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Overeducation and Overskilling across European Labour Markets. Preliminary Results from the First European Skills Survey using a Multilevel Analysis.

Preliminary version

Abstract:

We are interested in estimating the likelihood on the perception of being overeducated and overskilled of employees, in relation to what is required to do at their workplace. Using data from the first European Skills Survey completed by 48,676 adult employees across all the European Union's 28 Member States, we specify a multilevel logistic model in order to disentangle the differences of both overeducation and overskilling perception, considering two sources of variation: individual and country effects. Primary results show that male workers with tertiary education have higher probability to self-perceive both overeducated and overskilled. The constant accumulation of training and experience throughout a worker's career decreases the probability of employees to be overeducated. Furthermore, the random-effect estimate indicates that the source of variability at the level country plays a non-negligible role in interpreting results.

Keywords: *overeducation*, *overskilling, labour market, multilevel analysis*

1 Introduction

The severe economic, political and social crisis has upset the EU labour market plunging the most part of member states in an employment collapse. In this sense, skills development is highly important for building the virtuous circle in which the quality of education and training stimulates a new value of labour and a "new Deal" for the EU labour market. This will be enhanced by innovation, investment, technological change, enterprise development, economic diversification and competitiveness. Economic systems need all these issues to accelerate the creation of additional and qualitative jobs. However, some imbalances due to increasing global competition, the skill-biased technological change, increasing migration from poor countries, the ageing of population still impede finding the right persons for the appropriate jobs.

Education mismatch and skill mismatch suggest a certain grade of inefficiencies in the educational and occupation systems, stressed during the present economic recovery. Among several reasons by which a perfect match in the labour market is uncertain due to geographical mobility, time lags, or languages constraints, researchers suggest the presence of wrong investment in human capital, that causes an underutilisation at the workplace (Flisi et al., 2014). Education mismatch may take place upward or downward; when the educational attainment of the worker exceeds the educational qualification required for the job, we are talking of over qualification (upward). Having a higher level of education implies higher probability of being overeducated, solely over skilled, severely mismatched and mixed mismatched. Overeducation or overqualification is a serious concern today in Italy and Spain (Aina and Pastore, 2012; Ortiz, 2010; Di Paolo and Mañè, 2014). This is a well-known problem analysed since 1976 by Freeman on the case of American college graduates with a follow-up in the literature on the Mincerian wage equation and overskilling/overeducation effects (see Duncan and Hoffman, 1981). Since then, the literature on this topic has been extensively developed. However, while researchers have almost exclusively focused on education mismatch, in the last few decades analyses significantly move towards a greater focus on skill

mismatch and highly on overskilling (e.g. Mavromaras, McGuinness, O'Leary, Sloane and Wei, 2013; Quintini, 2011), a situation where a worker's skills exceed those required by his/her job.

Over-skills is of main concern in United Kingdom, Germany, Austria, but also in Greece and Spain as survived recently by Cedefop (2014) and OECD (2013). Education and skill mismatch, although related, are not the same concept, since they lead to different types of analysis and policy implications (Desjardins and Rubenson, 2011).

Overall, for both education and skill mismatch the main divide is between the objective and subjective approaches (Groot and Maassen van den Brink 2000), but in some cases also empirical methods are provided (Cedefop 2010, OECD 2013). The objective approach relies on objective measures, such as the actual level of education acquired or the actual skill level in comparison to the level of education/skills of peers in the same occupation; the subjective approach relies on direct questions asked to the workers about their perception of mismatch. We refer only to over mismatch, since literature maintains that overeducation and overskilling lead to lower levels of productivity, lower job satisfaction and psychological stress, besides being on aggregate level a waste in terms of investment in education. Further, it is associated to an increase in on-the-job search and turnover (Verhaest and Omey, 2009; Quintini, 2011; Kampelmann and Rycx, 2012) and the loss of productivity on individual level may hamper the aggregate output of companies.

Our analysis aims at estimating the likelihood on the self-perception of employees of being overeducated and overskilled using data from the first European Skills Survey, with a special focus on tasks and organisation. The remainder of the paper is organised as follows: Section 2 presents the literature review on skill mismatch; Section 3 is devoted to describing the identification strategy and data; Section 4 provides the model specification and preliminary results.

2 Evidence from previous studies

New job requirements are rapidly emerging in the labour market with a greater demand for more information-processing and high-level cognitive skills, while the skill gaps between different educational levels (in particular between tertiary graduates and upper secondary graduates) vary considerably across countries, but also within countries (among individuals with similar qualifications). This might be due to the loss of skills through time as an effect of ageing; or might be the result of change in the type and quality of education provided in the same country (OECD, 2013).

There are different approaches, which measure the different needs for skills owned by a worker and actual skills required for his/her job. The lack of appropriate data has prevented from larger empirical evidence up to date, but some international project such as the PIAAC of OECD and the European Skills and Jobs (ESJ) survey, the first pan-European survey on skill mismatch, carried out by Cedefop in Spring 2014 have closed somewhat the gap.

The approaches used for measuring skill mismatch can be summarized in objective, subjective and mixed methods. Whereas in our estimations we will use the subjective method, taking account of the nature of our data, we refer briefly to the statistical/realised match approach (RMskills) and to the mixed methods. The RMskills can be distinguished in two categories. In the first one, the distribution of skill levels is calculated for each occupation, and workers who depart from the mean or mode by more than some ad-hoc value – generally, one or two standard deviations – are classified as over or under-skilled. In a second approach, skill match and mismatch is derived by reported engagement in a given skill-related tasks at work, on one hand, and direct measures of the skills of workers, on the other (Krahn and Lowe, 1998; and Desjardins and Rubenson, 2011). Individuals are distinguished between low-skill and high-skill according to some direct measures of their skills. Part of the literature criticizes one of the main assumptions of these

methodologies, i.e. the use of skills engagement as a proxy for skill requirements for a certain job, on the basis that frequency of skill use is a different concept than required level (see e.g. OECD, 2013).

With the PIAAC dataset, the tentative is to apply a mixed method. OECD (2013) derived a measure of skill mismatch that combines questions on feeling overskilled or with a skill deficit and the individuals' proficiency score in each domain (i.e. literacy, numeracy and problem solving in technology-rich environments). Workers are overskilled in a domain if their score is higher than the maximum score of self-reported well-matched workers, and they are under-skilled in a domain if their score is lower than the minimum score of self-reported well-matched workers. We will use also this dimension in order to disentangle the real overeducation and overskilled, that is an extremely negative condition in which the individual has both an educational qualification which exceeds the qualification required and uses very little or little his/her skills in the current job. In the Cedefop European Skills and Jobs survey a measure of skill mismatch is derived from individuals' answers on self-declared literacy, numeracy and ICT skills doing their jobs.

The European Skills and Jobs survey allows to use the third method that relies on information provided by the worker and which consists of using his/her opinion on whether the job matches with his/her level of both education and skills, either through direct questions or by asking employees about the requirements of their current job. A distinction made in the literature is between the educational level required to get the job and the one required to do the job; alternatively, some authors used different expressions (e.g. "appropriate" education level, Allen and van der Velden, 2001) to identify these separate concepts. Subjective reports by respondents are always vulnerable to measurement error, which can vary from respondent to respondent. Despite this weakness, they have the advantage of being easily observable, specific to the job of the respondent and up-to-date. Subjective measures of the incidence of overqualification are typically found to exceed those obtained via objective (e.g. dictionary-based or empirical method) measures (Groot and van den Brink, 2000). Nevertheless, the various approaches in estimating the incidence and returns to overqualification tend to yield broadly consistent conclusions (McGuinness, 2006). Main references in literature based on this approach involve also Halaby (1994), Mavromara, McGuinness and Wooden (2007), Green and McIntosh (2007) or Diaz-Serrano and Cabral Viera (2005) among others.

On the other end, there are matched individuals, those who hold the required educational degree for the job they have and use quite a lot or almost all the skills he/she owns in the current job. Half-way, we can find individuals who are matched in terms of skills but mismatched in terms of educational qualification (formal overqualification) and individuals who are matched in terms of degree but their job do not allow them to exploit completely their own skills (qualification matched and skills underutilised). Native-born and foreign-born may exhibit a different grade of overqualification and overskilling.

The constant accumulation of experience and qualifications throughout a worker's career implies that, for a good job match to be maintained, qualification-specific job requirements must increase as the worker ages. If this does not occur, even older workers face a risk of becoming over-qualified (Frei and Sousa-Poza, 2012). This can occur if there is sufficient training on the job. Whereas it is noteworthy, that vocational education does not affect the likelihood of overskilling. Only Mavromaras et al. (2009) look at post-secondary vocational qualifications, finding that they reduce the likelihood and persistence of being overskilled at work in Australia compared with secondary and university education. However, Ryan and Sinning (2011) find that the wage penalty from overqualification is bigger for vocational graduates than for youth with academic degrees, and that vocational graduates may find themselves trapped in jobs, which do not make the best use of their skills. We can test this issue with the Cedefop data, which contain individual characteristics.

Job heterogeneity may also provoke overqualification/overskilling. Jobs involving supervisory roles, complex tasks, allowing significant independence and requiring the frequent use of computing skills present a higher quote of over-qualified workers while jobs where physical working conditions are poor have a lower probability to cause overskilling. Overskilling and underskilling are based on individuals' judgement of their skills and their job requirements, so who feels overskilled is supposed to be in less demanding jobs and those who feel under-skilled are likely to be in more demanding jobs (Quintini, 2011).

The empirical literature shows that some labour market features like experience, type of contract, firm size, activity sector and type of organisations play a fundamental role in both overskilling and underskilling. The mismatch declines with labour market experience and with firm size, whereas it appears that workers on fixed-term contracts are more likely to be overskilled at work than those on other contract types, and even more in temporary contracts. Also long unemployment spells may cause a skill obsolescence and mismatching.

Recent reports analysing a large number of countries indicate that job-skill mismatch is a widespread, persistent problem (Quintini, 2011; Berkhout et al., 2012; Pouliakas, 2013), and one that is likely to be associated with considerable individual and societal costs (Antonio di Paolo and Ferran Mañé, 2014). Some well-established conclusions emerge from this literature, namely that over-qualified workers are more likely to endure wage penalties, lower job satisfaction, higher turnover and absenteeism, and potentially lower participation in training.

For employers, costs associated with qualification and skills mismatch may take the form of higher recruitment costs, lower productivity and lower product quality. Some of these conclusions are currently being revised. Some researchers claim that unobserved individual heterogeneity biases the estimated earnings effects (Leuven & Oosterbeek, 2011). In addition, some recent research challenges the supposed negative impact on productivity (Pouliakas, 2013). Indeed, using linked employer-employee data, Kampelmann & Rycx (2012) suggest that employing overeducated workers is beneficial for productivity at the firm level.

More and more authors, however, are using measures of deficits/surpluses in skills or competences (Allen and van der Velden, 2001; McGuinness, 2003; Allen and de Weert, 2007; Green and McIntosh, 2007; Mavromaras, McGuinness and Wooden, 2007; Mavromaras et al., 2010; McGuinness and Sloane, 2011). An initial conclusion emerging from this literature is that, quite unexpectedly, educational and skills mismatches are only weakly correlated, indicating that perhaps they are distinct empirical phenomena that need to be studied separately.

A more controversial issue is the impact that educational and skills mismatches have on wages. The literature reports negative wage effects stemming from both forms of mismatch, a finding that is consistent with the growing evidence that educational and skills mismatches are distinct problems. However, there is a lack of consensus on the dimension of the negative effect deriving from the type of mismatch. There is increasingly robust evidence that the worst situation is to be overskilled and overeducated.

The effect of mismatching on wage cannot be observed separately from job satisfaction. Several papers (Allen & van der Velden, 2001; Green & Zhu, 2010; McGuinness & Sloane, 2011; Mavromaras et al., 2013) have analysed the impact of educational and skills mismatch on job satisfaction. It is important to analyse job satisfaction along with earnings, in order to fully understand the labour market impacts of job mismatch, because the mismatch may not be involuntary. Workers may forego higher wages in favour of other more satisfying job attributes, such as job security or work-life balance (McGuinness & Sloane, 2011; Mavromaras et al., 2013). The results of this new literature show that qualification mismatch per se is not strongly correlated with job satisfaction and that underutilisation of acquired skills has more serious consequences, particularly when accompanied by educational mismatch.

3 Identification strategies and data

We use data from the first European Skills Survey collected on 48,676 adult employees across all the European Union's 28 Member States. The available data concern: individual and professional characteristics of respondents, e.g. gender, age, level of education, profession, experience and training provided by firm/organization; kind of employment contract, main activity carried out by firm/organization and its size, and the country where respondents are employed.

Our variables of major interest are overeducation, derived from the comparison between the highest level of employees' education and the level of education required by their job, and overskilling, measured by employee's self-declaration on her/his professional skills and that required by the workplace.

In Table 1 we provide descriptive statistics about our sample and the employees' characteristics considered in the analysis. We also include a variable, named *Coherence*, that captures the correspondence between the area/field of workers' education and the focus of their current professional/technical job. We observe that the higher percentage of respondents works full-time, with a permanent contract, in the same country in which they are born. Further, more than half of interviewed is graduated, has attended training courses and works in the third sector.

A glance at the perception of being overeducated and overskilled (Table 2) reveals that 28.1% of respondents holds a higher level of education with respect to what is required by their job, while 38.6% of respondents evaluate themselves having higher skills than needed in their workplace. We observe remarkable differences with respect to the country. Half of workers in Greece, Austria and United Kingdom reports of having skills that cope those required at the workplace, while almost 80% of employees of both Baltic countries and Malta are matched or underskilled in relation with the demanding duties at work. With respect to the overeducated classification, worker's highest qualifications exceed extensively those required by the workplace in France and United Kingdom. Moreover, the percentage of respondents holding tertiary education in these countries are quite higher (54.2% and 48.6%, respectively) compared to the percentage observed in Luxemburg and Netherlands (26.7% and 38.3%, respectively), in which less than 17% of employees is evaluated of being overeducated. It is also noteworthy that Finland experiences below-average incidence of overeducation despite higher rate of tertiary education (57.5%).

Given the variability observed among European Countries involved in the Skills Survey and the research question, we adopt a multilevel (two-level) model in order to account both for the fixed effects and the country effect.

Table 1: Descriptive statistics

Variable	
Number of observations	48,676
Male	56.0%
Born in the Country	89,8%
Age: from 24 up to 65 years old	42 (Average value)
Level of Education	
Low	12.5%
Middle	41.8%
High	45.7%
Main area or field of highest level of qualification	
Humanistic studies	11.0%
Social sciences	19.1%
Sciences	17.8%
Medical sciences	6.0%
Other studies	8.5%
Coherence between professional category and field of study	19.7%
Work experience: from less than 1 year up to 50 years	10 years (Average value)
Professional categories	
Professional & Managers	28.9%
Technicians and associate professionals	15.8%
Skilled/semi-skilled/elementary	54.8%
Other	0.5%
Attended training course	55.2%
Full time employees	84.3%
Contract type:	
Permanent contract	82.8%
Temporary contract	11.6%
Atypical	5.6%
Sector of firm/organisation	26.1%
Agriculture, forestry and fishing	2.1%
Industry	22.9%
Services	61.7%
Public administration	11.7%
Other	1.6%
Firm Size:	
Small: from 1 up to 9 employees	1.7%
Medium: from 10 up to 99 employees	40.1%
Large: from 100 over 500 employees	36.4%
Salary (depending on country):	
Lower Quartile: from 1€ up to 1,799	20.1%
Medium-Low Quartile: from 216€ up to 3,000€	25.3%
Medium-High Quartile: from 359€ up to 4,500€	22.6%
Highest Quartile: from more than 359€ to more than 4,500€	21.6%

Table 2: Perception of being overeducated and overskilled by interviewed employees across the European Union's 28 Member States

Country	N. of observations per country	Overeducated (%)	Overskilled (%)
Germany	4,013	27.3	45.9
France	4,011	41.2	34.6
United Kingdom	4,001	40.3	50.3
Sweden	1,001	25.6	37.7
Italy	3,016	21.8	37.2
Greece	2,037	25.0	50.5
Czech Republic	1,506	29.4	31.5
Poland	4,017	29.3	40.0
Netherlands	1,502	16.2	39.5
Denmark	1,000	19.9	37.8
Hungary	1,500	24.2	35.3
Spain	4,009	32.0	43.1
Austria	1,000	26.9	50.4
Belgium	1,502	23.5	34.3
Ireland	1,004	30.0	44.3
Slovakia	1,019	29.0	40.4
Finland	2,004	21.3	41.6
Portugal	1,503	22.5	30.9
Estonia	1,001	31.7	21.0
Romania	1,502	21.4	28.9
Lithuania	1,010	29.7	21.0
Cyprus	500	28.6	40.2
Slovenia	1,010	24.8	35.8
Bulgaria	1,000	26.5	28.4
Latvia	1,004	22.8	21.8
Luxembourg	500	12.2	27.6
Malta	500	21.8	21.8
Croatia	1,004	21.6	33.6
Total observations	***48,676***	***28.1***	***38.6***

4 Model specification and preliminary results

Given the hierarchical structure of our data (level-1 Individuals; level-2 countries) and the binary nature of the outcome variable of interest, coded Overeducation and Overskilling, with value 1 indicating overeducation and overskilling perception, we implement a Multilevel Generalized Linear Mixed Model which takes into account both fixed and random effects. Indeed, our model includes several fixed effects predictors such as age, gender, education level, profession, etc., plus a fixed intercept and a random intercept for each level-2 component (e.g. one for each country).

The multilevel approach for binary outcome variables has been used in several disciplines (sociology, epidemiology, demography, etc.) to study data with hierarchical structure (individual, familiar, geographical, social, etc.) (Bryk and Raudenbush 1992; Goldstein 1999). Standard regression models and clustering are not adequate when dealing with hierarchical structure data, providing biased estimates and standard errors (Aitkin and Longford 1986). On the contrary, multilevel modelling corrects for the biases in parameter estimates, provides correct standard errors and estimates of the variances and covariance of random effects at various levels (Snijders and Bosker 1999). "Mixed effects" models, containing both fixed and random effects, allow analysing data with a complex variance through maximum likelihood estimation (Searle et al.1992). The fixed effects are analogous to standard regression coefficients and are directly estimated; the random effects are not directly estimated (although they may be obtained in the post-estimation), but are summarized according to their estimated variance and covariance. The distribution of the random effects is assumed to be Gaussian, while the conditional distribution of the response given the random effects is assumed to be Bernoulli, with probability determined by the logistic cumulative distribution function.

Since the research question aims at identifying factors that affect the overeducation and the self-evaluation of overskilling of workers, we specify a multilevel logistic model and we assume that its probability is associated with two level-related factors – individual and country level – via a logit link. In the following, we estimate two random intercept models for the probability of being overeducated (model 1) and over-skilled (model 2). In both models, we include the explanatory variables, as reported in Table 3.

For both model 1 and model 2, given a logit link function, the unconditional model at level 1 (individual characteristics), 2 (country) is the following:

$$Y_{ij} = \beta_{0j} + \beta_i X + e_{ij}$$

$$\beta_{0j} = \Upsilon_0 + \sigma_{0j} \qquad \text{where} \quad \sigma_{0j} \sim \mathcal{N}(0, \tau_\beta)$$

In particular, the intercept β_{0j} corresponds to the log-odds of a reference i-th individual being overeducated (model 1) or overskilled (model 2) in the *j*-th country; Υ_0 is the average log-odds being overeducated (model 1) or overskilled (model 2) across countries, while τ_β is the variance component that is estimated at country level.

The fitted model is the following:

$$Y_i = \beta_{0j} + \beta_i \boldsymbol{X} + e_i \qquad \text{where} \quad Y_i \text{ are either overskilling or overeducation}$$

Table 3: Explanatory variables

Variables		Reference category
Individual characteristics of workers		
Male (=1)	Dichotomous	
Born in the Country of the workplace (=1)	Dichotomous	
Age: from 24 up to 65	Continuous and centred around its mean	
Educational Level	Categorical, with three categories: *none/lower secondary education* *upper and post-secondary education* *tertiary education*	Lower secondary education
Main area or field of highest level of qualification	Categorical, with five categories:	Sciences
	Humanistic studies	
	Sciences	
	Medical sciences	
	Social Sciences	
	Other studies	
Professional characteristics of workers		
Occupation categories	Categorical with three categories	Technicians and associate
	professional and managers	professionals
	technicians and associate professionals	
	semi-skilled or elementary-skilled	
Coherence (=1)	Dichotomous	
Experience	Continuous and centred around its mean	
Training (=1)	Dichotomous	
Part-time vs. full-time contract (Part-time=1)	Dichotomous	
Contract type	Categorical with three categories *permanent contract* *temporary contract* *atypical*	Temporary
Salary Quartile	Categorical with four categories *lower band* *medium-lower band* *medium-higher band* *highest band*	Highest Band
Main activity carried out by firm/organizations and its dimension		Industry
Firm/organisation	Categorical with five categories *agriculture, forestry and fishing* *industry* *services* *public administration* *other*	
Firm-size	Categorical with 3 categories *Small firms from 1 up to 9* *Medium firms form 10 up to 99* *Large firms from 100 over 500*	Large firms

In Table 4, we report both the fixed effect estimates (and their significance) and the variance of the random effects on the likelihood of being overeducated and overskilled. The fixed effect of the intercept represents the log-odds of being overskilled or overeducated related to our reference variables.

With respect to the individual characteristics of employees, a male worker who attained post-secondary and tertiary education has the highest probability of being overeducated and self-perceive himself as an overskilled individual. Having a professional and manager position and a part-time contract decreases the log-odds of both being overeducated and overskilled. The constant accumulation of training and experience throughout a worker's career decreases the probability of employees to be overeducated (as in Frei and Sousa-Poza, 2012) and to perceive themselves overskilled. The wage penalty has a significant level in the case of overskilling increasing moderately the respective log-odds, whereas the lower bands of wage have a consistent effect on overeducation.

As regards the sectors of the firms, significant effects are estimated for each sector: the agriculture sector shows that workers have higher probability to be overeducated, while workers in public sector report higher probability to be overskilled. As regards services sector, employees display a higher probability of being both overeducated and overskilled. Concerning the firm size, we notice significant negative effect with respect to the log-odds of being overskilled in the small firms as expected, but without any other effect in the other cases.

Finally, the random-effect estimate indicates that the source of variability at the country level plays a non-negligible role in interpreting results, as highlighted in figures 1 and 2. Because in our analysis we have only one random effect at this level, Table 4 shows only one variance component. Likelihood ratio test is highly significant and confirms that country effect cannot be excluded from the analysis. The random effect is evident for both outcomes. In the case of overeducation, we observe that the highest effect is given for UK, France, Check Republic and Croatia, while the lowest effect is estimated in the Netherlands, Luxemburg and Romania. In the case of overskilling outcome, the largest impact is noticed in Austria, UK, Greece and Germany. On the other hand, Baltic countries show the lowest probability to be overskilled.

Table 4: Two-level analysis of the perceived overeducation and overskilling, with estimates related only to significant coefficients (Std. error in brackets)

Fixed effect	**Overeducation (Model 1)**	**Overskilling (Model 2)**
γ_0	-2.58*** (0.134)	-1.6740*** (0.124)
Individual characteristics		
Sex (male=1)	0.157*** (0.024)	0.244*** (0.021)
Age		0.005*** (0.001)
Post-secondary Education	0.810*** (0.042)	0.314*** (0.035)
Tertiary Education	1.577*** (0.049)	0.627*** (0.042)
Humanistic studies	0.303*** (0.039)	0.118*** (0.036)
Social Sciences	0.285*** (0.032)	0.117*** (0.029)
Other studies	0.471*** (0.039)	-0.117*** (0.037)
Coherence	-0.221*** (0.037)	-0.122*** (0.032)
Experience	-0.016*** (0.002)	-0.012*** (0.001)
Overskilling	0.601*** (0.023)	
Overeducation		0.608*** (0.023)
Professional characteristics		
Professional and managers	-0.366*** (0.037)	-0.073*** (0.032)
Semi/Elementary-skilled	0.654*** (0.036)	0.225*** (0.031)
Training	-0.291*** (0.024)	-0.082*** (0.021)
Part-time contract	-0.095*** (0.033)	0.070** (0.030)
Permanent contract		0.098*** (0.032)
Atypical	0.384*** (0.055)	
Low salary	0.539*** (0.037)	0.154*** (0.034)
Medium-low salary	0.203*** (0.032)	0.092*** (0.028)
Medium-high salary		0.097***(0.028)
Sector of firm		
Agriculture	0.428*** (0.077)	-0.184*** (0.076)
Services	0.109*** (0.028)	0.171*** (0.025)
Public administration		0.225*** (0.036)
Firm size		
Small		-0.278*** (0.083)
Medium	-0.058** (0.023)	
Random effects	**Variance Component**	
Country (τ_j)	0.142 (0.039)	0.147 (0.041)

*** p < :001; ** p < :01; *p < :05

Figure 1: Country level random effect on the intercept: Overeducation

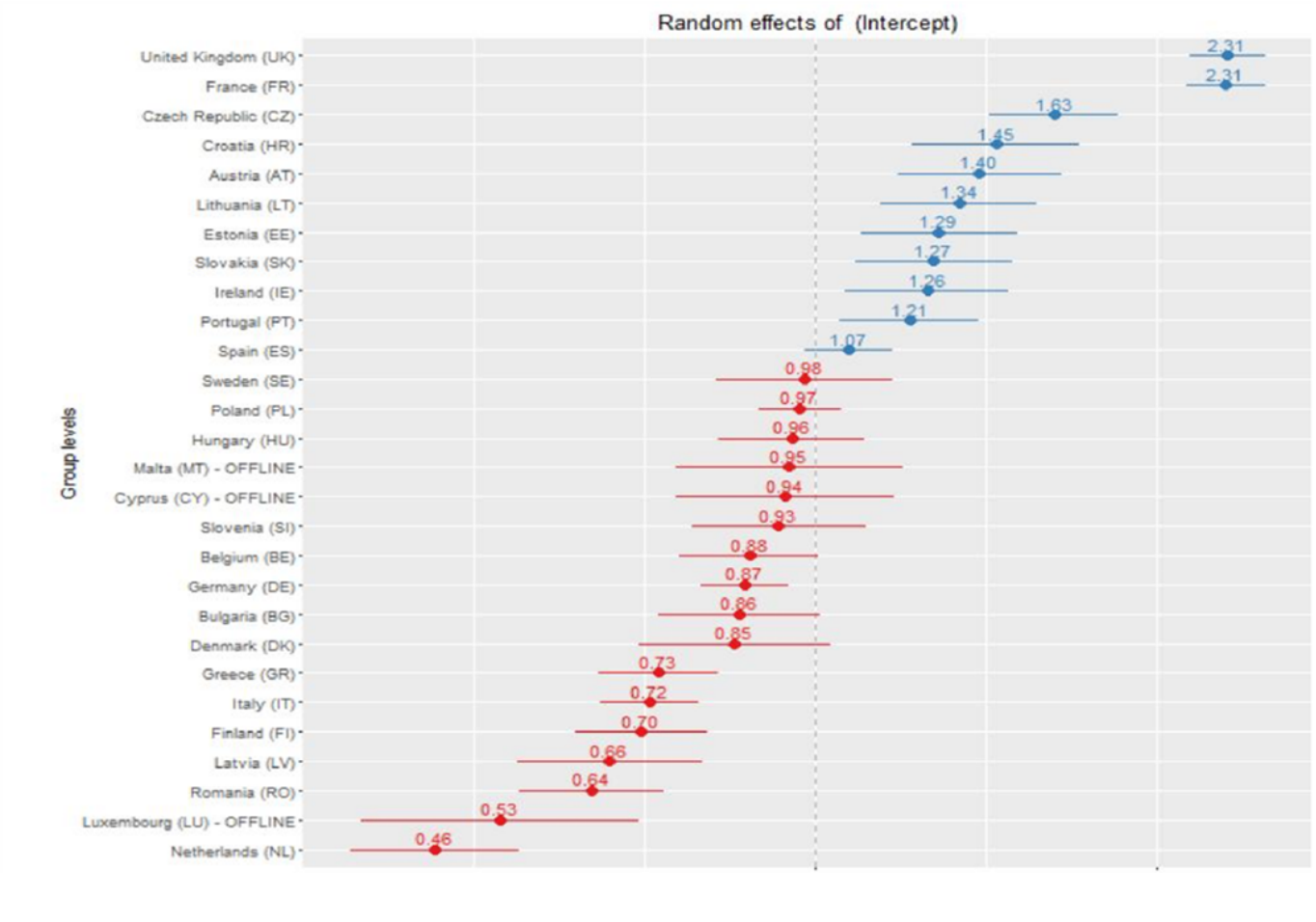
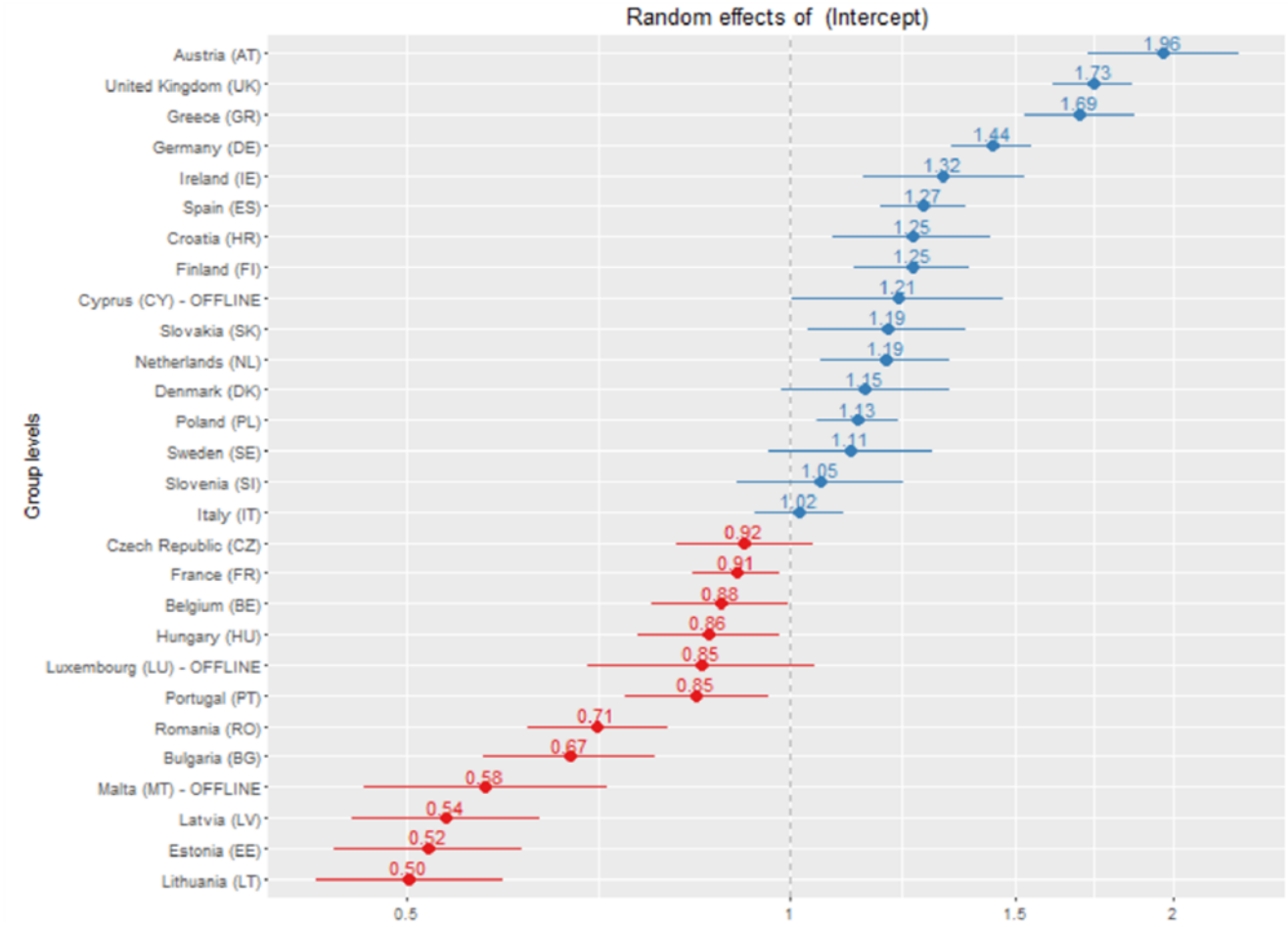


Figure 2: Country level random effect on the intercept: Overskilling



5 Conclusion

The paper presents an analysis on the employees perception of being overeducated and overskilled, in relation to what is required to do at their workplace. We use data from the first European Skills Survey collected on 48,676 adult employees across all the European Union's 28 Member States, with the aim at identifying the factors affecting the probability of employees to be overeducated and to perceive themselves as overskilled. Therefore, the variables of major interest considered are overeducation, derived from the comparison between the highest level of employees' education and the level of education required by their job, and overskilling, measured by employee's self-declaration on her/his professional skills and that required by the workplace.

Given the hierarchical structure of our data, we specify a multilevel logistic model and we assume the probability of workers to be overeducated and overskilled is associated with two level-related factors – individual and country level. Indeed, our model includes several fixed effects predictors such as age, gender, education level of employees, sector and firm size, etc., at level-1, plus a fixed intercept and a random intercept for each level-2 component (e.g., one for each country).

Our results show that male workers have higher probability to be overeducated and overskilled. As regards the level of employees' education, both post-secondary education and tertiary education increase the probability of being overeducated and overskilled, irrespective to the field of studies. As stated in the literature, the correlation between overeducation and overskill is low (0.15), but the cumulative effect on the estimates highlights a higher probability of mismatching of employee and job. Working in a low skilled job is disadvantageous for employees increasing both over-skilling and over-education probability, confirming the finding of Quintini (2011). Both low and medium wages seem to negatively influence the education mismatching, while higher salaries do not significantly affect the probability of being overeducated and overskilled. The atypical contract is detrimental for educated employees, whereas permanent contracts cause a harmful effect on skilled individuals. Having a part-time position increases acceptance of their skill and education mismatch perception on the job, decreasing the respective probability. Moreover, the constant accumulation of training and experience throughout a worker's career decrease the probability of employees to be overeducated. Finally, the random-effect estimate confirms that country effect cannot be excluded from the analysis and plays a non-negligible role in interpreting results.

Overeducation and overskilling continue to be problems characterising the actual workplace condition in Europe, affecting lower professions and higher educated employees. Further research can take account also of the OECD scores by countries such as PISA and PIAAC, in order to better differentiate overeducation and overskilling effects mediated by competence indicators.

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