Skills mismatch measurement in ETF partner countries (summary)

Introduction

Skills mismatch can be defined as a description of gaps and imbalances of the skills in the labour market due to either qualification or skills levels. Surplus of human capital is typically measured in terms of over-education or over-skilling. However, surplus of education may also be related to horizontal (or field of study) mismatch, whereby workers are employed in jobs that are not relevant to the skills and knowledge they acquired in formal education.

Skills mismatch is important to consider because its incidence reflects changes in the labour market, some at a rapid pace, and it is interconnected with human capital. Specifically, skills mismatch can be used to describe:

- vertical mismatch - usually measured in terms of over-education, under-education, over-skilling and under-skilling,
- horizontal mismatch - a comparison of fields of study and work (occupations),
- skills gaps - the extent to which workers lack the skills necessary to perform their current job,
- skills shortages - usually measured in terms of unfilled and hard-to-fill vacancies,
- skill obsolescence - skills can become obsolete due to ageing, through technological or economic change which renders certain skills unnecessary, or through the underutilisation of skills.

Literature shows that across geographical regions and countries the level and profile of education, qualifications or skills of many workers do not match their jobs. This is likely to cause labour shortages and affect businesses negatively, as well as the career prospects of the young and adult workforce. Understanding skills mismatch is therefore an important topic for the ETF Partner Countries as well as for the Member States of the European Union (EU). It also links to EU priorities to enhance the relevance of education and training and provide further opportunities for learning, as reflected by the European Skills Agenda and European Pillar of Social Rights. Research in this area allows countries to better target their efforts to match supply and demand and to assess the effectiveness of their skills and employment policies.

The European Training Foundation (ETF) conducted a pilot initiative aiming at investigating the feasibility of measuring the incidence of skills mismatch in a few partner countries (during 2017/18)1. Based on this work-strand, and after further refining the measurement framework[2], the ETF team[3] framed and estimated the skills mismatch incidence in most partner countries in 2020/21. Countries included in the research were Albania, Armenia, Belarus, Bosnia and Herzegovina, Egypt, Georgia, Jordan, Kosovo*, Kyrgyzstan, Moldova, Montenegro, North Macedonia, Palestine*, Serbia, Tunisia, Turkey and Ukraine.

[1] Serbia, Montenegro, North Macedonia, Moldova, Georgia, Egypt, and Morocco.

[2] ETF mismatch framework is made up of ten indicators: three core measuring vertical/horizontal mismatch, three contextual and four optional.

[3] Including experts from Economix (Germany) led by Dr. Ben Kriechel.

[*] This designation is without prejudice to positions on status and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence.

[*] This designation shall not be construed as recognition of a State of Palestine and is without prejudice to the individual position of the Member States on this issue.

This document summarizes the key findings of the *Report on Skills Mismatch Measurement in ETF Partner Countries* (forthcoming, 2022) that examines commonalities across countries and compares skills mismatch indicators.

Methodology and indicators

The ETF focused its work on several research questions: What are the most common types of skills mismatch in the ETF partner countries? What are the available datasets, and to what extent they are accessible, reliable or comparable internationally? Is it feasible to define and collect a set of key comparable indicators on the incidence of mismatch across our partner countries? What are the key shortcomings in computing these indicators? How can ETF and its partner countries take further steps to secure a regular assessment of mismatch incidence and its dynamics over time?

Previous research revealed a range of ways of identifying and measuring skills mismatch.

Table 1. Indicators for the main types and dimensions of skills mismatches

Dimension	Type	Definition	Method
Vertical	**Over-education (over-qualification)**	Worker´s level of education (qualification) exceeds the required level for the job (occupation)	Subjective Normative (refers to the level of skills (education) required to work in a specific occupation category Empirical (the statistical or realized matches method) using either the mean or the mode of education within an occupation category Job evaluation method
	Under-education (under-qualification)	Worker´s level of education (qualification) is lower than the required level for the job (occupation)	As above
	Over-skilled	Worker´s level of education (qualification) exceeds the required level for the job requirements	Subjective (but rare to find datasets including questions such as “to what extent are your skills utilized in this work?”
	Under-skilled	Worker´s level of education (qualification) is below the required level for the job requirements	As above
Horizontal	**Field of education to occupation mismatch**	The field of study does not match the occupational area of the job	Subjective (e.g., is your job matching your field of education?) Objective (using ISCO and ISCED-F codes)

Source: Authors' elaboration

Datasets for measuring skills mismatch encompass various sources, mainly Labour Force Surveys, vacancy monitoring and jobseekers' profiles (e.g. education, professional experience, unemployment duration), employers' surveys, tracer studies or graduates' tracking approaches, among others.

The ETF opted for Labour Force Survey-based estimations, mainly for securing a high degree of harmonisation, comparability and validity of results. For ETF, data availability, comparability and the use of international standardised classifications have been the main criteria followed when suggesting and engaging in computing new metrics for studying skills mismatch. Also, ease of interpretation of the skills mismatch estimates was also a priority.

This study relies on indirect measures of a skills mismatch which generalise the direction of the mismatch at the macro-level (e.g., the proportion of unemployed people versus employed people indicates the direction of the mismatch, i.e., the deficit or surplus of specific education levels). Other commonly used indicators, such as the coefficient of variation and the variance of relative (un-)employment rates, which show the general magnitude of mismatch at the macro level, are included to contextualize the results.

The research also relies on direct measures of skills mismatch, measuring over/under-qualification using both the normative and empirical methods, and horizontal mismatch using the normative correspondence method. Educational level and field of study are used as proxies for qualifications and skills. The indicators are calculated according to narrower groups (e.g. gender, intermediate VET/non-VET qualifications, age groups, etc.) as instruments for more meaningful input into policy design.

The table below presents the three categories of indicators selected for measuring skills mismatch incidence in the ETF partner countries. The calculation process covered the time range from 2016 to 2019 for most countries (except for those with limited availability of LFS datasets), while core mismatch indicators referred to the category of 'employees' to be aged 15+.

Table 2. Definition of the main skills mismatch indicators

Indicator	Calculation / Description
Context indicators	
Unemployment rates (context)	Unemployed/(Employed+Unemployed)
Ratios (context)	For example Unemployed/Employed, Inactive/Population, Employed/Population, (Unemployed+Inactive)/Employed
Not in Employment, Education or Training rate	Not in Employment, Education or Training/Population
Core indicators	
Over-education / occupational mismatch (normative method)	The ratio of people with a given education level (ISCED) working at an inappropriate skill level (measured by the International Standard Classification of Occupations – ISCO) to all workers within that ISCED level
Over-education, Under-education (Empirical method; following ILO recommendation)	Percentage with education level one at least one standard deviation above the mode of education in the occupation (group)
Horizontal Mismatch	Calculation of share of employed with horizontal mismatch: % not in occupations matched to field of studies
Optional indicators	
Coefficient of Variation (Optional)	Ratio of standard deviation to the mean, e.g., compares the distribution of skills within different groups to determine the variation between the two distributions
Variance of relative (un)employment rates (Optional)	Calculation of the variance of the (un)employment rates of various groups show how different are the (un)employment rates between these groups
Duration of unemployment by educational attainment levels (Optional)	The duration of unemployment by each level of educational attainment

Source: Authors' elaboration

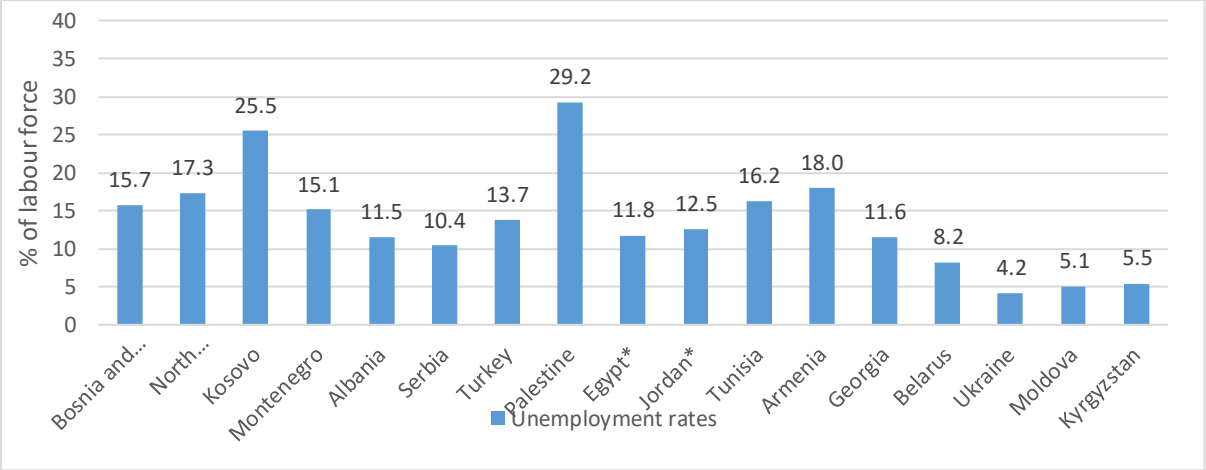
Key findings

Joblessness remains a key challenge

Unemployment and inactivity incidence

In all the South-Eastern European and Turkey (SEET) countries, the unemployment rate decreased between 2016 and 2019 (except Turkey), even if not homogeneously across groups (age, gender, education level). In Southern and Eastern Mediterranean (SEMED) countries, the indicator was relatively stable over time, while for Eastern Partnership (EaP) countries and in Kyrgyzstan, the unemployment rate slightly decreased over time (except for Armenia, where it was stable).

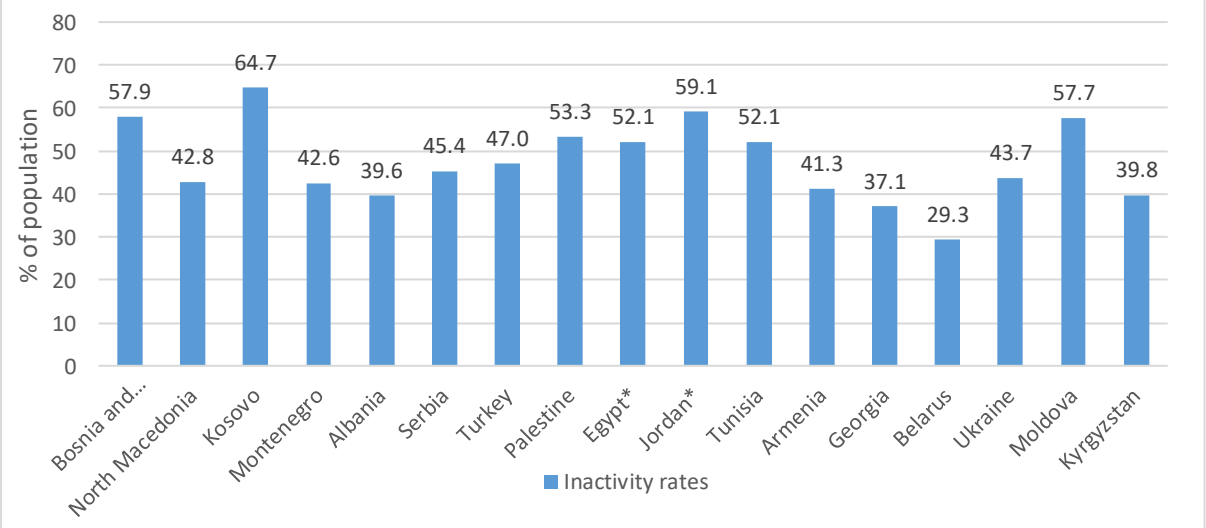
Figure 1. Unemployment rate (%), 2019



(*) Last year available in Egypt (2017), last year available in Jordan (2016)
Source: Authors' calculation based on Labour Force Surveys, National Statistical Offices

The inactivity rate is high in all the countries, with about half of the population being inactive in Tunisia, Palestine, Egypt, Turkey, Jordan and Bosnia and Herzegovina and above 70 per cent of the population in Kosovo. Belarus and Georgia had the lowest inactivity rate in 2019 (29.3% and 37.1%, respectively).

Figure 2. Inactivity rate (%), 2019



(*) Last year available in Egypt (2017), last year available in Jordan (2016)
Source: Authors' calculation based on Labour Force Surveys, National Statistical Offices

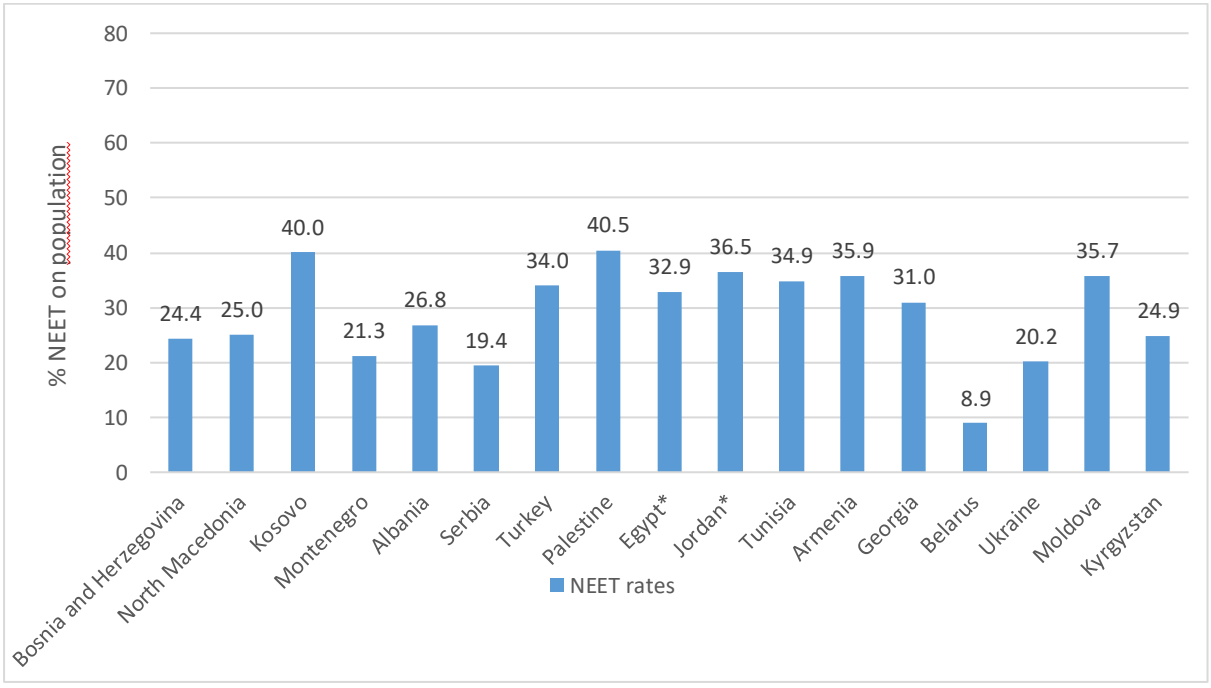
In all SEET countries, women were more likely than men to be unemployed and more likely to be inactive. The gender gap was significantly high in inactivity rates compared to unemployment rates. Inactivity is the larger driver of low unemployment rates for women in this region. In EaP countries, while there were no big gender differences in the unemployment rates, there were large differences in the inactivity rates across gender. The largest differences in unemployment rates across countries can be observed in the SEMED region, where women are less likely to actively search for a job and more likely to face barriers entering the labour market.

Youth Not in Employment, Education or Training

In SEET, the Not in Employment, Education or Training (NEET) incidence, particularly among young people (15-29 years) decreased between 2016 and 2019, suggesting an improvement in the school-to-work transition (except for Kosovo and Turkey, partly due to high inflows into working age cohort, i.e., youth bulge). In Palestine, the NEET rates were stable over time, yet high. In Tunisia and Egypt (between 2016 and 2017), the NEET rate slightly decreased. In all the EaP countries which were part of this study, the NEET rate slightly decreased over time, but was persistently high (except for Belarus and Moldova, where it was stable).

Gender differences are visible across all age groups. Women between 15 and 29 years old were more likely than men to be NEET. Palestine, Turkey, and Ukraine were nearly twice as likely to show high NEET rates. In Moldova, Serbia and Albania, women are one-fourth more likely than men to be NEET. However, in Belarus and Kyrgyzstan, NEET rates were similar across gender. In SEMED countries, young girls are typically over-represented in the NEET group, and in these countries, the proportion of young girls who are NEET is above 40%.

Figure 3. Not in Employment, Education or Training (%), 2019



(*) Last year available in Egypt (2017), last year available in Jordan (2016)
Source: Authors' calculation based on Labour Force Surveys, National Statistical Offices

Skills mismatch runs high in ETF partner countries

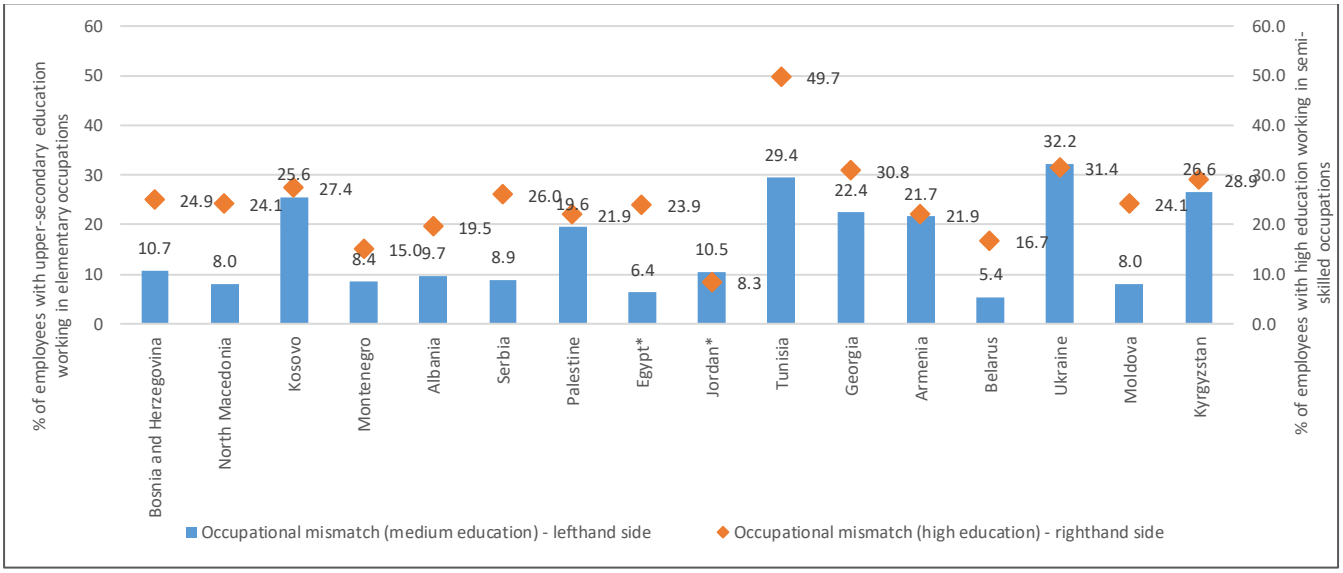
Over education (occupational mismatch - normative method)

This method is based on comparisons of the ratio of employees with a given education level (ISCED) working in an occupation that does not require such a level of skills, as measured by the International Standard Classification of Occupations (ISCO).

Results show that, in 2019, at least one in four tertiary graduates held jobs requiring lower levels of formal qualifications in the vast majority of countries, and that the rate was as high as one in three graduates in Georgia, Turkey or Ukraine, and almost 50% of tertiary graduates in Tunisia. The ETF evidence also shows that the incidence of skills mismatch for upper/post-secondary graduates is lower than that of tertiary graduates. Young tertiary graduates had a higher incidence of over-skilling in all countries with data available: in 2019, some two-thirds were mismatched (i.e., held jobs requiring lower levels of formal qualifications) in Tunisia; around 50% in Kyrgyzstan, Serbia and Turkey; some 40% in Albania, Georgia or Kosovo and one-third in Montenegro, North Macedonia, Moldova, Palestine or Ukraine.

Several countries, such as Albania, Kosovo, Moldova, Palestine and Turkey, displaying lower shares of high-skilled workers (i.e., with tertiary education attainment) in the workforce, have seen a sizeable and rapid increase in the size of this group in recent years. However, being highly-skilled has not always led to better employment prospects, and in some countries, holding a university degree does not always mean being employed and/or job-matched (ETF, 2020)[4]. This shows that education systems face many challenges in responding to changing demands for skills. It may also suggest that many higher-skilled graduates have to accept positions below their level of formal qualifications. High unemployment levels and limited opportunities in the labour market are forcing especially more highly-educated individuals to accept such positions. When it comes to gender differences, high education mismatch was more common among women in Belarus and Kyrgyzstan, while the opposite was true in Moldova and medium-skill mismatch was more common among women in Albania and Jordan. From an age group perspective, young tertiary graduates (15-24 years old) tnd to be over-skilled: one-fourth or more were mismatched (i.e. they held jobs requiring lower levels of formal-ISCED qualifications).

Figure 4. Occupational mismatch (normative method), %, 2019



(*): Egypt (2017), Jordan (2016). Source: Authors' calculation based on LFS, National Statistical Offices
Note: Medium: upper secondary education working at skill level 1 (ISCO 9). High: tertiary education degree, working at skill levels 1 (ISCO 9) or 2 (ISCO 4-8)

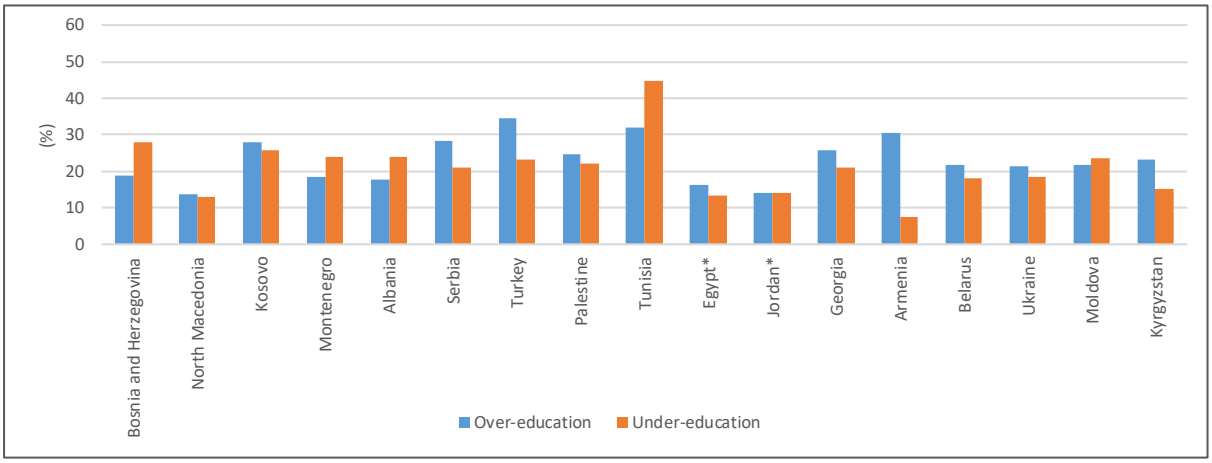
[4] ETF (2020), *Unlocking youth potential in South-Eastern Europe and Turkey: Skills development for labour market and social inclusion*.

Over and under-education (empirical method)

The indicators show mixed evidence about the trends in the share of over-and under-educated employees. Under-education was more common in SEET, while over-education was more likely to exist in EaP countries and Kyrgyzstan. Most countries experienced a reduction in both over- and under-education rates between 2016-2019. Comparing within the group, male workers were more likely to experience both over- and under-education. The gender gap in over-education mismatch is relatively lower than under-education mismatch.

In most of the selected ETF partner countries about one in four employees was either over- or under-educated in 2019, (in Egypt, Bosnia and Herzegovina, and North Macedonia the share is lower). Among all countries, Turkey and Armenia had the highest share of over-educated employees (about 35% and 30.6% in 2019) while the highest share of under-educated was found in Tunisia (almost 45%), Bosnia and Herzegovina, Moldova and Montenegro (about one-fourth).

Figure 5. Over and under-education (Empirical method), %, 2019



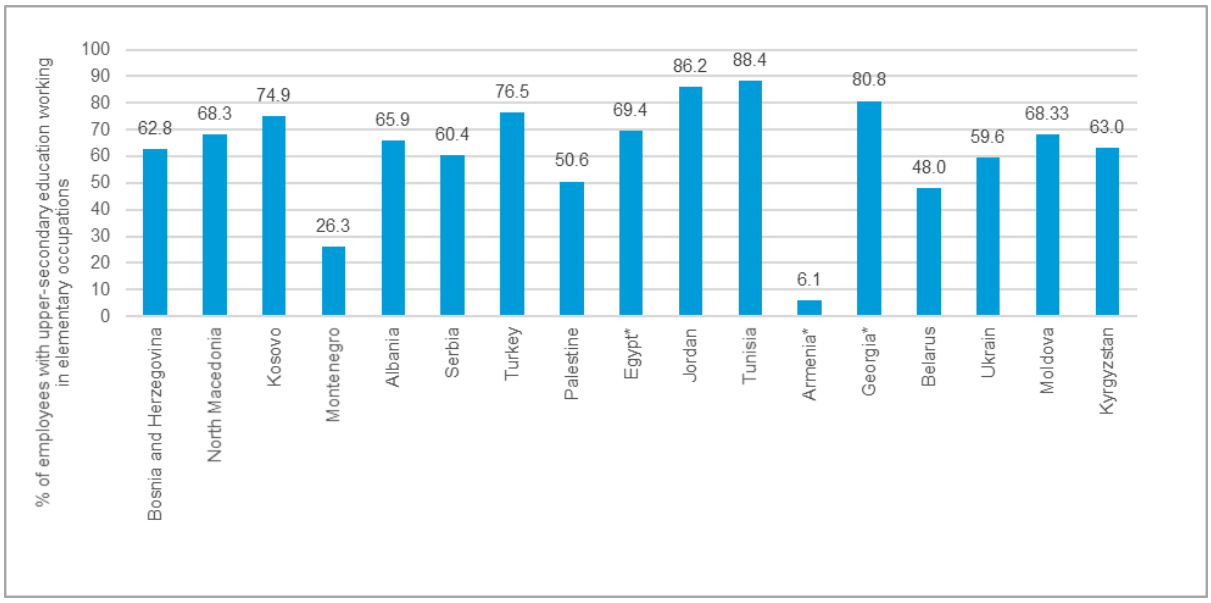
(*): Data are available in Egypt (2017), Jordan (2016)
Source: Authors' calculation based on Labour Force Surveys, National Statistical Offices

Horizontal mismatch

This type of mismatch occurs when the field of study does not match the occupational area of the job; namely, there is a discrepancy between a person's current occupation and their highest level of education attainment within their field of study. The basic criterion used when assigning occupational codes to a field of education is the assumed congruence of skills acquired through a particular field and those needed for the job.

The horizontal mismatch rate was generally high across all countries. However, the results are sensitive and depend on occupation classification (ISCO 88 versus ISCO08 at 1,2, or 3-digit levels, or national classification). Therefore, comparability across countries, as well as across-time interpretation within a country should be assessed with caution. In 2019, the share of horizontal mismatch was close to or above 60% in most of the selected ETF partner countries, except for Armenia (6.1%), Montenegro (26.3%), Belarus (48%) and Palestine (50.6%). Equally, in most countries, the share of horizontally mismatched employees was higher for men than for women, with the greatest gender gap occurring in Kosovo, Egypt, Kyrgyzstan and Tunisia, followed by Albania, Turkey and Jordan.

Figure 6. Occupational mismatch – horizontal (normative method), %, 2019



Note: Armenia and Montenegro: Occupation is defined at the one-digit level, therefore results are not fully comparable to other countries.
Source: Authors' calculation based on Labour Force Surveys, National Statistical Offices

Key findings and recommendations

Methodological issues

The biggest challenges when comparing the skills mismatch indicators across countries were due to the different coding of occupations: ISCO-88, ISCO-08[5] or a national classification was used. The specific field of education was classified using either ISCED-F 1997, ISCED-F 1997[6] or a national classification. In some countries it was not possible to distinguish between vocational training and upper-secondary education. This study attempted to harmonise these variables across countries to ensure the highest possible degree of cross-country comparability.

Data availability was quite homogeneous across the partner countries. LFSs are collected in all partner countries and are regularly updated, so the study was able to include (in most countries) all the relevant variables to collect the skills mismatch indicators. However, data accessibility was heterogeneous across countries, with only a handful of countries providing direct access to microdata of LFS. In certain countries, the occupation classification was available only at the 1-2 digits level, altering the comparability across countries. Therefore, certain results, particularly those referring to horizontal mismatch incidence, should be interpreted very cautiously.

The labour and social contexts of selected countries, in particular the informality and migration impact on skills demand and supply, also proved to be a limiting factor. In labour markets with a significant proportion of informal workplaces, some indicators (e.g., those proxying skills using the qualification level) were less meaningful as on-the-job training and apprenticeships usually provide the necessary skills. Additionally, migration may lead to an underestimation of mismatch magnitude and characteristics.

Finally, the empirical method for assessing over- and under-education is a purely mechanistic measurement, so should be interpreted as a proxy.

[5] Versions of the International Standard Classification of Occupations

[6] Versions of the International Standard Classification of Education

Research variables

The skills mismatch indicators were calculated for the whole population (e.g., employed, unemployed, inactive). We also used some further dimensions which provided us with insights into specific groups. As well as age, which identifies the difficult school-to-work transition, education level and gender are crucial dimensions to analyse. For example, in many countries, both labour market participation and access, especially in SEMED countries, is very different for men and women. In some countries, large shares of youth are enrolled in VET secondary education. Breaking down the indicators according to these dimensions can help policymakers to shape better policy responses.

Additional dimensions that could be explored in future studies are the formality/informality of labour markets and urban/rural labour markets. These differences might help us to understand cross-country differences in skills mismatch, and provide a new angle of interpretation of the results. However, these dimensions are usually not captured in the LFS surveys, and new data sources would be needed if they were to be included in another study.

Mismatch results

The study finds strong evidence for mismatches such as high unemployment rates (especially for youth); differences in unemployment by education level; high NEET rates in all countries, suggesting structural and institutional problems in the labour market and shortcomings within educational systems in the problematic school-to-work transition

Over-education is also a common issue in most countries analysed, where one in four employees are often over-educated, especially men. In most of the countries we analysed, women are more likely than men to be under-educated, suggesting the existence of a gender gap in access to education. Horizontal mismatch also seems to be high and persistent over time in all the partner countries, notwithstanding that the significance of this indicator should not be interpreted too strictly

Similar indicators on horizontal mismatches, such as the occupational mismatch and the indicator of over education, pointed in the same direction and usually followed similar dynamics.

VET-based training showed mixed success in overcoming the skills mismatch problem. In some countries, the indicators did prove a better match of VET-based workers relative to non-VET graduates. However, it should be noted in this context that the identification of VET remains problematic in the data and that VET training is only provided via very specific qualifications or in certain occupations, both in fields and levels.

Generally, an interpretation of the skills mismatch results should be sensitive enough to the country context, the economy's structure and its outputs, as well as the demographic context and migration factors.

Recommendations

Better data is needed

One of the key challenges of this project was getting access to LFSs microdata, which are the most available, reliable and up-to-date labour market data across ETF countries. Developing national analytical capacity is crucial. Access to microdata for researchers, ministries, and similar institutions are an important prerequisite to fully develop and use the information that already exists.

Working closely with National Statistical Offices and involving them in constructing the skills mismatch indicators is desirable, to assist in getting important feedback on harmonising the variables across countries and directly contributing to capacity building in the ETF partner countries.

Countries should consider strengthening their data collection in several ways. In particular, the sample size in small countries remains often too small to allow analysis across several dimensions. Hence, it could be useful to increase sampling. A scoping exercise with detailed information on the cell sizes of

key dimensions would help; for example, determining age groups, to include as many observations as possible.

Cross-country comparisons still prove difficult to make within a particular education level and across occupations. National education systems are not always easy to map onto international ISCED standards. Equally, national classifications of occupations do not always translate into the ISCO classification and fields of education, or into the ISCED-F one, thus challenging cross-country and cross-survey wave comparability. While countries have already taken measures to harmonise their statistical products with international standards and to update them, in certain cases, labour force surveys still need to be properly synchronised with new standards in ISCED and ISCO classifications.

Given that VET and non-VET disaggregation was found unfeasible or unavailable in many cases, we recommend better coverage of VET programmes in labour force and skills surveys. Current data is not always fully capable of demonstrating the effect of VET on students and graduates, such as their labour market outcomes.

In a nutshell, countries could **improve their statistics** relevant for skills measurement as follows:

- Standardise the classification of the field of education to the latest ISCED-F (ISCED-F 2013) for all education levels
- Ensure occupation codes at the 3-digit level (ISCO classification)
- Where possible, keep the education classification consistent over time
- Specify which level of education is VET/higher education
- Improve survey design of the LFS and explore consistent utilisation of other data sources, such as skills surveys, registering of data and online vacancy datasets.

Consolidate skills development and matching policies

Skills mismatches reflect changes in the labour market, some of which occur rapidly which then impact on human capital. A system of continuous update of skills-sets, with well-funded and relevant (re)skilling programmes accessible to all youth and adults, becomes crucial in a very dynamic economic context with significant technological and environmental transformations (ETF, 2021 *Woking Paper on Youth Disengagement and Skills Mismatch in the Western Balkans*).

The relatively high level of over-education, particularly among tertiary-educated workers is not completely surprising, as such workers are typically more exposed to (vertical) mismatch. Nevertheless, the relatively high incidence of over-qualified tertiary graduates in most countries included in this analysis, indicates that graduation does not necessarily always lead to a matched integration in the labour market, and could signal a human capital loss. There could be many reasons behind this situation, and further country-specific studies are necessary to identify the determinants and most effective solutions to prevent or counteract such imbalances. What emerges clearly is that education systems are in part generating such imbalances. This may be through insufficiently forward-looking enrolment policies, the poor quality and relevance of educational programmes or failures in addressing social inclusiveness goals. Career guidance and career education from early schooling onwards, effective matching services and work-experience programmes during the transition phase from school to work are also essential.[7]

Youth transition is seen to be increasingly linked to the existence of various imbalances in the labour market. During their transition from school to the labour market, young people often gain practical experience by accepting jobs requiring lower levels of skills. Together with low labour mobility, this leads to a higher level of observed overqualification. Young people face more challenges than adults do in entering the labour market, owing to their lack of work experience and the mismatch between the skills they have to offer and those required by employers (ETF, 2021).

[7] (ETF, 2021), M. Badescu and C. Mereuta, *Skills mismatch: Measurement and policy implications in selected* countries, in *Changing skills for a changing world: Understanding skills demand in EU neighbouring countries.*

This report shows that when planning national education provision, countries should particularly focus on the school to work transition. They should develop policies that include more focus on outcomes for VET education vs general education at upper secondary level, and the real work outcomes for more highly educated graduates. There also needs to be effort in tackling both NEETs and gender gaps.

Therefore, in terms of policy implications and actions to address high mismatch incidence, we underline the need to improve labour market matches for youth and adult employees through more effective enrolment education policies, (re)skilling programmes, as well as an effort to diversify employment opportunities and economic policies thereby enabling technological progress and value-added activities.