type of secondary education obtained – had four possible outcomes: no secondary education, vocational secondary education, complete secondary education obtained in a standard path, and complete secondary education obtained in a non-standard path. The table shows only the contrast between the two latter categories.

Table 9: Estimated coefficients and standard errors (in parentheses) for a binomial logistic regression model of entry into university on attainment path, other covariates, and interactions. Central and Eastern Europe, 1948 – 1989. N= 8,192.

	Estimated coefficient	Standard error
Male	0.462	0.052
Father's education	0.092	0.012
Father's education – missing	-0.433	0.171
Mother's education	0.090	0.012
Mother's education – missing	-0.044	0.240
Main breadwinner's ISEI	0.017	0.002
Main breadwinner's ISEI – missing	0.247	0.117
Number of siblings	-0.104	0.026
Number of siblings – missing	-0.717	0.216
Parents CP members	0.128	0.058
Parents CP members – missing	-0.047	0.111
Bulgaria	0.159	0.081
Czech Republic	-0.245	0.080
Hungary	0.319	0.086
Poland	0.132	0.089
Cohort 1948 – 1960	0.889	0.077
Cohort 1961 – 1975	0.453	0.061
'Non-standard' path	-1.094	0.108
Interactions		
'Non-standard' path * father's education	-0.188	0.049
'Non-standard' path * mother's education	0.060	0.048
'Non-standard' path * ISEI	-0.009	0.009
Constant	-1.746	0.079

Table 10: Estimated coefficients and standard errors (in parentheses) of a multinomial logistic regression model of secondary school choice conditional on primary school graduation, Central and Eastern Europe 1948 – 1989. N= 17,935.

	No secondary education	Vocational education
Male	-0.186	0.861
	(0.051)	(0.038)
Father's education	-0.110	-0.036
	(0.011	(0.009)
Father's education – missing	0.661	0.372
	(0.119)	(0.104)
Mother's education	-0.124	-0.082
	(0.012)	(0.010)
Mother's education – missing	0.505	0.162
	(0.157)	(0.145)
Main breadwinner's ISEI	-0.023	-0.023
	(0.003)	(0.002)
Main breadwinner's ISEI – missing	0.343	0.068
	(0.0991)	(0.089)
Number of siblings	0.331	0.196
	(0.021)	(0.017)
Number of siblings – missing	0.083	0.147
	(0.160)	(0.147)
Parents CP members	-0.287	-0.137
	(0.071)	(0.047)
Parents CP members – missing	0.151	0.071
	(0.095)	(0.076)
High culture participation	-0.608	-1.152
	(0.256)	(0.150)
High culture participation – missing	-0.602	-0.228
	(0.179)	(0.143)
Family reading climate	-4.126	-1.417
	(0.173)	(0.129)
Family reading climate – missing	0.943	0.362
	(0.190)	(0.182)
Bulgaria	-1.035	-2.834
	(0.088)	(0.088)
Czech Republic	0.834	0.829
	(0.083)	(0.055)
Hungary	0.437	0.042
	(0.081)	(0.059)
Poland	-0.034	-0.072
	(0.083)	(0.059)
Cohort 1948 – 1960	0.547	-0.412
	(0.073)	(0.056)
Cohort 1961 – 1975	0.249	-0.122
	(0.069)	(0.046)
Constant	0.330	0.617
	(0.108)	(0.080)

Table 11: Percentage distribution of simulated direct enrollment in complete secondary education in groups defined by type of first secondary school attended, Central and Eastern Europe, 1948 – 1989.

Real secondary school enrollment	Percent predicted to enroll based on simulations	Number of cases at risk
Vocational secondary education	30.5%	6,809
Complete secondary education	74.0%	7,968
Total	53,9%	14,777

Note: predicted probabilities were based on a multinomial logistic regression model (see Table 10). Only students who ever enrolled in some secondary education were considered for the simulation.

Table 12: Estimated coefficients and standard errors of a binomial logistic regression model predicting graduation from complete secondary education conditional on entry into it, Central and Eastern Europe 1948 – 1989. N= 7,968.

	Coefficient	Standard error
Male	-0.010	0.081
Father's education	0.008	0.017
Father's education – missing	-0.243	0.213
Mother's education	0.075	0.017
Mother's education – missing	-0.259	0.292
Main breadwinner's ISEI	0.000	0.003
Main breadwinner's ISEI – missing	-0.273	0.157
Number of siblings	-0.107	0.035
Number of siblings – missing	0.061	0.249
Parents CP members	-0.086	0.094
Parents CP members – missing	0.107	0.172
High culture participation	-0.565	0.299
High culture participation – missing	0.078	0.284
Family reading climate	1.526	0.269
Family reading climate – missing	-0.520	0.317
Bulgaria	-0.244	0.144
Czech Republic	-0.084	0.164
Hungary	-1.224	0.139
Poland	-0.972	0.142
Cohort 1948 – 1960	-0.395	0.111
Cohort 1961 – 1975	-0.018	0.100
Constant	2.214	0.184

Table 13: Percentage distribution of simulated graduation from complete secondary school in groups defined by type of first secondary school attended, Central and Eastern Europe, 1948 – 1989.

First secondary school enrollment	Percent predicted to graduate based on simulations	Number of cases at risk
Vocational secondary education	88.3%	2,074
Complete secondary education	91.4%	5,894
Total	90.6%	7,968

Note: predicted probabilities were based on a binomial logistic regression model (see Table 12). Only students who were predicted to enroll in complete secondary programs in a previous simulation (see Table 11) were considered for this simulation.

Table 14: Estimated coefficients and standard errors of a binomial logistic regression model predicting university entry conditional on graduation from complete secondary education, Central and Eastern Europe 1948 – 1989. N= 8,192.

	Coefficient	Standard error
Male	0.389	0.052
Father's education	0.063	0.011
Father's education – missing	-0.476	0.173
Mother's education	0.073	0.012
Mother's education – missing	-0.053	0.243
Main breadwinner's ISEI	0.014	0.002
Main breadwinner's ISEI – missing	0.227	0.118
Number of siblings	-0.115	0.026
Number of siblings – missing	-0.721	0.216
Parents CP members	0.106	0.058
Parents CP members – missing	-0.049	0.111
High culture participation	0.503	0.174
High culture participation – missing	0.049	0.189
Family reading climate	1.352	0.182
Family reading climate – missing	-0.022	0.257
Bulgaria	0.294	0.082
Czech Republic	-0.367	0.080
Hungary	0.219	0.085
Poland	0.093	0.088
Cohort 1948 – 1960	0.862	0.077
Cohort 1961 – 1975	0.407	0.061
Constant	-2.550	0.121

Table 15: Percentage distribution of simulated university entry in groups defined by type of first secondary school attended, Central and Eastern Europe, 1948 – 1989.

First secondary school enrollment	Percent predicted to enter university based on simulations	Number of cases at risk
Vocational secondary education	24.1%	1,832
Complete secondary education	39.1%	5,384
Total	35.3%	7,216

Note: predicted probabilities were based on a binomial logistic regression model (see Table 14). Only students who were predicted to graduate from a complete secondary program in a previous simulation (see Table 13) were considered for this simulation.

Table 16: Comparison of actual and simulated high school graduation and college entry rates among students who first enrolled in a vocational program, Central and Eastern Europe, 1948 – 1989. Number of cases= 6,809.

	Actual rate in a non-standard path	Simulated rate in a standard path
Graduation from complete secondary education	14.3%	26.9%
College entry	1.8%	6.5%

Table 17: Percentage distribution of simulated direct vocational school enrollment in groups defined by real secondary school choice, Central and Eastern Europe, 1948 – 1989.

First secondary school enrollment	Percent predicted to enroll based on simulations	Number of cases at risk
Vocational secondary education	69.0%	6,809
Complete secondary education	26.5%	7,968
Total	46.1%	14,777

Note: predicted probabilities were based on a multinomial logistic regression model (see Table 10). Only students who ever studied at any secondary school were considered for this simulation.

Table 18: Estimated coefficients and standard errors of a binomial logistic regression model predicting graduation from vocational secondary education conditional on entry into it, Central and Eastern Europe 1948 – 1989. N= 6,809.

	Coefficient	Standard error
Male	0.060	0.096
Father's education	-0.011	0.023
Father's education – missing	0.052	0.232
Mother's education	0.062	0.025
Mother's education – missing	-0.326	0.314
Main breadwinner's ISEI	0.002	0.005
Main breadwinner's ISEI – missing	-0.271	0.199
Number of siblings	-0.069	0.040
Number of siblings – missing	-0.188	0.319
Parents CP members	0.035	0.130
Parents CP members – missing	-0.186	0.173
High culture participation	0.680	0.450
High culture participation – missing	0.444	0.417
Family reading climate	0.196	0.311
Family reading climate – missing	0.134	0.476
Bulgaria	-0.251	0.289
Czech Republic	-0.105	0.149
Hungary	-0.753	0.142
Poland	-0.445	0.145
Cohort 1948 – 1960	0.558	0.144
Cohort 1961 – 1975	0.316	0.109
Constant	2.468	0.194

Table 19: Percentage distribution of simulated vocational school graduation in groups defined by real secondary school choice, Central and Eastern Europe, 1948 – 1989.

First secondary school enrollment	Percent predicted to graduate based on simulations	Number of cases at risk
Vocational secondary education	91.6%	4,699
Complete secondary education	94.9%	2,110
Total	92.6%	6,809

Note: predicted probabilities were based on a binomial logistic regression model (see Table 18). Only students who were predicted to enroll in a vocational secondary program in a previous simulation (see Table 17) were considered for this simulation.

Table 20: Estimated coefficients and standard errors of a binomial logistic regression model predicting entry into complete secondary education after graduation from vocational secondary education, Central and Eastern Europe 1948 – 1989. N= 6,305.

	Coefficient	Standard error
Male	0.142	0.070
Father's education	0.007	0.017
Father's education – missing	-0.202	0.183
Mother's education	0.037	0.018
Mother's education – missing	-0.564	0.291
Main breadwinner's ISEI	0.018	0.003
Main breadwinner's ISEI – missing	-0.361	0.173
Number of siblings	-0.018	0.029
Number of siblings – missing	0.287	0.252
Parents CP members	0.072	0.085
Parents CP members – missing	0.058	0.134
High culture participation	-0.077	0.272
High culture participation – missing	0.413	0.253
Family reading climate	2.101	0.226
Family reading climate – missing	-0.652	0.374
Bulgaria	0.164	0.229
Czech Republic	-0.529	0.102
Hungary	0.435	0.104
Poland	1.114	0.098
Cohort 1948 – 1960	0.622	0.105
Cohort 1961 – 1975	0.519	0.084
Constant	-3.079	0.149

Table 21: Percentage distribution of simulated entry into complete secondary education after vocational school graduation in groups defined by real secondary school choice, Central and Eastern Europe, 1948 – 1989.

First secondary school enrollment	Percent predicted to re-enter based on simulations	Number of cases at risk
Vocational secondary education	17.6%	4,302
Complete secondary education	21.9%	2,003
Total	19.0%	6,305

Note: predicted probabilities were based on a binomial logistic regression model (see Table 20). Only students who were predicted to graduate from a vocational secondary program in a previous simulation (see Table 19) were considered for this simulation.

Table 22: Estimated coefficients and standard errors of a binomial logistic regression model predicting graduation from complete secondary education after school re-entry, Central and Eastern Europe 1948 – 1989. N= 1,198.

	Coefficient	Standard error
Male	0.047	0.163
Father's education	-0.033	0.040
Father's education – missing	-0.744	0.441
Mother's education	-0.086	0.040
Mother's education – missing	1.454	1.212
Main breadwinner's ISEI	0.012	0.008
Main breadwinner's ISEI – missing	0.124	0.427
Number of siblings	-0.017	0.069
Number of siblings – missing	0.661	0.669
Parents CP members	-0.470	0.185
Parents CP members – missing	0.236	0.348
High culture participation	0.078	0.628
High culture participation – missing	1.095	0.887
Family reading climate	0.633	0.544
Family reading climate – missing	-1.765	0.986
Bulgaria	1.000	- -
Czech Republic	0.069	0.294
Hungary	-1.106	0.260
Poland	-0.937	0.235
Cohort 1948 – 1960	1.222	0.288
Cohort 1961 – 1975	0.507	0.178
Constant	1.431	0.356

Note: the coefficient and S.E. for the dichotomous variables denoting Bulgaria was not estimated as all Bulgarian respondents successfully graduated. Therefore the coefficient could not be estimated and was constrained to be 1.

Table 23: Percentage distribution of simulated graduation from complete secondary education after school re-entry in groups defined by real secondary school choice, Central and Eastern Europe, 1948 – 1989.

First secondary school enrollment	Percent predicted to graduate based on simulations	Number of cases at risk
Vocational secondary education	79.8%	759
Complete secondary education	84.3%	439
Total	81.5%	1,198

Note: predicted probabilities were based on a binomial logistic regression model (see Table 22). Only students who were predicted to re-enter complete secondary programs in a previous simulation (see Table 21) were considered for this simulation.

Table 24: Percentage distribution of simulated university entry after school re-entry in groups defined by first secondary school choice, Central and Eastern Europe, 1948 – 1989.

First secondary school enrollment	Percent predicted to enter university based on simulations	Number of cases at risk
Vocational secondary education	9.9%	606
Complete secondary education	16.2%	370
Total	12.3%	976

Note: predicted probabilities were based on a binomial logistic regression model of university entry (see Table 12). Only students who were predicted to graduate from complete secondary programs in a previous simulation (see Table 20) were considered for this simulation.

Table 25: Comparison of actual and simulated high school graduation and college entry rates among students who first enrolled in a complete secondary program, Central and Eastern Europe, 1948 – 1989. Number of cases= 7,968.

	Actual rate in a standard path	Simulated rate in a non-standard path
Graduation from complete secondary education	90.6%	4.6%
College entry	30.4%	0.8%

Table 26: Estimated coefficients and standard errors of a binomial probit regression model predicting assignment to treatment (standard vs. non-standard trajectories) among complete secondary school graduates, Central and Eastern Europe 1948 – 1989. N= 8,192.

	Coefficient	Standard error
Male	0.576	0.041
Father's education	-0.032	0.009
Father's education – missing	0.091	0.120
Mother's education	-0.058	0.010
Mother's education – missing	-0.124	0.177
Main breadwinner's ISEI	-0.007	0.002
Main breadwinner's ISEI – missing	-0.180	0.107
Number of siblings	0.127	0.018
Number of siblings – missing	0.192	0.146
Parents CP members	-0.074	0.049
Parents CP members – missing	0.083	0.080
Bulgaria	-1.312	0.097
Czech Republic	0.285	0.059
Hungary	0.167	0.062
Poland	0.413	0.059
Cohort 1948 – 1960	0.024	0.060
Cohort 1961 – 1975	0.170	0.049
Constant	-1.462	0.059

Note: this model is used to compute propensity scores for each individual and then form the basis of the matching procedure (see text for details).

Table 27: Unmatched and matched college entry rates among standard and non-standard complete secondary school graduates, Central and Eastern Europe 1948 – 1989. N= 8,192.

	'Treated' individuals (non-standard path)	'Untreated' individuals (standard path)	Difference
College entry rate			
- Unmatched	12.3%	33.6%	-21.3%
- Average treatment effect for the treated	12.3%	30.4%	-18.1%
- Average treatment effect for the untreated	14.0%	33.6%	-19.6%
- Average treatment effect			-19.4%

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