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Skills mismatch in the new and old member states – are generations affected differently?[1]

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In the paper we investigate differences in the skills mismatch in the new and old EU member states. We look at the influence of their different socio-economic characteristics, in particular age and educational attainment, on the level of skills mismatch and link these to the patterns of economic development, in particular the economic transition in Central and Eastern Europe. The results of our analysis show that workers in the NMS compared to the EU-15 have a higher risk of underskilling and a lower risk of overskilling in all age groups. The differences between the two sets of countries are larger for older workers and smaller for younger ones. This indicates that there may be a gradual convergence of the skills match patterns on the European labour market for younger generations and educational levels.

Keywords: skills mismatch, overskilling, underskilling, generations, labour market, new member states

INTRODUCTION

Skills mismatch, defined as an imperfect match between the required level or the range of skills in relation to job requirements (Cedefop 2012), becomes a permanent feature of labour markets in developed economies. Institutional theories explain mismatches by information

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asymmetry between employers and employees (Schlotter 2008), as the labour markets are subject to numerous imperfections, including incomplete information, heterogeneity among agents and transaction costs (Cahuc, Zylberberg 2004; Borjas 2008).

In the paper we investigate differences in the skills match in the old and new EU member states. In particular we look whether there are differences in the level and intensity of skills mismatch by selected characteristics of workers, including their gender, age, education levels as well as job characteristics. Labour market institutions in the two sets of countries developed differently, which could affect the level of skills mismatch.

In the paper, we use data from the European Skills and Jobs (ESJ) Survey (Cedefop 2015) in order to verify the following research hypotheses:

1) Workers in the new member states are more likely to be underskilled and less likely to be overskilled compared to the workers in the EU-15 countries;

2) The skills gap between workers in the new member states and the EU-15 countries is larger in the case of older workers and smaller for younger ones;

3) The skills gap between the two groups of countries is higher in the case of workers with lower levels of educational attainment.

The paper is structured as follows. In the first section we present a literature review that focuses on the issue of skills mismatch. We focus on the four aspects of the skills mismatch in the literature: approach to the measurement of this phenomenon, skills mismatch related to age and period, including aspects of economic transition, as well as cross-national comparison of the skills mismatch. Then, we present data and methodology that we use in the analysis. The third section summarises the results and the final section presents conclusions and policy recommendations.

LITERATURE REVIEW

Measuring skills mismatch raises definitional and methodological concerns (Cedefop 2010). Theoretical assumptions of the measurement of skills mismatch have been widely debated, for example, by Handel (2003), McGuinness and Ortiz (2014), and Verhaest and Omey (2006). Indifferently, as concluded by Sattinger (2012), qualitative mismatches – however, measured – imply consequences and potential losses for workers, firms and economies.

Analysis of the literature related to skills mismatch and age shows that there are age and period effects that can explain the observed skills mismatch. Rubb (2009) indicates two reasons for such mismatch: (i) depreciation of human capital over time, leading to the mismatch between acquired and required skills (skills mismatch) at later stages of the working life; (ii) at the end of their career, older workers may voluntarily choose jobs for which they are overskilled. As noted by Quintini (2011a), the literature provides "extensive evidence that the incidence of over-qualification is larger for youth than for adults". The skills profile of older and younger workers is also different. The former are less likely to be employed in jobs requiring some type of skills, such as use of ICT, which is also confirmed by Hirsch et al. (2000). Dixon (2003) underlines that (1) older workers have higher average levels of work experience, which could have positive effects on productivity (also in Disney 1996); and (2) older workers' skills also depend on the stock of knowledge that is acquired early, which becomes outdated, negatively affecting productivity (also in Levy, Murnane 2004). The demand for skills changes rapidly (Autor et al. 2003), in particular in the area of technology-driven requirements, and older workers cannot adjust quickly enough to this change. Thus, skills mismatch is one of the main factors explaining negative displacement-related employment outcomes associated with age, which is further reinforced by perceptions, bias and discrimination (Bendick et al. 1999; Noonan 2005).

Age is a powerful predictor of many employment-related outcomes and significantly shapes individuals' labour market opportunities (Roscigno et al. 2007). Ageing takes place in particular historical and institutional contexts. Part of the observed relationships between age and employment outcomes may be explained by a cohort effect (Lippmann 2008). Referring these results to the context of labour markets in the old and new EU member states, we can expect that different socio-economic situation, education systems and skills requirements existed when older workers started their working careers, that can have an impact on the level and perception of the skills mismatch.

One of the factors that can have an impact on the incidence of skills mismatch are institutional characteristics of labour markets related to the economic transformation. Transition to market economies led to a deep restructuring of all areas of economic activities in the CEE countries in the 1990s, followed by the EU accession process, bringing more changes in the labour demand and supply (Aghion, Commander 1999; Boeri, Lehmann 1999). Concurrently, skills obsolescence rate accelerated, due to a considerable transformation in the skill composition of the workforce and a quickly arising demand for new, modern skills, with the demand for skills significantly altered (Commander, Kollo 2008). The drop in low skilled employment was accompanied by rising the skills content of blue collar work and business occupations expanded and technical ones contracted (Jeong et al. 2008). Skills mismatches in Central Europe constitute an important obstacle in further labour reallocation and thus convergence to EU-15 employment structures (Rutkowski 2007; Brixiova et al. 2009).

Over the past two decades, the CEE economies and labour markets were subject to intensive changes driven primarily by the deep economic restructuring and adaptation to market economies, globalisation and technological change (Adamchik, Bedi 2000; Munich et al. 2005; Keane, Prasad 2006). The changes led to a quick depreciation of skills held by workers educated under the old economic system, accompanied by a quickly increasing demand for skilled workers (Rutkowski 1996; Kertesi, Köllő 2002; Brixiova et al. 2009).

Cross-country comparative studies are scarce, mainly due to the lack of sufficient data. For example, for the OECD countries, Handel (2012) observed a steady and continuous process of skill upgrading over time for economically advanced countries. Quintini (2011b) puts Central and Eastern European countries, along with UK, at the lower end of the over-qualification spectrum. She notes that Czech Republic, Poland, Slovenia and the Slovak Republic (along with Italy and Switzerland) have both below average levels of over-qualification and under-qualification. Our paper fills the gap in the literature related to the comparison of skills mismatch between old and new EU member states.

DATA AND METHODOLOGY

The ESJ provides a wide set of comparable information on the skills mismatch among European workers. These include personal and workplace characteristics, and those relating to skills encompass several measures based on self-assessed ratings. The dataset counts 47 524 individual observations, with respondents aged 24–65[2]. Table 1 summarizes the most important characteristics of our sample, together and separately for the EU-15 and NMS employees.

[2] Despite its great advantage of being a harmonised survey for all EU workers, it also has its drawback from the point of view of our analysis. The survey employed a quota approach (not a sampling one, a golden standard in survey research), thus the selection bias of respondents might be an issue. There is also no information available on the place of birth, thus we are unable to control NMS migrant workers in our EU-15 sample.

Table 1. **Sample descriptives**

EU-15	EU-15	NMS	Total
Underskilled workers	4.9%	6.8%	5.4%
Overskilled	41.0%	33.3%	39.4%
Female	48.3%	47.2%	48.1%
Age	43.3	41.3	42.9
Primary education	1.9%	1.3%	1.8%
Lower secondary	14.4%	4.4%	12.4%
Upper secondary general	14.1%	19.8%	15.2%
Upper secondary vocational	33.1%	42.9%	35.3%
Tertiary education	36.6%	31.2%	35.5%
Part time employment	20.9%	9.0%	18.5%
Fixed term contract	10.4%	16.8%	11.7%
Tenure	11.2	8.4	10.6
Informal employment	2.6%	2.6%	2.6%
Private sector employment	63.7%	67.8%	64.5%
Employment in NGO	4.8%	1.7%	4.2%
Micro company	17.8%	26.0%	19.5%
Small company	37.1%	41.2%	37.9%
Large company	28.1%	18.6%	26.2%
N	32 290	15 234	47 524

Source: Authors' analysis.

The share of underskilled workers is higher in the NMS, while the EU-15 workers are more likely to be overskilled. EU-15 workers are slightly older and more likely to be university graduates, while the NMS employees more frequently have upper secondary education. Finally, part time, permanent contracts are much more common in the EU-15, where also the share of the public sector and incidence of large firms are higher.

We use the most common definition of skills mismatch, which relates the overall shortage or excess of skills held by individuals with respect to job requirements[3]. It is neutral to the sectoral or occupational specificity of skills, but remains a subjective measure and may be susceptible to a bias arising from a different perception of skill levels and requirements (Støren, Wiers-Jenssen 2010). Moreover, based on the available data, we are unable to assess whether and to what extent the bias might be age, education or region specific, and if and how it may impact our results.

The dependent variable Y_i takes one of the three possible outcomes ($j = 0, 1, 2$), representing the underskilled workers, those with matched skills, and the overskilled workers, respectively. We use the multinomial logistic framework and estimate the probabilities of over-and underskilling relative to the skills match probability and calculate the log-odds relative to the baseline, which we assume to be a linear function of the predictors. The covariates include individual and work-place characteristics, such as age group (young: below 30, prime: between 30 and 49, and old: 50 and over), educational attainment, type of work contract, sector, company size, we also include

[3] We use the replies to the question: "Overall, how would you best describe your skills in relation to what is required to do your job?" (matched, higher, lower).

interactions between age group and education. The model is estimated using the maximum likelihood estimator.

RESULTS

We run our regression in four sets of specifications. The first one for all EU-28 countries includes a dummy variable for the NMS (column [1] in Tables 2 and 3). In the second set [2] we

Table 2. **Estimates results: underskilling probabilities**

EU-28 and EU-15	[1] EU-28 NMS dummy	[2] EU-28 NMS and age interactions	[3] EU-15	[4] NMS
Female	0.031	0.033	0.119*	–0.190**
Young	0.008	–0.072	–0.074	0.058
Old	–0.128	–0.156	–0.221	0.066
Primary	–0.192	–0.193	0.047	–2.672*
Secondary	–0.176	–0.185*	–0.181	–0.310
Tertiary	0.098	0.093	0.027	0.363***
Vocational	–0.470***	–0.471***	–0.441***	–0.538***
Young* primary	0.293	0.269	0.683	0.902
Young* secondary	0.148	0.188	–0.092	0.827*
Young* tertiary	–0.152	–0.139	0.031	–0.532**
Old* primary	0.207	0.219	0.052	2.106
Old* secondary	0.014	0.034	0.090	–0.037
Old* tertiary	0.034	0.045	0.145	–0.297
Young* vocational	0.361*	0.362*	0.234	0.649**
Prime* vocational	0.108	0.110	0.076	0.162
Part time	–0.032	–0.034	–0.072	0.0813
Fixed term contract	0.176**	0.177**	0.130	0.295***
Tenure	–0.013***	–0.013***	–0.012***	–0.015**
Informal employment	0.377**	0.382**	0.197	0.859***
Private sector	0.020	0.018	–0.023	0.131
NGO	0.330***	0.329***	0.339**	0.133
Micro firm	–0.071	–0.070	–0.009	–0.211*
Small firm	–0.184**	–0.183**	–0.181*	–0.194*
Large firm	–0.120	–0.119	–0.096	–0.196
NMS	0.180***			
Young* NMS		0.340**		
Prime* NMS		0.132*		
Old* NMS		0.218*		
N	47 682	47 682	32 413	15 269

Note: *** .01; ** .05; * 1.

Reference category: male, prime age, post-secondary education, working full time on an open-ended contract, in the public sector in a medium size company.

Source: Authors' calculations.

Table 3. **Estimates results: overskilling probabilities**

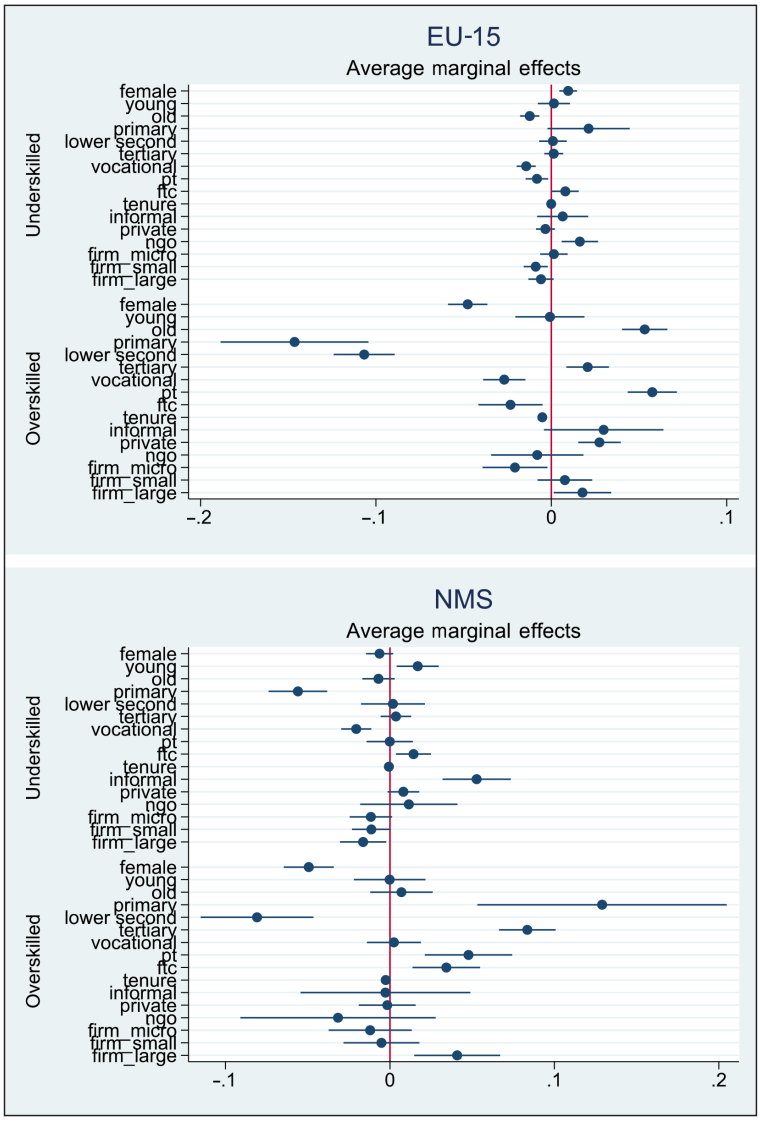
EU-28 and EU-15	[1] EU-28 NMS dummy	[2] EU-28 NMS and age interactions	[3] EU-15	[4] NMS
Female	–0.201***	–0.199***	–0.191***	–0.246***
Young	0.073	0.046	0.155	–0.021
Old	0.088	0.122*	0.121*	–0.061
Primary	–0.237*	–0.236*	–0.466**	0.571**
Secondary	–0.456***	–0.451***	–0.482***	–0.445***
Tertiary	0.121***	0.123***	0.0601	0.392***
Vocational	–0.056	–0.053	–0.073	0.025
Young* primary	0.316	0.301	–0.336	0.488
Young* secondary	0.251	0.263	0.216	0.149
Young* tertiary	–0.120	–0.118	–0.184*	–0.139
Old* primary	–0.683***	–0.706***	–0.533**	–0.774
Old* secondary	–0.033	–0.059	–0.058	–0.002
Old* tertiary	0.151**	0.139**	0.158**	0.093
Young* vocational	–0.155*	–0.158*	–0.283**	0.034
Prime* vocational	–0.070	–0.073	–0.076	–0.090
Part time	0.244***	0.242***	0.236***	0.227***
Fixed term contract	–0.024	–0.024	–0.087*	0.188***
Tenure	–0.021***	–0.021***	–0.023***	–0.013***
Informal employment	0.138*	0.134*	0.143	0.079
Private sector	0.092***	0.091***	0.114***	0.006
NGO	–0.023	–0.025	–0.005	–0.130
Micro firm	–0.087**	–0.088**	–0.089*	–0.077
Small firm	0.006	0.006	0.017	–0.044
Large firm	0.079**	0.078*	0.067	0.166**
NMS	–0.359***			
Young* NMS		–0.259***		
Prime* NMS		–0.327***		
Old* NMS		–0.493***		
N	47 682	47 682	32 413	15 269

Note: *** .01; ** .05; * 1.

Reference category: male, prime age, post-secondary education, working full time on an open-ended contract, in the public sector in a medium size company.

Source: Authors' calculations.

add interaction terms between age and NMS. The third [3] and fourth [4] set of estimates are run separately for the EU-15 and NMS10. Results are presented separately for underskilling (Table 2) and overskilling (Table 3). We also present average marginal effects (AMEs) that show probabilities of underskilling and overskilling for the two groups of countries in the Figure.



Source: Authors' calculations.

Figure. Average marginal effects by groups of countries

Results of the first two sets confirm that the probability of underskilling is higher in the NMS, while the probability of overskilling is lower. If we include interaction with age group, the probability of underskilling is higher of young and old workers in the NMS, which indicates that both lack of work experience of young people or relevant skills in the case of older ones may lead to these differences. In the case of overskilling we see the clear age gradient. While the probability of overskilling is lower for all age groups in the NMS, the reduction is highest for

older workers and lowest for young workers, compared to their EU-15 peers. In all countries we see a similar direction of several characteristics on the reduction of underskilling: vocational education, tenure, working in a large company. At the same time work on a fixed term contract in a micro company increases the risk of underskilling. Females, those with primary and secondary education, with a longer tenure and working in micro firms have a lower risk of overskilling in all countries. Those with tertiary education, working on an informal contract, in the private sector and in large companies report a higher risk of overskilling.

In order to verify our research hypotheses, we compare the results presented in sets [3] and [4].

Age does not change the risk of under- or overskilling in the two groups of countries, only the EU-15 older workers report a higher probability of overskilling, compared to the prime aged workers. Educational attainment has an impact on the risk of skills mismatch. Interestingly, in the NMS those with tertiary education report a higher risk of underskilling (compared to post-secondary education). As interactions between age and educational attainment show that this risk is lower for young workers with tertiary education, this may show that in particular workers in prime age and older have problems with inadequate skills. While vocational education reduces the risk of underskilling, the age interactions show that young workers with vocational education have a higher risk of this phenomenon. We see interesting results in relation to overskilling. Workers with primary education in the EU-15 have a higher risk of overskilling compared to the reference post-secondary education, while in the NMS this probability is lower. However, interactions with age show that old workers with primary education in the EU-15 have a lower risk of overskilling. Similar effects (lower risk of underskilling) are seen for those with secondary education and for those with tertiary education in the NMS. This shows that tertiary education in the NMS is associated with significant skills mismatches in both directions (under- and overskilling). The interactions between education and age are significant in the EU-15 countries. Young workers with tertiary and vocational education have a lower risk of overskilling. Those in the prime age group, at all education levels, seem to be better matched to their workplaces compared to the group with higher educational attainment.

EU-15 and NMS employees also differ with respect to personal and job-level characteristics that impact the risk of skills mismatch. Temporary jobs are associated with a higher risk of underskilling in the NMS only. We cannot judge the direction of causality here, though we expect those underskilled to be more likely to be employed on fixed term contracts (Booth et al. 2002; Schömann et al. 2013). Formal employment contracts increase the probability of overskilling in the EU-15 and the risk of underskilling in the NMS. Private sector employees in the EU-15 have a higher risk of overskilling, while those in the NMS are more likely to display skills shortages, which is likely to be linked to a higher job creation in the latter sector (Aghion, Commander 1999; Lehmann et al. 2005; Cuestas et al. 2011). Finally, there is less underskilling in the NMS micro and small firms. This reflects the fact that the sector of micro enterprises is much larger in the NMS than in the EU-15 and is likely to offer different hiring strategies and career patterns than large firms, who have more possibilities to offer on-the-job training and invest in skill-upgrading among the underskilled employees.

CONCLUSIONS AND POLICY IMPLICATIONS

The results of our analysis confirm our first hypothesis that there are differences in skills mismatch observed in the new and old member states of the European Union.

These differences increase with the age of workers, which may indicate that those who completed education and entered the labour market in the centrally planned economy are

likely to have a higher level of skills gap after the transition to the market economy. These differences are lower, but still remaining, for young workers. There are differences in the risk of skills mismatch between the workers with different educational attainment, which confirm our second and third hypothesis.

We also found the evidence of job segmentation related to fixed term employment between the old and new member states, combined with different patterns of skills mismatch in the two groups of countries. The incidence of temporary employment is almost twice higher in the new member states and employees with such contracts report a higher risk of mismatch – both in the case of underskilling and overskilling.

These findings have clear policy implications, in particular for the EU-level support to education and training policies focusing skills mismatches. As reasons for mismatch differ, this calls for tailored policy response. In particular, actions aimed at older workers in the NMS, especially those with low educational attainment, being at a higher risk of obsolescence of skills needed for prolonging their working lives, connected to the implementation of the New Skills Agenda in Europe need to be steeped up. Policies aimed at reduction of underskilling in micro and small companies, need to be developed – particularly in the NMS, as these sectors are a significant part of the economy and low skill levels can hamper the productivity growth. Our results also clearly point out to the need of improving the link between education and labour market needs in the case of higher education in the NMS, as young people in those countries have a significant risk of skills mismatch in both directions.

Two caveats of our study must be borne in mind. First, our results are sensitive to the definition of skills mismatch and the subjective way of measurement, which is based on the assessment of workers performing their jobs. Second, we capture only one cross-sectional picture of the EU-15 – NMS difference in skills mismatch, whereas more comparative studies and in particular longitudinal ones capturing time trends are necessary to understand the developments. Further work on the measurement of skills mismatch also using objective approaches is needed to improve the understanding on how to increase the skills match on the labour markets in the European Union.

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Profesinio rengimo neatitikimas ES senosiose ir naujosiose šalyse – ar yra laikmečio poveikis?