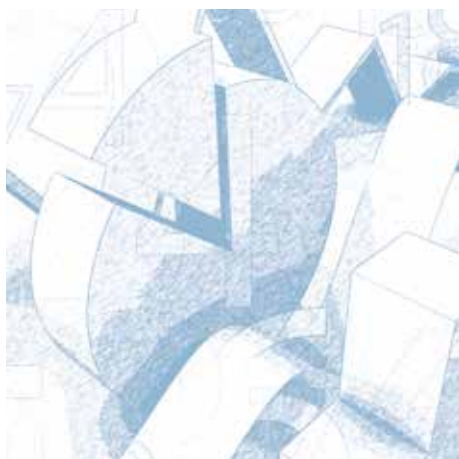




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Skills mismatch of natives and immigrants in Europe

Theo SPARREBOOM and Alexander TARVID



Labour
Migration
Branch

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by

Theo Sparreboom and Alexander Tarvid

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Preface

Skills mismatch continues to be a topic of strong interest as it is an important factor affecting labour market and economic outcomes. Proper skills and jobs matching can moreover ensure positive development outcomes for all workers, lending support to the 2030 Agenda for Sustainable Development, and target 8.8 on the protection of all workers, including migrant workers. The need for improving skills recognition schemes and vocational training for both migrants and refugees is of rising importance to global governance. It is highlighted in the New York Declaration addressing large movements of refugees and migrants, adopted by the UN General Assembly (UNGA) in September 2016 and a topic for inclusion in the Global Compact on Migration to be adopted by the UNGA in 2018.

Despite this interest and a rich and expanding literature, agreed methodologies to measure mismatch are lacking. In 2008, the use of skills mismatch as a potential indicator or component of the measurement of labour underutilization was discussed at the 18th International Conference of Labour Statisticians (ICLS); skills mismatch was also mentioned in the Resolution concerning statistics of work, employment and labour underutilization adopted by the 19th ICLS in 2013, while a discussion of measurement methodologies is planned for the Conference in 2018.

This Technical Report, prepared by Theo Sparreboom and Alexander Tarvid, is part of the larger efforts that the ILO is undertaking to contribute to the understanding and quantification of skills mismatch. It is building on earlier work, including the Key Indicators of the Labour Market (8th edition, 2013) and the Statistics Brief on skills mismatch in Europe (2014). This report updates previous estimates, and in a similar fashion identifies patterns of skills mismatch, differences in skills mismatch risk between groups of workers identified by age or sex, and trends at the country level based on several methodologies.

Importantly, in contrast to earlier work, this report includes an analysis of skills mismatch among immigrants in comparison with native workers in European countries. Immigrants are typically vulnerable to skills mismatch, which depresses the potential contribution they can make to both business and the economies of host countries. Continuous work in low-skilled jobs that do not account for migrants' higher skills level can lead to deskilling, increased risk of exposure to vulnerability and exploitation in the workplace, reduction in potential savings and remittances, and affect their re-entry into the labour market on return home. Monitoring of levels and trends of skills mismatch of immigrants in comparison with natives is therefore of high importance to realizing fair and effective labour migration policy.

We wish to express our thanks to Valentina Stoevska, ILO Statistics Department, for valuable comments on an earlier draft of the Report.

Michelle Leighton
Chief
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1. Introduction

Education and training of the workforce should match occupational requirements, and the extent to which this process is successful is a major factor shaping labour market outcomes, productivity and economic growth. If workers are overeducated or undereducated for the jobs they perform, skills mismatch will impose costs on individuals, enterprises and society at large. Overqualified workers are likely to face wage penalties, have lower job satisfaction and higher turnover than workers with jobs matching their qualifications, while persistent qualification mismatch may result in scarring and affect workers' careers many years later (Groeneveld & Hartog, 2004). Among groups vulnerable to skills mismatch, first and second generation immigrants typically face a higher risk (Aleksynska & Tritah, 2013; ILO, 2013; WEF, 2014).

This report provides an update on the incidence of overeducation and undereducation in Europe as presented in ILO (2014). Similar to the earlier brief, patterns of skills mismatch are identified, in particular trends at both the country and regional level as well as differences in skills mismatch risk between age groups and sexes; in addition this report includes an analysis of skills mismatch among immigrants in comparison with natives.

The findings confirm that overeducation is increasing and undereducation is decreasing in Europe. In our sample, from 2002 to 2014, ISCO-based overeducation increased on average from 7.6 per cent to 11.0 per cent and ISCO-based undereducation dropped from 35.9 per cent to 25.9 per cent.

At the country level, 10 countries show an increasing trend on at least one measure of overeducation, and 13 countries show a decreasing trend on at least one measure of undereducation. Mismatch trends are dependent on the measure that is adopted, and overeducation is more stable according to the mean-based measure, while undereducation is increasing according to this measure.

Average skills mismatch by age group shows that younger workers (aged 15-30) tend to have higher levels of overeducation and lower levels of undereducation than adult workers (aged 31 and above), and these results hold for both the ISCO-based and the mean-based measure. On the ISCO-based measure, men have lower overeducation and higher undereducation than women, which means that men tend to have higher-level positions than women with the same level of education.

Average overeducation of immigrants on both the ISCO- and the mean-based measure is higher than that of natives. On the ISCO-based measure, overeducation increased on average from 7.3 per cent to 10.0 per cent for natives and from 11.2 per cent to 18.4 per cent for immigrants. In contrast to the ISCO-based measure, the difference in overeducation between the two groups has been fairly constant on the mean-based measure. The differences between immigrants and natives in undereducation are smaller than in overeducation on both measures. In most countries, country-level trends are not the same for natives and for immigrants.

2. Skills mismatch in the literature

Three approaches are frequently mentioned in the literature on skills mismatch, namely the normative, the statistical and the self-assessment method.¹ In brief, the normative method uses a pre-defined mapping between occupations and education levels, while the statistical method operates with currently observed most typical ('matched') versus atypical ('mismatched') education levels in groups of occupations. Self-assessment relies on the respondent to decide on the type or level of mismatch.

These three methods can best be considered as groups of methods, because each of them is frequently implemented differently. Differences in implementation are more common for the statistical and self-assessment measures and less common for the normative measure. For the latter, the typical variation is the use of internationally comparable mappings of ISCED levels to ISCO major groups versus the use of a country-specific mapping between occupations and education levels. The latter better reflects the situation in a particular country but is perhaps less appropriate in case of international comparison.

The most common statistical measure used in the literature is based on average years of education in two- or three-digit ISCO groups, with atypical values starting one standard deviation from the average. Variations in this method include using education levels instead of years and mode instead of average. When mode is used, atypical values are any values not equal to the mode. It would seem logical to use mean years and mode education levels,² but some authors prefer mode years (e.g. Bečić, 2014; Ghignoni & Verashchagina, 2014; Joonas, Gupta, & Wadensjö, 2014; Murillo, Rahona-López, & Salinas-Jiménez, 2012; Nielsen, 2011; Nieto, 2015). While one standard deviation is the most typical approach to define the threshold to consider respondents' education to be atypical for the job (i.e., consider them overeducated or undereducated), hard thresholds at concrete percentiles of the distribution are also used (Barone & Ortiz, 2010; Ortiz & Kucel, 2008).

Subjective measures can be classified by means of the target the respondent should make reference to. The most frequent approach is asking respondents about the correspondence of their level of education to job requirements, although qualifications (e.g. Brynin & Longhi, 2009; Budría, 2011; Cainarca & Sgobbi, 2012; Frei & Sousa-Poza, 2012; Nieto, 2015; Tijdens & van Klaveren, 2012; Verhaest & Omey, 2012; Verhaest & van der Velden, 2013), skills (e.g. Allen & van der Velden, 2001; Mavromaras, McGuinness, O'Leary, Sloane, & Fok, 2010; McGuinness & Sloane, 2011; Sánchez-Sánchez & McGuinness, 2015) and years of education (e.g. Mateos-Romero & Salinas-Jiménez, 2016) were also used as targets. In addition, subjective measures can be divided into direct and indirect, where, taking the level of education as a target, direct measures are asking the respondent about the use or relevance of his/her level of education to the contents or requirements of his/her job, while indirect measures are asking about the level of education that would be appropriate for someone to do this job, which is then compared to the respondent's level of education.

Alternative measures proposed in the literature are usually specific to data that were used in the analysis and cannot be implemented in other datasets. Kiersztyn (2013) applied the statistical approach but based it on very specific educational requirements scores to avoid some of the drawbacks of standard approaches. Another approach can be called income ratio method, whereby an efficient frontier of potential income is

¹ For a summary, see e.g. Table 1 in Sparreboom and Tarvid (2016). For recent reviews, see Leuven and Oosterbeek (2011) and Flisi, Goglio, Meroni, Rodrigues and Vera-Toscano (2016).

² Using the mode years of education and considering anyone with years of education not equal to the mode – even with as small as one-year difference – as mismatched, risks to overstate the incidence of mismatch.

constructed, and those off the frontier (with actual income less than potential income) are overeducated (Guironnet & Peypoch, 2007; Jensen, Gartner, & Rässler, 2010). Fine and Nevo (2007) proposed the cognitive overqualification measure, whereby they assume linear relationship between cognitive ability and job performance until a turning point where the relationship departs from the linear trend – after that point, i.e. with higher cognitive ability than observed at that threshold, individuals are cognitively overeducated. Finally, Pellizzari and Fichen (2013) use data on numeracy and/or literacy skills. They select individuals who do not have the skills to perform a more demanding job and neither need training to perform current duties. They are identified as matched and the distribution of numeracy and/or literacy skills is built for them. Those with numeracy and/or literacy skills below the minimum of that distribution are underskilled and those with skills above its maximum are overskilled.³

Given a wide variety of existing measures of mismatch and the differences in estimates between methods, the tables summarising estimates available in the literature take only estimates based on the standard measures into account (including statistical measures based on literacy and/or numeracy skills) and presenting results separately for normative, statistical and subjective measure groups. Results are presented in Table 4 for overeducation and Table 5 for undereducation. These tables also include mismatch statistics from the literature focused on immigrants, but most results reported are based on the subjective opinions of immigrants themselves (few studies using normative or statistical measures of mismatch for immigrants were found/accessible).

2.1 Measures of skills mismatch in this report

Skills mismatch is an encompassing term which refers to various types of imbalances between skills offered and skills needed in the world of work. As skills per se are not measured by the regular statistical programmes of most countries, skill proxies are used such as qualifications and years of education at the supply side, and occupations at the demand side (ILO, 2014).

In this report, we use two measures of skills mismatch. For the first, normative measure we divide respondents into three levels of education: primary (ISCED 1–2), secondary including post-secondary non-tertiary (ISCED 3–4) and tertiary (ISCED 5–6). Based on first-digit ISCO levels, we then divide occupations into five broad groups (see Table 1), and assign a level of education to each broad group.⁴ Individuals working in a given broad occupational group and having the assigned level of education are considered well-matched. Those having a higher (lower) level of education are over- (under-) educated. Thus, for instance, a university graduate working as a clerk (a low-skilled non-manual occupation) is overeducated, while a secondary school graduate working as a manager (a high-skilled non-manual occupation) is undereducated. An advantage of the ISCO-based measure is that the definition of mismatch does not change over time and the results are, therefore, strictly comparable. Possible disadvantages of this method are that it does not take changes in occupational requirements or the actual distribution of educational attainment into account. Therefore, in high-attainment countries, the proportion of the overeducated might be higher. Another disadvantage of this measure is that, by construction, it does not allow for overeducation in major groups 1 to 3.

The second measure is a statistical measure based on mean years of education in ISCO two-digit (sub-major) groups for every country and round of the European Social Survey (ESS), which is the main source of data we use. The threshold is based on one standard deviation, so that if years of education of a respondent in a given sub-major group are higher (lower) than that group's mean years of education plus one standard deviation, he or she is considered overeducated (undereducated). An advantage of this method is that there is less heterogeneity among groups of jobs compared with the three groups according to the normative method. In addition, this method is less sensitive to the average level of educational attainment in a country,

³ See Flisi, Goglio, Meroni, Rodrigues and Vera-Toscano (2016) for several variations of this method.

⁴ We do not take the military into account.

as this will be reflected in higher mean levels of education. But this is also a disadvantage in the sense that mean levels may or may not be driven by job requirements.⁵

Table 1 Division of ISCO Major Groups into Broad Occupation Groups

ISCO Major Group	Broad Occupation Group	Appropriate Education Level
Legislators, senior officials, managers Professionals Technicians and associate professionals	High-skilled non-manual	Tertiary (ISCED 5-6)
Clerks Service workers, shop, market sales workers	Low-skilled non-manual	Secondary (ISCED 3-4)
Skilled agricultural and fishery workers Craft and related trades workers Plant and machine operators and assemblers	Skilled manual	
Elementary occupations	Unskilled	

Changes in the two measures of mismatch do not necessarily have the same interpretation. For instance, an increase in ISCO-based overeducation could signal that an increasing proportion of workers cannot find a job at their level of education and are forced to work in jobs requiring a lower level of education. By contrast, an increase in mean-based overeducation points at increasing years, but not necessarily levels, of education in given occupations. It might reflect that workers are doing more courses without increasing their education level (such as a second master's degree).

⁵ In countries with low levels of educational attainment of the labour force, this method may not be appropriate; see Sparreboom and Nübler (2013).

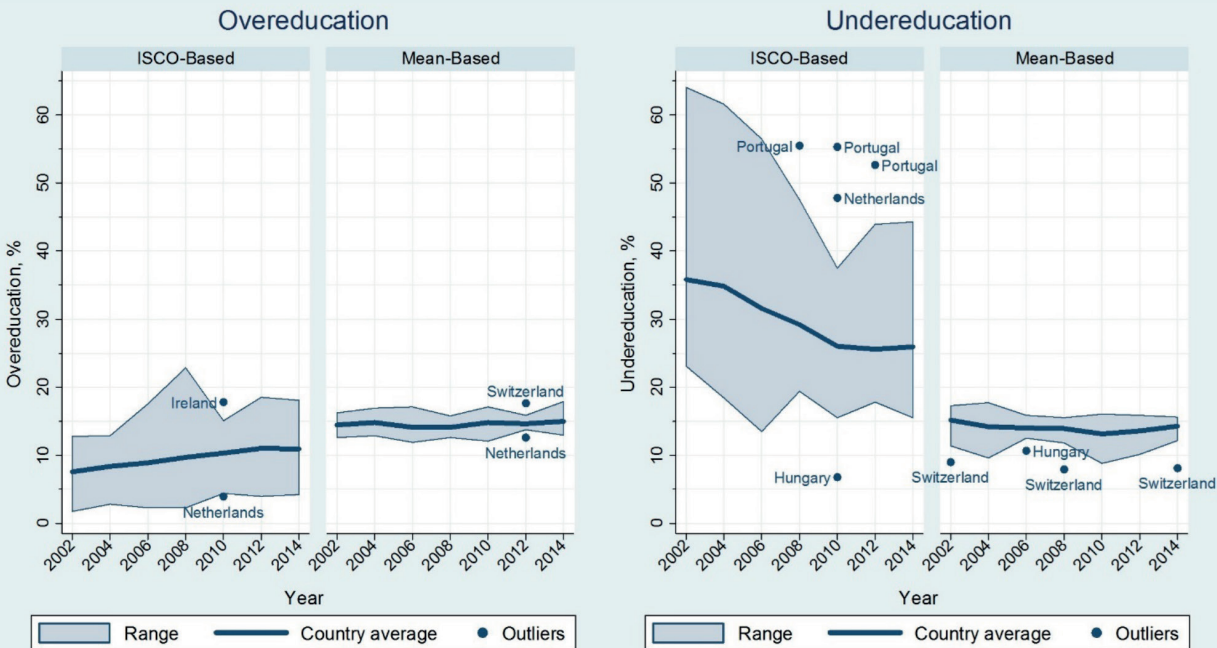
3. Incidence of skills mismatch

3.1 Average skills mismatch by age group and sex

Results for all workers (aged 15 and above) and younger workers (aged 15–30) are presented in Tables 6–13. In the sample of European countries with data for all seven ESS rounds, overeducation is generally increasing and undereducation generally decreasing on the ISCO-based measure, although there is nearly no change in average overeducation between the last two rounds and there was a small increase in undereducation in 2014 (Figure 1). From 2002 to 2014, the average incidence of ISCO-based overeducation increased from 7.6 per cent to 11.0 per cent of the employed and the average incidence of ISCO-based undereducation dropped from 35.9 per cent to 25.9 per cent of the employed. Mean-based overeducation is stable between 14.1 and 15.0 per cent, while mean-based undereducation started slowly increasing in more recent years. Mean-based undereducation increased from 13.2 per cent in 2010 to 14.3 per cent in 2014.

Figure 1 Dynamics of average mismatch in Europe

Based on 15 countries available in all seven ESS rounds: Belgium, Denmark, Finland, France, Germany, Hungary, Ireland, the Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland and the UK. Outliers are country-round pairs that are outside the $[p_{25} - 1.5 \times IQR, p_{75} + 1.5 \times IQR]$ interval defined for the respective round for a given measure of mismatch, where p_{25} and p_{75} are 25th and 75th percentiles of the incidence distribution across countries, respectively, and IQR is inter-quantile range. Outliers are excluded from the calculation of averages. Averages over countries are unweighted.



Average mismatch by age group shows that younger workers (aged 15-30) tend to have higher levels of overeducation and lower levels of undereducation than adult workers (aged 31 and above), and these results hold for both the ISCO-based and the mean-based measure (Figure 2). In 2010, ISCO-based undereducation for young males and females rose above the levels for adults, and the level of mean-based overeducation for young men fell below that of adult male population in the same year, but the figure suggests these were exceptions. In 2014, compared to the previous four years, the difference between the overeducation of younger workers and that of adults continued to increase, reaching 4.2 percentage points for men and 5.0 percentage points for women on the ISCO-based measure. According to the mean-based measure, the differences were 3.4 percentage points for men and 2.1 percentage points for women.

The relationship between the indicators of male and female subpopulations is somewhat more complex (see Fig. 3). On the ISCO-based measure, men have lower overeducation and higher undereducation than women, which means that men generally obtain higher-level positions than women with the same level of education. While the dynamics of mean-based undereducation were intertwining in 2002–2006, men eventually have had a slightly higher undereducation rate on the mean-based measure starting from 2008. In contrast to ISCO-based overeducation, mean-based overeducation suggests that men have a higher rate of overeducation than women. Thus, levels of both overeducation and undereducation are higher for men than for women on the mean-based measure.

3.2 Country-level skills mismatch

In 2014, overeducation ranged from around 4.3 per cent in Portugal to 22.2 per cent in Lithuania on the ISCO-based measure and from 12.9 per cent in Hungary to 17.9 per cent in Spain on the mean-based measure (Figure 4). Undereducation ranged from 8.4 per cent in Lithuania to 44.3 per cent in Portugal on the ISCO-based measure and from 8.1 per cent in Switzerland to 15.6 per cent in Norway on the mean-based measure. On the ISCO-based measure, the level of overeducation of most countries falls in a range from 5 to 20 per cent, and undereducation in most countries lies between 15 and 30 per cent.

It can be noted that Lithuania has both a very high incidence of overeducation and a very low incidence of undereducation on the ISCO-based measure, while the reverse is true, for instance, for Portugal. In general, levels of overeducation tend to be high in countries where undereducation is low, and the other way around (Figure 5, upper right-hand panel).⁶ Very low overeducation rates on the ISCO-based measure are sometimes associated with low tertiary education attainment rates, as is the case in Austria, Poland and Portugal. However, this relationship is generally not very strong, as overeducation rates also depend on the structure of the economy and employment. This is illustrated by the Czech Republic and Hungary – both countries have levels of tertiary education attainment rates comparable with Austria but a far higher rate of overeducation (Figure 5, bottom right-hand panel).⁷ The relationship between the secondary education attainment rate in a country and undereducation is stronger.⁸ Nevertheless, there are countries with similar secondary attainment rates but widely different levels of undereducation (e.g. Finland and Poland, see upper left-hand panel in Figure 5).

Austria, Germany and Switzerland have relatively high rates of secondary educational attainment, while these countries are also well-known for their vocational secondary education and apprenticeship systems. Such systems provide post-secondary non-tertiary education (as this education does not lead to a degree), which might result in an overestimation of the level of undereducation in high skill occupations. While Switzerland and Germany have similar secondary education rates, the incidence of undereducation in the former was around 10 percentage points higher than in the latter in 2014. At the same time, Switzerland stands out on the mean-based measure as the country with the lowest incidence of undereducation (8.1 per cent in 2014).

⁶ The correlation coefficient between the incidence of overeducation and undereducation is -0.58 and significant at 1 per cent.

⁷ The correlation coefficient between the incidence of overeducation and the tertiary education attainment rate is 0.35 and not significant.

⁸ The correlation coefficient between the incidence of undereducation and the secondary education attainment rate is -0.53 and significant at 5 per cent.

Figure 2 Dynamics of average mismatch in Europe, adults and young workers, by sex

Young workers are defined as aged 15–30. Outliers identified as for Figure 1 are excluded from the calculation of averages.

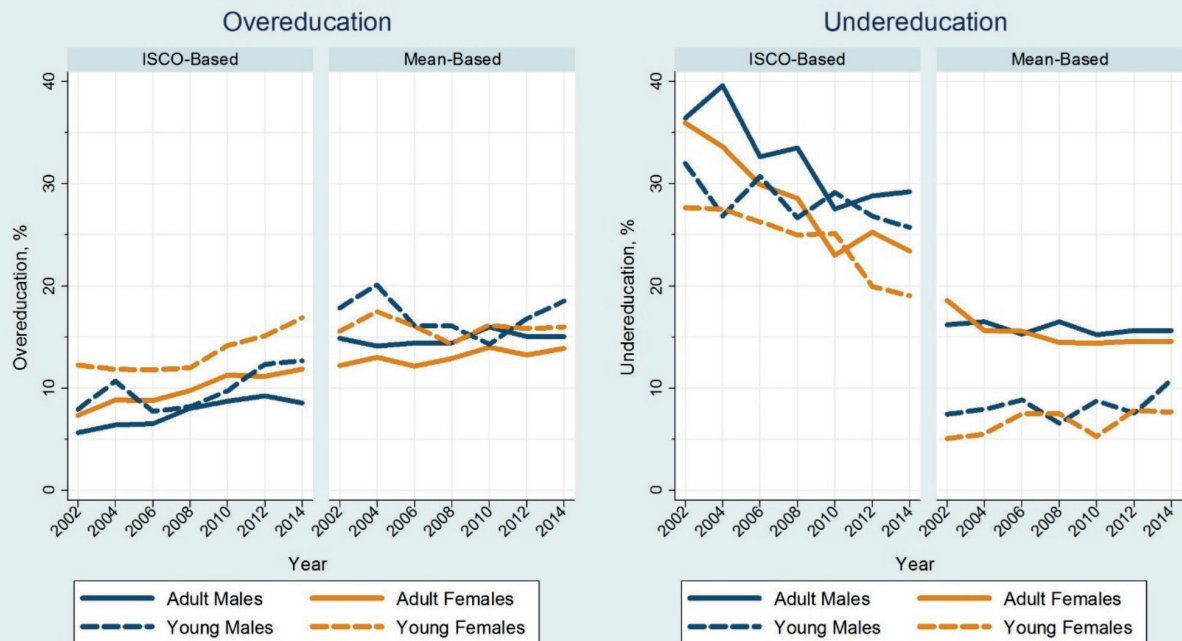


Figure 3 Dynamics of average mismatch in Europe by sex

Outliers identified as for Figure 1 are excluded from the calculation of averages.

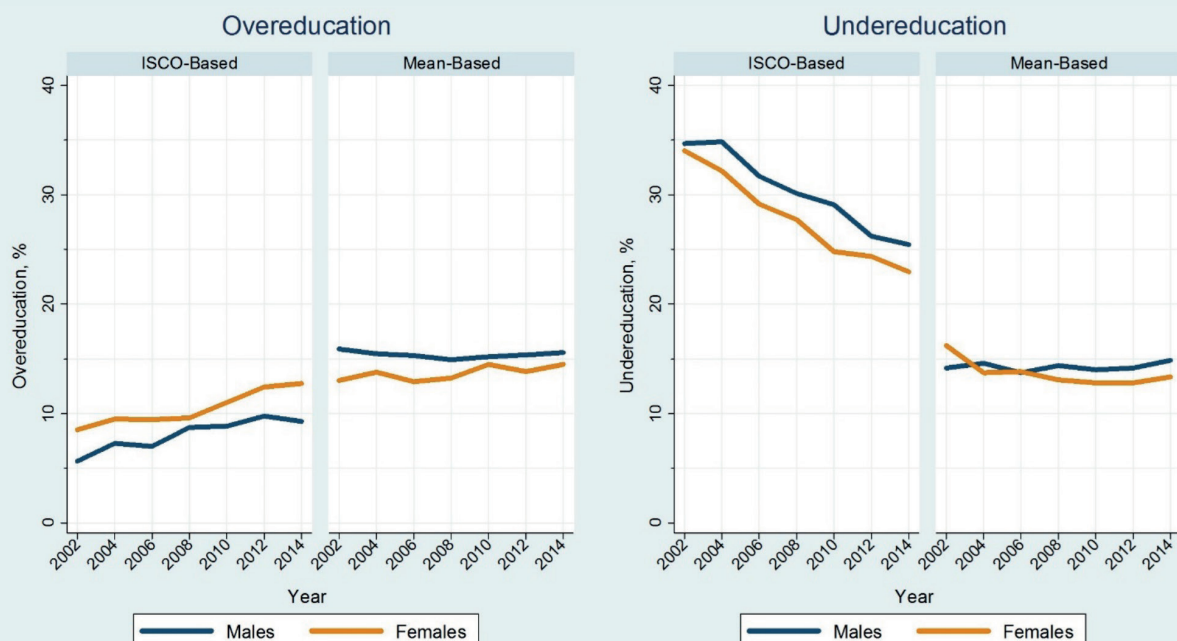


Figure 4 Country-specific skills mismatch in 2014

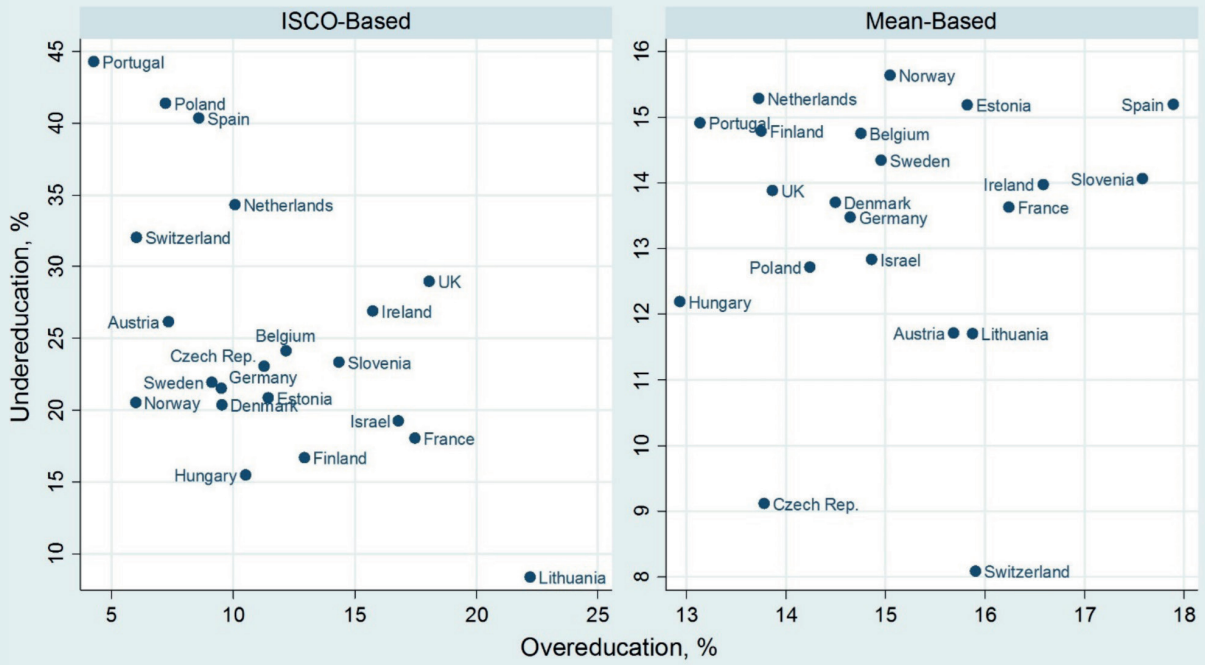
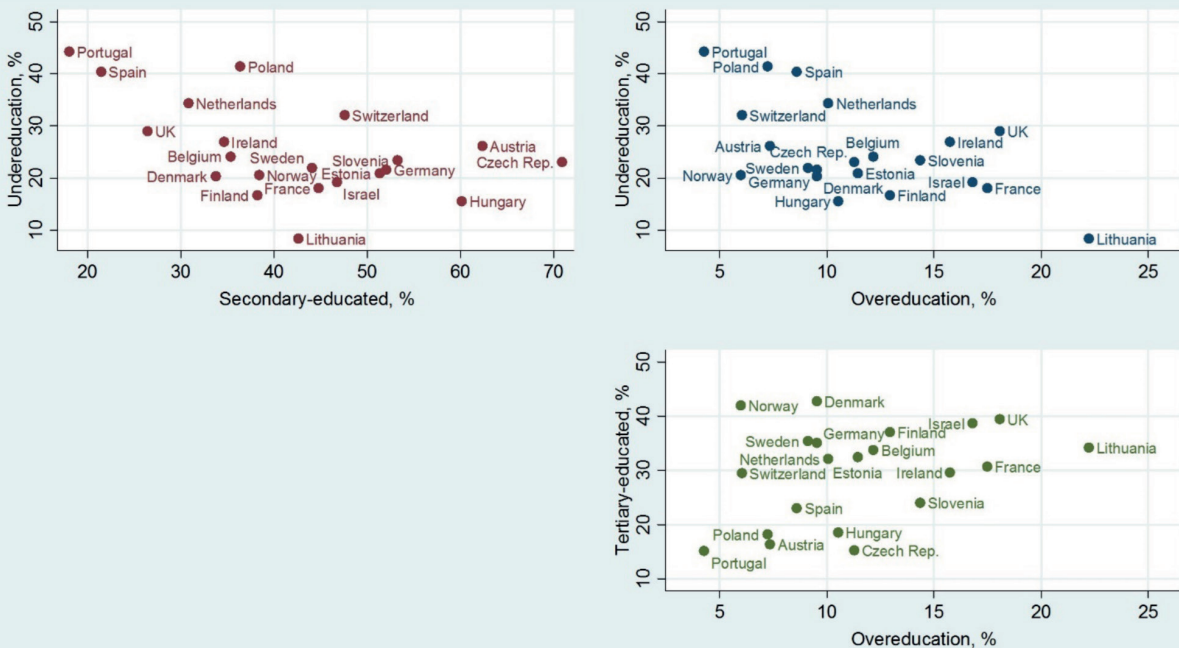


Figure 5 Country-specific ISCO-based skills mismatch in 2014 and secondary and tertiary education attainment rates



3.3 Trends in country-level skills mismatch

Analysis of the incidence of skills mismatch at the country-level demonstrates a stable trend in most countries (Table 2). Excluding Austria, Greece and Italy, because of gaps in data, only Denmark and Russia have no clear trend in either overeducation or undereducation. Germany and Israel have no trend in overeducation, but both are experiencing decreasing undereducation on the ISCO-based measure. Germany stands out because undereducation is decreasing on both measures and also for younger workers. Only Slovenia and Spain do not demonstrate trends in undereducation.

Table 2 Trends in skills mismatch: all employed and youth (aged 15-30)

	Overeducation				Undereducation			
	All		Youth		All		Youth	
	ISCO	Mean	ISCO	Mean	ISCO	Mean	ISCO	Mean
Austria	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Belgium	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Bulgaria	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Cyprus	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Czech Rep.	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Denmark	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Estonia	Green	Green	Green	Green	Green	Green	Green	Green
Finland	Green	Green	Green	Green	Green	Green	Green	Green
France	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Germany	Green	Green	Green	Green	Green	Green	Green	Green
Greece	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Hungary	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Ireland	Green	Green	Green	Green	Green	Green	Green	Green
Israel	Green	Green	Green	Green	Green	Green	Green	Green
Italy	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Lithuania	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Netherlands	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Norway	Green	Green	Green	Green	Green	Green	Green	Green
Poland	Green	Green	Green	Green	Green	Green	Green	Green
Portugal	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Russia	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Slovakia	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Slovenia	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Spain	Green	Green	Green	Green	Green	Green	Green	Green
Sweden	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
Switzerland	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
UK	Green	Green	Green	Green	Green	Green	Green	Green
Ukraine	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange

Red bars show minimum values; green bars show maximum values. Orange background shows a stable increasing trend in mismatch in the last three observed ESS rounds. Green background shows a stable decreasing trend in mismatch in the last three observed ESS rounds. Albania, Croatia, Iceland, Kosovo, Latvia, Luxembourg, Romania and Turkey are excluded because they have data in only one or two ESS rounds.

Overeducation is generally increasing, and 10 countries show an increasing trend on at least one measure. The pattern of increasing overeducation is not universal, however, and overeducation was decreasing on the ISCO-based measure in Estonia, Ireland, Norway and Spain; it was also decreasing on the mean-based measure in Finland, Poland and the UK.

Undereducation was decreasing in 13 countries on at least one measure with only 4 countries showing an increasing trend (excluding countries with contrasting trends on the two measures). On the ISCO-based measure, undereducation was increasing in Ireland, Norway and Switzerland and on the mean-based measure in Finland, Hungary and Sweden.

General trends in the ISCO-based measure - overeducation is increasing and undereducation decreasing – suggest that workers with higher educational credentials are taking up lower-level jobs. This happens through inflows of young workers and outflows of retirees, and also through changes in jobs. It is not surprising that trends in overeducation are more pronounced for younger workers, and in eight countries ISCO-based overeducation is increasing for younger workers (decreasing only in Estonia). Nevertheless, according to the mean-based measure, undereducation is also increasing for youth in five countries (and decreasing in three countries).

Given the methodological differences, trends in ISCO-based mismatch and mean-based mismatch may go in opposite directions. This is, for instance, happening in Estonia, Finland and Sweden for the employed of all ages, and in Belgium, the Czech Republic and the UK for younger workers. Same-direction trends on both measures are also not very common – these are found only in the Czech Republic for overeducation and in Bulgaria, France, Germany, the Netherlands and Slovakia for undereducation. Similarly, trends not always go in the same direction for younger workers and the employed of all ages on the same measure. Divergent trends by age group can be observed in Cyprus, Estonia, Lithuania, the Netherlands, Slovenia and Ukraine for overeducation; and in the Czech Republic, Finland, Germany, Lithuania, the Netherlands, Norway, Slovakia, Sweden and the UK for undereducation.

4. Immigrants and skills mismatch

Migrant workers are vulnerable to skills mismatch for several reasons.⁹ Some of the skills and knowledge of migrants may not be recognized in the host country, for example due to barriers in transferability of qualifications. Work experience acquired abroad may be discounted while limitations in language skills may hamper the full use of other skills. Discrimination may also prevent job seekers with a migrant background from obtaining appropriate employment. Furthermore, self-selection of immigrants as well as migration and integration policies affect labour market outcomes including matching of jobs and skills.

4.1 Immigration, education and employment

Advances in educational attainment of workers have continued, in particularly with regard to tertiary education. From 2002 to 2014, the share of tertiary-educated persons in our sample of European countries increased from just below 22 per cent to more than 30 per cent (Figure 6, upper panels). Similar dynamics, with some exception in 2008, characterise the education levels of immigrants (Figure 6, lower panels). The share of non-tertiary educated immigrants decreased from around 72 per cent in 2002 to 64 per cent in 2014, and the share of those with primary education or less from 33 to 27 per cent. Compared to natives, the share of the tertiary-educated among immigrants is 4 to 9 percentage points higher, depending on the year. Immigrants are thus not randomly drawn from their countries of origin, and this selection is likely to affect labour market outcomes in countries of destination.

Before considering skills mismatch in more detail, we examine which occupational groups show employment growth in our sample of countries, and how important these groups are for immigrants. During the whole period covered by our data (2002-2014), two major occupational groups demonstrated net growth in terms of shares in employment, namely professionals and service workers (Figure 7). Considering employees and the self-employed separately, there was also some growth in the major group of technicians among employees, and in the major groups craft workers and machine operators among the self-employed.

Migrant workers are overrepresented in the growing groups of professionals, service workers and machine operators among the self-employed, but not in the group of craft workers. Among employees, migrant workers are overrepresented among service workers, but not in the major groups of technicians and professionals. These patterns suggest on the one hand that immigration is driven by demand for labour, as captured by relative growth in occupations, alongside other factors. On the other hand, (lack of) recognition of qualifications may play a role given the strongly divergent patterns between employees (less driven by occupational growth) and the self-employed (more driven by occupational growth). There is also a striking difference between the share of immigrants and the share of natives in elementary occupations of employees (the share of immigrants is 7 percentage points higher than the share of natives), which again may foreshadow skills mismatch. Given that migrants are not less educated than natives, skills mismatch is one explanation of such a high share of migrants in elementary occupations.

⁹ This report adopts a definition of immigrants based on place of birth – all persons born outside the country under consideration are considered immigrants, disregarding nationality or other characteristics. Conversely, natives and native workers are born in the country under consideration and thus include second and later generation immigrants.

Figure 6 Education attainment dynamics for natives and immigrants in Europe

The figure is based on 15 countries, all of which are observed in all ESS rounds and have sufficient respondents—immigrants in every round. These countries are Belgium, Denmark, Finland, France, Germany, Hungary, Ireland, the Netherlands, Norway, Portugal, Slovenia, Spain, Sweden, Switzerland and the UK. The figure shows simple averages over countries.

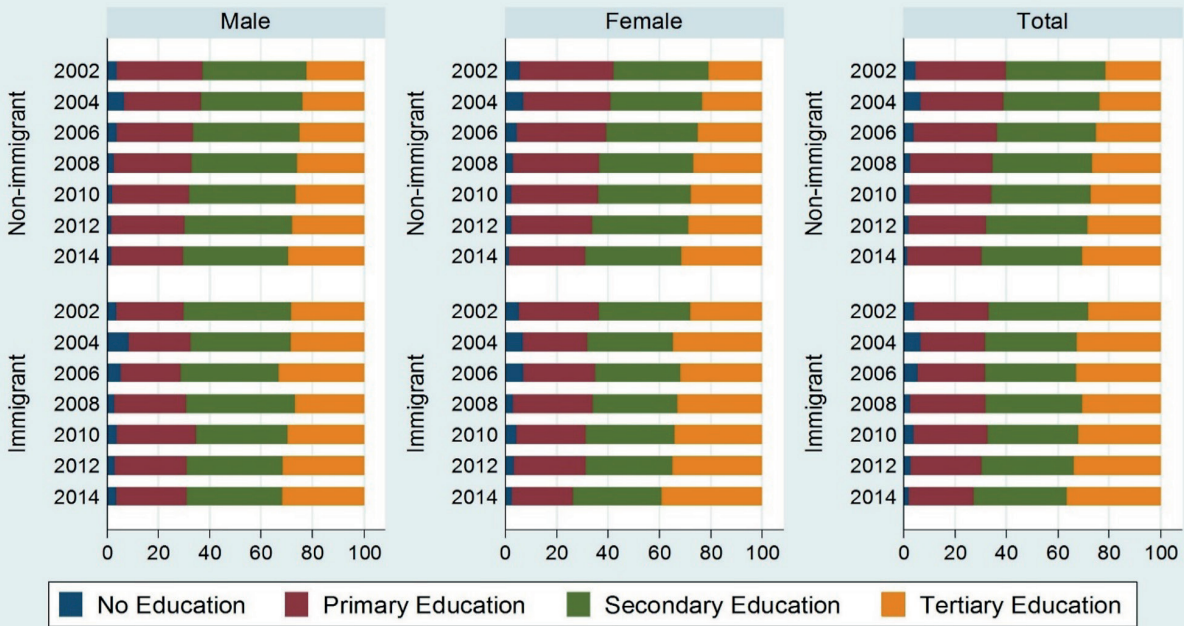
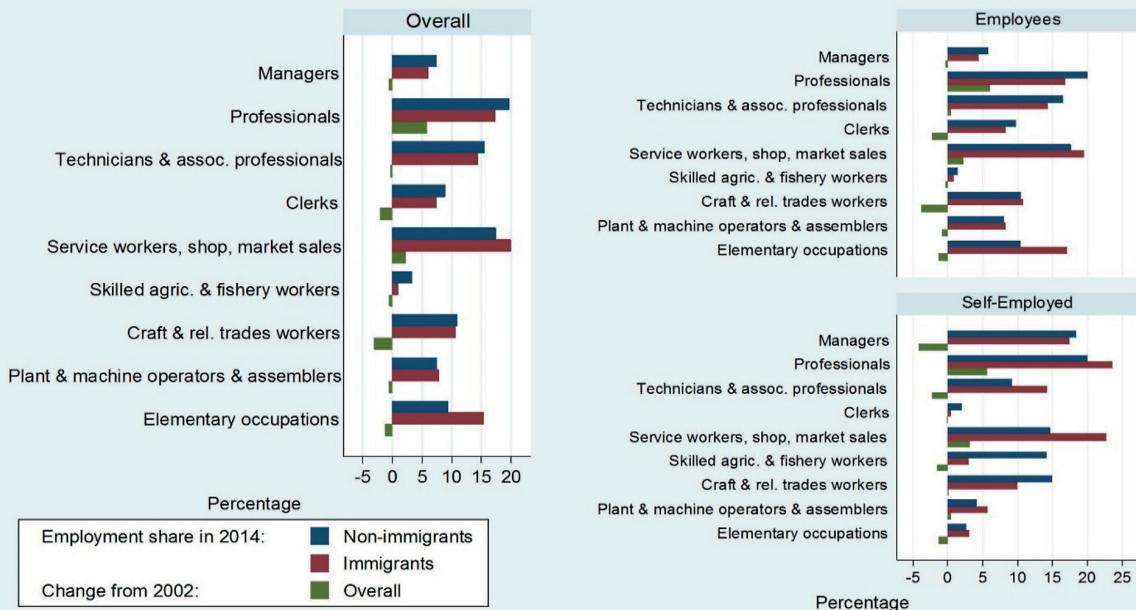


Figure 7 Employment by major occupational group and nativity status, 2014

The figure shows country averages over the same 15 countries as Figure 6.

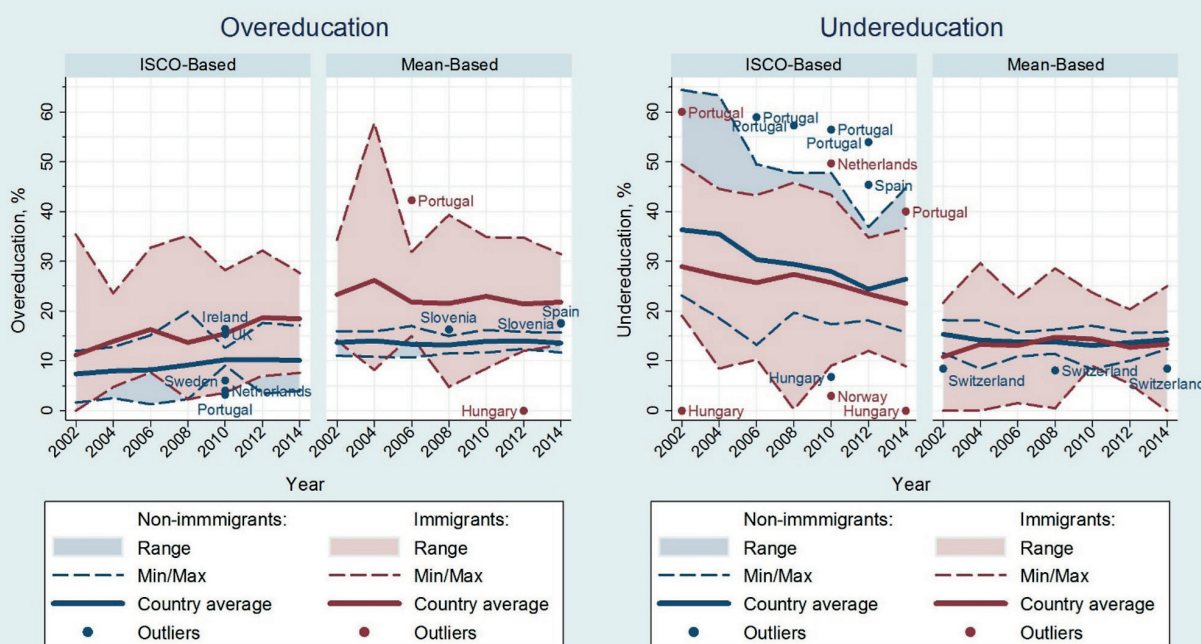


4.2 Skills mismatch

In the sample of European countries with data for all seven ESS rounds, average overeducation of immigrants on both ISCO- and mean-based measures is higher than that of natives (Figure 8). On the ISCO-based measure, overeducation increased from 7.3 per cent to 10.0 per cent for natives and from 11.2 per cent to 18.4 per cent for immigrants. Mean-based overeducation has been close to constant on average, ranging from 13.2 per cent to 14.0 per cent for natives and from 21.4 per cent to 23.3 per cent for immigrants. The difference in overeducation of immigrants and natives has thus been increasing over time on the ISCO-based measure (from around 4 percentage points in 2002 to 8 percentage points in 2014), and has been fairly constant on the mean-based measure at around 8-9 percentage points.

Figure 8 Dynamics of average mismatch in Europe by nativity status

The figure is based on the same 15 countries as Figure 6. Outliers are country-round pairs that are outside the $[p_{25} - 1.5 \times IQR, p_{75} + 1.5 \times IQR]$ interval defined for the respective round for a given measure of mismatch, where p_{25} and p_{75} are 25th and 75th percentiles of the incidence distribution across countries, respectively, and IQR is inter-quantile range. Outliers are excluded from the calculation of averages.



The differences between immigrants and natives in undereducation are smaller than in overeducation on both measures. On the ISCO-based measure, undereducation decreased on average from 36.3 per cent in 2002 to 26.4 per cent in 2014 for natives, and from 28.9 per cent to 21.5 per cent for immigrants. Differences have thus become smaller over time, and average level was the same for natives and immigrants in 2012 (Figure 8, right-hand panel). Mean-based undereducation is very close and relatively stable both for immigrants and natives.

With few exceptions, the incidence of ISCO-based overeducation among immigrants at the country-level is higher and undereducation lower than among natives, as shown in Tables 14–17. The same is true for overeducation according to the mean-based measure, and the Netherlands is the only country where overeducation according to both measures is lower for immigrants in 2014. In Lithuania, Norway and Spain, the difference in the incidence of overeducation between immigrant and native workers exceeded 15 percentage

points in the most recent year on the ISCO-based measure, and the same is true for the Czech Republic, Ireland and Switzerland on the mean-based measure.

More detailed analysis of overeducation by major occupational group at the country level is likely to give a more varied picture. For example, in the sample of 15 countries used in Figure 8, average overeducation in elementary occupations was higher for immigrants in 2014. The same observation can be made in 8 of the 15 countries, but in the remaining 7 the incidence of overeducation was higher for natives. This also shows that there are important differences in the position of migrants in the labour market between countries.

Similar to Table 2, Table 3 summarises recent country-specific trends in mismatch of natives and immigrants. Some differences between the two tables can be noted, but the more interesting finding is that there are few countries where trends in skills mismatch are the same for natives and immigrants. Trends on at least one of the two measures of overeducation are the same for natives and immigrants in five countries (Estonia, France, the Netherlands, Slovenia and Ukraine) and on one of the two measures of undereducation in four countries (Germany, Israel, Lithuania and Norway). In Portugal and Spain in case of ISCO-based

Table 3 Trends in skills mismatch: natives and immigrants



Red bars show minimum values; green bars show maximum values. Orange background shows a stable increasing trend in mismatch in the last three observed ESS rounds. Green background shows a stable decreasing trend in mismatch in the last three observed ESS rounds. Only country-round pairs where there are at least 25 immigrants included. Iceland and Kosovo were excluded from the table because they have observations in only a single ESS round; Croatia, Latvia, Luxembourg and Poland were excluded because they appear only in two ESS rounds.

overeducation, Switzerland in case of ISCO-based undereducation and Sweden in case of mean-based undereducation, the trends are opposite for natives and immigrants. In most other countries, there is a trend for one subsample but no trend for the other.

Considering only immigrants, the incidence of overeducation on the ISCO-based measure is increasing in France, Lithuania, the Netherlands, Slovenia, Spain and Ukraine and decreasing only in Estonia and Portugal. On the mean-based measure, the proportion is more balanced: overeducation is increasing in Estonia, Israel, Slovenia and Switzerland but decreasing in Finland, Portugal, Russia, Spain and Ukraine. Note that both measures have different trends in Estonia, Spain and Ukraine and similar in Portugal and Slovenia.

Undereducation has a decreasing trend on the ISCO-based measure in Germany, Israel, Lithuania and Switzerland but an increasing trend in Belgium and Norway. Similarly to Table 2, mean-based undereducation of immigrants is increasing in most countries with observable trends (Belgium, Lithuania, Norway and Russia, while it is decreasing in Estonia and Sweden). Both measures have the same trend directions in Belgium and Norway and disagree in trend direction only in Lithuania.

5. Concluding remarks

The update of the incidence of overeducation and undereducation in European countries in this report demonstrates a continuation of patterns highlighted in ILO (2014). On average, the level of skills mismatch is considerable in Europe according to both the normative and the statistical measure, and shows large variations by age group and sex. The updated numbers confirm that overeducation is increasing and undereducation is decreasing on the ISCO-based measure. The analysis also confirms that average overeducation tends to be higher for younger workers as well as women on this measure.

New analysis of skills mismatch among immigrants in comparison with native workers in European countries highlights the vulnerable position immigrants typically have in labour markets. With few exceptions, levels of overeducation captured by the ISCO-based measure are higher for immigrants, and both the high incidence of overeducation and the low incidence of undereducation on the ISCO-based measure is consistent with the fact that immigrants may have difficulties transferring their skills and experience across countries.

In general, labour market integration measures can help reduce skills mismatch, for example in terms of access to jobs, recognition of foreign credentials and countering discriminatory practices. This is not only beneficial for the migrants themselves, but also helps host countries to economically benefit from migrant labour. Policies should also be informed by research into the determinants of skills mismatch, which are different across countries.

Monitoring of levels and trends of skills mismatch of migrant workers in comparison with native workers is an important element for the development of policies that improve labour market integration and aim to ensure decent work for migrant workers and native workers alike.

Table 6 Incidence of overeducation, ISCO-based measure, all workers (%)

	2002			2004			2006			2008			2010			2012			2014						
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T				
Albania																									
Austria	3.3	3.7	3.5	6.5	4.8	5.6	4.6	6.1	5.4	5.1	8.8	7.0	5.7	8.6	7.1				5.6	2.3	4.3				
Belgium	7.7	12.7	9.7	9.9	14.1	11.8	6.4	11.7	8.9	5.9	12.6	8.9	11.6	15.6	13.6	8.0	11.8	9.8	8.0	11.8	9.8	6.8	18.1	12.2	
Bulgaria							7.9	7.4	7.6	5.6	8.4	7.1	9.5	12.6	11.2	11.1	14.4	12.9							
Croatia										15.9	11.6	13.8	13.1	13.5	13.3										
Cyprus							15.4	15.7	15.5	14.6	22.5	17.9	13.8	27.9	20.7	23.0	29.0	26.0							
Czech Rep.	5.9	9.0	7.2	4.8	7.0	5.8				4.4	9.9	6.8	6.0	9.7	7.6	6.6	10.1	8.2	11.2	11.4	11.4	11.2	11.4	11.3	
Denmark	13.2	10.6	12.0	11.1	14.7	12.9	8.2	12.8	10.3	12.7	12.3	12.5	10.0	10.9	10.4	14.1	23.3	18.5	14.1	23.3	18.5	7.9	11.4	9.5	
Estonia				12.2	13.0	12.6	9.3	15.6	12.5	11.3	9.6	10.3	17.3	21.2	19.5	11.7	15.5	13.8	11.7	15.5	13.8	7.4	14.5	11.4	
Finland	5.2	14.6	9.7	7.0	16.6	11.8	7.1	14.9	10.7	8.0	11.7	9.7	9.3	13.7	11.4	12.3	19.9	15.9	12.3	19.9	15.9	9.6	16.5	12.9	
France	7.6	11.2	9.3	6.6	9.5	8.1	9.2	10.6	9.9	6.8	10.9	8.9	9.1	11.1	10.1	13.0	13.0	13.0	13.0	13.0	13.0	14.3	20.9	17.5	
Germany	15.1	10.1	12.8	12.5	9.1	10.9	7.9	9.6	8.7	11.5	9.3	10.6	10.8	9.4	10.2	16.0	10.3	13.4	16.0	10.3	13.4	10.8	8.0	9.5	
Greece	5.8	11.1	8.0	10.7	14.8	12.4				8.9	14.0	11.3	9.1	16.7	12.7										
Hungary	6.0	7.0	6.4	4.4	10.4	7.7	9.3	11.8	10.6	13.0	16.2	14.6	7.1	11.0	9.0	11.9	12.2	12.1	11.9	12.2	12.1	8.9	12.0	10.5	
Iceland				15.8	17.6	16.8										6.0	8.4	7.1							
Ireland	9.9	14.9	12.2	10.7	14.7	12.7	12.2	23.6	17.5	19.8	26.3	22.9	22.0	13.4	17.8	16.9	16.8	16.8	16.9	16.8	16.8	14.9	16.7	15.7	
Israel	10.3	13.2	11.7							13.9	18.6	16.4	14.1	14.9	14.5	10.5	14.5	12.6	10.5	14.5	12.6	16.8	16.8	16.8	
Italy	2.1	2.1	2.1	3.8	4.9	4.2										4.7	8.6	6.3							

Table 7 Incidence of overeducation, ISCO-based measure, workers aged 15–30 (%)

	2002			2004			2006			2008			2010			2012			2014			
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	
Albania																						
Austria	4.5	2.4	3.4	5.2	1.9	3.8	2.0	5.6	3.8	4.7	11.5	8.7	7.7	4.2	6.0				5.0	7.4	6.3	
Belgium	7.4	11.5	8.9	14.3	17.7	15.9	5.9	15.8	10.1	6.8	21.7	13.5	16.0	19.3	17.8	8.7	9.5	9.0	7.1	16.9	12.0	
Bulgaria							6.6	5.3	5.9	7.5	3.2	5.1	14.2	13.5	13.9	7.4	14.6	10.6				
Croatia										20.6	13.8	17.6	17.5	10.0	13.2							
Cyprus							21.5	21.1	21.3	18.2	22.0	20.1	23.3	40.7	32.3	27.1	48.3	37.0				
Czech Rep.	5.8	4.1	5.1	6.4	5.9	6.2				2.3	10.8	5.3	4.6	9.5	6.5	5.0	17.7	11.4	13.9	6.1	10.4	
Denmark	15.1	13.2	14.1	10.3	14.9	12.4	4.2	9.1	6.3	7.6	7.1	7.4	5.6	12.7	9.2	8.5	24.6	15.4	5.8	9.1	6.9	
Estonia				8.7	6.7	7.8	3.5	16.3	9.3	6.7	11.4	9.0	13.3	20.8	16.7	10.4	14.5	12.3	5.9	17.2	10.9	
Finland	9.6	18.5	13.7	10.5	17.8	13.8	10.1	14.6	12.0	8.7	12.1	10.2	8.8	12.8	10.8	14.0	17.1	15.3	5.6	23.5	13.4	
France	18.1	29.1	22.9	21.3	14.5	17.7	16.8	14.4	15.8	10.5	14.9	12.8	12.9	15.9	14.5	15.6	11.9	13.8	22.2	19.9	21.2	
Germany	8.1	8.5	8.3	11.0	6.4	8.8	6.1	5.9	6.0	11.9	7.9	10.2	5.0	4.0	4.6	13.0	9.4	11.4	9.2	6.1	7.8	
Greece	6.4	16.9	10.2	15.9	25.7	20.6				11.6	21.1	15.7	13.3	16.8	14.8							
Hungary	3.0	8.7	5.4	3.9	12.2	8.1	7.2	17.5	11.5	27.1	15.7	21.5	12.3	9.3	11.0	14.6	17.3	15.9	14.5	15.9	15.3	
Iceland				21.4	23.1	22.3										6.1	3.6	5.0				
Ireland	11.1	27.9	20.0	14.7	17.1	15.9	19.1	37.8	28.1	38.6	43.2	41.0	17.2	19.6	18.3	24.1	28.1	25.8	27.3	23.8	25.8	
Israel	14.4	13.6	14.1							16.1	24.2	20.2	15.8	12.3	14.3	10.0	11.9	10.9	14.3	19.4	16.4	
Italy	6.1	2.5	4.7	6.6	8.2	7.2										6.3	14.8	9.3				

Table 8 Incidence of overeducation, mean-based measure, all workers (%)

	2002			2004			2006			2008			2010			2012			2014				
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T		
Albania																18.4	13.9	16.5					
Austria	12.5	10.0	11.3	14.9	7.4	11.0	15.5	11.7	13.6	14.1	15.6	14.9	16.1	10.7	13.6				15.2	16.2	15.7		
Belgium	15.3	11.1	13.6	15.0	14.6	14.8	13.6	14.9	14.2	13.9	12.1	13.1	14.2	14.1	14.2	16.7	12.0	14.5	15.2	15.2	14.2	14.7	
Bulgaria							11.7	11.4	11.5	15.0	11.0	12.8	12.9	13.6	13.3	11.7	11.4	11.5					
Croatia										17.8	11.5	14.6	11.0	14.2	12.6								
Cyprus							10.2	11.0	10.6	12.3	12.1	12.2	14.9	14.8	14.9	15.4	13.6	14.5					
Czech Rep.	14.5	8.5	12.0	12.1	11.7	11.9				12.2	12.8	12.5	11.4	10.5	11.0	14.1	12.3	13.3	14.7	13.0	13.8		
Denmark	15.3	14.0	14.7	13.0	13.7	13.3	12.1	11.6	11.9	13.6	11.5	12.6	13.6	12.4	13.1	14.9	17.0	15.9	14.9	14.9	14.1	14.5	
Estonia				12.9	15.7	14.4	12.7	13.0	12.9	15.7	13.1	14.3	14.4	12.8	13.5	16.5	13.9	15.1	16.2	16.2	15.5	15.8	
Finland	12.2	15.9	13.9	15.4	13.5	14.5	12.6	15.8	14.1	13.1	15.1	14.0	14.5	14.0	14.3	13.4	14.3	13.8	12.1	15.4	13.7		
France	15.2	10.2	12.8	17.8	14.9	16.3	15.6	11.3	13.5	13.8	13.5	13.7	16.2	13.8	14.9	14.9	12.8	13.8	17.8	14.6	16.2		
Germany	17.5	14.8	16.2	16.9	12.2	14.7	15.7	11.2	13.7	15.5	11.2	13.6	16.4	13.2	15.0	15.7	12.8	14.4	16.1	12.9	14.6		
Greece	14.6	7.9	11.9	15.3	13.3	14.4				13.6	13.2	13.4	13.7	11.5	12.7								
Hungary	16.0	10.5	13.6	14.3	18.7	16.5	19.2	15.0	16.9	18.5	11.8	15.1	12.3	15.2	13.7	16.2	15.1	15.6	14.1	11.9	12.9		
Iceland				13.5	11.4	12.4										13.8	14.8	14.3					
Ireland	15.7	14.3	15.0	15.3	17.5	16.4	12.1	12.9	12.5	12.9	15.4	14.1	20.0	14.1	17.1	15.8	12.6	14.3	18.1	14.9	16.6		
Israel	16.5	14.9	15.7							14.4	16.2	15.3	15.0	14.2	14.6	11.5	16.4	14.0	14.2	15.5	14.9		
Italy	17.6	10.2	14.4	14.3	14.5	14.4										12.8	13.6	13.2					

Table 9 Incidence of overeducation, mean-based measure, workers aged 15–30 (%)

	2002			2004			2006			2008			2010			2012			2014			
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	
Albania																						
Austria	9.6	10.4	10.0	9.2	7.8	8.6	12.4	15.8	14.1	18.3	23.8	21.4	20.2	13.8	17.0	13.7	10.4	11.9	13.7	10.4	11.9	
Belgium	17.0	15.1	16.3	21.8	14.3	18.4	13.5	16.9	15.0	13.1	19.6	16.0	11.0	14.3	12.7	15.5	17.5	18.5	17.5	19.5	18.5	
Bulgaria							12.8	18.0	15.8	16.6	9.6	12.7	21.5	21.8	21.6	6.4						
Croatia										19.9	18.7	19.4	5.3	22.7	15.5							
Cyprus							13.1	13.7	13.3	13.7	14.4	14.0	18.4	24.5	21.6	17.8	29.4	23.2				
Czech Rep.	7.6	6.5	7.2	13.8	16.4	14.9				10.1	9.3	9.8	14.3	18.9	16.0	33.9	22.3	27.8	19.9	13.7	17.1	
Denmark	19.8	13.3	16.6	9.8	9.7	9.7	3.4	6.1	4.7	11.0	4.5	7.9	13.6	6.1	9.7	6.7	15.8	10.6	8.8	12.8	10.1	
Estonia				14.5	16.3	15.4	11.6	20.0	15.3	9.4	10.8	10.1	13.5	22.5	17.5	14.4	14.7	14.5	12.6	17.8	14.9	
Finland	13.1	21.0	16.7	21.2	22.5	21.8	13.7	16.0	14.7	8.5	13.3	10.6	14.7	9.1	11.8	9.1	16.0	12.1	9.4	12.3	10.7	
France	25.5	9.2	18.4	27.0	18.6	22.5	27.8	16.6	22.9	22.7	8.9	15.6	16.7	20.6	18.8	14.4	12.7	13.6	16.6	21.6	18.9	
Germany	13.5	12.0	12.8	15.6	9.4	12.6	15.0	13.3	14.3	10.3	9.5	10.0	12.8	13.1	12.9	13.8	18.2	15.7	10.9	10.7	10.8	
Greece	14.8	9.2	12.7	19.4	15.2	17.4				13.2	22.1	17.2	17.9	16.0	17.1							
Hungary	10.5	9.0	9.9	13.5	26.4	19.7	12.4	20.0	15.6	19.9	12.5	16.2	11.2	15.5	13.1	19.5	19.4	19.5	25.0	15.6	19.7	
Iceland				11.4	18.8	15.7										10.1	5.9	8.2				
Ireland	21.1	21.2	21.1	19.5	25.2	22.5	13.8	16.7	15.2	21.3	22.8	22.1	21.6	19.2	20.5	22.4	16.0	19.6	34.3	13.0	25.1	
Israel	10.1	6.6	8.5							7.1	8.2	7.7	8.4	7.7	8.1	5.3	11.0	7.8	6.8	10.2	8.2	
Italy	31.8	21.7	27.9	20.9	19.2	20.2										9.8	19.0	12.9				

Table 10 Incidence of undereducation, ISCO-based measure, all workers (%)

	2002			2004			2006			2008			2010			2012			2014			
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	
Albania																48.5	23.4	38.6				
Austria	49.1	40.1	44.6	38.1	34.0	36.0	43.4	37.3	40.2	37.7	31.9	34.8	30.4	24.6	27.6				28.0	24.2	26.2	
Belgium	32.3	23.7	28.8	31.3	22.3	27.4	37.5	20.8	29.6	34.0	18.9	27.3	27.1	21.6	24.4	33.5	20.8	27.7	31.5	16.0	24.1	
Bulgaria							25.9	19.0	21.9	25.9	21.7	23.6	24.2	16.3	20.0	18.1	13.8	15.8				
Croatia										17.3	14.4	15.9	15.9	14.9	15.4							
Cyprus							25.1	13.2	19.8	23.7	16.8	20.8	26.6	12.1	19.5	20.1	13.6	16.8				
Czech Rep.	21.4	28.6	24.5	20.5	34.1	27.0				24.9	28.5	26.4	17.5	23.8	20.3	22.2	26.7	24.2	23.4	22.7	23.0	
Denmark	27.7	24.4	26.1	21.8	15.0	18.4	25.8	18.2	22.2	25.1	17.8	21.6	26.2	25.0	25.7	23.6	12.7	18.4	24.0	16.3	20.4	
Estonia				23.6	25.8	24.8	26.7	25.2	25.9	26.9	32.9	30.2	24.0	18.5	21.0	22.3	16.7	19.3	24.5	18.1	20.9	
Finland	38.0	24.1	31.3	33.4	19.4	26.4	27.7	18.1	23.3	27.3	18.5	23.3	27.6	17.4	22.7	22.5	12.6	17.9	21.6	11.5	16.7	
France	30.7	29.9	30.3	37.9	29.7	33.7	29.9	28.6	29.3	31.9	24.1	28.0	33.2	26.6	29.8	30.6	23.0	26.6	23.6	12.1	18.0	
Germany	19.4	29.8	24.3	20.6	30.5	25.3	21.7	32.3	26.4	21.0	29.6	24.7	21.5	29.7	25.1	18.3	26.4	22.1	16.9	27.3	21.5	
Greece	48.2	45.8	47.2	40.4	30.9	36.4				38.6	30.4	34.8	33.1	27.3	30.4							
Hungary	19.5	28.9	23.6	24.2	24.2	24.2	13.5	13.4	13.5	16.9	25.1	20.8	7.2	6.3	6.8	15.5	22.3	19.1	14.0	16.8	15.5	
Iceland				31.1	31.0	31.1										42.8	31.5	37.4				
Ireland	40.0	33.2	36.9	46.4	29.8	38.3	35.6	25.4	30.9	34.3	16.9	26.0	24.8	22.1	23.5	24.8	23.2	24.1	30.4	23.2	26.9	
Israel	33.9	29.1	31.5							34.9	20.7	27.3	32.9	21.2	26.9	30.4	17.7	23.8	23.2	15.2	19.2	
Italy	59.1	46.7	53.7	47.8	37.9	43.9										45.9	39.0	43.0				

Table 11 Incidence of undereducation, ISCO-based measure, workers aged 15–30 (%)

	2002			2004			2006			2008			2010			2012			2014			
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	
Albania																						
Austria	45.2	36.9	40.9	46.1	36.6	42.3	44.9	34.8	40.0	34.7	27.3	30.4	30.0	16.7	23.3				23.5	21.4	22.4	
Belgium	29.5	17.2	25.0	23.2	17.7	20.7	38.2	13.2	27.5	22.6	9.6	16.8	29.6	21.6	25.4	24.0	24.2	24.1	26.2	10.8	18.6	
Bulgaria							27.9	18.7	22.8	22.0	19.0	20.4	18.9	16.5	17.9	22.1	15.6	19.2				
Croatia										13.0	11.1	12.2	11.1	8.4	9.6							
Cyprus							16.9	2.5	11.8	13.1	6.0	9.5	17.6	5.3	11.3	0.0	0.0	0.0				
Czech Rep.	25.1	29.8	27.0	18.9	33.8	25.2				25.1	32.5	27.7	16.4	20.2	17.9	10.7	28.1	19.6	26.6	18.3	22.8	
Denmark	23.7	29.7	26.6	21.8	24.3	23.0	35.2	21.8	29.4	30.4	32.9	31.5	40.7	32.7	36.7	32.9	26.2	30.1	32.7	25.5	30.2	
Estonia				31.5	16.2	24.6	33.6	25.0	29.8	34.4	29.5	32.0	28.9	16.7	23.5	31.3	15.5	24.2	32.2	14.0	24.2	
Finland	17.6	19.4	18.5	26.7	13.3	20.5	22.5	15.6	19.6	21.3	9.1	15.9	26.3	9.0	17.7	19.0	13.2	16.5	25.8	13.2	20.4	
France	11.9	9.0	10.6	20.8	14.2	17.3	15.0	14.5	14.8	18.2	24.4	21.4	17.4	14.9	16.1	25.1	15.1	20.4	16.4	4.9	11.3	
Germany	32.2	33.5	32.8	26.9	37.2	31.8	33.5	33.4	33.5	25.7	32.3	28.5	38.1	49.4	43.0	26.7	28.3	27.4	17.7	36.3	26.3	
Greece	41.5	24.2	35.2	25.1	13.6	19.5				32.6	10.4	22.9	29.8	8.9	20.9							
Hungary	23.2	20.3	22.0	31.2	12.8	21.8	16.5	18.3	17.3	13.6	22.8	18.1	7.1	6.3	6.7	11.4	13.5	12.4	11.3	14.6	13.2	
Iceland				40.5	30.8	35.1										50.8	39.3	45.7				
Ireland	25.1	26.8	26.0	25.0	18.9	21.7	26.8	16.9	22.1	9.2	10.7	10.0	20.6	14.2	17.5	10.9	4.3	8.1	15.1	13.0	14.2	
Israel	34.0	27.4	31.0							30.7	16.9	23.6	25.9	20.4	23.6	30.5	20.9	26.2	20.2	17.4	19.0	
Italy	50.5	34.5	44.3	44.7	24.3	36.7										37.5	7.4	26.7				

Table 12 Incidence of undereducation, mean-based measure, all workers (%)

	2002			2004			2006			2008			2010			2012			2014			
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	
Albania																17.0	10.9	14.5				
Austria	15.7	15.4	15.5	13.2	15.9	14.6	13.6	10.8	12.1	13.3	13.8	13.5	9.7	9.8	9.7				12.4	11.0	11.7	
Belgium	15.1	16.9	15.8	17.0	13.7	15.6	16.6	15.1	15.9	15.4	15.0	15.2	15.5	12.2	13.8	13.4	10.3	12.0	14.2	15.4	14.8	
Bulgaria							19.0	12.4	15.1	15.6	13.8	14.6	13.9	8.7	11.2	9.3	10.3	9.8				
Croatia										8.7	8.8	8.8	7.9	11.2	9.5							
Cyprus							11.6	14.2	12.8	10.6	13.8	11.9	16.2	15.7	16.0	12.0	12.7	12.4				
Czech Rep.	9.5	9.4	9.5	10.6	13.6	12.0				7.1	13.8	10.0	9.3	12.9	10.9	9.7	10.7	10.1	8.2	10.0	9.1	
Denmark	16.5	15.9	16.2	14.7	14.5	14.6	14.2	13.8	14.0	16.5	11.5	14.1	13.4	15.4	14.4	15.8	13.7	14.8	15.6	11.6	13.7	
Estonia				15.1	14.6	14.8	17.5	14.2	15.8	11.5	16.6	14.4	17.3	18.0	17.7	16.6	13.9	15.2	17.5	13.4	15.2	
Finland	18.9	14.9	16.9	14.6	15.7	15.2	15.1	14.7	14.9	14.3	13.6	13.9	14.5	10.2	12.5	15.7	11.2	13.6	18.3	11.2	14.8	
France	12.7	17.7	15.1	14.2	13.4	13.8	13.6	15.4	14.5	15.4	11.1	13.2	16.6	13.5	15.0	16.9	12.6	14.6	14.8	12.5	13.6	
Germany	11.2	18.7	14.8	13.2	16.5	14.7	11.7	14.4	12.9	13.7	14.8	14.2	14.7	14.9	14.8	11.8	16.7	14.1	12.9	14.2	13.5	
Greece	15.8	15.8	15.8	13.2	12.9	13.1				12.0	14.3	13.1	14.3	12.5	13.5							
Hungary	8.0	15.7	11.4	11.4	7.8	9.6	9.0	12.2	10.7	10.7	17.0	13.8	6.4	11.8	9.0	10.3	13.3	11.9	13.0	11.4	12.2	
Iceland				13.5	15.0	14.3										16.6	13.5	15.2				
Ireland	15.5	13.4	14.5	17.8	14.2	16.0	14.6	12.4	13.5	16.0	13.6	14.9	14.3	12.0	13.2	14.8	13.4	14.1	12.7	15.4	14.0	
Israel	14.2	10.9	12.5							12.4	7.5	9.8	11.9	11.0	11.4	11.9	7.4	9.6	12.2	13.4	12.8	
Italy	16.7	13.7	15.4	15.4	13.7	14.7										16.1	11.7	14.2				

Table 13 Incidence of undereducation, mean-based measure, workers aged 15–30 (%)

	2002			2004			2006			2008			2010			2012			2014			
	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	M	F	T	
Albania																						
Austria	13.6	12.7	13.2	18.8	12.3	16.1	16.6	5.4	11.2	12.2	8.5	10.1	13.4	5.3	9.4				10.5	13.7	12.3	
Belgium	10.7	2.3	7.5	7.0	7.1	7.1	9.4	5.6	7.8	6.1	2.4	4.4	5.5	2.4	3.8	5.2	9.6	7.3	7.5	8.5	8.0	
Bulgaria							28.4	5.3	15.1	14.4	8.9	11.4	16.4	8.4	12.9	11.1	8.8	10.1				
Croatia										5.3	3.3	4.4	2.2	4.2	3.4							
Cyprus							5.6	1.7	4.2	2.3	3.2	2.7	12.3	6.1	9.1	4.6	1.8	3.3				
Czech Rep.	8.9	6.6	8.0	20.2	8.4	15.2				8.9	13.8	10.6	8.1	8.6	8.3	1.9	8.9	5.5	7.1	2.3	4.9	
Denmark	12.1	14.4	13.3	11.0	16.7	13.6	17.2	16.3	16.8	11.0	12.1	11.5	11.4	22.4	17.2	8.0	14.0	10.6	18.7	6.4	14.5	
Estonia				13.7	4.8	9.6	20.5	8.9	15.3	9.4	14.5	11.9	11.2	7.0	9.4	17.4	11.0	14.5	16.2	5.6	11.4	
Finland	2.5	4.8	3.5	5.1	6.7	5.9	2.4	4.3	3.2	4.2	4.1	4.2	6.7	2.6	4.6	8.1	8.0	8.0	9.4	7.7	8.7	
France	4.5	7.1	5.6	4.2	2.5	3.3	3.4	7.5	5.2	3.4	5.8	4.6	10.3	4.7	7.3	6.6	11.6	8.9	3.9	13.3	8.2	
Germany	11.9	17.4	14.4	18.4	19.1	18.7	16.0	7.2	12.2	14.8	13.1	14.1	20.2	11.5	16.4	13.7	14.7	14.1	12.3	14.5	13.3	
Greece	6.4	7.8	6.9	5.0	1.4	3.2				7.4	1.7	4.9	13.4	3.7	9.2							
Hungary	8.4	3.0	6.2	12.2	4.6	8.5	7.3	11.6	9.1	5.4	16.1	10.8	6.2	6.3	6.2	4.8	6.1	5.4	16.7	6.5	10.9	
Iceland				8.6	6.3	7.2										11.7	14.0	12.7				
Ireland	5.1	5.6	5.4	8.6	4.5	6.5	10.2	4.6	7.5	1.2	8.3	4.9	9.0	3.1	6.2	5.1	5.5	5.3	9.1	0.6	5.4	
Israel	10.3	13.2	11.6							9.3	3.4	6.3	6.3	13.5	9.4	8.3	3.1	5.9	11.8	10.6	11.3	
Italy	6.0	3.9	5.1	9.0	0.7	5.8										7.3	4.8	6.5				

Table 14 Incidence of overeducation, ISCO-based measure, natives and immigrants, all workers (%)

	2002		2004		2006		2008		2010		2012		2014	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
Austria	3.0	8.4	5.3	10.3	5.5	3.0	6.5	9.4	6.5	12.2			6.2	14.2
Belgium	9.9	7.5	11.4	15.7	8.4	14.7	8.3	13.8	12.5	21.2	8.2	19.5	10.5	22.6
Croatia							14.1	10.6	14.2	5.3				
Cyprus					14.9	25.6	16.5	31.1	19.9	29.1	23.9	41.7		
Czech Rep.	7.1	11.5	6.0	1.3	6.7	12.6	6.7	12.6	7.6	8.8	8.4	2.2	11.3	12.5
Denmark	11.7	19.0	12.8	15.6	9.5	22.4	12.3	15.1	10.3	13.0	17.6	32.1	8.7	19.7
Estonia			10.5	24.1	10.7	20.0	9.5	14.2	17.9	31.4	13.2	18.2	10.4	17.6
Finland	9.8	8.0	11.7	13.6	10.3	20.0	9.6	12.1	10.8	27.3	15.5	22.0	12.1	26.8
France	9.8	4.2	8.4	4.7	9.0	18.5	7.9	20.2	10.1	10.8	12.8	14.4	17.1	20.9
Germany	12.0	21.6	10.4	15.5	8.5	10.1	10.2	14.0	9.7	13.5	11.4	26.9	9.2	12.0
Greece	6.3	17.0	11.6	18.0			10.4	21.0	11.1	23.6				
Hungary	6.5	0.0	7.3	23.6	10.6	10.0	14.6	12.4	9.0	9.0	11.9	30.5	10.4	18.2
Iceland											6.6	12.4		
Ireland	11.6	19.9	12.2	19.2	15.1	32.7	19.9	35.2	16.3	24.3	14.9	28.1	14.1	25.5
Israel	9.6	16.1					13.0	22.6	11.6	21.9	10.2	20.3	14.2	23.7
Italy	2.2	0.0	4.0	10.0							5.8	15.2		
Kosovo											11.6	3.4		
Latvia					12.1	15.6	17.2	22.2						

Table 15 Incidence of overeducation, mean-based measure, natives and immigrants, all workers (%)

	2002		2004		2006		2008		2010		2012		2014	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
Austria	10.6	17.7	11.0	11.9	13.4	17.6	14.8	15.4	12.6	21.8			14.4	23.0
Belgium	12.6	27.4	14.3	21.7	13.7	20.9	12.4	19.6	13.6	18.9			13.5	21.4
Croatia							15.0	11.2	13.2	7.2				
Cyprus					9.1	37.6	11.4	20.3	14.3	19.8			12.6	28.8
Czech Rep.	12.1	6.6	11.6	21.5			12.5	11.7	10.8	22.4			12.8	36.3
Denmark	14.6	16.7	13.4	9.5	10.6	31.9	12.4	14.9	12.6	20.5			14.7	34.7
Estonia			12.9	22.4	12.6	14.2	14.3	13.7	13.6	13.0			14.9	16.1
Finland	13.9	16.0	14.1	31.8	13.8	21.2	13.8	21.2	13.6	33.3			13.0	26.8
France	11.9	20.8	15.9	21.2	12.6	22.5	13.1	20.3	13.9	28.0			14.0	11.9
Germany	16.0	18.9	15.2	10.0	13.2	19.1	13.9	10.4	14.7	17.2			14.2	15.6
Greece	11.9	10.6	13.9	18.1			13.2	16.0	13.2	9.1				
Hungary	13.5	22.2	15.7	57.7	16.9	17.5	14.9	39.3	13.6	17.7			15.8	0.0
Iceland													13.5	22.4
Ireland	15.1	14.1	15.6	27.4	10.9	21.5	12.9	19.2	15.1	26.6			12.5	25.2
Israel	14.4	19.1					12.7	20.6	14.3	15.4			13.2	16.7
Italy	14.7	5.6	14.4	14.2									13.4	21.4
Kosovo													10.7	2.0
Latvia					15.2	19.0	14.8	13.7						

Table 16 Incidence of undereducation, ISCO-based measure, natives and immigrants, all workers (%)

	2002		2004		2006		2008		2010		2012		2014	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
Austria	45.3	38.7	36.0	35.9	40.1	43.1	35.8	26.6	28.3	22.3			26.8	22.6
Belgium	28.5	31.3	26.4	38.6	30.1	24.0	27.3	27.6	24.5	23.1	25.0	25.8	23.9	25.8
Croatia							16.7	8.8	15.2	18.2				
Cyprus					20.4	8.9	21.5	13.8	19.5	19.5	18.3	6.1		
Czech Rep.	25.0	5.6	27.2	22.2			26.4	32.6	20.2	24.3	17.5	23.2	23.1	23.2
Denmark	26.5	19.0	18.6	15.6	22.8	13.8	21.3	26.4	25.2	33.3	14.3	16.7	20.7	16.7
Estonia			26.6	15.4	28.1	17.1	29.9	33.1	22.3	10.8	21.0	15.8	21.7	15.8
Finland	31.5	24.0	26.4	27.3	23.6	14.3	23.6	12.1	23.1	12.1	13.6	8.9	17.1	8.9
France	29.8	34.7	32.9	44.5	29.2	30.1	27.5	33.9	30.2	25.5	28.5	22.1	17.5	22.1
Germany	24.6	20.6	25.8	20.9	26.7	23.6	24.9	23.2	25.5	21.8	17.5	13.6	22.5	13.6
Greece	48.5	40.1	36.5	35.6			35.0	32.7	30.7	27.7				
Hungary	23.9	0.0	24.6	8.4	13.2	24.9	21.1	0.3	6.7	9.0	20.7	0.0	15.7	0.0
Iceland											28.4			
Ireland	38.1	22.6	39.3	21.5	32.9	17.3	28.8	14.6	24.2	20.4	22.6	18.2	28.4	18.2
Israel	33.3	26.8					30.9	20.6	29.2	21.2	20.5	15.6	20.6	15.6
Italy	54.0	45.7	44.0	40.2							39.4			
Kosovo											9.7			
Latvia					21.2	17.8	16.0	18.9						

Table 17 Incidence of undereducation, mean-based measure, natives and immigrants, all workers (%)

	2002		2004		2006		2008		2010		2012		2014	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
Austria	14.6	24.1	14.2	21.2	12.0	14.5	13.2	16.9	9.8	9.6			11.2	14.6
Belgium	15.5	19.4	15.1	21.7	15.6	19.4	14.7	19.5	14.1	11.6	10.8	19.7	13.8	20.5
Croatia							8.7	11.6	8.7	16.1				
Cyprus			13.1		13.1	7.2	12.2	9.3	15.1	23.3	14.0	0.0		
Czech Rep.	9.7	0.0	11.6	22.8			9.9	18.9	11.0	6.8	10.0	18.8	9.3	3.6
Denmark	16.2	16.7	14.7	11.9	14.2	10.6	13.4	25.5	14.1	18.2	15.1	10.2	13.6	15.5
Estonia			15.2	13.0	16.8	11.8	13.8	18.0	17.3	21.0	14.9	17.5	15.4	13.8
Finland	17.4	0.0	15.4	4.5	15.1	9.1	14.0	12.1	12.6	9.1	13.7	12.5	15.3	5.7
France	14.5	21.7	13.3	20.0	14.1	18.0	12.2	25.9	14.6	19.8	14.3	17.8	12.9	20.2
Germany	14.4	20.1	13.2	29.6	12.7	14.7	13.1	24.6	14.3	19.3	13.5	18.0	12.9	18.5
Greece	16.5	11.7	13.2	11.7			12.7	17.4	13.8	11.1				
Hungary	11.5	0.0	9.8	0.0	10.8	5.6	14.0	0.4	8.9	13.7	12.0	9.6	12.4	0.0
Iceland											15.7	8.9		
Ireland	15.0	9.0	16.3	12.4	14.4	8.4	16.1	9.5	14.0	9.6	14.3	12.8	14.5	11.1
Israel	12.3	13.4					10.6	8.1	11.7	10.8	8.1	14.4	13.4	11.2
Italy	15.5	11.2	14.8	10.6							13.6	17.9		
Kosovo											13.0	3.9		
Latvia			14.8		14.8	16.5	13.4	13.1						

References

- Aleksynska, M., & Tritah, A. (2013). Occupation-education mismatch of immigrant workers in Europe: context and policies. *Economics of Education Review*, 36, 229-244.
- Allen, J., & van der Velden, R. (2001). Educational mismatches versus skill mismatches: effects on wages, job satisfaction, and on-the-job search. *Oxford Economic Papers*, 53(3), 434-452. doi:10.1093/oep/53.3.434
- Badillo Amador, L., López Nicolás, Á., & Vila, L. E. (2012). The consequences on job satisfaction of job-worker educational and skill mismatches in the Spanish labour market: a panel analysis. *Applied Economics Letters*, 19(4), 319-324. doi:10.1080/13504851.2011.576999
- Barone, C., & Ortiz, L. (2010). Overeducation among European University Graduates: a comparative analysis of its incidence and the importance of higher education differentiation. *Higher Education*, 61(3), 325-337. doi:10.1007/s10734-010-9380-0
- Battu, H., & Sloane, P. J. (2004). Over-education and Ethnic Minorities in Britain. *The Manchester School*, 72(4), 535-559. doi:10.1111/j.1467-9957.2004.00407.x
- Becic, M. (2014). Preobrazovanost na tržištu 10 rada Republike Hrvatske. *Privredna kretanja i ekonomska politika*, 23(1), 9-35.
- Blázquez Cuesta, M. (2005). Youth labour market integration in Spain: Search time, job duration and skill mismatch. *Spanish Economic Review*, 7(3), 191-208. doi:10.1007/s10108-005-0097-7
- Blázquez, M., & Budría, S. (2012). Overeducation dynamics and personality. *Education Economics*, 20(3), 260-283. doi:10.1080/09645292.2012.679338
- Boll, C., Leppin, J., Rossen, A., & Wolf, A. (2016). *Overeducation - New Evidence for 25 European Countries*. HWWI Research Paper 173, Hamburg Institute of International Economics. Retrieved from http://www.hwwi.org/fileadmin/hwwi/Publikationen/Publikationen_PDFs_2016/Research_Paper_173.pdf
- Brynin, M., & Longhi, S. (2009). Overqualification: Major or minor mismatch? *Economics of Education Review*, 28(1), 114-121. doi:10.1016/j.econedurev.2008.01.003
- Büchel, F., & Battu, H. (2003). The Theory of Differential Overqualification: Does it Work? *Scottish Journal of Political Economy*, 50(1), 1-16. doi:10.1111/1467-9485.00251
- Büchel, F., & van Ham, M. (2003). Overeducation, regional labor markets, and spatial flexibility. *Journal of Urban Economics*, 53(3), 482-493. doi:10.1016/S0094-1190(03)00008-1
- Budría, S. (2011). Are Educational Mismatches Responsible for the 'Inequality Increasing Effect' of Education? *Social Indicators Research*, 102(3), 409-437. doi:10.1007/s11205-010-9675-7
- Cainarca, G., & Sgobbi, F. (2012). The return to education and skills in Italy. *International Journal of Manpower*, 33(2), 187-205. doi:10.1108/01437721211225444
- Capsada-Munsech, Q. (2014). The role of social origin and field of study on graduates' overeducation: the case of Italy. *Higher Education*, 69(5), 779-807. doi:10.1007/s10734-014-9805-2
- Cattani, L., Gaidetti, G., & Pedrini, G. (2014). *Assessing the incidence and wage effects of overeducation among Italian graduates using a new measure for educational requirements*. Quaderni - Working Paper

- DSE No. 939, Università di Bologna, Department of Economics. Retrieved from <http://amsacta.unibo.it/4012/1/WP939.pdf>
- Congregado, E., Iglesias, J., Millán, J., & Román, C. (2016). Incidence, effects, dynamics and routes out of overqualification in Europe: a comprehensive analysis distinguishing by employment status. *Applied Economics*, *48*(5), 411-445. doi:10.1080/00036846.2015.1083080
- Croce, G., & Ghignoni, E. (2012). Demand and Supply of Skilled Labour and Overeducation in Europe: A Country-level Analysis. *Comparative Economic Studies*, *54*(2), 413-439. doi:10.1057/ces.2012.12
- Cutillo, A., & di Pietro, G. (2006). The effects of overeducation on wages in Italy: a bivariate selectivity approach. *International Journal of Manpower*, *27*(2), 143-168. doi:10.1108/01437720610666182
- Dekker, R., de Grip, A., & Heijke, H. (2002). The effects of training and overeducation on career mobility in a segmented labour market. *International Journal of Manpower*, *23*(2), 106-125. doi:10.1108/01437720210428379
- DG Employment, Social Affairs and Inclusion. (2012). *Employment and Social Developments in Europe 2012*. Luxembourg: Publications Office of the European Union. Retrieved from <http://ec.europa.eu/social/BlobServlet?docId=9604&langId=en>
- Diem, A. (2015). Overeducation among Graduates from Universities of Applied Sciences: Determinants and Consequences. *Journal of Economics & Financial Studies*, *3*(2), 63-77. doi:10.18533/jefs.v3i02.105
- Erdsiek, D. (2014). *Overqualification of Graduates: Assessing the Role of Family Background*. Discussion Paper No. 14-130, Centre for European Economic Research. Retrieved from <http://ftp.zew.de/pub/zew-docs/dp/dp14130.pdf>
- Fernández, C., & Ortega, C. (2008). Labor market assimilation of immigrants in Spain: employment at the expense of bad job-matches? *Spanish Economic Review*, *10*(2), 83-107. doi:10.1007/s10108-007-9032-4
- Fine, S., & Nevo, B. (2007). A Phenomenon of Overqualification in Personnel Psychology. *International Journal of Testing*, *7*(4), 327-352. doi:10.1080/15305050701632213
- Flisi, S., Goglio, V., Meroni, E. C., Rodrigues, M., & Vera-Toscano, E. (2016). Measuring Occupational Mismatch: Overeducation and Overskill in Europe—Evidence from PIAAC. *Social Indicators Research*, 1-39. doi:10.1007/s11205-016-1292-7
- Frei, C., & Sousa-Poza, A. (2012). Overqualification: permanent or transitory? *Applied Economics*, *44*(14), 1834-1847. doi:10.1080/00036846.2011.554380
- Ghignoni, E., & Verashchagina, A. (2014). Educational qualifications mismatch in Europe. Is it demand or supply driven? *Journal of Comparative Economics*, *42*(3), 670-692. doi:10.1016/j.jce.2013.06.006
- Groeneveld, S., & Hartog, J. (2004). Overeducation, wages and promotions within the firm. *Labour Economics*, 701-714.
- Groot, W., & van den Brink, H. M. (2000). Skill mismatches in the Dutch labor market. *International Journal of Manpower*, *21*(8), 584-595. doi:10.1108/01437720010379493
- Guironnet, J.-P., & Peypoch, N. (2007). Human capital allocation and overeducation: A measure of French productivity (1987, 1999). *Economic Modelling*, *24*(3), 398-410. doi:10.1016/j.econmod.2006.09.003
- Habibi, N. (2016). *Higher Education Policies and Overeducation in Turkey*. Working Paper 104, Brandeis University, Economics Department. Retrieved from <https://ideas.repec.org/p/brd/wpaper/104.html>
- Hensen, M. M., de Vries, M. R., & Cörvers, F. (2009). The role of geographic mobility in reducing education-job mismatches in the Netherlands. *Papers in Regional Science*, *88*(3), 667-682. doi:10.1111/j.1435-5957.2008.00189.x

- Huddleston, T., Niessen, J., & Tjaden, J. D. (2013). *Using EU Indicators of Immigrant Integration*. Final Report for Directorate-General for Home Affairs. Retrieved from <http://bookshop.europa.eu/en/using-eu-indicators-of-immigrant-integration-pbDR0313566/>
- ILO. (2013). *Global Employment Trends for Youth 2013. A generation at risk*. Geneva: International Labour Office.
- ILO. (2014). *Skills mismatch in Europe*. Geneva: International Labour Office. Retrieved from http://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/publication/wcms_315623.pdf
- Jauhiainen, S. (2011). Overeducation in the Finnish regional labour markets. *Papers in Regional Science*, 90(3), 573-588. doi:10.1111/j.1435-5957.2010.00334.x
- Jensen, U., Gartner, H., & Rässler, S. (2010). Estimating German overqualification with stochastic earnings frontiers. *AStA Advances in Statistical Analysis*, 94(1), 33-51. doi:10.1007/s10182-009-0121-6
- Joona, P. A., Gupta, N. D., & Wadensjö, E. (2014). Overeducation among immigrants in Sweden: incidence, wage effects and state dependence. *IZA Journal of Migration*, 3(9), 1-21. doi:10.1186/2193-9039-3-9
- Karakaya, G., Plasman, R., & Rycx, F. (2007). Overeducation on the Belgian labour market: evaluation and analysis of the explanatory factors through two types of approaches. *Compare: A Journal of Comparative and International Education*, 37(4), 513-532. doi:10.1080/03057920701366317
- Kiersztyn, A. (2013). Stuck in a mismatch? The persistence of overeducation during twenty years of the post-communist transition in Poland. *Economics of Education Review*, 32, 78-91. doi:10.1016/j.econedurev.2012.09.009
- Kupets, O. (2015a). *Education in transition and job mismatch: Evidence from the skills survey in non-EU transition economies*. KIER Discussion Paper No. 915, Kyoto University, Kyoto Institute of Economic Research. Retrieved from <http://repository.kulib.kyoto-u.ac.jp/dspace/bitstream/2433/195912/1/DP915.pdf>
- Kupets, O. (2015b). Skill mismatch and overeducation in transition economies. *IZA World of Labor*, 224, 1-10. doi:10.15185/izawol.224
- Kupets, O. (2016). Education-job mismatch in Ukraine: Too many people with tertiary education or too many jobs for low-skilled? *Journal of Comparative Economics*, 44(1), 125-147. doi:10.1016/j.jce.2015.10.005
- Leuven, E., & Oosterbeek, H. (2011). Overeducation and Mismatch in the Labor Market. In E. A. Hanushek, S. Machin, & L. Woessmann (Eds.), *Handbook of the Economics of Education* (Vol. 4, pp. 283-326). Amsterdam: Elsevier.
- Lianos, T. P., Asteriou, D., & Agiomirgianakis, G. M. (2004). Foreign university graduates in the Greek labour market: Employment, salaries and overeducation. *International Journal of Finance & Economics*, 9(2), 151-164. doi:10.1002/ijfe.238
- Lindley, J. (2009). The over-education of UK immigrants and minority ethnic groups: Evidence from the Labour Force Survey. *Economics of Education Review*, 28(1), 80-89. doi:10.1016/j.econedurev.2007.11.003
- Mateos-Romero, L., & Salinas-Jiménez, M. d. (2016). Skills Heterogeneity Among Graduate Workers: Real and Apparent Overeducation in the Spanish Labor Market. *Social Indicators Research*, 1-18. doi:10.1007/s11205-016-1338-x
- Mavromaras, K., McGuinness, S., O'Leary, N., Sloane, P., & Fok, Y. K. (2010). The Problem of Overskilling in Australia and Britain. *The Manchester School*, 78(3), 219-241. doi:10.1111/j.1467-9957.2009.02136.x
- McGuinness, S., & Sloane, P. J. (2011). Labour market mismatch among UK graduates: An analysis using REFLEX data. *Economics of Education Review*, 30(1), 130-145. doi:10.1016/j.econedurev.2010.07.006

- McGuinness, S., & Byrne, D. (2015). Born abroad and educated here: examining the impacts of education and skill mismatch among immigrant graduates in Europe. *IZA Journal of Migration*, 4(17), 1-30. doi:10.1186/s40176-015-0039-6
- McGuinness, S., Bergin, A., & Whelan, A. (2015). *A Comparative Time Series Analysis of Overeducation in Europe: Is there a common policy approach?* STYLE Working Paper WP5.1, Economics and Social Research Institute. Retrieved from http://www.style-research.eu/wordpress/wp-content/uploads/ftp/STYLE-Working-Paper-WP5_1.pdf
- Murillo, I. P., Rahona-López, M., & Salinas-Jiménez, M. d. (2012). Effects of educational mismatch on private returns to education: An analysis of the Spanish case (1995–2006). *Journal of Policy Modeling*, 34(5), 646-659. doi:10.1016/j.jpolmod.2011.07.012
- Nielsen, C. P. (2011). Immigrant over-education: evidence from Denmark. *Journal of Population Economics*, 24(2), 499-520. doi:10.1007/s00148-009-0293-0
- Nieto, S. (2015). Overeducation, skills and wage penalty: Evidence for Spain using PIAAC data. *Investigaciones de economía de la educación*, 10, 597-616. Retrieved from <http://repec.economicsofeducation.com/2015madrid/10-30.pdf>
- Norwegian Social Science Data Services. (2002). *European Social Survey Round 1 Data. Data File Edition 6.3.*
- Norwegian Social Science Data Services. (2004). *European Social Survey Round 2 Data. Data File Edition 3.3.*
- Norwegian Social Science Data Services. (2006). *European Social Survey Round 3 Data. Data File Edition 3.4.*
- Norwegian Social Science Data Services. (2008). *European Social Survey Round 4 Data. Data File Edition 4.2.*
- Norwegian Social Science Data Services. (2010). *European Social Survey Round 5 Data. Data File Edition 3.1.*
- Norwegian Social Science Data Services. (2014). *European Social Survey Round 6 Data. Data File Edition 2.1.*
- Norwegian Social Science Data Services. (2016). *European Social Survey Round 7 Data. Data File Edition 2.0.*
- Orbay, B., & Aydede, Y. (2015). *Educational Mismatch and the Cost of Underutilization in Turkish labour markets.* Degus University, Saint Mary's University. Retrieved from <https://mpa.ub.uni-muenchen.de/65713/>
- Ordine, P., & Rose, G. (2015). Educational mismatch and unemployment scarring. *International Journal of Manpower*, 36(5), 733-753. doi:10.1108/IJM-03-2013-0048
- Ortiz, L., & Kucel, A. (2008). Do Fields of Study Matter for Over-education? The Cases of Spain and Germany. *International Journal of Comparative Sociology*, 49(4-5), 305-327. doi:10.1177/0020715208093079
- Pastore, F., Sattar, S., & Tiongson, E. R. (2013). Gender differences in earnings and labor supply in early career: evidence from Kosovo's school-to-work transition survey. *IZA Journal of Labor & Development*, 2, 1-34. doi:10.1186/2193-9020-2-5
- Pecoraro, M. (2014). Is There Still a Wage Penalty for Being Overeducated But Well-matched in Skills? A Panel Data Analysis of a Swiss Graduate Cohort. *LABOUR*, 28(3), 309-337. doi:10.1111/labr.12031
- Pellizzari, M., & Fichen, A. (2013). "A New Measure of Skills Mismatch: Theory and Evidence from the Survey of Adult Skills (PIAAC)." OECD Social, Employment and Migration Working Paper No. 153, OECD. doi:10.1787/5k3tpt04lcnt-en
- Ramos, R., & Sanromá, E. (2013). Overeducation and Local Labour Markets in Spain. *Tijdschrift voor economische en sociale geografie*, 104(3), 278-291. doi:10.1111/j.1467-9663.2012.00752.x
- Rohrbach-Schmidt, D., & Tiemann, M. (2016). Educational (Mis)match and skill utilization in Germany: Assessing the role of worker and job characteristics. *Journal for Labour Market Research*, 1-21. doi:10.1007/s12651-016-0198-9

- Sánchez-Sánchez, N., & McGuinness, S. (2015). Decomposing the Impacts of Overeducation and Overskilling on Earnings and Job Satisfaction: An Analysis Using REFLEX data. *Education Economics*, 23(4), 419-432. doi:10.1080/09645292.2013.846297
- Sparreboom, T., & Nübler, I. (2013). Productive transformation, employment and education. *Development Conference on Learning to Compete: Industrial Development and Policy in Africa*. Helsinki: UNU-WIDER.
- Sparreboom, T., & Tarvid, A. (2016). Imbalanced Job Polarization and Skills Mismatch in Europe. *Journal for Labour Market Research*, 1-28. doi:10.1007/s12651-016-0196-y
- Støren, L. A., & Wiers-Jenssen, J. (2010). Foreign Diploma Versus Immigrant Background: Determinants of Labour Market Success or Failure? *Journal of Studies in International Education*, 14(1), 29-49. doi:10.1177/1028315308327951
- Sutherland, J. (2012). Qualifications mismatch and skills mismatch. *Education + Training*, 54(7), 619-632. doi:10.1108/00400911211265666
- Tijdens, K., & van Klaveren, M. (2012). A skills mismatch for migrant workers? Evidence from WageIndicator survey data. In B. Galgóczi, J. Leschke, & A. Watt (Eds.), *EU Labour Migration in Troubled Times: Skills Mismatch, Return and Policy Responses* (pp. 81-107). Ashgate: Farnham.
- Verhaest, D., & Omeij, E. (2010). The determinants of overeducation: different measures, different outcomes? *International Journal of Manpower*, 31(6), 608-625. doi:10.1108/01437721011073337
- Verhaest, D., & Omeij, E. (2012). Overeducation, Undereducation and Earnings: Further Evidence on the Importance of Ability and Measurement Error Bias. *Journal of Labor Research*, 33(1), 76-90. doi:10.1007/s12122-011-9125-6
- Verhaest, D., & van der Velden, R. (2013). Cross-country Differences in Graduate Overeducation. *European Sociological Review*, 29(3), 642-653. doi:10.1093/esr/jcs044
- WEF. (2014). *Matching Skills and Labour Market Needs. Building Social Partnerships for Better Skills and Better Jobs*. Geneva: World Economic Forum.
- Wirz, A., & Atukeren, E. (2005). An analysis of perceived overqualification in the Swiss labor market. *Economics Bulletin*, 9(2), 1-10.

TECHNICAL REPORT

Skills mismatch of natives and immigrants in Europe



Despite the strong interest in skills mismatch, an internationally agreed methodology to measure the phenomenon is lacking and methodological discussions are on-going. At the same time, matching of jobs and skills is a major factor shaping labour market outcomes, and monitoring of levels and trends of skills mismatch is important to inform labour market policy development including labour migration and integration policy.

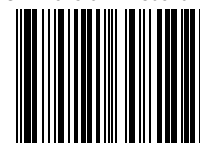
In this Technical Report, which is part of the larger efforts that the ILO is undertaking to contribute to the understanding and quantification of skills mismatch, several methodologies are used to analyse trends at the country level. The report also assesses differences in skills mismatch risk between groups of workers identified by age, sex or country of birth.

For more information visit the ILO topic portal on Labour Migration
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