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ARE POLES STUCK IN OVEREDUCATION? INDIVIDUAL DYNAMICS OF EDUCATIONAL MISMATCH IN POLAND

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Are Poles stuck in overeducation? Individual dynamics of educational mismatch in Poland

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Abstract: The paper investigates persistency of overeducation from individual perspective. Following aspects of mobility are analysed: probability of staying in employment, upward occupational mobility and wage dynamics. Data for Poland are used. The results show that overeducated individuals are more likely to stay in employment compared to their properly matched colleagues. The overeducated workers as well as undereducated ones tend to move toward jobs for which they are more properly matched. However, the rate of this adjustment is low and one can fairly claim that in Poland overeducation is a persistent phenomenon from individual perspective. In line with other studies, the overeducated workers are found to experience faster wage growth compared to properly matched individuals. However, it can be largely attributed to overeducated workers improving their match status over time. It means that initially overeducated workers can expect faster wage growth than properly matched workers especially when they move to jobs requiring more schooling.

Keywords: overeducation, educational mismatch, occupational mobility, earnings mobility

JEL codes: I21, J24

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1. Introduction

Overeducation is a situation that worker's level of education exceeds level of education required for his or her job. Such situation raises concerns of underutilisation of human capital, and thus has been in the interest of researchers for a long period of time. The earliest discussion on overeducation traces back to Freeman (1976) who found that rise in number of college graduates in the US was accompanied by falling tertiary education wage premia. The aim of this paper is to contribute to the literature investigating persistency of overeducation from individual perspective, offering evidence from Poland.

Determining the persistency of educational mismatch is crucial from a policy perspective. Numerous studies found that overeducation is a negative situation for individuals. It suppresses wages of overeducation workers, leads to lower job satisfaction or might cause human capital depreciation (for comprehensive literature reviews see: Leuven and Oosterbeek 2011 or Quintini 2011). If overeducation is determined to be a persistent phenomenon, it questions rationale behind policies aimed at universal expansion of high level education. It also brings about need for further discussion on what policies can lead to improvement in job match. However, if overeducation is found short-lasting from individual perspective, i.e. overeducated workers move quickly to jobs which better utilise their education, there is rather no need to be worried about.

There are several possible explanations of existence of overeducation, which have different implications for persistency of educational mismatch. Sicherman and Galor (1990) proposed *career mobility theory* which implies that young individuals voluntarily accept to be overeducated at the beginning of their career paths in order to gain job experience to enhance their chances for faster promotion. In the light of Sicherman-Galor hypothesis, overeducation affects mainly young, unexperienced individuals but it is also associated with increased rates of upward occupational mobility and wage growth in subsequent periods. In this light, overeducation is *a stepping stone* for better career prospects. If Sicherman and Galor are right, overeducation, seen from individual perspective, should vanish with time.

The another possible explanation is that overeducated workers might in fact differ from their equally educated peers in terms of human capital components other than education, such as skills or innate ability. Thus overeducation might be merely an apparent phenomenon reflecting differences in unobserved human capital endowments between overeducated and

properly matched workers (compensation hypothesis). In this light, disappearance of overeducation would be observed only if there is improvement in unobserved human capital components.

Overeducation might be also seen as a result of frictions of matching process in the labour market. Since job searching is resource-consuming and associated with an opportunity cost, individuals looking for a job might eventually accept positions which do not properly match their education level because they simply cannot afford further searching. Overeducation disappears over time as mismatched workers obtain information on job offers which better match their education. The speed of transitions to properly matched jobs is likely to depend on effectiveness of labour market institutions. However, under the asymmetry of information, current overeducation might send to the labour market a negative signal about worker's actual productivity and dwindle chances of worker's transition to better matched jobs (Grunau and Pecoraro 2017). Finally, overeducation might result from aggregate mismatch between high supply of educated workers and low demand for high qualifications in the economy. From this perspective, overeducation would be persistent as long as the mismatch between supply and demand sides prevails.

Over the last three decades, empirical research gave very mixed evidence to validity of Sicherman-Galor hypothesis of temporariness of overeducation. The aim of this study is to contribute to the empirical literature testing dynamic implications of Sicherman-Galor model. The paper analyses job mobility of overeducated workers and offer new evidence on persistency of overeducation in Poland. In the paper, several aspects of mobility are investigated: probability of staying in employment, upward occupational mobility and wage dynamics. Empirical strategy builds on previous studies in this area, especially Rubb (2006) and Korpi and Tåhlin (2009). The analysis uses data from Polish Labour Force Survey and covers the period 2011-2018.

The rest of paper is organised in the following way. Part 2 discusses empirical literature investigating job and wage mobility of overeducated workers. Part 3 presents data, providing descriptive statistics, as well as empirical strategy employed in the study. Part 4 presents results of econometric analyses. Part 5 discusses results and concludes.

2. Literature review

Sicherman (1991) was the first researcher who tested empirically implications of Sicherman-Galor hypothesis by investigating firm and occupational mobility of overeducated workers using US data. For identification of upward mobility he constructed a ranking of occupations using an eclectic measure of human capital needed for an occupation which combined information on formal schooling, previous experience and required training. Overeducated individuals were found to experience more firm and occupational mobility, including upward occupational mobility, compared to the properly matched workers of the same education level. However the size of identified effect was relatively moderate: estimating additional 3p.p. of probability to move to a higher rank occupation for overeducated individuals. Furthermore, undereducated workers[1] were found to face increased chances to move to higher rank occupations compared to properly matched workers.

Robst (1995) pointed to a methodological flaw of Sicherman's study which had been controlling for actual schooling rather than required schooling.[2] Robst argued that, due to this flaw, findings of increased mobility of overeducated workers might simply reflect greater average mobility of workers in jobs that require less schooling. After addressing this problem on the same data source as Sicherman, he found results which partially diverged from Sicherman's findings. Overeducated workers were again found to be more likely to move to jobs requiring more schooling in subsequent years compared to properly matched workers (of the same required education), although they did not experience more job and occupational mobility in total. Undereducated workers were found to be more likely to experience job and occupational mobility in total, whilst less likely to move to jobs requiring more schooling, compared to properly matched workers.

In line with Sicherman-Galor model, Alba-Ramírez (1993), who analysed situation of Spanish workers, found that overeducated workers experience shorter job durations, higher job

[1] Contrary to overeducated workers, undereducated workers have schooling level which is below the level required in their occupations.

[2] Controlling for workers' actual schooling in the empirical model, as Sicherman (1990) originally did, means that overeducated workers are compared to properly matched workers of the same schooling level. Since Robst's critique, most studies control for schooling which is required for a given occupation, such that overeducated workers are compared to their properly matched colleagues in occupations requiring the same schooling level.

turnover and tend to improve their match status over time. Another evidence in favour of transitory overeducation was provided by Frei and Sousa-Poza (2012) in the study was conducted for Switzerland. Overeducation spells identified by Frei and Sousa-Poza were relatively short-lasting. About 60% of overqualified workers left overeducation in the next year, and about 90% in the four-year time horizon.[3]

Contrary to the hypothesis of short-lasting overeducation, Sloane, Battu, Seaman (1999) showed that overeducated workers tend to experience more frequent job changes which do not necessarily lead to improvement in education match. Furthermore, a group of studies for different economies reported large shares of overeducated workers staying in the mismatch. Battu, Belfield and Sloane (1999), who analysed situation of British tertiary education graduates in 1, 6, and 11 years after graduation, demonstrated that around 30% of graduates failed to find matched job at any moment of time. Similarly, Dolton and Vignoles (2000) reported that among the British graduates of 1980 38% were overeducated in the first job, and even six years later the share of overeducated workers was 30%. Further evidence for the United Kingdom was delivered by Lindley and McIntosh (2009) who reported that out of individuals identified as overeducated in 1991, 46% were still overeducated in 1996, and 18% in 2006. Rubb (2003) presented descriptive statistics for the US for the 1990s showing that 74% of the overeducated workers stayed in overeducation after one year, less than one-fifth became properly matched, whilst the rest left full-time employment.[4] Similarly, Clark, Joubert and Maurel (2017) reported that 66% of overeducated workers in the US stay in overeducation after one year. Frenette (2004) provided an evidence of persistence of overeducation among graduates in Canada. Frenette showed that only one-fourth of those who were overeducated two years after graduation improved their match three years later. Furthermore, some of the abovementioned studies find also that there is non-negligible share of properly matched

[3] However, because Frei and Sousa-Poza used workers' subjective declarations to identify overeducation, changes in the mismatch status turned to be weakly associated with actual changes of jobs. 87% individuals who moved out of (subjectively reported) overeducation did not change job or employer. It suggests that subjectively perceived mismatch might be less persistent than mismatch identified with other methods.

[4] However, Rubb's study has some apparent flaws. Firstly, the methodology based on realised matches, calculated separately for each of the two periods, allows education requirements to vary. Hence, the flows out / into overeducation might be to some extent a purely statistical effect. Furthermore, there is also some share of individuals, though small, who reported *decreasing* education level between periods.

workers who become overeducated, which is a feature which cannot be explained on the basis of Sicherman-Galor model. For instance, in the study by Frenette (2004) one-eighth of those who were not overeducated became overeducated.

Recent two studies using panel data from Germany give also evidence of persistent overeducation. Boll, Leppin and Schömann (2016) ran a dynamic mixed multinomial logit model to overcome the problem of individual heterogeneity. They found that overeducation, especially self-reported one, is highly state-dependent. According to their results, probability of being in self-assessed overeducation increases by 28%-43% if an individual was in overeducation in the previous year. Similarly, Erdsiek (2017) reported strong persistency of overeducation among young university graduates. Being overeducated 5 years before increases chances of current overeducation by 45 p.p. However, results from a dynamic random-effects probit model run by Erdsiek indicate that most of this effect can be explained by observable and unobservable heterogeneity of individuals.

There is rising empirical evidence suggesting that transitions to properly matched jobs might be hindered by scarring effect associated with overeducation. Studies by Baert, Cockx and Verhaest (2013) and Meroni and Vera-Toscano (2017) showed that in case of young graduates, at the beginning of their careers, taking up a job for which they are overeducated decreases chances to find well-matched job in subsequent periods compared to staying longer in unemployment. Further evidence of scarring effect of overeducation was provided by Clark, Joubert and Maurel (2017) who showed that past episodes of overeducation exert negative impact on current wages even if an individual moved to a matched job.

Another dynamic implication of Sicherman-Galor model, i.e. greater upward wage mobility of overeducated workers, started to be tested later than implication of increased job mobility. The first paper which addressed this issue was Büchel and Mertens (2004). They pointed that studies such as Sicherman (1991), although demonstrating that overeducated individuals experienced more job mobility, missed the aspect of quality of subsequent jobs. Using data for Germany, Büchel and Mertens found that overeducated individuals experienced lower wage growth than properly matched workers. In the context of job mobility, they also found that overeducated workers experienced less mobility to higher ranked jobs, whilst greater mobility was found for undereducated workers.

In turn, Korpi and Tåhlin (2009) argued that results by Büchel and Mertens were dependent on inclusion of workers' schooling, rather than required schooling, into regression

model so *"that the overeducation indicator reflects low occupational rank rather than mismatch",* which is similar to Robst's critique (1995) of Sicherman's study (1991). In their study for Sweden, which applied ORU specification[5] for percentage change of wage, they found that each year of excess schooling (overeducation) adds positively to wage dynamics. This effect is of similar size as for required schooling when initial wage level is not controlled, whilst the half of the size of the effect for required schooling when initial wage level is controlled. It means that overeducated individuals experience on average faster wage growth compared to their properly matched colleagues (of the same required education), however they are penalised compared to equally educated workers who are properly matched. The lacking schooling (undereducation) was found to add negatively to wage dynamics.

Rubb (2006) verified both dynamic implications of Sicherman-Galor model, using US data. Similarly to Korpi and Tåhlin, Rubb estimated ORU model controlling initial wage level, and investigated not only real wage dynamics but also probability of upward occupational mobility. He found that excess schooling increases chances of upward occupational mobility, whilst lacking schooling decreases them. Years of excess schooling positively contribute to wage dynamics, however this effect is about half a size of the effect of required schooling (which is in line with Korpi and Tåhlin). The lacking schooling contributes negatively to wage dynamics. Following Rubb (2006) and Korpi and Tåhlin (2009), ORU specification based approach is incorporated in this paper to investigate the mobility of overeducated workers.

Frenette (2004) also investigated the impact of mismatch status on wage change. Rather than initial mismatch status, the identification was based on individuals changing the mismatch status between two periods (over three years' period). He found that moving from overeducation to non-overeducation increases wages (by about 3-11% depending on type of tertiary education degree). It is worth noticing that overeducation wage penalty identified based on those who switch from overeducation to non-overeducation is more negative compared to the penalty identified based on individuals who switch from non-overeducation to overeducation (for them it is closer to zero or even positive).

Grunau and Porcaro (2017) analysed upward career mobility, defined as a promotion to managerial positions, and wage mobility of mismatched workers using German administrative data. They found that overeducated workers experience greater chances to be promoted to managerial positions compared to equally educated peers, whilst the opposite holds for the

[5] I explain ORU specification in the Data and methodology section of the paper.

undereducated workers, which supports Sicherman-Galor hypothesis. Furthermore the study differentiated between promotions within firms and between firms. They found that overeducated workers are less likely to be promoted to managerial positions when changing firms compared to situation when staying in a current firm. This finding suggests that overeducation is a negative signal to other employers affecting worker's chances for between-firm promotion versus within-firm promotion. Furthermore they find that overeducated workers experience relative wage improvement when being promoted, especially when changing firm, whilst non-promoted overeducated workers staying with the same employer experience wage decrease compared to equally educated workers.

Recently, Wen and Maani (2019) employed a dynamic random effects probit model, using data for Australia. Lower likelihood of upward occupational mobility and slower wage growth were found for overeducated workers, which opposes implications of Sicherman-Galor model. The coefficients for lagged dependent variables are positive which suggests that previous upward occupational mobility and previous wage growth increase current upward occupational and wage mobility, respectively. In turn, in a recent study for Germany, Roller, Rulff and Tamminga (2019) found that overeducated workers experience faster wage growth than their properly matched colleagues.

The evidence on persistency of overeducation from Poland is limited. Notable exceptions are two papers by Kiersztyn (2011, 2013), using data from a longitudinal survey POLPAN. In the first paper, Kiersztyn presented statistics that about 50%-68% overeducated individuals remained overeducated after 5 years' time. In the second paper she demonstrated that overeducated workers faced about four times higher probability to be in overeducation after 5 years compared to not-overeducated individuals. She interpreted these results as opposing Sicherman-Galor hypothesis. Because Kiersztyn's studies cover only the period 1988-2008 and do not address wage mobility, my paper fulfils an apparent gap in the literature, offering more recent evidence for Poland, using different source of data and addressing broader scope of issues associated with mobility of overeducated workers.

To sum up the literature review, the implication of temporary nature of overeducation, which arises from Sicherman-Galor career mobility model, was tested by many researchers giving mixed results. Whilst early articles seem to support temporariness of overeducation which is a stepping stone for better career prospects, more recent research on mobility of overeducated workers gives rather opposite evidence. Nevertheless, the literature seems to have

reached a consensus that both job mobility as well as wage mobility should be investigated to give a comprehensive picture of dynamic effects of overeducation.

3. Data and methodology

To identify education mismatch I follow so-called *realised matches approach*. Besides *job analysis approach* and *subjective approach*, it is one of three main approaches frequently used to identify overeducation and apparently the most popular one. The popularity of realised matches approach comes from the simplicity of its application. A researcher who wants to apply the method needs no information but education distribution within occupations. The other two approaches, although often said to be more preferable than realised matches approach, require additional data on analyst's assessments of required education for different types of occupations (for job analysis approach) or workers' self-assessment of their match quality. However, these additional data are seldom available. According to the realised matches approach required level of education for a given occupation is defined as a measure of central tendency of years of schooling in this occupation. Verdugo and Verdugo (1989) proposed to use mean value of years of schooling.[6] Alternatively, Kiker, Santos and de Oliveira (1997) proposed to use modal value of schooling observed among the workers in a given occupation. Besides mean and modal values, one might also think about using median number of years of schooling of workers in a given occupation. In this paper I use all three measures of central tendency, which allows me to check whether results change with different measure used (they do not).[7]

In the sample, I assigned to each individual the number of years of schooling corresponding to reported education level. Thus, all individuals with the same education level are assigned with the same number of years of schooling, and it does not necessarily reflect actual years of schooling for individuals who followed atypical education paths. The lowest schooling, 6 years, is assigned to individuals holding primary education (ISCED 0-1), whilst the highest schooling, 21 years, is assigned to people with at least PhD title (ISCED 8).

[6] Precisely, in Verdugo & Verdugo method the required level of education is mean value of schooling plus/minus one standard deviation.

[7] Although, to my knowledge, there is no other study on overeducation which uses median values to calculate required schooling, I purposely use this method, along with other two, to demonstrate that different operationalisation of realised matches approach does not change findings and median method can substitute the other two.

Occupations are analysed on a four-digit code level according to Polish classification of occupations which is consistent with the International Standard Classification of Occupations (ISCO). This provides very narrow granulation of data (at this level of representation there are 458 occupations in the sample). When calculating required education levels for occupations, observations of different years are pooled. It means that for one occupation I obtain one level of required schooling which does not change over time. Calculating education requirements independently for each year would lead to a problem of interpretation of changes in overeducation over time as they could arise from workers changing jobs as well as changing required schooling over time, which I want to avoid. I also assume that education level in the second period is the same as in the first period. Hence all changes in mismatched schooling must be due to occupation change.

The degree of education mismatch is represented as a difference between years of schooling corresponding to worker's actual level of education and required years of schooling calculated for worker's occupation (see

Figure 1 for the distribution of mismatched schooling in the first period). As already mentioned, required schooling is calculated in three ways: as mean, mode and median schooling. Following Duncan and Hoffman (1981), I express individuals' education using so-called ORU decomposition, which is well-rooted in the research on overeducation, especially on its impact on wages. According to ORU decomposition worker's schooling, edu, is a sum of schooling required in their occupation, $redu$, and one of two components representing number of years of mismatched schooling: excess schooling, $oedu$, or lacking schooling, $uedu$. Depending whether actual education exceeds required education, we have three cases:

- if $edu > redu$, actual education is represented as a sum of required and excess education, $edu = redu + oedu$, and workers are labelled as *overeducated*;

- if $edu < redu$, actual education is represented as required minus lacking education, $edu = redu - uedu$, and workers are labelled as *undereducated*;

- if $edu = redu$, there is no mismatched schooling and workers are labelled as *properly matched*.

I use microdata from the Polish Labour Force Survey (*Badanie Aktywności Ekonomicznej Ludności*). The timespan of the analysis is 2011-2018. Dynamics of overeducation can be analysed as LFS data allow to construct short panels. For the purpose of this study, I construct a sample in which each individual is observed twice. The second

observation is made one year after the first one. The sample consists of individuals aged 19-65 who worked in the first period. The sample size is at best 242,560 observations. When analysing mismatch change the sample size is reduced to 225,736 observations as individuals not working in the second period are excluded. The sample size for wage change estimations is much smaller. The reason behind this is large number of respondents declining to answer the question about their wages in both periods. Furthermore I also purposely delete observations for 1% of the lowest and 1% of the highest values of percentage change of wages to prevent the situation that results are driven by outliers. As a result the sample for wage change regression is reduced to 51,497 observations (which makes 23% of individuals working in both periods).

Since I address different issues associated with mobility of educationally mismatched workers it implies adoption of different dependent variables and econometric strategies. In the first model I analyse how the education mismatch is associated with chances to stay in employment in the second period of observation. Here the dependent variable is a dummy variable taking value 1 if a worker continues working in the second period, and 0 otherwise. The second model aims at investigating whether those who stay in employment experience upward occupational mobility. The dependent variable adopted to analyse this issue is a dummy variable taking value 1 if in the second period a worker reports occupation which requires more schooling than occupation reported in the first period, and 0 otherwise. In the third model I look at a change in number of years of required schooling between two periods. Here the dependent variable is continuous. Positive values of dependent variable mean that those workers who were initially overeducated reduced their years of excess schooling, i.e. they moved toward properly matching jobs, whilst those workers who were initially undereducated increased their lacking schooling, i.e. they moved away from properly matching jobs. Finally my attention is directed to wage mobility. The fourth dependent variable is the percentage change of full-time equivalents of monthly (real) wage. For dummy dependent variables logistic regression is used, for continuous dependent variables models are estimated with OLS method.

The explanatory variables used in the econometric analysis are:

- $redu$ – number of years of required education for a given occupation.
- $oedu$ – number of years of excess schooling, i.e. positive values of the difference between years of schooling assigned to workers' education level and number of years of schooling required for their occupation. Since the study focuses on mobility of

overeducated workers, the estimates of coefficients for this variable are of my main interest.

- $uedu$ – number of years of lacking schooling.
- $female$ – dummy variable taking value 1 for females and 0 for males.
- age – worker's age.
- $tenure$ – variable describing for how long a worker works for a current employer.
- $disability$ – dummy variable taking value 1 for people with disability and 0 otherwise.
- $region$ – categorical variable for voivodships. Dolnoslaskie voivodship is a reference level.
- $urbanisation$ – categorical variable for size of place of living (degree of urbanisation). The reference level is cities with more than 100 thousand inhabitants. The other categories are: towns with 20-100 thousand inhabitants, towns with less than 20 thousand inhabitants, and rural areas.
- $year$ – set of yearly period dummies. The dummies aim at catching the effect of labour market conditions.
- $child$ – a dummy variable taking value 1 if there is a child aged 3 or less in worker's household.
- $\ln(initialwage)$ – natural logarithm of worker's (real) wage in the first period. The full-time equivalents are used.
- $positive.redu.change$ and $negative.redu.change$ – change in number of years of required schooling between periods, respectively positive and negatively values.

The general form of the model is as below:

$$dep.var_i = \alpha + \beta_1 redu_i + \beta_2 oedu_i + \beta_3 uedu_i + \boldsymbol{\beta X_i} + \epsilon_i$$

Due to the fact that not all workers stay in employment in the second period, there is potential problem of sample selection, which might bias the results. It is plausible to think that selection is not random and depends on variables in the model. In fact, further results in Table 4 suggest that workers who were overeducated in the first period are more likely to stay in employment in the second period. Thus, as a robustness check, I also use the model with Heckman correction. The selection model is a probit regression with two additional variables: dummy for individuals with children aged under 3 and interaction between children and female. The model is estimated with two-step procedure.

The model describing percentage change of FTE monthly wages has the following specification:

$$wagechange_i = \alpha + \beta_1 \ln(initialwage_i) + \beta_2 redu_i + \beta_3 oedu_i + \beta_4 uedu_i + \beta_4 pos.redu.change_i + \beta_4 neg.redu.change_i + \boldsymbol{\beta X}_i + \epsilon_i$$

The ORU specification to percentage wage change was previously applied by Rubb (2006) and Korpi and Tåhlin (2009). The specification is augmented with additional variables. The first additional variable is log of initial wage level (also included in those studies). This variable is included to control for the fact for individuals with lower starting point it is easier to experience faster percentage wage growth. Those who have already high wage level tend to experience slower wage growth in percentage terms. The other two additional variables are $positive.redu.change$ and $negative.redu.change$, continuous variables difference in required schooling between two periods (the same as one of previously mentioned dependent variables). The variables aim to control whether wage change is associated with change in mismatch status.[8] Values for positive and negative changes are treated as separate variables following the finding of Frenette (2004) who demonstrated that switching from overeducation to non-overeducation is associated with different size of wage effect than switching from non-overeducation to overeducation.

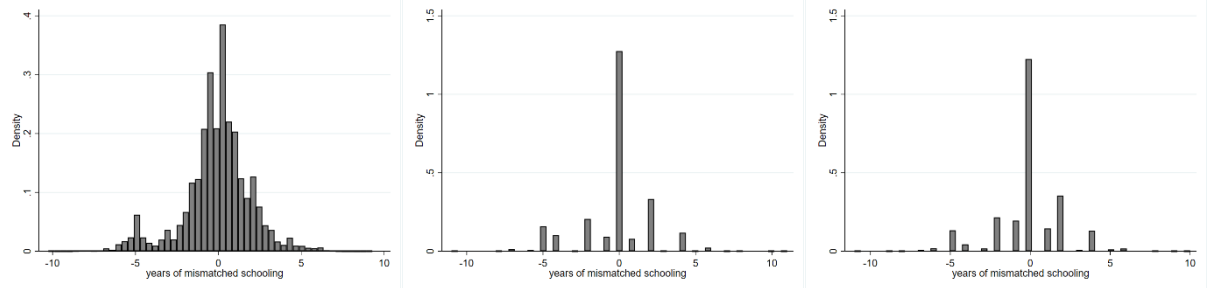
3.1. Descriptive statistics

Table 1 describes average number of years of schooling in the sample broken down in line with ORU decomposition. For the required education calculated as mean of years of schooling of workers in a given occupation, the average number of years of required schooling in the sample is 13.05 in the first period. In the second period it slightly increases to 13.09. The average number of years of excess schooling is 0.68 in the first period and 0.63 in the second period. Whilst for the lacking schooling it is 0.74 years in the first period and 0.68 years in the second period. Similar results are obtained when required schooling is calculated as mode or median. For each approach, we observe that in the second period required schooling slightly increases and excess and lacking schooling decreases. Thus the results suggest that there is reduction in mismatched schooling in the second period.

[8] For the stake of simplicity, I assume that worker's actual schooling does not improve in the second period, so changes in required schooling perfectly translate into changes in educational mismatch.

Figure 1. The distribution of mismatched schooling in the sample, first period

'mean approach' 'mode approach' 'median approach'



Note: Mismatched schooling is a difference between actual schooling and required schooling.

Table 1. Average number of required, excess and lacking years of schooling in the sample

	t = 1			t = 2		
required schooling calculated as	redu	oedu	uedu	redu	oedu	uedu
mean	13.05	0.68	0.74	13.09	0.63	0.68
mode	13.20	0.56	0.77	13.24	0.52	0.70
median	13.04	0.62	0.67	13.08	0.58	0.61
obs. (workers)	242,560			225,736		
share of working	100%			93.1%		

However, the decreased mismatched schooling in the second period might be potentially driven by mismatched individuals flowing out of employment. In fact, the share of non-working individuals in the second period is 6.9% (cf. Table 1). Table 2 looks at those who stayed in employment in both periods and changed the required schooling. Changes in required schooling are rather uncommon. Results based on mean approach for calculating required schooling indicate that 7.6% of individuals who worked in both periods changed the degree of required schooling in the second period. For the two other approaches, the share of workers changing required schooling is much smaller, 2.5% for the mode approach, and 3.4% for the median approach. For those who change required schooling, the average change is 0.05 for the mean approach, and 0.07 for the mode approach, and 0.10 for the median approach. It means that, on average, workers tend to move upward on an occupational ladder to jobs which require more schooling. Also the median change in required schooling suggests the upward occupational mobility.

Table 2 includes also information on changes in required schooling for subsamples of overeducated and undereducated workers respectively. For the overeducated workers, i.e. workers for whom actual schooling exceeded required schooling in the first period, clear upward shift in required schooling is observed. For those overeducated workers who changed

required schooling, the average change is between 0.38 for the mean approach to 2.96 for the mode approach. The reverse tendency is observed in case of undereducated workers. Undereducated workers who change required schooling tend to move to occupations requiring less schooling. To sum up, descriptive statistics suggest that although small fraction of mismatched workers change occupation, they move to jobs which better match their education.

Table 2. Change in required schooling in the sample

required schooling calculated as	average change	median change	% of workers changing required years schooling
whole sample			
mean	0.05	0.03	7.6%
mode	0.07	2.00	2.5%
median	0.10	1.00	3.4%
edu > redu in the first period (overeducated workers)			
mean	0.38	0.24	7.8%
mode	2.96	4.00	3.7%
median	1.72	2.00	5.0%
edu < redu in the first period (undereducated workers)			
mean	-0.36	-0.24	7.3%
mode	-2.26	-4.00	3.5%
median	-1.37	-2.00	4.2%

Notes: Individuals who did not change years of required schooling were excluded.

4. Empirical analysis

In this part I present and discuss results of the econometric analysis. To enhance comparability of results, the general outline of the tables is very similar. In each table, there are nine columns, three per each approach of calculation required schooling, starting from the most parsimonious model to full-specification model. This way of presenting clearly shows whether coefficients for explanatory variables of my main interest, i.e. required, excess and lacking schooling, are robust to model specification and changing approach to identify required schooling.

Firstly, let us discuss results for the logistic regression model of probability of staying in employment in the second period. The estimation results are presented in Table 3. First of all, we see that people working in occupations requiring more schooling had higher probability of staying in employment in the second period. Except of estimations in column 1, excess schooling increases chances of staying in employment in the second period. However the size of this effect is smaller than in case of required schooling. The average marginal effect of one year increase in required schooling is about 0.007 – 0.009 based on results from fully specified models. The average marginal effect for excess schooling is about 0.001 – 0.003, also based on

full specification models. The lacking schooling, in turn, decreases chances of staying in employment in the second period, on average by 0.005. Introducing controls for age and tenure – undereducated workers are usually older and with longer tenures, whilst overeducated workers are usually found among young with short tenures – increases the coefficients for lacking and excess schooling. The coefficients for controls are in line with intuition: being a woman decreases chances of staying in employment, larger tenure increases, disability decreases. The pseudo R-squared for the broadest specification models is about 8%. The results for mean, mode and median method are very similar. Concluding, mismatched schooling differs chances to stay in employment in the second period. Overeducated workers are slightly more likely to stay in employment compared to their properly matched colleagues working in the same occupations. However, if they are compared to individuals of the same education but working in occupations of higher schooling required, they have lower chances to stay in employment. The reverse conclusion applies to undereducated workers.

Table 3. Results of logistic regression of probability of staying in employment in the second period

	required education calculated as mean schooling			required education calculated as mode schooling			required education calculated as median schooling		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
redu	0.126***	0.137***	0.152***	0.092***	0.109***	0.111***	0.110***	0.124***	0.128***
oedu	-0.000	0.031***	0.019**	0.022***	0.056***	0.046***	0.015**	0.047***	0.040***
uedu	-0.069***	-0.073***	-0.074***	-0.091***	-0.085***	-0.084***	-0.078***	-0.078***	-0.079***
female		-0.381***	-0.438***		-0.369***	-0.435***		-0.375***	-0.433***
age		0.281***	0.287***		0.281***	0.287***		0.281***	0.286***
age sq.		-0.003***	-0.003***		-0.003***	-0.003***		-0.003***	-0.003***
tenure		0.042***	0.035***		0.043***	0.037***		0.042***	0.036***
disability		-0.350***	-0.395***		-0.360***	-0.402***		-0.354***	-0.398***
region dummies			yes			yes			yes
urb.dummies			yes			yes			yes
year dummies			yes			yes			yes
sector dummies			yes			yes			yes
constant	1.041***	-4.532***	-4.733***	1.464***	-4.204***	-4.224***	1.230***	-4.378***	-4.439***
LR chi2	1171	7954	9708	996	7816	9550	1082	7881	9605
prob. > chi2	0	0	0	0	0	0	0	0	0
pseudo R2	0.010	0.067	0.081	0.008	0.065	0.080	0.009	0.066	0.081
obs.	242,560	240,072	239,813	242,560	240,072	239,813	242,560	240,072	239,813
average marginal effects									
redu	0.0081	0.0084	0.0091	0.0059	0.0067	0.0067	0.0071	0.0076	0.0077
oedu	0.0000	0.0019	0.0011	0.0014	0.0034	0.0028	0.0010	0.0029	0.0024
uedu	-0.0044	-0.0044	-0.0045	-0.0058	-0.0052	-0.0050	-0.0050	-0.0048	-0.0048

*** p<0.01, ** p<0.05, * <0.1

Now, let us move to Table 4 presenting results of logistic regression describing probability of worker to move to higher rank occupation requiring more schooling. This situation means that individuals reduce their excess schooling or increase lacking education. First of all, the coefficients associated with required schooling are negative, which means that

workers in occupations which already require higher schooling are less likely to move to occupations requiring even more schooling. Coefficients for excess schooling are positive and statistically significant in all estimations. It means that overeducated individuals are more likely to move in the second period to occupations requiring more schooling compared to properly matched individuals. In turn, the coefficient for lacking schooling is negative which means that undereducated individuals are less likely to move to jobs which require more schooling. Very similar results are obtained with alternative approaches to identify required schooling. Hence the results suggest that in the second period there is some degree of shift to better matched jobs.

Table 4. Results of logistic regression on probability of moving to occupation requiring more schooling

	required education calculated as mean schooling			required education calculated as mode schooling			required education calculated as median schooling		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
redu	-0.111***	-0.122***	-0.203***	-0.161***	-0.202***	-0.397***	-0.191***	-0.217***	-0.370***
oedu	0.243***	0.211***	0.203***	0.419***	0.384***	0.374***	0.378***	0.343***	0.329***
uedu	-0.048***	-0.033***	-0.034***	-0.176***	-0.186***	-0.162***	-0.111***	-0.106***	-0.089***
female		0.100***	0.091***		0.531***	0.465***		0.311***	0.244***
age		-0.096***	-0.096***		-0.152***	-0.154***		-0.125***	-0.127***
age sq.		0.001***	0.001***		0.002***	0.002***		0.001***	0.001***
tenure		-0.023***	-0.019***		-0.032***	-0.019***		-0.027***	-0.016***
disability		0.035	0.017		0.067	-0.043		0.055	-0.034
region dummies			yes			yes			yes
urb.dummies			yes			yes			yes
year dummies			yes			yes			yes
sector dummies			yes			yes			yes
constant	-1.967***	0.460***	1.703***	-2.724***	1.028***	3.819***	-1.976***	1.156***	3.476***
LR chi2	1483	2615	3975	2379	3165	4140	2433	3152	4131
prob. > chi2	0	0	0	0	0	0	0	0	0
pseudo R2	0.020	0.036	0.055	0.079	0.108	0.142	0.061	0.082	0.107
obs.	225,736	223,707	223,473	225,736	223,707	223,473	225,736	223,707	223,473
average marginal effects									
redu	-0.0041	-0.0044	-0.0072	-0.0019	-0.0023	-0.0046	-0.0032	-0.00356***	-0.0060
oedu	0.0089	0.0075	0.0072	0.0050	0.0045	0.0043	0.0064	0.00562***	0.0053
uedu	-0.0018	-0.0012	-0.0012	-0.0021	-0.0022	-0.0019	-0.0019	-0.00173***	-0.0014

*** p<0.01, ** p<0.05, * p<0.1

Table 5 presents results of estimations where dependent variable is a continuous variable for change in years of required schooling between two periods. The positive change in required schooling means that either years of excess schooling decreased or years of lacking schooling increased. Level of required schooling in the initial period is negatively associate with the change in required schooling in the second period. The higher the initial level of required schooling, the smaller increase in required schooling in the second period. It is possibly explained by the fact that if a worker is initially in a job which requires high level of schooling, there are few jobs with higher levels of required schooling and many jobs with lower levels of required schooling, so moving to a job which would decrease his or her level of required

schooling is more probable than moving to a job which would further increase required schooling.

Overeducated individuals tend to move into better matched jobs as coefficients for number of years of excess schooling are positive and highly statistically significant. For models where required schooling is obtained as the mean of years of schooling within a given occupation, one year of excess schooling increases number of years of required schooling in the second period by about 0.03. Results for models for required schooling calculated with different approaches give estimates which are only slightly higher. The estimated coefficients for lacking education are about -0.01 for models with required schooling calculated as a mean schooling, and slightly lower (bigger in absolute terms) for models with required schooling calculated with either mode schooling or median schooling. The coefficients are highly statistically significant. It means that in the second period undereducated individuals tend to move to occupations for which they become better matched (but it means degradation in required education).

Positive coefficients for excess schooling and negative coefficients for lacking schooling mean that there is a tendency to reduce mismatch from both sides of mismatch distribution. Overeducated workers move upward and undereducated ones move downward in terms of required education. Nevertheless, the coefficients for the mismatch schooling are very small. The quickest speed of converge of overeducated workers to proper match is implied by the model for required schooling calculated with a 'mode' approach (0.04). According to these results, it needs about 25 years for overeducated individuals to become properly matched workers.[9] For the undereducated individuals the speed of transition toward properly matched jobs is even much smaller. Theoretically, it would take about 50 years to become properly matched, which is roughly the length of total career span. Thus transition to better matched jobs is a very sluggish process.

Let us now look at the coefficients associated with the controls. Tenure and age are statistically significant variables but with very small size of coefficients. A dummy variable for females has a positive coefficient which means that overeducation decreases for women faster than for men. The total explanatory power of the model is though very small. At best, only 3% of variance of dependent variable is explained with the explanatory variables. This is to great

[9] This is based on simple extrapolation of coefficients based on yearly transitions.

extent a result of large number of zeros in dependent variable since changing occupation is relatively infrequent.

Table 5. Change in years of required schooling

	required education calculated as mean schooling			required education calculated as mode schooling			required education calculated as median schooling		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
redu	-0.016***	-0.016***	-0.026***	-0.016***	-0.017***	-0.028***	-0.017***	-0.017***	-0.028***
oedu	0.034***	0.033***	0.033***	0.040***	0.039***	0.038***	0.038***	0.036***	0.035***
uedu	-0.010***	-0.010***	-0.009***	-0.020***	-0.020***	-0.017***	-0.015***	-0.015***	-0.013***
female		0.018***	0.012***		0.034***	0.029***		0.025***	0.019***
age		-0.003***	-0.003***		-0.003***	-0.003***		-0.003***	-0.003***
age sq.		0.000***	0.000***		0.000***	0.000***		0.000***	0.000***
tenure		0.000***	0.001***		0.000*	0.001***		0.000***	0.001***
disability		-0.005	-0.005		0.006	0.004		0.002	0.002
region dummies			yes			yes			yes
urb.dummies			yes			yes			yes
year dummies			yes			yes			yes
sector dummies			yes			yes			yes
constant	0.193***	0.260***	0.397***	0.201***	0.265***	0.424***	0.208***	0.271***	0.424***
F	1562	594.9	110.1	1740	667.8	121.1	1744	662.8	121.1
prob. > F	0	0	0	0	0	0	0	0	0
R2	0.020	0.021	0.025	0.023	0.023	0.027	0.023	0.023	0.027
obs.	225,736	223,707	223,473	225,736	223,707	223,473	225,736	223,707	223,473

*** p<0.01, ** p<0.05, * p<0.1

Because not all workers stay in employment in the second period, there is a potential problem of sample selection, which might bias the results. In fact, results presented in the Table 3 show that selection is not random and depends on variables in the model, including initial mismatch status. To address this problem model with Heckman correction is applied. The results of this model are reported in the Table 6. For the sake of brevity, only results for full specification are presented. High statistical significance of coefficients for inverse Mills ratio implies that sample selection is present. However, accounting for sample selection does not alter main results from the Table 5. The estimated coefficients for the years of required, excess and lacking schooling are very close to those presented in the previous table, which does not address the problem of sample selection. Thus we see selectivity of observations in the second period does not largely bias the results and OLS method gives estimates fairly close to true values.

Table 6. Change in years of required schooling (Heckit results)

	required education calculated as mean schooling		required education calculated as mode schooling		required education calculated as median schooling	
	redu change	selection	redu change	selection	redu change	selection
redu	-0.023***	0.077***	-0.026***	0.057***	-0.025***	0.065***
oedu	0.034***	0.015***	0.039***	0.027***	0.037***	0.025***
uedu	-0.011***	-0.037***	-0.019***	-0.043***	-0.015***	-0.040***
female	0.003	-0.148***	0.020***	-0.146***	0.008***	-0.145***
age	0.005***	0.148***	0.005***	0.148***	0.006***	0.148***
age sq.	-0.000***	-0.002***	-0.000***	-0.002***	-0.000***	-0.002***
tenure	0.001***	0.016***	0.001***	0.017***	0.002***	0.017***
disability	-0.017***	-0.209***	-0.007	-0.213***	-0.013**	-0.211***
region dummies	yes	yes	yes	yes	yes	yes
urbanisation dummies	yes	yes	yes	yes	yes	yes
year dummies	yes	yes	yes	yes	yes	yes
sector dummies	yes	yes	yes	yes	yes	yes
child under 3		0.098***		0.099***		0.098***
child under 3 x female		-0.400***		-0.399***		-0.399***
constant	0.165***	-2.317***	0.217***	-2.068***	0.160***	-2.165***
inv. Mills ratio (lambda)	0.223***		0.207***		0.261***	
rho	0.568		0.381		0.544	
sigma	0.393		0.543		0.480	
Wald chi2(52)	5252.39		6098.74		5891.86	
prob. > chi2	0		0		0	
obs.	239,822		239,822		239,822	
uncensored obs.	223,473		223,473		223,473	
censored obs	16,349		16,349		16,349	

*** p<0.01, ** p<0.05, * p<0.1

Now, let us move to discuss results for the wage change regressions. The results are presented in Table 7 and Table 8. First of all, we see that the initial level of wages negatively affects wage growth in the second period. It is what we would expect – workers who have already high wages experience lower wage changes expressed in percentage terms. An increase in initial wage level by 10% lowers wage growth in the second period by about 0.4-0.5 percentage points. Secondly, workers working in occupations requiring more schooling face faster wage growth. Each year of required schooling adds about 0.2-0.4 percentage points to wage dynamics in the second period.

When it comes to mismatched schooling, the results presented in Table 7 suggest that excess schooling improves wage dynamics in the second period, whilst lacking schooling has negative or zero impact on wage dynamics. In fully specified models the estimated coefficients for excess schooling are between 0.09-0.12. Hence, one year of excess schooling adds to wage dynamics about three times less than one year of required schooling.[10] Coefficients for lacking

[10] Similarly, Korpi and Tåhlin (2009) found that excess schooling adds to wage dynamics half as required schooling when initial wage level is included as a control (see results of model 4 in table 5 in their paper).

schooling are found to be statistically insignificant in some estimations for models with required schooling calculated with mean approach. The strongest effect of lacking education on wage dynamics is identified in case of estimations using required education calculated with mode approach (-0.1). It means that undereducated workers are penalized in terms of wage growth prospects compared to their properly matched colleagues.

Table 7. Results of regression on percentage wage change

	required education calculated as mean schooling			required education calculated as mode schooling			required education calculated as median schooling		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln wage fte	-3.867***	-4.187***	-5.034***	-3.822***	-4.094***	-4.917***	-3.863***	-4.154***	-4.993***
redu	0.220***	0.321***	0.367***	0.190***	0.260***	0.285***	0.214***	0.294***	0.329***
oedu	0.177***	0.149***	0.109***	0.149***	0.119***	0.092**	0.170***	0.149***	0.118***
uedu	-0.056*	-0.035	-0.036	-0.105***	-0.101***	-0.097***	-0.062**	-0.058**	-0.057**
female		-0.942***	-0.977***		-0.910***	-0.970***		-0.922***	-0.962***
age		-0.049*	-0.011		-0.051*	-0.014		-0.049*	-0.013
age sq.		0.000	-0.000		0.000	-0.000		0.000	-0.000
tenure		-0.015***	-0.009*		-0.013***	-0.008		-0.014***	-0.008
disability		-0.512**	-0.472**		-0.523***	-0.472**		-0.508**	-0.464**
region dummies			yes			yes			yes
urb.dummies			yes			yes			yes
year dummies			yes			yes			yes
sector dummies			yes			yes			yes
constant	27.677***	30.739***	33.457***	27.775***	30.907***	33.748***	27.740***	30.871***	33.687***
F	339.8	175.6	62.07	337.7	173.5	61.58	340.5	175.2	61.9
prob. > F	0	0	0	0	0	0	0	0	0
R2	0.026	0.030	0.060	0.026	0.030	0.060	0.026	0.030	0.060
obs.	51,497	51,305	51,257	51,497	51,305	51,257	51,497	51,305	51,257

*** p<0.01, ** p<0.05, * p<0.1

Table 8 further clarifies relationship between excess schooling and wage growth. Compared to Table 7, estimations in Table 8 are augmented with the change in years of required schooling, similar to a dependent variable in one of the previous models (as in Table 5), but here broken down into two separate variables as positive and negative changes are treated separately. The new variables are generally statistically significant. The exception are coefficients for negative change in required schooling when required schooling is calculated with mode and median approach. What is interesting, for required education calculated with mean approach both improving and worsening of schooling requirement between the two periods are associated with positive effect on wage dynamics (for negative change in required schooling the coefficients are negative, hence the impact is positive). At the first glance it might be counterintuitive why moving to occupation which requires less schooling positively affects wages. However, workers when decide to change job are, *inter alia*, motivated by higher wage in a new workplace. Those workers who are offered a new job in an occupation requiring lower schooling with no compensation in terms of wage increase, would just decide to stay in current job. Thus occupational change is dependent on wage growth prospects and the positive impact

for decrease in required schooling is not as surprising as it might look at the first glance. Although increase and decrease in number of required years of schooling impact wage growth in the same direction, the size of the impact is different. The effect associated with positive change in required schooling is 4 times bigger than negative change in required schooling (when calculated with mean approach), it means that workers who improve their schooling requirement experience substantially faster wage growth than those who worsen it. It implies that overeducated individuals who move to better matched occupations are substantially rewarded compared to other overeducated individuals.

Another important finding is that in the models augmented with additional variables for the change in required schooling, the coefficients for excess schooling decrease and, for full model specifications, lose on statistical significance. It means that when we control whether overeducated workers change their mismatched status over time, the initial mismatch status turns to be less relevant for explaining wage growth. Hence, it suggests that positive association between excess schooling and wage dynamics, which has been identified in the results presented in Table 7, can be largely attributed to those overeducated individuals who change their position for occupation requiring more education. Roughly speaking, overeducated workers can expect faster wage growth than the properly matched workers if they improve their education match in the second period, but it is less clear otherwise.

Table 8. Results of regression on percentage wage change

	required education calculated as mean schooling			required education calculated as mode schooling			required education calculated as median schooling		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ln wage fte	-3.875***	-4.213***	-5.063***	-3.828***	-4.113***	-4.937***	-3.887***	-4.194***	-5.034***
pos. redu change	1.951***	1.936***	1.992***	0.988***	1.020***	1.039***	1.476***	1.478***	1.514***
neg. redu change	-0.426**	-0.335*	-0.401**	-0.167	-0.099	-0.134	-0.033	0.036	-0.015
redu	0.224***	0.328***	0.383***	0.189***	0.262***	0.291***	0.218***	0.301***	0.342***
oedu	0.121***	0.096**	0.059	0.115***	0.086**	0.060	0.122***	0.103***	0.074**
uedu	-0.063*	-0.043	-0.044	-0.106***	-0.103***	-0.099***	-0.062**	-0.058**	-0.059**
female		-0.957***	-0.986***		-0.922***	-0.977***		-0.941***	-0.975***
age		-0.040	-0.002		-0.046*	-0.010		-0.044	-0.008
age sq.		0.000	-0.000		0.000	-0.000		0.000	-0.000
tenure		-0.015***	-0.009*		-0.013***	-0.008		-0.013***	-0.008
disability		-0.507**	-0.467**		-0.526***	-0.472**		-0.509**	-0.464**
region dummies			yes			yes			yes
urb.dummies			yes			yes			yes
year dummies			yes			yes			yes
sector dummies			yes			yes			yes
constant	27.645***	30.608***	33.215***	27.812***	30.907***	33.684***	27.854***	30.948***	33.662***
F	253	157.6	62.94	238.1	149.3	60.96	249.6	155.6	62.4
prob. > F	0	0	0	0	0	0	0	0	0
R2	0.029	0.033	0.063	0.027	0.031	0.062	0.028	0.032	0.063
obs.	51,497	51,305	51,257	51,497	51,305	51,257	51,497	51,305	51,257

*** p<0.01, ** p<0.05, * p<0.1

5. Conclusions

The paper places itself among the literature testing dynamic implications of Sicherman-Galor model, which predicts that overeducated workers should experience greater likelihood of upward occupational mobility and increased rate of wage growth compared to other workers.

The paper investigates persistency of educational mismatch from individual perspective. This issue has been tested since the 1990s, starting after Sicherman and Galor (1990) paper. Sicherman and Galor presented career mobility theory which implies that overeducation, a situation that a person works in a job requiring lower level of education than he or she actually have, is a transitory condition among young workers and it fades out with time as they gain experience and on-the-job training enabling them for upward occupational mobility. Hence, Sicherman-Galor hypothesis predicts that overeducated workers should experience more upward job mobility and faster wage growth compared to their properly matched colleagues. The subsequent empirical studies gave mixed evidence of validity of Sicherman-Galor model.

The paper contributes to this literature, giving evidence on persistency of overeducation in Poland. Specifically, three aspects of job-related mobility of overeducated workers are analysed: probability of staying in employment, upward occupational mobility and wage dynamics. The empirical strategy of the paper builds on previous studies, especially Rubb (2006) and Korpi and Tåhlin (2009). Yearly changes in employment status, occupation and wages are analysed.

The study identifies that overeducated workers are more likely to stay in employment compared to their properly matched colleagues in the same occupations. The reverse holds for the undereducated workers. Higher labour market attachment suggests that overeducated workers might be more productive to their properly matched colleagues in the same occupations. It corresponds to the well-documented fact that overeducated workers experience wage premium compared to properly-matched workers in their occupations.

The study finds weak evidence for educational mismatch to fade over time. Although results for upward occupational mobility analysis show that overeducated individuals tend to move to jobs requiring more schooling for which they become more properly matched, it is a very sluggish process. Based on simple extrapolation of estimated coefficients, the average time of overeducated workers fully moving to properly matched occupations is at best 25 years. Hence one can say that in Poland overeducation is rather a persistent phenomenon from individual perspective. The undereducated workers are found to move to jobs requiring less

education, but the rate of this change is negligible. Because chances to stay in employment differ between educational mismatch status, it might potentially make results for upward occupational mobility biased. The Heckman selection model is used to address this issue, but main results do not alter.

Finally, the percentage FTE wage growth is analysed. The results show that overeducated workers experience increased wage growth compared to their properly matched colleagues in the same occupations. In turn, undereducated workers experience lower wage growth compared to properly matched workers. Estimations controlling for change in required schooling show that faster wage growth for the overeducated can be largely attributed to those overeducated workers who improve their match status. In other words, initially overeducated workers can expect faster wage growth than their properly matched colleagues especially when they move to jobs requiring more schooling.

To sum up, the results presented in the paper give mixed support for Sicherman-Galor career mobility theory. The prediction of faster upward occupational mobility of the overeducated workers is hardly confirmed as the rate of additional upward mobility is extremely low. On the other hand, the overeducated workers are found to experience increased wage growth which is in line with Sicherman-Galor model. These results add to already mixed picture emerging from other studies, which might suggest that there are country specific factors influencing validity of Sicherman-Galor model.

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