

The Czech Sorting Machine: The Role of Educational Pathways on Occupational and Class Attainment in the Czech Republic

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Abstract

This article introduces a new approach to the study of the association between education and socio-economic outcomes in the Czech Republic: educational pathways, which are the primary channels of study involving at least two educational transitions, which themselves have qualitatively different tracks. Based on Czech Household Panel Study data, we operationalize Czech educational pathways between secondary and tertiary education, and examine the role of eight different educational paths on ESeC-derived social classes. Based on the ordered logit model, we compute the predicted probability that specific educational pathways would lead to a specific class status, controlling for family background, gender and age. We find that the educational pathway approach yields distinct insights about the education-class link that would be masked had we studied only highest level of education attained. The educational pathway approach could, therefore, be a fruitful way to approach other areas of Czech social stratification research.

Keywords: educational pathways; educational attainment; social class; occupational status.

The role of education in the intergenerational transmission of socio-economic status has been a cornerstone of sociological research in the last half century. In the social stratification research tradition, Blau and Duncan's (1967) structural model of status attainment conceived occupational status as determined primarily by educational attainment and indirectly by parental background (father's education and occupation), which impacts the social standing of their offspring primarily through its influence on education. The key role of educational institutions in stratifying modern society has led them to be seen as "sorting machines" that imbue subsequent social status, whether through processes of socialization or allocation (Kerckhoff 1976, 2001; Domina, Penner and Penner 2017). To better understand the mechanisms at work in these sorting machines, an entire generation of sociologists updated status attainment models to include educational and occupational aspirations, peer effects, cognitive ability, and many other factors. Despite sociologists' anxieties of not wanting to omit a decisive explanatory variable, this research has consistently affirmed the role of education as a 'universal' sorting machine across modern societies (Treiman and Ganzeboom 1990; Hout and DiPrete 2006), even if those machines differ in their degree of stratification, standardization, and vocational specificity (Müller and Shavit 1998).

Despite the universality of education as a sorting machine, studies of socio-economic status attainment continue to treat the education variable in simplistic ways. In the early years of stratification research, education was often operationalized in terms of years of completed schooling, which enabled scholars to take a blind eye to institutional differentiation of educational systems and to universalize models of human capital formation, such as models of wage returns to years of education, still widely used today (Mincer 1974; Psacharopoulos and Patrinos 2004). Mare (1980, 1981) was the first to break through the hegemony of years of education to conceptualize educational attainment as a sequence of binary transitions, which helped take into account institutional differentiation in educational systems. In the tradition of the Mare transition model, social stratification researchers conceive a given educational

attainment as a dichotomous outcome (e.g. attaining a college degree or not), which is itself conditional on having transitioned through lower levels of educational attainment (a high school degree or not). One of the lasting contributions of educational transition models is the finding that parental background strongly shapes children's educational attainments early in life, but then declines across subsequent transitions within school and then from school to work.

The limitation of educational transition models is their reliance on binary outcomes: what if educational decisions are not binary, but involve the choice of multiple educational trajectories, each of which might have its own set of consequences for future socio-economic attainment? The multinomial transition model (Breen and Jonnson 2000) directly addressed this in the case of educational stratification, i.e. with a set of educational qualifications or characteristics as the outcome variable. Besides the simple shift from logistic to multinomial regression, the real contribution of the multinomial transition model is the conceptualization of educational attainment as a set of *pathways* that combine both temporal sequence as well as qualitatively different multinomial educational outcomes. In this path dependent approach, each educational pathway – defined as the combination of each relevant sequential transition and the strata of the school system at those points in time – rather than a particular educational achievement, has its own coefficient in determining educational or other socio-economic outcomes.

While Breen and Jonnson (2000) applied their pathway approach to multinomial educational outcomes, in this article we will apply an analogous approach to occupational and class outcomes. The conceptualization of educational trajectories as qualitatively distinct multinomial paths has not been applied to research on Czech occupational and class stratification until now. The reason for this is that the logit models of this kind require detailed data on respondents' educational history, not simply the highest level of educational attainment, as is commonly asked in Czech social surveys. But by utilizing data from the Czech Household Panel Study, we can finally examine the role of educational pathways on socio-economic status attainment in the Czech Republic.

This study hypothesizes that occupational and class attainment is not simply determined by the highest level of education attained, but more specifically by the educational pathway respondents experienced between secondary and tertiary education. If this hypothesis is correct, we would expect differences in occupational and class attainment by whether, for example, university graduates previously attended a secondary grammar school, a secondary technical school, or a secondary vocational school. We would also expect gender differences in the role of educational pathways on occupational and class attainment, both due to gender differences in occupational structure and to gender differences in the importance of higher education on life chances. By contrast, a lack of differentiation in the effects of educational pathways within and between genders would indicate that our hypothesis on the key role of educational pathways, compared to highest education attained, should be rejected.

This article is structured as follows. The following section overviews key findings in the literature on Czech social stratification, particularly from the lens of how education is operationalized in that research. We then introduce our approach for conceptualizing educational pathways, and overview the data and methods used in the analysis, which involves ordinal regression of ESeC social classes by qualitatively distinct educational pathways, controlling for family background, gender and age. We then report our results by computing the probability of attaining a particular social status by educational pathway, parental background, and gender. A discussion of the significance of the results follows.

Educational attainment vs. educational stratification

In this article, we attempt to integrate two different bodies of literature on social stratification in the Czech Republic – i.e. occupational and class stratification, on the one hand, and educational stratification, on the other – which have modeled the role of education in quite different ways. First, research on the attainment of socio-economic attainment in the Czech Republic has exclusively modeled education in terms of years of schooling or highest education attained. For example, in his analyses of the crystallization of social class in the 1990s, Matějů

(2000) focused on Czechs' subjective identification with the middle and upper classes as his dichotomous dependent variable, predicted by respondents' highest level of education. He found that the effect of education on social class actually declined between 1992 and 1996, leading to the conclusion that consistent linkages between dimensions of socio-economic status, which would be expected in a crystalized system of social stratification, were still very much in flux in the period of economic transformation. In the subsequent decade, the association between educational attainment and the self-identified middle class would significantly increase (Večerník 2009).

Similarly, Katrňák and Fučík's (2010) research on intergenerational class mobility also used highest education attained as one of its explanatory variables, finding that completing the school-leaving exam (*maturita*) or attaining tertiary education contributed to upward class mobility by respondents compared to the class position of their fathers, as well as reduced the odds of downward class mobility between those generations. While they find that intergenerational upward mobility outpaced downward mobility in the two decades from 1988-2009, the effect of education on upward or downward mobility remains more or less constant during that period. Nonetheless, both downward class mobility and downward educational mobility are significant predictors of the transmission of poverty (Zelinsky, Mysíková, Večerník 2016).

Recent structural equation models of the determination of Czech occupational status have relied on the traditional operationalization of education in terms of years of schooling. Incorporating data on cognitive ability collected in the PIAAC survey, Smith, Matějů and Anýžová (2018) found that respondent education remains the strongest determinant of occupational status (ISEI), with standardized coefficients roughly three times the size of the effect of both cognitive ability and family background. Anýžová and Matějů (2018) supplemented that model by incorporating data on respondents' physical attractiveness – which impacts the income and occupational status of middle aged Czech women, but not men – but

also found that stability in the effect of education on occupational status across age, cohorts, and genders.

While research on occupational status, class status, and class mobility has been content with operationalizing education in terms of years or highest level attained, Czech research on educational stratification – carried out by many of the same community of authors – points to the danger of that approach. Above all, empirical analyses have shown that the high degree of institutional stratification of the Czech educational system – above all differentiation at the level of secondary education, which is one of the most extreme among OECD countries (Matějů, Smith, Soukup and Basl 2007) – has a decisive impact on future life chances. Attending a secondary grammar school doubles one's odds of aspiring for a managerial, professional occupation (Münich et al. 2018), while attending a vocational school is a leading risk factor for the long-term unemployment of young people (Trhlíková and Úlovcová 2010). Surprisingly, Simonová and Soukup (2010) did not find that the type of secondary school attended had a significant effect on respondents' odds of attending tertiary education, but this is because the type of secondary school attended is itself highly sorted by family background and academic achievement (Matějů, Prochazkova, Burdova 2006). Indeed, parents who are themselves highly educated play a key role in ensuring their children attend a multi-year grammar school (beginning at approximately 11 years of age), as this is seen as a primary mechanism for ensuring their children also have a smooth path towards university studies (Straková and Greger 2013). Given the importance of secondary school track, Czech sociologists have applied numerous educational transition models to estimate the size of inequalities in access to secondary and tertiary education, and whether those inequalities have changed over time as educational opportunities in tertiary education have expanded (Simonová 2003, 2011; Katriňák, Simonová, Fonadová 2013; Smith et al. 2016).

This excursion into the core findings of Czech social stratification research has revealed a major tension between the relatively simple way education is operationalized in research on occupational and class attainment, compared to the key role of qualitatively distinct secondary

school tracks on subsequent educational and occupational outcomes. The problem is that social surveys containing data on highest educational attainment do not contain information on the secondary school track attended in the case of respondents who have achieved some level of tertiary education. To overcome this impasse, we utilize new data from the Czech Household Panel Study, which contained a detailed battery of questions on respondents' educational history that was designed to precisely fill in this gap in sociological knowledge.

Data and Methods

The Czech Household Panel Study (CHPS) is the first large-scale household panel survey conducted by sociologists in the Czech Republic, modelled on the British Household Panel Study and the German Socio-economic Panel. This paper utilizes CHPS data from the first wave carried out in 2015, which is only wave that is publicly available as of writing. The first wave involved interviews with over 5,000 households and 13,000 respondents, including children. A unique aspect of the CHPS questionnaire is that it contains detailed information on educational history of respondents, which form the basis for this article.

The sample is truncated to adult respondents aged 25-64 at the time of the survey who have been economically active. The age 25 was selected because nearly all Czechs have completed their educational studies and entered the labor market by that time, and is a standard starting point in Czech social stratification research. The age of 64 is just before the current retirement age for both men and women (65). This also creates four 10-year birth cohorts, which is useful for subsequent analysis. In the end, 5,047 respondents with complete data on the variables of interest were included in the main analytic sample.

Educational pathways are defined as the primary channels of study involving at least two educational transitions, which themselves have qualitatively different tracks. Our specification of these educational pathways is based on features of the Czech educational system, which have been thoroughly described elsewhere (e.g. Simonová 2011; Münich et al. 2018). For our purposes, it is important to note the structure of upper secondary education,

which has three main tracks. Only two tracks lead to a school leaving examination *maturita* (ISCED 3A) that entitles pupils to apply for tertiary education: 4-, 6- and 8-year grammar schools (*gymnasia*), which are academically oriented, and secondary technical schools, providing a more technical and sometimes more vocationally oriented education. The third track, vocational schools (also referred to as apprenticeship programs), prepare pupils for specific vocations (e.g. cooking, horticulture, hotel operations, carpentry, etc.), typically last three years and is concluded by an apprenticeship certificate (ISCED 3C), which does not qualify them for tertiary school entry. However, a small share of pupils in vocational schools later attend follow-up studies to pass the *maturita* exam, which entitles them to apply for tertiary education.

Keeping in mind these basic characteristics of Czech secondary education, we identify the following educational pathways in Table 1, each of which can be specified by a separate dummy variable.

<< Table 1 here >>

The first five paths were identified on the basis of a detailed question on respondents' highest education attained. Path 1 groups together respondents who attended only elementary education, or dropped out of school before completion. Path 2 includes respondents to completed secondary vocational education, which ordinarily ends with a certificate and not the *maturita* school-leaving exam, and thus did not attend college. However, we also include here a few respondents who completed vocational education and ultimately also received the *maturita*, but did not attend college. Because there are so few of such individuals, they do not constitute a separate path. Path 3 and 4 characterize respondents who completed secondary technical education, the most common form of secondary education in the Czech Republic and former Czechoslovakia, but did not continue to tertiary education. Because of their sizable numbers, we can differentiate whether they received the *maturita* (Path 4), a valued credential

on the labor market, versus those who did not (Path 3). Path 5 includes respondents who completed secondary education at a 3-year, 4-year, 6-year or 8-year grammar schools, but who did not follow up with tertiary education. Because the possible lengths of grammar schools have changed over the age distribution, and because relatively few older respondents attained 6- or 8-year gymnasium education at the time of the survey, Path 5 includes all forms of grammar schools.

Paths 6, 7 and 8 include all respondents who attained tertiary education. We are able to differentiate their pathways on the basis of a separate question asking what kind of secondary school they attended. Path 6 codes for secondary vocational education, Path 7 for secondary technical education, and Path 8 for grammar schools. As is evident, very few respondents (0.8%) attended secondary vocational schools, passed the *maturita* exam, and subsequently attained a tertiary education degree. However, because this represents a very specific pathway to escape from a dead-end track, and because such individuals have not been studied before in the framework of a large-scale social survey, we find it meaningful to incorporate those respondents into a separate path. The only respondents we had to drop from our analysis are 618 persons who attained tertiary education, but did not specify what kind of secondary education they received.

Readers may wonder why we differentiate secondary school tracks in a detailed way, but not tertiary education degrees. The reason is because before Czech membership in the EU (and the implementation of the Bologna process), few Czechs received only a bachelor's degree (4% of the total sample), as it was – and still is – common to study primarily for a master's degree, attained in about 5 years (18.4% of the total sample). Differentiated by secondary school track, it would not be possible to constitute pathways to undergraduate education with sufficient sample size. It would be possible, however, to differentiate university educated Czechs by their field of study, for example, but that analysis would require full treatment in a separate paper.

For the dependent variable, for preliminary analyses we use a standard measure of occupational status (ISEI), based on the ISCO-08 classification. We use ISEI because it is the most common measure of socio-economic status attainment used in the Czech social stratification literature. We thus use ISEI for benchmark comparisons when considering the role of the educational pathways above, compared to standard approaches of highest education attained.

Our primary dependent variable, however, is social class, based on the ESeC classification (European Socio-economic Classification). This classification was based on comparative analyses of class structures in European countries (Rose and Harrison 2010), has not yet been widely used by Czech sociologists, who overwhelmingly adopted the EGP class schema (Tuček 2003). The EGP schema was developed primarily on the analysis of British social classes (Goldthorpe, Llewellyn, and Payne 1980), then applied across Europe (Erikson and Goldthorpe 1992). A detailed comparison of the class schema and their empirical application on Czech data can be found in Katrňák and Fučík (2010) and Katrňák (2012), who argue in favor of using the ESeC schema for studies of Czech social stratification. As that analysis played a key role in the construction of occupational, employment, and workplace questions in the CHPS, we use the ESeC schema here.

However, as with Katrňák and Fučík (2010), we drop long-term unemployed or never employed respondents as a social class, as it is not evident such persons (e.g. stay at home mothers, adult students, long-term unemployed, etc) constitute a coherent social class. In addition, we reduce the 9-class ESeC scheme into five social classes, but in a way different from the standard approach used in Rose and Harrison (2010). This is depicted in Table 2.

<< Table 2 here >>

There are several reasons for this approach. First, the standard shortened versions of the ESeC classification call for the merging of ESeC classes 1 and 2, which would be 41.6%

of our sample. Given the importance of Czechs' aspirations to join the managerial class (Munich et al 2017), and given the size of these classes, we choose to keep them conceptually distinct. Doing so also adds variation in the high end of the classification. Similarly, we maintain variation at the lower end of the classification by keeping ESeC classes 8 and 9 as intact as possible, with the small revision of including ESeC class 6 (higher grade blue collar workers with mixed contracts; 332 respondents) with ESeC class 8 (skilled blue collar workers on labor contracts; 538 respondents), given the similarity of their occupations and that both classes are relatively small. Lastly, we group the remaining ESeC classes into the lower service class, which is technically not a class at all but instead groups respondents who are primarily self-employed, run small businesses, or work in lower level administrative and sales positions. Together, they constitute lower level workers in the service economy, as commonly understood. This re-classification is also useful given that some of the ESeC classes are very small (e.g. only 19 self-employed respondents in agriculture, ESeC class 5). We use this 'lower service class' primarily as a point of reference for comparisons with the two white collar and two blue collar classes in our analysis.

As our main task is to analyze the association between educational pathways and social class destinations, we keep the analysis straightforward in terms of contrast variables. We differentiate associations in the education-class link in terms of sex (women = 1, men = 0); age category dummies for ages 25-34, 35-44, 45-54, and 55-64; and the highest education of either parent (four dummy variables for basic education, vocational or technical education without a matura, vocational or secondary education with a matura, and university education). We group father's and mother's education in this way in order to reduce the number of cases with missing values. While it would be valuable to include a variable on father's or mother's occupation in the main analysis, there are too many missing values for those variables and preliminary analyses indicated that neither has a significant effect on class attainment, especially in comparison to parental education.

Our statistical approach is also straightforward. Following Katrňák (2012), who views 6-class EGP and ESeC classifications as ordinal, we use ordered logit regression of the five social classes. All explanatory variables used in the main analysis are dichotomous, making coefficients easy to interpret. Given the importance of gender gaps in both education and the labor market, we analyze both sexes together and introduce interaction terms between sex and all of the other explanatory variables in the model, so that the main effects can easily be interpreted as the logit coefficients for men. As it is difficult to interpret logits of educational pathways across values of contrast variables of interest, such as parental education, we compute the predicted probabilities of attaining a given social class for each respondent and then plot the means of those predicted probabilities across values of contrast variables.

Results

To better understand the role of educational pathways on socio-economic status attainment, compared to the role of highest education attained, we first run simple OLS regressions of those education variables on occupational status (ISEI), with standard controls (Table 3). All explanatory variables in the model are dichotomous.

A comparison of the baseline approach – involving typical dummy variables for highest education attained that can be generated from most Czech social surveys – and the new educational pathways approach reveals several important findings. Estimates for tertiary education in the baseline model overestimate the effect of having that educational credential for respondents who went to secondary vocational or technical schools, and underestimate it for respondents who attended secondary grammar schools. Such differences may not seem to matter, but a difference of four points in ISEI can mean the difference between top professionals and the associates who work just under them. The difference in paths 6 and 8 (university educated respondents, but when attended secondary vocational and follow-up studies, versus those who went to grammar schools) is particularly large, and suggests that the stigma of vocational education persists in the labor market, even with a university diploma.

Our detailed approach to classifying educational pathways also reveals the importance of differentiating respondents without a *maturita* into those who went to secondary vocational or technical schools. On the other hand, occupational status depending on whether respondents attained secondary technical education (Path 4) and grammar school education (Path 5) are basically the same, as both groups of respondents have passed the *maturita* exam. Also note the decline in the role of gender from the baseline to the pathways model, suggesting the possibility that some educational pathways might be sufficiently gendered to account for some of the variation in the direct gender effect. Lastly, the educational pathways model has a marginally higher explained variance, as well as scores better on other model selection criteria, such as AIC, as well as all other criteria of significance. Nonetheless, the fact that nearly half of the explained variance in occupational status is accounted for by just a few factors clearly demonstrates that the Czech labor market is highly stratified by educational background, regardless of how education is operationalized.

<< Table 3 here >>

Based on these results, we ran an ordered logit model of the five social classes with the same variables as the educational pathways model in Table 3. The only difference is that we now interact the female dummy variable with all other explanatory variables in the model. The results are reported in Table 4. The logits should be interpreted as the odds of being in higher social classes (managerial class at the top) for each unit change in the predictors, which in this case are all [0,1]. Gender is a substantively important intervening variable in the association between educational pathways and social class, particularly for respondents with vocational education without a *maturita* (Path 2), which is dominated by men. While the interactions are generally not significant, university educated men having attended secondary technical or grammar schools do have higher odds of attaining higher class status than women who have traversed the same educational pathways.

<< Table 4 here >>

Because these logits are difficult to interpret, particularly across intervals of social class and relevant values of the predictors, we plot the results in Table 4 in terms of predicted probabilities of attaining a particular social class, by educational pathway, gender, and parental background. We do not plot predicted probabilities by age cohort – though this is certainly possible – because the effect of these cohorts are too small, suggesting stability in the association of educational pathways and social classes across levels of experience in the labor market.

The predicted probabilities are reported in Graphs 1-5, each with two panels, one for men and one for women. In terms of the probabilities in attaining the managerial class (Graph 1), there is a substantial difference between men and women: differences in secondary school background among college educated men have a substantial impact on class attainment, but this does not appear to be the case for women. For college educated men with a college educated parent, their predicted probability of becoming managers stands at 42% for those who attended vocational schools, 54% for those who attended technical schools, and 58% for those who attended grammar schools. Another feature of these probabilities are the large differences in pathways by educational credential: there are no differences between Paths 1, 2 and 3 for both genders, and a large gap is present between those paths and Paths 4 and 5 (respondents with a *maturita*, but no college education) and other gap between them and the college educated. In both panels, the trend-line is upward sloping, reflecting a modest role of parental education in pushing their children into higher social classes.

<< Graphs 1-5 here >>

The link between educational pathways and social class is quite different in the case of the technical class (ESeC class 2, depicted in Graph 2) compared to the managerial class. These differences would have been entirely masked had we followed conventional wisdom in merging ESeC class categories 1 and 2. While educational credentials (and the higher educational pathways among men) seem to be decisive predictors of managerial status, such factors play a much smaller role for the technical class. Surprisingly, university educated respondents do not sort by educational pathway, and they have the same probability of attaining this professional class status as are respondents who only passed the *maturita* exam. By contrast, this class status is out of reach for Czech men and women without *maturita*.

We will not comment much on Graph 3, which depicts the probability of attaining a multitude of lower service class jobs (or self-employment in the service sector), rather than one coherent social class. Our violent re-classification of the 'lower service class' probably explains the flux in the effect of educational pathways, as well as by parental education. We can clearly see, however, that tertiary educated parents seem to help push their children out of these social classes and into the technical and managerial class. In other words, there is a resorting in the association between educational pathways and the lower service class by the level of parental education.

Moving to the more coherent class of skilled manual workers, both employed and self-employed (e.g. skilled craftsmen), the most likely group of Czechs to attain this class are respondents without a *maturita* – i.e. without any major educational credential – with negligible differences between Paths 1, 2 and 3, for both men and women. In fact, there are no apparent differences in the probabilities of attaining this class status between men and women, betraying the popular conception that this is a male dominated class.

Similar to our comparison of the managerial and technical classes, we can also observe remarkable differences between the skilled manual class and the unskilled manual class. Once again, this reminds us of the importance of not blindly reclassifying the ESeC schema to the recommended five-class version, which would violently merge these two distinct classes,

something that the analogous EGP 5-class schema does not do (Erikson and Goldthorpe 1992). While great efforts were required to establish both (and other) social class schemas, their reclassification for the purposes of empirical analysis should take into account facts on the ground, which may vary in country-specific ways.

Roughly 40% of Czech men and women with only elementary education end up in the unskilled manual class, though well-educated parents do seem to pull their children out of these predicament. The difference in the predicted probability of respondents in Path 1 between those with parents with elementary education versus university educated parents is about 10%. While there were no differences in predicted probabilities for Paths 1, 2 and 3 in attaining skilled manual status, there are in fact large differences in these pathways in the case of the unskilled manual class. This suggests that some degree of incomplete upper secondary education, whether at a vocational or technical school (the difference does seem to matter for Czech men, but not for women) can potentially shift Czechs from unskilled into skilled class status.

Discussion

We can draw a number of important lessons from this analysis. First and foremost, we have established that there are substantive differences in the association between educational pathways and social class attainment that are typically masked if we were to use simpler educational categories. These differences in paths – such as in differences in secondary school track among college educated Czechs, or differences among Czechs who succeeded or failed the *maturita* exam at different types of school – have a substantive impact on their future trajectories on the labor market, and most likely on other socio-economic outcomes not examined here. It is therefore a reminder of the need for Czech sociologists to offer detailed response categories to the standard question of highest educational attainment, as well as to have a follow-up question on type of secondary school attended in the case of Czechs who have attained some degree of college education.

Second, the strength of the association between educational paths and social class – and the large explained variance of these parsimonious models – once again confirm that the Czech Republic is very much a credentialist society (Collins 1979) that remains highly stratified by the sorting machine of educational background. The differences in probabilities for college educated men in the managerial class by secondary school type suggest that such details of educational background are probably scrutinized in the managerial hiring process. That these differences are significant for men but not for women underscores the possible role of male-dominated social networks (“good old boys”) in the upper social class. In addition, Czechs commonly report secondary school background on professional resumes, and as a cultural practice, and as a simple ethnographic observation, Czechs who have attended grammar schools do not hesitate to point it out, even among the small pond of equally educated Czech sociologists.

Third, the analysis presented here was intentionally made simple, so it can serve as a stepping stone for subsequent research on educational pathways. One direction of future research would be to analyze in more detail the role of educational pathways at the elementary and secondary levels on tertiary educational attainment, tertiary degrees or fields of study. Educational pathways can also serve as a basis for the re-analysis of educational mobility tables, or cohort analyses of change in inequality of educational attainment over time.

Lastly, the results presented here demonstrate the value of graphically representing non-linear associations. This is not a matter of style, but that the findings we reported from Graphs 1-5 are substantively richer than what an average mind can glean from the same results presented in Table 4. Unfortunately, a large amount of Czech social stratification research lazily present binary regression tables or other logit models without deeper interpretation, belying the very purpose of our great enterprise in understanding and communicating the nature of social inequality, mobility and stratification in the Czech Republic.

References

- Anýžová, P. and P. Matějů. 2018. "Beauty still matters: The role of attractiveness in labour market outcomes." *International Sociology* 33 (3): 269–291.
- Blau, P. M. and O. D. Duncan. 1967. *The American Occupational Structure*. New York: Wiley.
- Breen, R. and J. O. Jonsson. 2000. "Analyzing Educational Careers: A Multinomial Transition Model." *American Sociological Review* 65: 754-72.
- Collins, R. 1979. *The Credential Society: An Historical Sociology of Education and Stratification*. New York: Academic Press.
- Domina, T., A. Penner, and E. Penner. 2017. "Categorical Inequality: Schools As Sorting Machines." *Annual Review of Sociology* 43: 311-330.
- Erikson, R. and J. H. Goldthorpe. 1992. *The Constant Flux. A Study of Class Mobility in Industrial Societies*. Oxford: Clarendon Press.
- Goldthorpe, J. H., C. Llewellyn, and C. Payne. 1980. *Social Mobility and Class Structure in Modern Britain*. Oxford: Clarendon Press.
- Hout, M. and T. A. DiPrete. 2006. "What we have learned: RC28's contributions to knowledge about social stratification." *Research in Social Stratification and Mobility* 24: 1–20.
- Katrňák, T. 2012. "Is current Czech society a social class-based society? The validity of EGP and ESeC class schemes." *Sociológia* 44 (6): 678-703.
- Katrňák, T. and P. Fučík. 2010. *Návrat k sociálnímu původu. Vývoj sociální stratifikace české společnosti v letech 1989 až 2009*. Brno: Centrum pro studium demokracie a kultury.
- Katrňák, T., N. Simonová, and L. Fonadová. 2013. "From Differentiation to Diversification: Testing MMI and EMI in the Czech Secondary School System in the First Decade of the 21st Century." *Sociologický časopis-Czech Sociological Review* 49 (4): 491-520.
- Kerckhoff, A. C. 1976. "The Status Attainment Process: Socialization or Allocation?" *Social Forces* 55: 368–381.
- Kerckhoff, A. C. 2001. "Education and Social Stratification Processes in Comparative Perspective." *Sociology of Education Extra Issue*: 3–18.
- Mare, R. D. 1980. "Social background and school continuation decisions." *Journal of the American Statistical Association* 75 (1): 295–305.
- Mare, R. D. 1981. "Change and stability in educational stratification." *American Sociological Review* 46 (1): 72–87.
- Matějů, P. 2000. "Peripetie vývoje a krystalizace střední třídy." Pp. 73-97 in P. Matějů, K. Vlachová et al., *Nerovnost, spravedlnost, politika: Česká republika, 1991-1998*. Prague: SLON.

- Matějů, P., I. Procházková, and P. Burdová. 2006. "Přechod mezi střední a vysokou školou ve světle Sondy Maturant a Uchazeč 1998-1999." Pp. 313-341 in P. Matějů, J. Straková et al. *(Ne)rovné šance na vzdělání: vzdělanostní nerovnosti v České republice*. Prague: Academia.
- Matějů, P., Smith, M. L., Soukup, P., and Basl, J. 2007. "Determination of College Expectations in OECD Countries: The Role of Individual and Structural Factors." *Czech Sociological Review* 43 (6): 1121–1148.
- Mincer, J. 1974. *Schooling, Experience, and Earnings*. New York: National Bureau of Economic Research.
- Müller, W. and Y. Shavit. 1998. "The Institutional Embeddedness of the Stratification Process: A Comparative Study of Qualifications and Occupations in Thirteen Countries." Pp. 1–48 in *From School to Work: A Comparative Study of Educational Qualifications and Occupational Destinations*, ed. by Y. Shavit and W. Muller. Oxford: Oxford University Press.
- Münich, D., P. Matějů, J. Straková, and M. L. Smith. 2018. "Structural Embeddedness of Students' Professional Expectations: The Czech Republic and Taiwan in Comparative Perspective." *Compare: A Journal of Comparative and International Education* 48 (6): 973-991.
- Psacharopoulos, G., and H. A. Patrinos. 2004. "Returns to Investment in Education: A Further Update." *Education Economics* 12 (2): 111-134.
- Rose, D., and E. Harrison (eds.). 2010. *Social Class in Europe. An Introduction to the European Socio-economic Classification*. New York: Routledge.
- Simonová, Natalie. 2003. "The evolution of educational inequalities in the Czech Republic after 1989." *British Journal of Sociology of Education* 24 (4): 471-485.
- Simonová, N. 2011. *Vzdělanostní nerovnosti v české společnosti: vývoj od počátku 20. století do současnosti*. Prague: SLON.
- Simonová, N. and P. Soukup. 2010. "Působení primárních a sekundárních faktorů sociálního původu při přechodu na vysokou školu v ČR: výsledky výzkumu PISA-L." Pp. 298-321 in P. Matějů and J. Straková (eds.) *Nerovnosti ve vzdělávání. Od měření k řešení*. Prague: SLON.
- Smith, M. L., S.-L. Tsai, M.-H. Huang, and P. Matějů. 2016. "Educational Expansion and Inequality in Taiwan and the Czech Republic." *Comparative Education Review* 60 (2): 339-374.
- Smith, M. L., P. Anýžová, and P. Matějů. 2018. "Returns to Cognitive Skills: New Evidence from 14 Nations." *Innovation: The European Journal of Social Science Research*. Online First.
- Straková, J. and D. Greger. 2013. "Faktory ovlivňující přechod žáků 5. ročníků na osmileté gymnázium." *Orbis Scholae* 7 (3): 73–85.
- Treiman, D. J., and H. B. G. Ganzeboom. 1990. "Comparative status attainment research." *Research in Social Stratification and Mobility* 9: 105-27.
- Trhlíková, J., and H. Úlovcová. 2010. "Vliv rodinného zázemí na předčasné odchody ze vzdělávání a dlouhodobou nezaměstnanost mladých lidí." Pp. 151-179 in P. Matějů, J. Straková, and A. Veselý (eds.), *Nerovnosti ve vzdělávání: Od měření k řešení*. Prague: SLON.

Tuček, M. (ed.). 2003: *Dynamika české společnosti a osudy lidí na přelomu tisíciletí*. Prague: SLON.

Večerník, J. 2009. *Czech Society in the 2000s: A Report on Socio-economic Policies and Structures*. Prague: Academia.

Želinský, T., M. Mysíková and J. Večerník. 2016. "Occupational Mobility, Educational Mobility and Intergenerational Transmission of Disadvantages in Europe." *Ekonomický časopis* 64 (3): 197–217.

Table 1. Main educational pathways in the Czech Republic

Pathway	Description	N	% of sample
Path 1	Completed elementary education (or less), no college	382	5.3%
Path 2	Completed secondary vocational education; no college	1,892	26%
Path 3	Completed secondary technical education, but did not attain a <i>maturita</i> ; no college	598	8.2%
Path 4	Completed secondary technical education, passed the <i>maturita</i> exam; no college	2,271	31.2%
Path 5	Attained secondary grammar school (gymnazium); no college	377	5.2%
Path 6	Completed secondary vocational education, follow-up studies for <i>maturita</i> ; attained a college degree	56	0.8%
Path 7	Completed secondary technical education; attained a college degree	516	7.6%
Path 8	Completed grammar school education, attained a college degree	693	10.3%
Total		7,271	100%

Table 2. Description of Czech social classes, based on ESeC schema

Class name	ESeC Class	N	% of sample
Managerial class	Identical to ESeC class 1: large employers, higher grade professional, administrative and managerial occupations	1063	20.3%
Technical class	Identical to ESeC class 2: lower grade professional, administrative and managerial occupations and higher grade technician and supervisory occupations	1115	21.3%
Lower service class	Comprises ESeC classes 3, 4, 5, and 7: self-employed and small employers, intermediate occupations, and lower services, sales, and clerical occupations	1451	27.7%
Skilled manual class	ESeC classes 6 and 8: higher grade blue collar workers and skilled blue collar workers	870	16.6%
Unskilled manual class	Identical to ESeC class 9: routine occupations, i.e. semi- and non-skilled workers	740	14.1%
Total		5,239	100%

Table 3. The role of highest level of education vs educational pathways on occupational status. Unstandardized coefficients with standard errors in parentheses.

Variable	Baseline model: Highest level of education	New approach: Educational pathways
Intercept	21.101*** (1.274)	21.750*** (1.273)
Elementary education (reference)		
Secondary education without maturita	5.144*** (1.058)	
Secondary education with maturita	21.620*** (1.057)	
Tertiary education	39.332*** (1.126)	
Path 1 (reference)		
Path 2		5.419*** (1.073)
Path 3		6.834*** (1.230)
Path 4		22.056*** (1.067)
Path 5		22.970*** (1.401)
Path 6		34.137*** (2.331)
Path 7		37.656*** (1.240)
Path 8		41.205*** (1.207)
Female	1.921*** (0.444)	1.377** (0.447)
Age: 25-34 (reference)		
Age: 35-44	1.178 (0.659)	1.207 (0.658)
Age: 45-54	1.718* (0.678)	1.685* (0.677)
Age: 55-64	2.601*** (0.678)	2.294** (0.676)
Parental education: Elementary (reference)		
Parental education: Secondary w/o maturita	0.058 (0.842)	-0.155 (0.841)
Parental education: Secondary with maturita	2.861** (0.886)	2.688** (0.886)
Parental education: Tertiary	4.673*** (1.022)	4.045*** (1.028)
R-square	0.455	0.457
AIC	27738.037	27687.534

*** indicates $p < 0.001$, ** indicates $p < 0.01$, and * indicates $p < 0.05$.

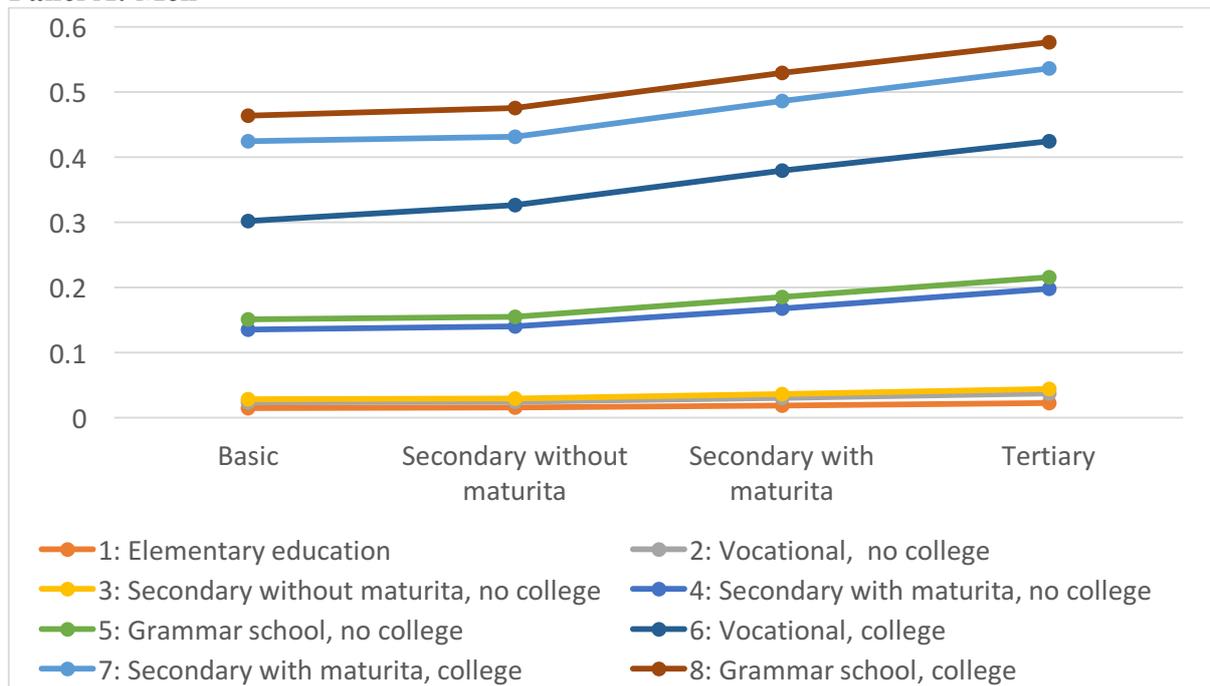
Table 4. Logits from ordinal regression, with two-way interactions of all variables with sex. Standard errors in parentheses.

	Main effects	Interaction effects (by female)
Path 1: Basic education, no college (reference)	--	--
Path 2: Secondary vocational school, no college	0.459* (0.184)	0.473* (0.204)
Path 3: Secondary technical education, no maturita, no college	0.633** (0.215)	0.307 (0.249)
Path 4: Secondary technical education, maturita, no college	2.310*** (0.189)	0.327 (0.205)
Path 5: Gymnazium, no college	2.428*** (0.272)	0.342 (0.312)
Path 6: Secondary vocational school, college	3.411*** (0.346)	0.202 (0.572)
Path 7: Secondary technical education, maturita, college	3.850*** (0.218)	-0.285 (0.254)
Path 8: Gymnazium, college	4.022*** (0.225)	-0.355 (0.250)
Parents' highest education: basic (reference)	--	--
Parents' highest education: secondary without maturita	0.050 (0.144)	-0.026 (0.178)
Parents' highest education: secondary with maturita	0.274 (0.151)	0.025 (0.190)
Parents' highest education: university	0.479* (0.177)	-0.025 (0.226)
Age: 25-34 (reference)	--	--
Age: 35-44	0.071 (0.114)	0.018 (0.149)
Age: 45-54	0.104 (0.118)	0.071 (0.153)
Age: 55-64	0.097 (0.115)	0.238 (0.149)
Observations		5,047
Nagelkerke R-square		0.374

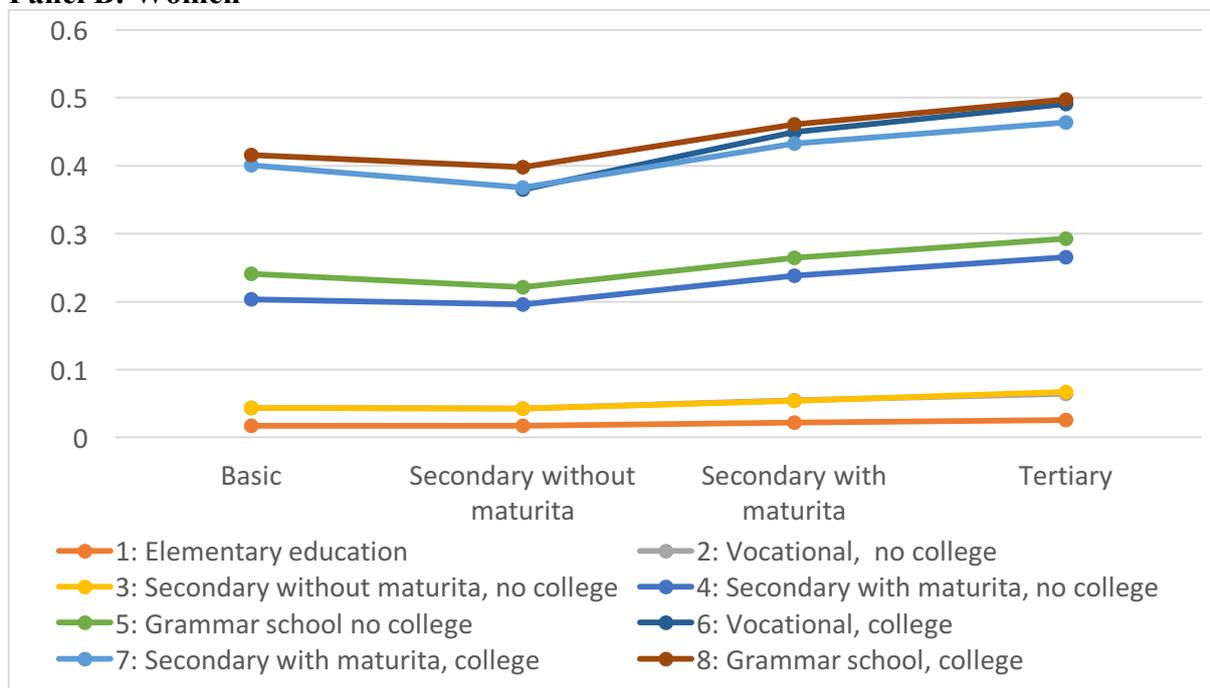
*** indicates $p < 0.001$, ** indicates $p < 0.01$, and * indicates $p < 0.05$.

Graph 1. Predicted probability of managerial class by parental education (X-axis) and respondent educational pathway.

Panel A: Men

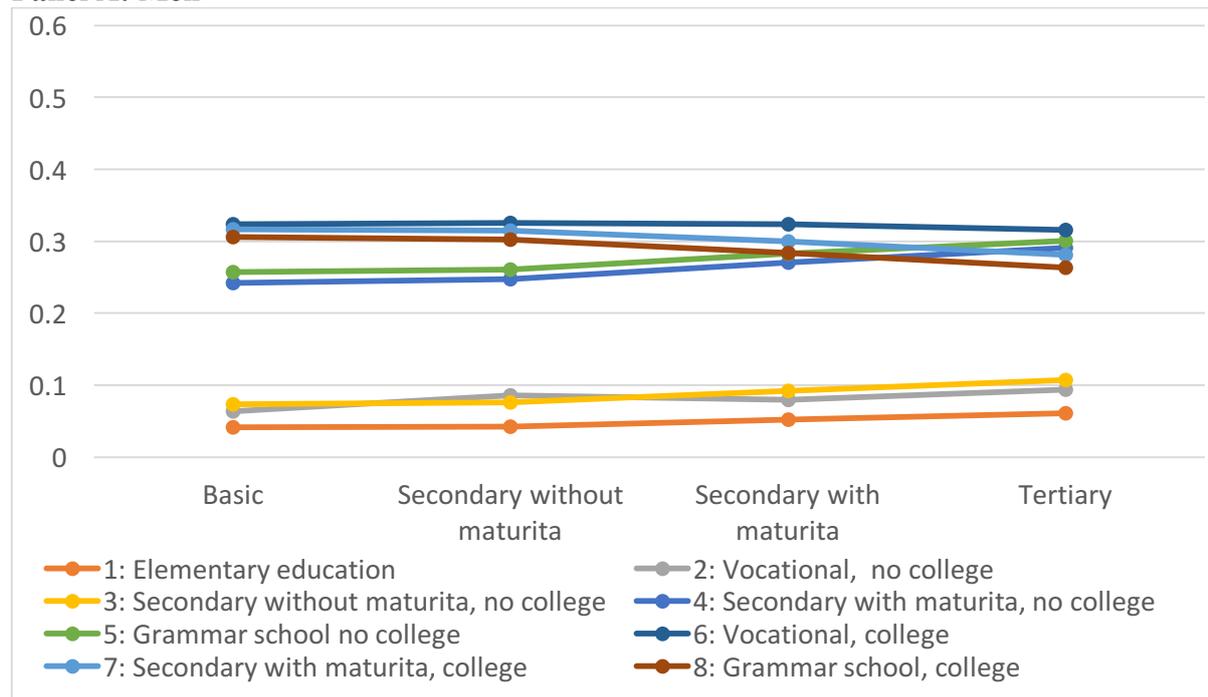


Panel B: Women

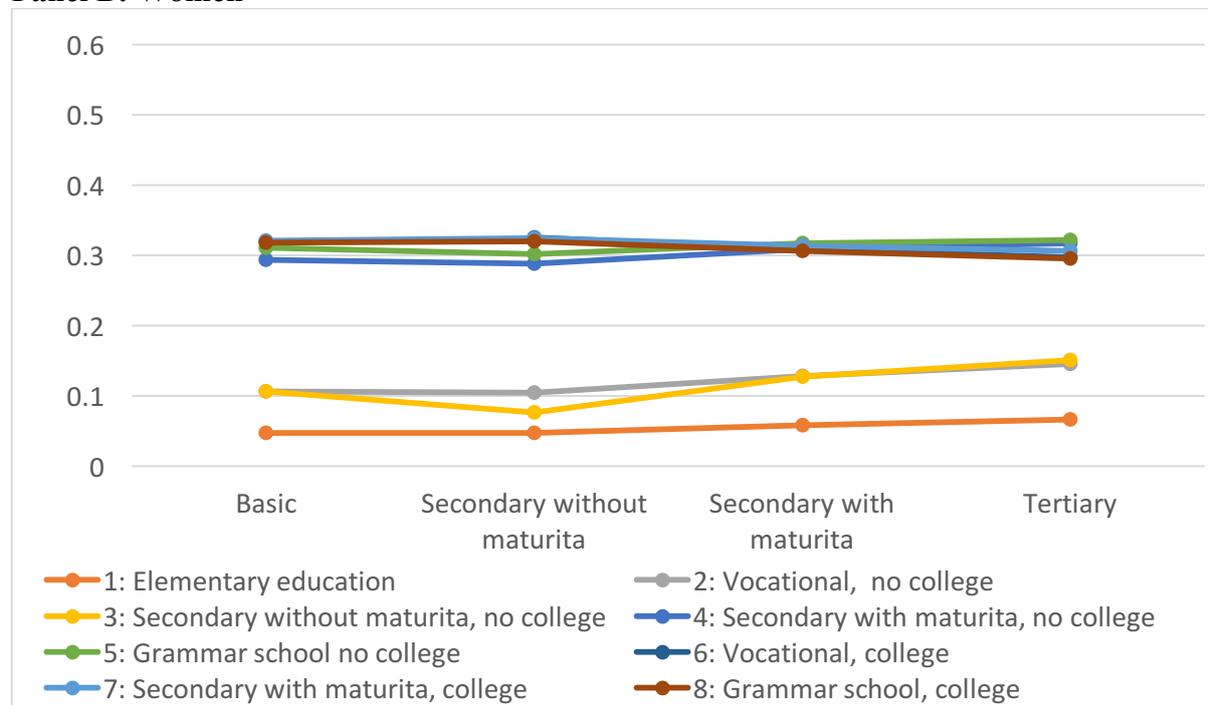


Graph 2. Predicted probability of technical class by parental education (X-axis) and respondent educational pathway.

Panel A: Men

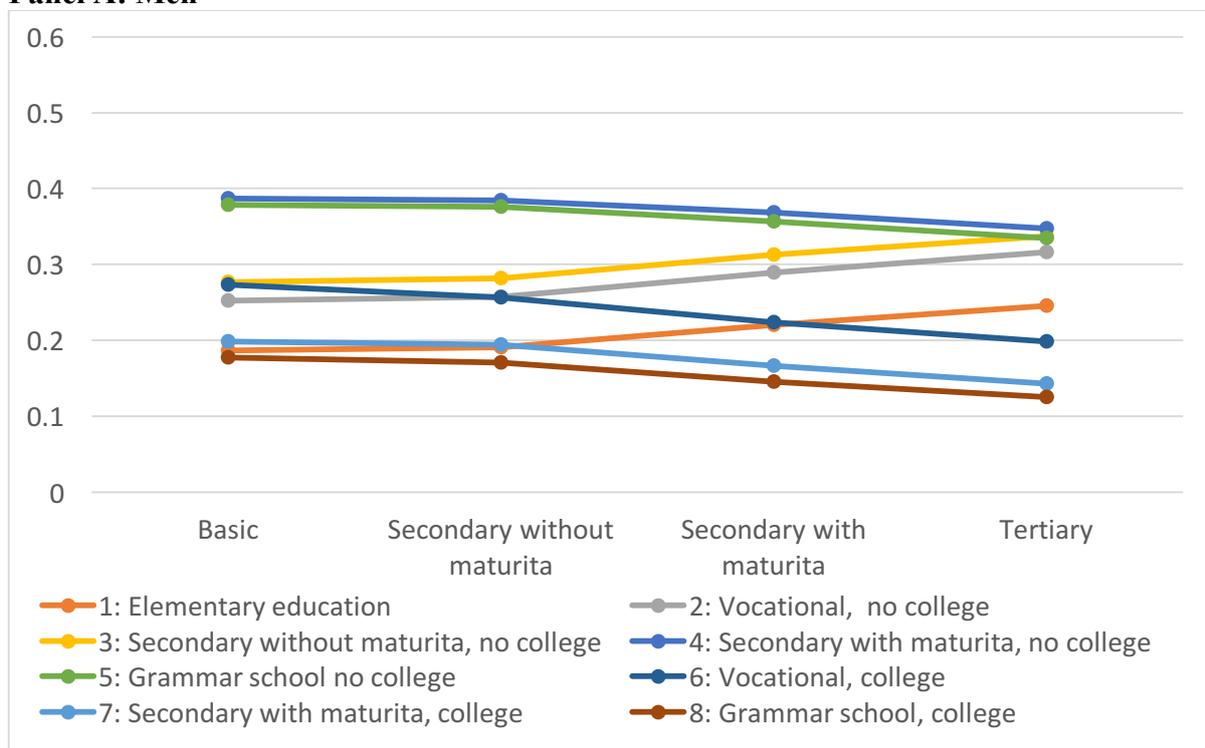


Panel B: Women

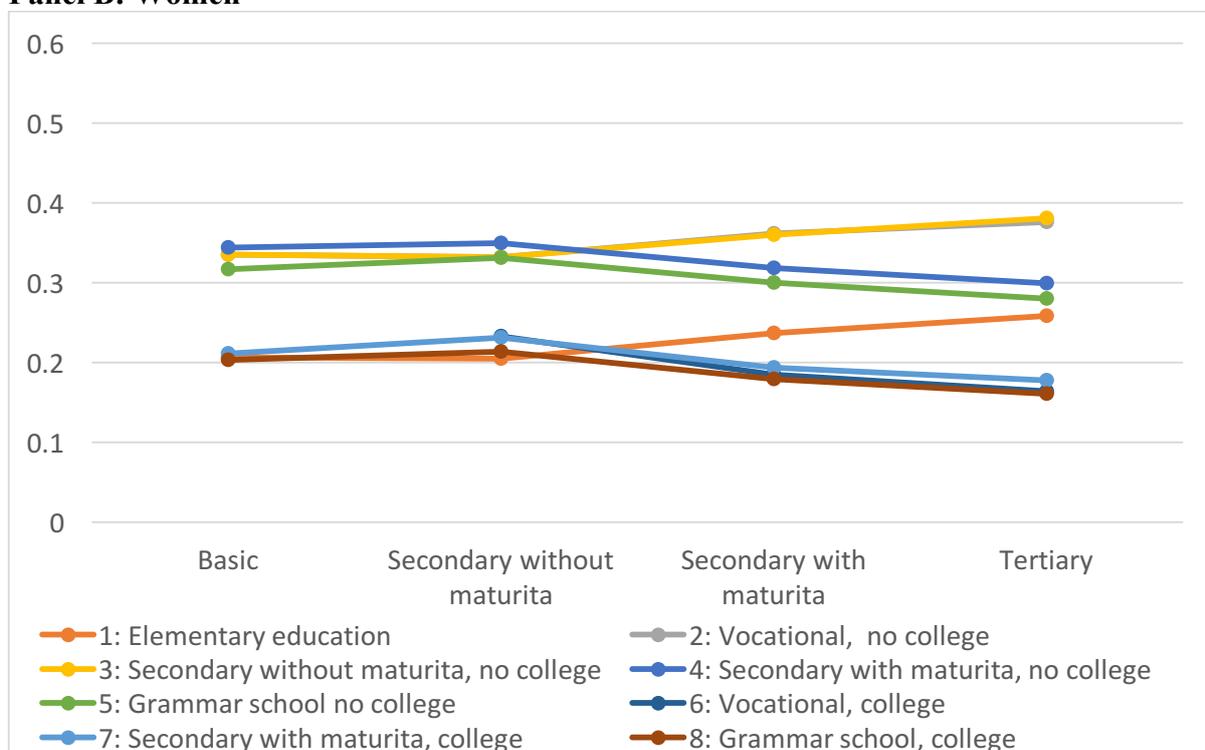


Graph 3. Predicted probability of lower service class by parental education (X-axis) and respondent educational pathway.

Panel A: Men

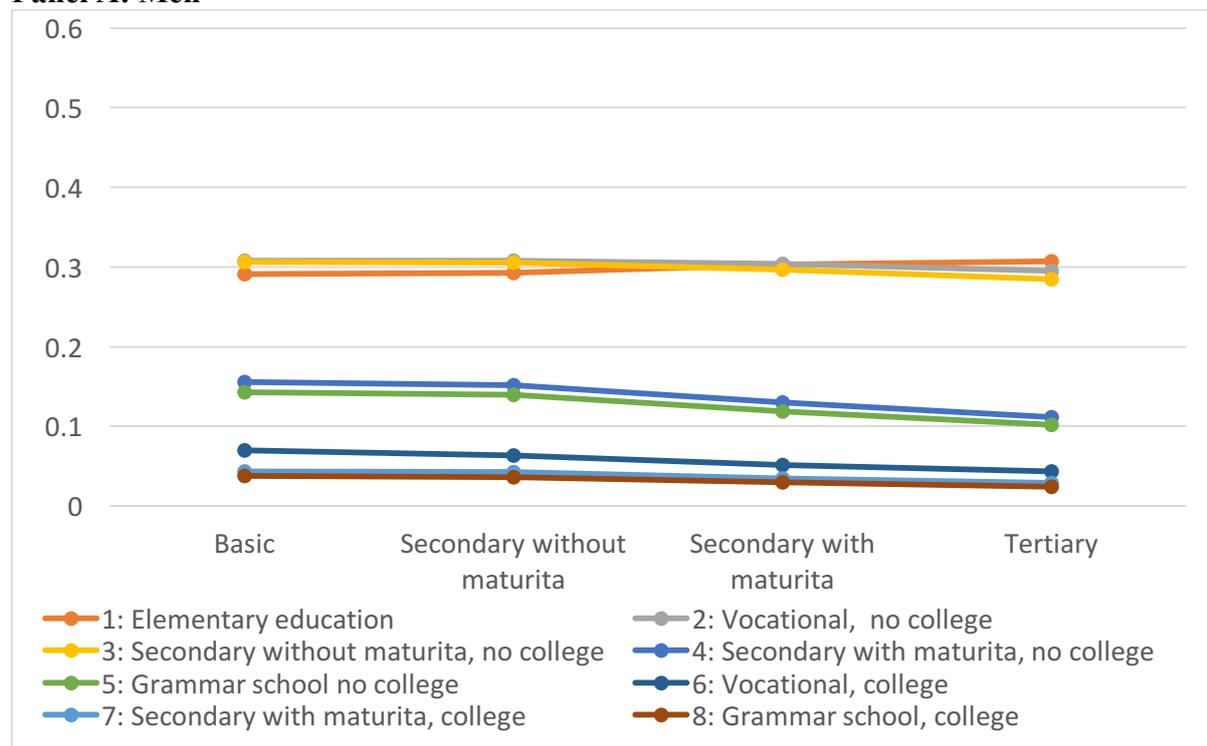


Panel B: Women

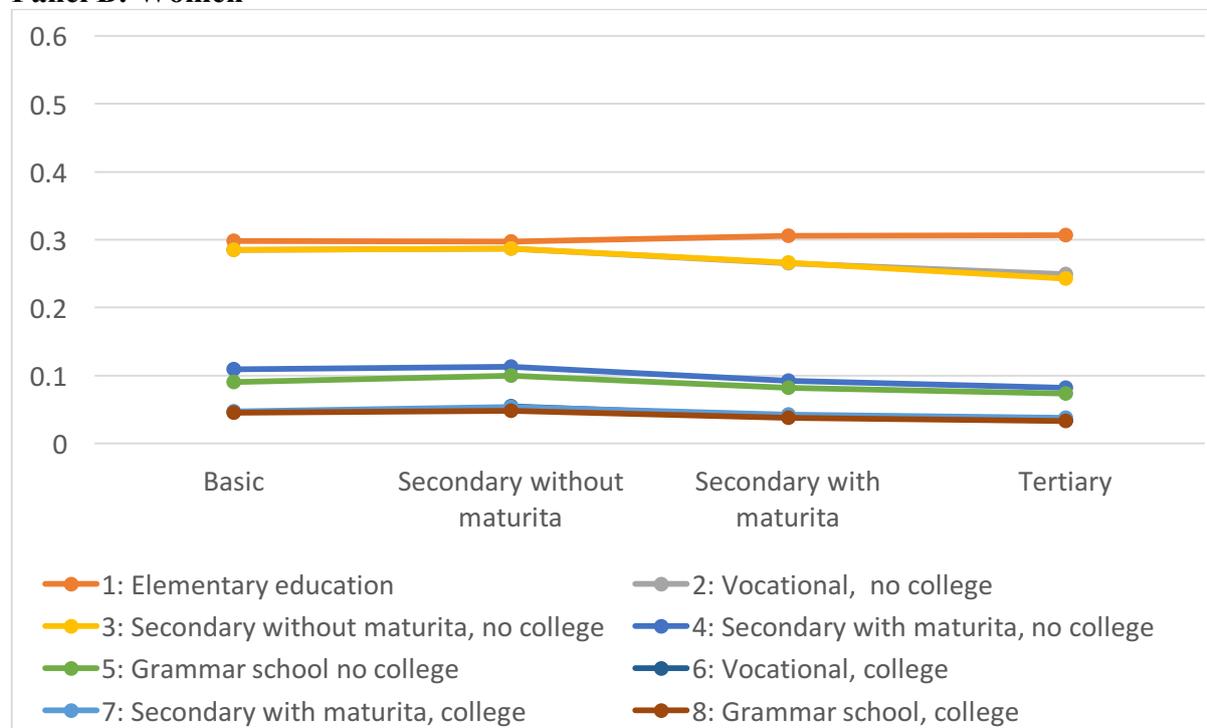


Graph 4. Predicted probability of skilled manual class by parental education (X-axis) and respondent educational pathway.

Panel A: Men

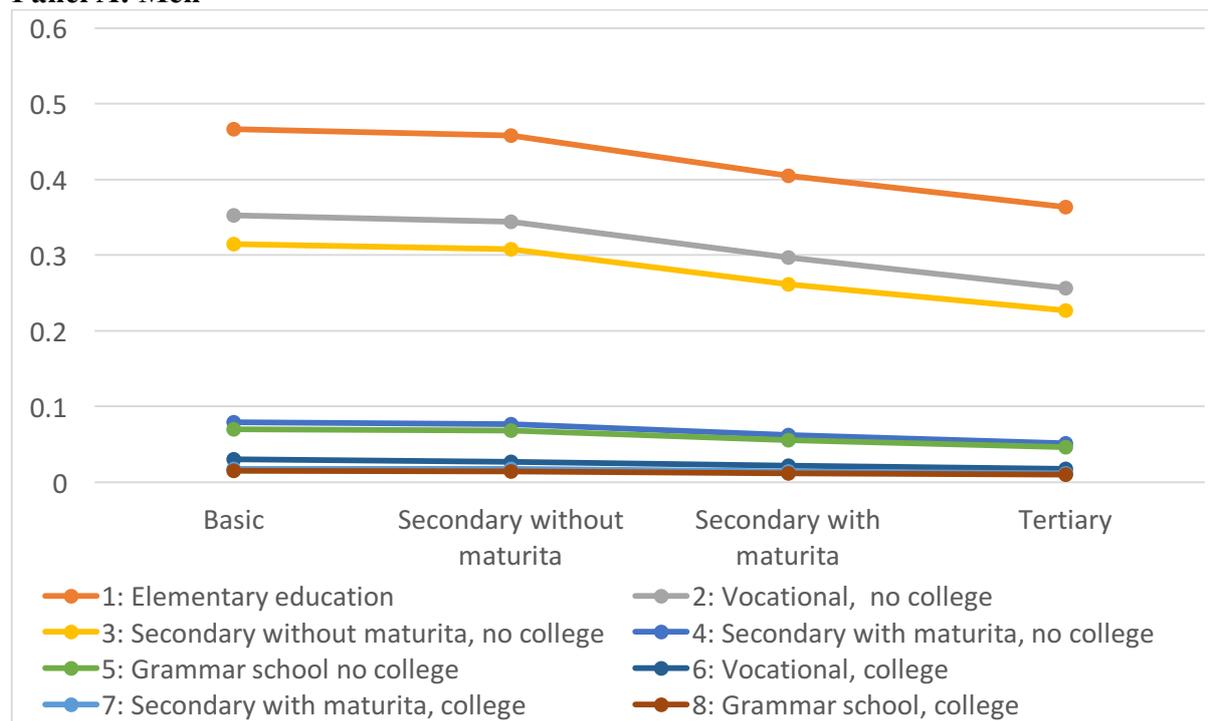


Panel B: Women



Graph 5. Predicted probability of unskilled manual class by parental education (X-axis) and respondent educational pathway.

Panel A: Men



Panel B: Women

