

# KIEL WORKING PAPER

Skills in African Labor  
Markets and  
Implications for  
Migration to Europe



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# ABSTRACT

## SKILLS IN AFRICAN LABOR MARKETS AND IMPLICATIONS FOR MIGRATION TO EUROPE

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This paper assesses the potential for skilled labor migration from sub-Saharan Africa to Europe. It utilizes representative surveys from Ghana and Kenya to shed light on the quality and distribution of skills in the labor markets of these countries. Skills in both countries are found to be unevenly distributed, with significant parts of the labor force being essentially unskilled.

Similarly designed surveys from France, Germany, and the UK further allow comparing skills and formal education between the African and the European countries. On average, the labor force in the sub-Saharan African countries is less skilled and less educated than the European labor force. Importantly, even at the same levels of formal education, workers in Ghana and Kenya are substantially less skilled than workers in Europe.

The paper further considers a number of hypothetical scenarios for skilled labor migration from the African to the European countries. It is demonstrated that the European countries would have to recruit workers from the very top end of the African skill distribution to match European demands for skills. In turn, the average worker from the African labor markets would fit only into the low end of the European skill distribution where employment rates are low.

Hence, more regular and skilled labor migration from African countries will unlikely be a remedy for skill shortages in Europe unless migrants are positively selected on their skills. In that case, however, additional opportunities for skilled labor migration would risk a brain drain from African countries that could harm economic development there. Improving the quality of education in sub-Saharan Africa on a broad scale remains indispensable for mutually beneficial migration between Africa and Europe.

**Keywords:** migration, skills, human capital, brain drain, sub-Saharan Africa, Europe

**JEL classification:** I25; J61; O15

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## 1 Introduction

Migration pressure from Africa to Europe is likely to increase over the coming decades. In parallel, the European workforce is predicted to decline without substantial immigration from third countries, with a particular demand for skilled immigration to maintain productivity growth. However, European countries have attracted fewer skilled migrants than other OECD countries in recent years. At the same time, irregular migration has posed substantial challenges to the European asylum and migration systems, thereby undermining Europe's scope regarding migration management. (European Commission, 2018a)

As a consequence, the EU is set on creating more opportunities for regular and skilled labor migration with a particular focus on African sending countries. These intentions reach back to the Action Plan adopted at the Valletta Summit, which aimed to promote new regular channels for migration and mobility from and between Africa and Europe (Council of the EU, 2015). A later contribution from the European Commission then explicitly linked the expansion of legal pathways for migration from African countries to skill shortages in EU labor markets and to the prospect of reducing irregular migration flows (European Commission, 2018a). Clearly, in order for the expanded legal pathways to have the desired effects, migration flows would have to be larger than under previous schemes that focused exclusively on the highest-skilled workers in the sending countries.

In this spirit, a number of proposals and concepts for expanding regular and skilled labor migration between Africa and Europe have been proposed (MEDAM, 2018; Barslund et al., 2019; Clemens et al., 2019; MPI Europe and SVR, 2019). Currently, some EU member states are already testing skilled labor migration programs on a small scale with selected countries of origin and sectors of employment.

Skills represent a focal point in this context. On the one hand, African migrants will need sufficient skills in order to successfully access and integrate into European labor markets. On the other hand, the African labor markets need to retain enough skilled workers in order to sustain economic growth.

Skilled labor migration from African countries hence bears the risk of a brain drain for these sending countries, i.e. the depletion of their human capital stock. This risk will increase if European migration policies select migrants on their skills and if simultaneously, skills are scarce among the working-age population in African countries. The assessment of this threat requires knowledge on the availability and distribution of skills in the African sending countries. However, this kind of knowledge is difficult to find because until recently, efforts have been focused on increasing enrollment into education in African countries, putting the quality of education in second place at best. Currently, a shift is taking place toward a stronger differentiation between the formal attainment of education on the one hand and the actual skills on the other hand (World Bank, 2018; 2019).

In line with this paradigm shift, this paper wants to answer the following questions:

- What is the state of skills in African labor markets?
- How do African labor markets compare to European labor markets in terms of skills?
- What does this comparison imply for different migration scenarios from Africa to Europe?

The evidence presented in this paper serves to inform policy-makers about the magnitude of the skill challenge in African countries and its implications for EU migration management. The more detailed analyses of the causes and potential remedies to this skill challenge are left to future data collection and research. The current empirical limitations stem first and foremost from a severe lack of data on adult skills in African countries. While surveys are being collected on schools, students, and teachers in African countries (e.g. SACMEQ), the only large-scale and skill-oriented data collection in African labor markets so far is the World Bank's STEP survey, which includes two sub-Saharan African countries, Ghana and Kenya. The availability of skill data is more favorable for European countries due to the OECD's PIAAC survey, which collects data on various skills of the working-age population in important migrant destination economies such as France, Germany, and the UK.

Throughout the paper, it should be kept in mind that Ghana and Kenya rank among the upper half of all sub-Saharan African countries in terms of GDP per capita. Given the positive correlation between economic development and skills, it can be plausibly assumed that any shortage or insufficiency of

skills found in Ghana and Kenya translates into an even more severe problem in poorer nations of sub-Saharan Africa. This consideration is also relevant in the migration context, as many irregular migrants arriving in the EU in recent years have originated from sub-Saharan African countries with high poverty rates such as Eritrea, Guinea, and Somalia.

Methodologically, this paper is similar to Patt et al. (2017) who present evidence on the role of occupational choices and skills for selection into migration from Mexico to the US. They find that Mexican migrants to the US are positively selected on manual skills and negatively selected on cognitive skills in comparison to Mexican non-migrants. A methodological novelty of their paper is that they exploit similar sections in Mexican and US-American surveys to achieve scale comparability of their measures of occupational skills. While Patt et al. (2017) observe actual migration from Mexico to the US, all migration scenarios considered in this paper are hypothetical, given that the African surveys do not observe emigrants to Europe. However, a particular feature of this study is that it is able to directly compare skills in Africa and Europe by relying on a direct assessment of literacy and related competencies scored on the same scale in all sample countries.

There are at least two potential remedies to the threat of a brain drain that are worth discussing *a priori*:

First, the European destination countries could decrease the selectivity of their policies on skills by accepting and training less skilled migrants instead. To this point, the currently proposed labor migration schemes already foresee that migrants will receive occupation-specific trainings before entering employment in Europe. However, the empirical evidence presented in this paper suggests that large, potentially even unrealistic skill gains through training would be necessary for employability if no selection on skills at the top of the African skill distribution was applied. Further, the envisaged trainings will already require a certain level of skills in the basic domains of literacy and numeracy in order to be effective.

Second, the additional opportunities for skilled labor migration from African to Europe could incentivize skill investment and accumulation in the African sending countries. If then skilled emigration was regulated to be not too large, this mechanism would result in a net gain of skills in the African labor markets. (Stark et al., 1998) However, there are reasons for caution regarding the extent of such a brain gain: Valerio et al. (2016), using the same surveys on skills in African labor markets as this paper, find evidence of positive returns to skills in these labor markets. Given that the overall level of skills is low, their finding raises the question why not more workers have already invested into their skills to earn higher wages. Evidence presented in this paper indicates that the formal education systems in the surveyed African countries release large cohort shares of students into the labor market without having equipped them with appropriate skills, thereby supporting other findings that the educational systems in African countries fail to achieve actual learning.

Section 2 presents the surveys that provide the skill data for this study. It shows that the preferred skill measure correlates strongly and similarly with socio-demographic variables and self-reported skill usage across the sample countries. Section 3 presents the evidence in response to the questions formulated above. It reemphasizes the importance of skills, rather than formal education, for economic development, followed by a presentation of the estimated skill distributions in African and European labor markets. The skill data are furthermore utilized to highlight the average differences in skills between African and European workers at comparable levels of formal education. Finally, the African and European skill distributions are directly compared in order to assess from which segments of the African distribution European demands for skilled labor migration would be met. Section 4 discusses several implications of the findings, and Section 5 concludes the paper.

## 2 Skill data and measurement

### 2.1 Skill measurement in the PIAAC and STEP surveys

The following empirical investigation relies on two data sources that feature elements of skill assessment that are similar or identical in both of them. These sources are the World Bank's STEP Skills Measurement Program and the OECD's Programme for the International Assessment of Adult Competencies (PIAAC).

PIAAC collects an international survey of adult skills in currently over 40 countries. The Survey is implemented by interviewing adults aged 16 to 65 in their homes, aiming at 5,000 interviewed individuals in each participating country. The survey collects a broad range of information, including how skills are used at work and in other contexts, such as the home and the community. It further assesses literacy and numeracy skills and the ability to solve problems in technology-rich environments. Skills are scored on a scale from 0 to 500 points. The Survey is designed to be valid cross-culturally and internationally for countries to be able to administer the survey in their national languages and still obtain comparable results regarding the international benchmarking of adult skills.

The STEP survey originates from an initiative to measure skills in low and middle-income countries. In all surveyed countries, the target population consists of urban adults aged 15 to 64, whether employed or not. In addition to Ghana and Kenya being two relatively well-developed sub-Saharan African countries, it should therefore be further kept in mind that the limitation to the urban population is likely to overstate the level of skills relative to the total population. In terms of content, the household-based STEP survey features three unique modules: (1) personality traits, behavior, and time and risk preferences (e.g., Big Five, Grit, decision-making, and hostile attribution bias); (2) self-reported job-relevant skills that respondents possess or use in their job; and most importantly (3) a direct assessment of literacy (or reading) proficiency and related competencies scored on the same scale (0-500) as the PIAAC survey.

Hence, there exists considerable overlap between the two surveys regarding their measurement of skills: Both collect self-reported usage of skills like literacy, numeracy and ICT at home and at work, and they both assess the literacy skills of the respondents on the same scale and with essentially the same toolkit. While the self-reported measures of skill usage could be incomparable across countries for various cultural and technical reasons, the literacy assessment mitigates these concerns. The latter further provides a continuous measure of a specific skill, which facilitates the cross-country comparison of the skill distributions.<sup>1</sup>

Based on the literacy scores, PIAAC assigns five different levels of literacy to these scores and an additional category “Below Level 1” for scores lower than 176. In order to measure and differentiate low levels of literacy more precisely in developing countries, STEP concentrates almost 90% of its literacy assessment items on the three lowest literacy levels and the bottom category.

The Ghanaian and Kenyan STEP data were collected in 2013, while the first round of the PIAAC data had been collected in 2011 and 2012. From the collection of OECD countries surveyed as part of PIAAC, France, Germany and the UK<sup>2</sup> are selected for the following analysis. All three represent large OECD economies. They are further important destination countries for migrants from around the globe.

## 2.2 Comparability and relevance of the literacy skill assessment

The availability of the literacy skill assessment in both the PIAAC and the STEP surveys raises the questions whether the literacy scores are informative about more general labor-market relevant skills and whether the former are similarly informative across countries.

In the case of PIAAC, it is well-established that the scores of the literacy, numeracy, and problem-solving assessments are closely correlated with each other. To demonstrate this pattern, Figure 1 shows scatterplots of the numeracy scores against the literacy scores in Germany. The relationship between the two assessment scores is strong, positive and linear.

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<sup>1</sup> For more background information on the design and collection of the two surveys, as well as on the literacy assessment, please refer to: Educational Testing Services (2014), OECD (2016), and World Bank (2014).

<sup>2</sup> Only England and Northern Ireland were surveyed within the United Kingdom for PIAAC.

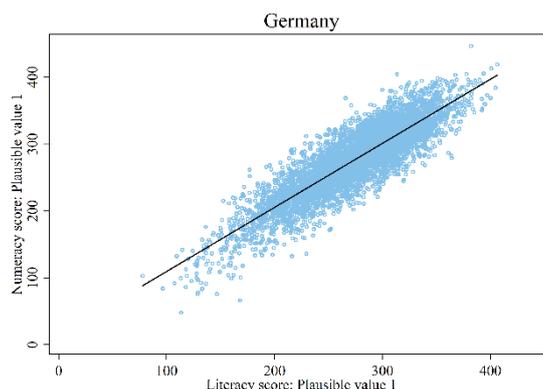


Figure 1: Scatterplots of numeracy scores against literacy scores in Germany.

Source: Own depiction based on PIAAC data.

The visual impression is confirmed by the high and positive correlation coefficients computed between the two scores and presented in Table 1.<sup>3</sup> In addition to its strong association with the numeracy skill, literacy also correlates strongly with the problem-solving skills assessed in Germany and the UK.

Country	Correlation between literacy score and...	
	Numeracy score	Problem-solving score
France	0.863	-
Germany	0.872	0.806
United Kingdom	0.875	0.773

Table 1: Correlations between the literacy score with the numeracy and the problem-solving scores by country.

Source: Own computations based on PIAAC data.

The literacy scores further exhibit similar correlation patterns with a variety of demographic and socio-economic variables in all five surveyed countries, as reported in Table 2. Literacy correlates negatively with age in all countries. While being female correlates only weakly with literacy in the three OECD countries, the correlation is stronger and negative in Ghana, indicating a gender gap regarding this skill. Reassuringly, the literacy scores are positively associated with the logarithm of monthly earnings and the completed years of education within each country. Hanushek et al. (2015) use PIAAC to establish more elaborately that the returns to skills are indeed positive in OECD countries. In Ghana and Kenya, literacy proficiency further correlates positively with employment in the formal sector of the economy.

Country	Correlation between literacy score and demographic-economic variables:				
	Age	Female	Log earnings	Years of education	Formal
France	-0.257	0.008	0.290	0.563	-
Germany	-0.204	-0.052	-	0.399	-
United Kingdom	-0.104	-0.050	0.307	0.347	-
Ghana	-0.051	-0.223	0.156	0.518	0.390
Kenya	-0.091	-0.063	0.274	0.624	0.253

Table 2: Correlations between the literacy score and demographic-economic characteristics by country. Source:

Own computations based on PIAAC and STEP data. Earnings data are unavailable in the scientific public use file for Germany, while formal and informal employment is differentiated only in Ghana and Kenya.

<sup>3</sup> Both PIAAC and STEP impute ten so-called “plausible values” (PVs) for each surveyed individual’s literacy score. In order to account for the imputation variance, all ten PVs must be used for the estimation of means, correlations, and regression coefficients. This procedure is applied in the following. For the skill density estimates and their graphical depictions, either all ten PVs, or their average, or one selected PV are used.

Finally, Table 3 reports correlation coefficients between the literacy scores and the ordinal measures of self-reported skill usage at the workplace. A higher value of each of these ordinal measures implies a more frequent usage of the respective skill. Unsurprisingly, the formally assessed literacy skills are positively correlated with the self-reported reading and writing done at work. Further, the positive association between the literacy and numeracy scores appears to extend also to the self-reported numeracy usage at work in all countries. Interestingly, there is also a strong positive correlation between literacy scores and the usage of computers and ICT more generally at the workplace. In Ghana and Kenya, higher assessed literacy skills are further associated with a higher self-reported frequency of learning at work.

Country	Correlation between literacy score and self-reported skill usage at work:				
	Reading	Writing	Numeracy	ICT	Learning
France	0.181	0.196	0.237	0.274	0.047
Germany	0.251	0.166	0.239	0.334	0.036
United Kingdom	0.208	0.175	0.233	0.329	0.004
Ghana	0.438	0.395	0.161	0.379	0.289
Kenya	0.422	0.345	0.241	0.353	0.201

*Table 3: Correlations between the literacy score and the self-reported usage of skills at work by country.  
Source: Own computations based on PIAAC and STEP data.*

To sum up, there are strong reasons to believe that the literacy assessments in both PIAAC and STEP is informative on a broad set of labor-market related skills and that the assessments capture a similar and relevant bundle of skills in both the OECD and the African sample countries.

For the remainder of the paper, the STEP samples for Ghana Kenya will be restricted to individuals younger than 40 years of age. The reason for this restriction is that the propensity to migrate internationally decreases with age; hence a focus on the younger African working-age population comes closer to a focus on the segments of the population that are prone to migrate.

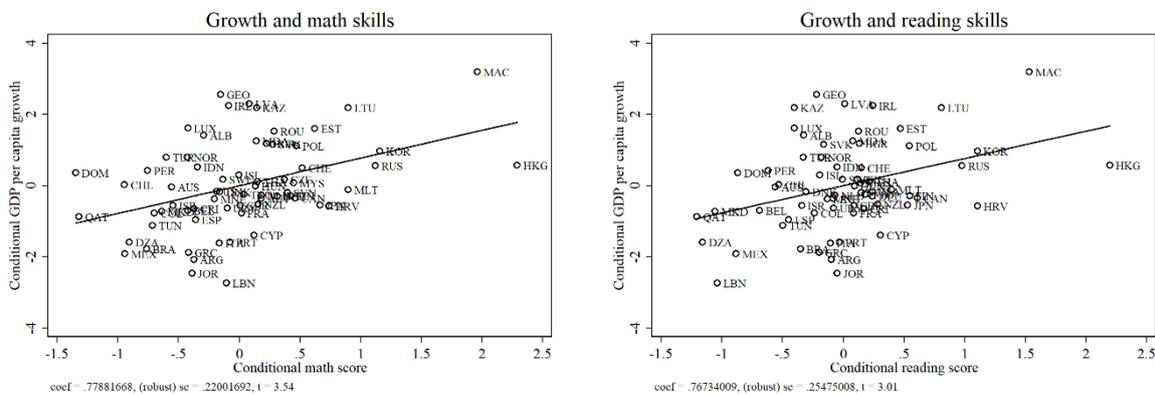
### 3 Evidence

#### 3.1 Skills, education, and economic development

Equating skills with (formal) education and using these two terms interchangeably is ill-fated in particular in the context of developing countries. Nonetheless, it has often been a necessity to do so, given that skill-adjusted measures of education have only recently gained more prominence and are still confined to the macro level of a subset of countries (e.g. the learning-adjusted years of schooling proposed by Filmer et al., 2018).

Empirical doubts whether purely quantitative measures of education are sufficiently informative on skills have been raised in conjunction with economic growth. Hanushek and Woessmann (2008) show that years of schooling are not significantly associated with country-level growth rates after controlling for qualitative measures of education, such as standardized test scores. These test scores, in turn, have a high explanatory power for economic growth, suggesting that they capture a country's stock of human capital more comprehensively than years of schooling.

Figure 2 replicates this striking finding using country-level aggregates of PISA scores collected in multiple waves between 2006 and 2015, averaged across waves, thereby arriving at one observation per country. Figure 2 shows added-variable plots<sup>4</sup> of the average growth rate of GDP per capita between 2000 and 2018 against the PISA test score averages. After conditioning on secondary enrolment, GDP per capita in the year 2000, and a dummy for OECD membership, all three dimensions of skills are shown to be positively and significantly related to economic growth, while secondary enrolment shows only a weak, negative and insignificant association with growth (bottom right panel).



<sup>4</sup> An added-variable plot displays the relationship between the dependent variable and one of the independent variables in the regression model after controlling for the presence of the other independent variables.

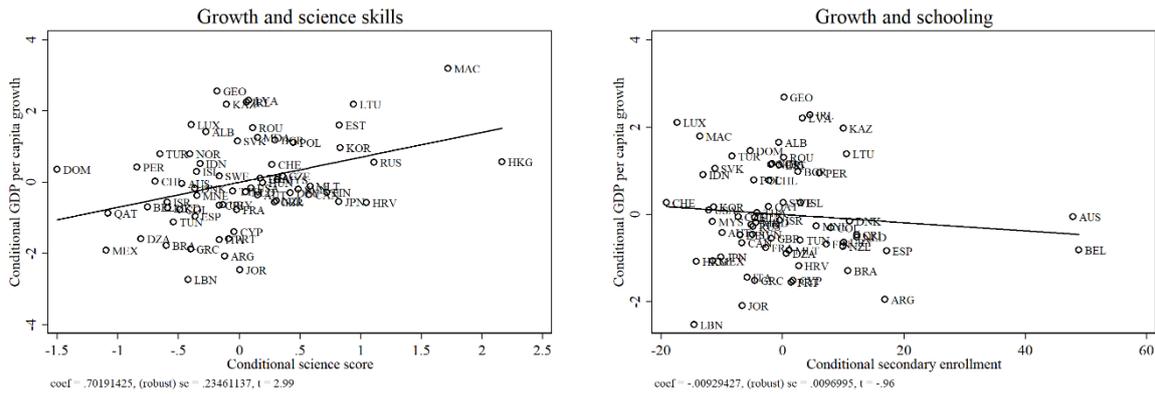


Figure 2: AV plots of GDP per capita growth rates against skill scores and secondary enrollment rates. Source: Own computations based on WDI and OECD-PISA data.

### 3.2 Skills in African and European labor markets

Focusing only on the scores of the literacy assessments in the PIAAC and STEP surveys, the literacy skill distributions of the three European OECD countries are very similar to each other: The kernel density estimates using the plausible values suggest that the distributions are all single-peaked at scores slightly below 300 and left-skewed (Figure 3).

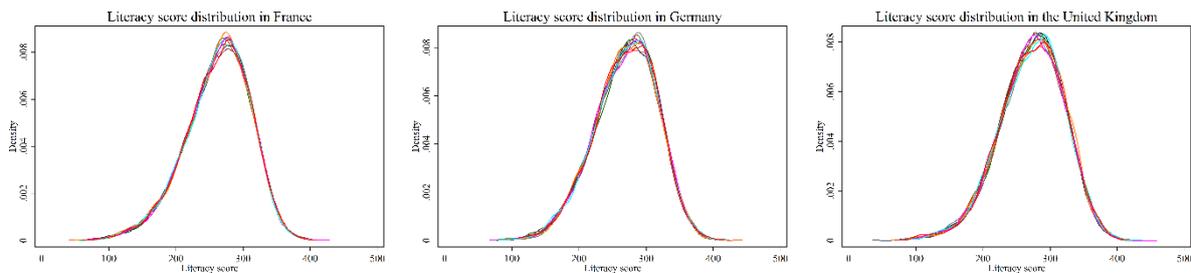


Figure 3: Distributions of literacy scores in France, Germany, and the UK. Source: Own depiction based on PIAAC data.

The skill distributions of the two African countries, in turn, suggest a considerably stronger heterogeneity both within and between countries (Figure 4): While the literacy skills of Kenyan workers are concentrated around the score of 60, on the one part, and around the score of 220, on the other part, the Ghanaian distribution is rather irregular at low scores, but also concentrated around the score of 220. However, fewer Ghanaian workers reach this literacy score compared to Kenyan workers.

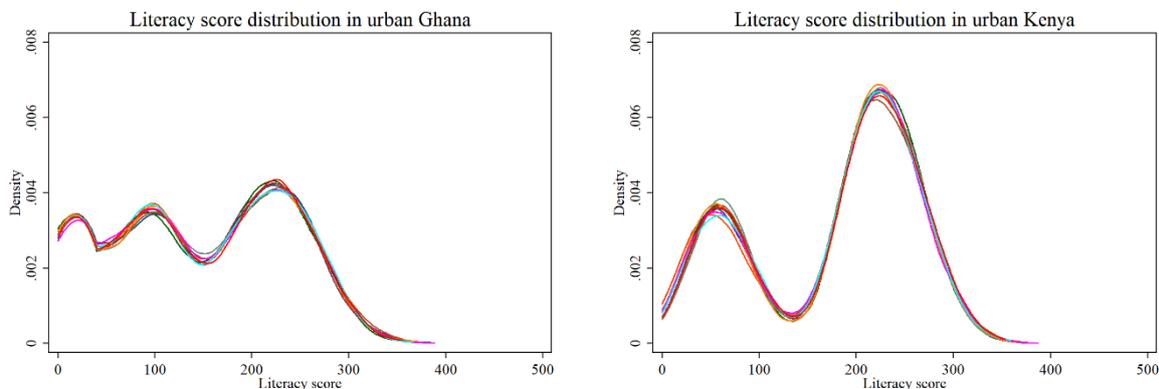


Figure 4: Distributions of literacy scores in urban Ghana and Kenya. Source: Own depiction based on STEP data.

Pooling the data from all three OECD countries hence results in a smoothly estimated distribution of the literacy skills (Figure 5, left panel), while pooling the Ghanaian and the Kenyan data yields some irregularities at the low end of the support (Figure 5, right panel). Nevertheless, the depiction clearly suggests that the two sub-Saharan African labor markets are polarized in terms of skills: Part of the urban working-age population that is younger than 40 exhibits a level of literacy that is somewhat comparable to the lower segment of the literacy distribution in the European OECD countries. Another significant part, however, is essentially unskilled in terms of literacy.

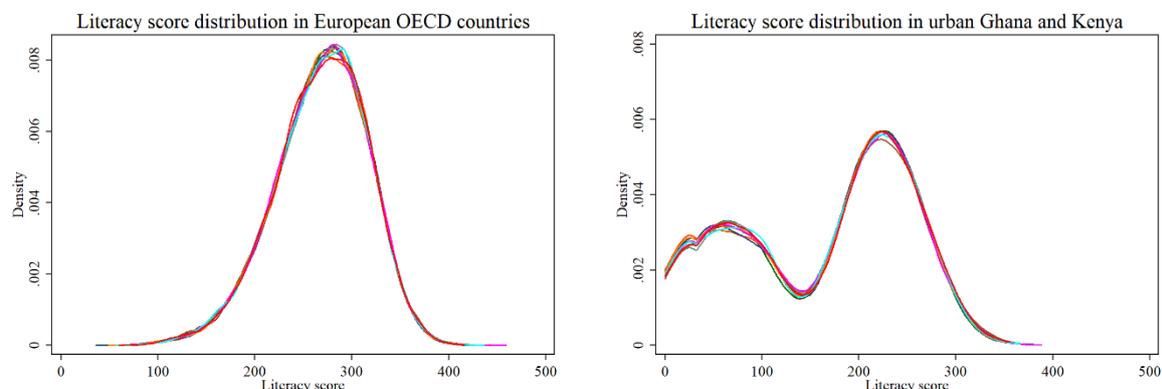


Figure 5: Skill distribution in European OECD countries and sub-Saharan African countries.  
 Source: Own depiction based on PIAAC and STEP data.

Correspondingly, Table 4 presents summary statistics on the literacy skills in the groups of sample countries. Mean, median and mode are located at very similar values of the literacy score in the three OECD countries. Pooling the scores from Ghana and Kenya and comparing the same three parameters between the two country groups suggests a substantially lower level of literacy in the two sub-Saharan African countries than in the OECD countries: The median urban adult younger than 40 in Ghana and Kenya scores more than 100 points less than the median adult in France, Germany, and the UK. Confirming the visual impression from Figure 5, literacy skills are not only lower, but also much more dispersed in the sub-Saharan African countries, as indicated by the larger standard deviations. Comparing Ghana and Kenya, the Ghanaian workforce is less skilled at the mean and the median.

Country	Mean	Median	Mode	Std. Dev.
OECD	268	272	277	46
Ghana and Kenya	162	190	222	91
Ghana	143	145	224	92
Kenya	177	206	222	86

Table 4: Summary statistics on literacy skills in the three OECD countries, Ghana, and Kenya.  
 Source: Own computations based on PIAAC and STEP data.

Further, average literacy scores can be computed for different levels of educational attainment, given that both the level of formal education and the scores obtained in the literacy assessment are available in the PIAAC and STEP surveys. Table 5 provides such descriptive evidence on the relationship between literacy skills and educational attainment for each group of sample countries. A first and not surprising observation is that the distribution of educational attainment in the labor force, as measured on the ISCED scale<sup>5</sup>, differs strongly between African and European countries. In France, Germany and the UK, less than 10% of the working-age population have achieved only ISCED level 1 or less. By contrast, in the two African countries, more than 30% of the surveyed individuals fall into the two lowest ISCED levels. Both groups of countries have in common though that ISCED levels 2 and 3 together comprise the largest shares of the working-age populations.

More importantly, Table 5 strongly supports the presumption that the same level of educational attainment across countries does not imply the same or even a similar level of skills. For example, while adults in the three OECD countries with an educational attainment at ISCED level 3 score on average 264 points in the literacy assessment, adults in the two African countries with the same level of educational attainment achieve on average only 197 points in the literacy assessment. The gap between the two country groups is largest at the lowest levels of educational attainment, while it still amounts to 50 points at the highest two ISCED levels.

ISCED	<u>Africa</u>			<u>OECD</u>			<u>Africa-OECD</u> Difference in scores
	Average score	Obs.	Perc.	Average score	Obs.	Perc.	
Level 0	73	699	12.8	179	99	0.5	-106
Level 1	129	1035	18.9	230	716	3.4	-101
Level 2	151	1230	22.5	240	3173	15.2	-89
Level 3	197	1555	28.4	264	9499	45.6	-67
Level 4	227	269	4.9	300	386	1.9	-73
Levels 5-6	244	686	12.5	294	6978	33.5	-50
Total	162	5474	100.0	268	20851	100.0	-106

Table 5: Average literacy scores by ISCED level and country group.

Source: Own computations based on PIAAC and STEP surveys. Sample weights applied.

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<sup>5</sup> ISCED 1997 classification. Levels: 0 – pre-primary education, 1 – primary education or first stage of basic education, 2 – lower secondary education or second stage of basic education, 3 – upper secondary education, 4 – post-secondary non-tertiary education, 5 – first stage of tertiary education, 6 – second stage of tertiary education.

A linear regression of the literacy skills on the ISCED indicator, an indicator for the OECD countries, and controls for gender and age yields quantitatively similar results if the OECD indicator is interacted with the ISCED indicator in order to allow for a differential association between formal education and literacy skills in OECD countries. Results are available on request.

### 3.3 Skills and possible migration scenarios

Finally, it is possible to assess the actual overlap between the literacy skill distributions of the OECD countries on the one hand and the sub-Saharan African countries on the other hand. The extent of this overlap, in turn, can then be used to determine where a hypothetical migrant worker from a range or specific percentile of the African skill distribution would be located in the European skill distribution, holding all other variables constant.

Hence, this is an exercise to illustrate the skill potential that African labor markets can provide for European labor markets in different and very simplified migration scenarios. Simultaneously, it also indicates the extent to which higher European requirements for skilled migration would tap into the supply of skilled workers in African labor markets, which has important implications regarding a potential brain drain.

Figure 6 shows the two kernel density estimates of the literacy skill distributions in sub-Saharan Africa and Europe respectively in the same graph. For each country group, the graph is based on the arithmetic mean of the ten plausible values of the literacy score.

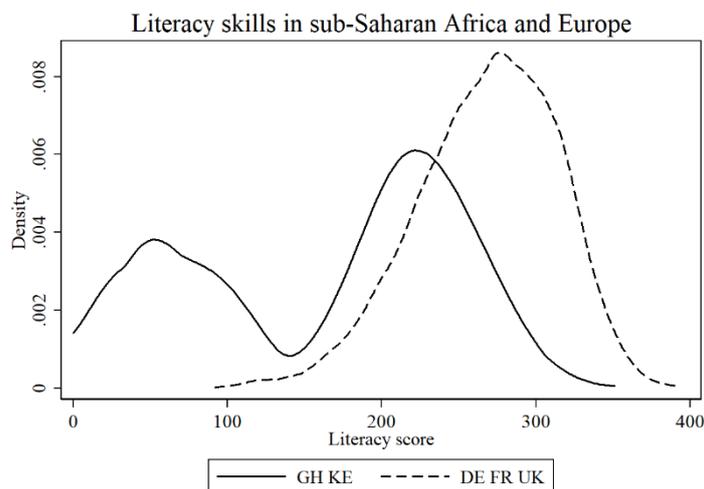


Figure 6: Distribution of skills in sub-Saharan Africa and European OECD countries. Source: Own depiction based on PIAAC and STEP data.

The hypothetical migration scenarios considered in this section can be grouped in two categories: The first category assumes that it is a rather “typical” working-age individual that migrates from sub-Saharan Africa to Europe – “typical” in the sense that the skill level of the individual corresponds either to the median, the mean, or the mode of the literacy skill distribution in Ghana and Kenya. The second category instead assumes that the migrant is selected based on her/his skill level. Both the 90<sup>th</sup> and the 99<sup>th</sup> percentiles of the Ghanaian-Kenyan literacy skill distribution are considered as potential thresholds for these skill-selected migration scenarios.

As reported in column 1 of Table 6, the median literacy score of the working-age individuals younger than 40 in Ghana and Kenya is 193 points. This score corresponds to the 6<sup>th</sup> percentile in the European OECD skill distribution. The average worker in the two sub-Saharan Africa countries, in turn, only scores 162 points, corresponding to only the 2<sup>nd</sup> percentile of the skill distribution in the three European countries, as reported in column 2. The mode of 222 points, i.e. the literacy skill score that the Ghanaian and Kenyan working-age individuals most frequently obtain, is located at the 66<sup>th</sup> percentile of the sub-Saharan African literacy skill distribution, which corresponds to the 15<sup>th</sup> percentile in the European counterpart, as shown in column 3.

Turning toward the skill-selected migration scenarios, column 4 reports that a working-age individual from the 90<sup>th</sup> percentile of the Ghanaian-Kenyan literacy skill distribution would match only the 42<sup>nd</sup> percentile of the European distribution. Hence, even a strongly positively selected migrant would not yet match the skill level of the median working-age individual in the three OECD countries. Regarding the final hypothetical scenario considered in this exercise, a highly selected potential migrant from the 99<sup>th</sup> percentile of the Ghanaian-Kenyan literacy skill distribution would fit into a relatively highly skilled segment (79<sup>th</sup> percentile) of the OECD countries’ distribution, as reported in column 5.

Migration scenario:	(1) Median	(2) Average	(3) Mode	(4) Selected	(5) Highly selected
Score in African distribution:	193	162	222	264	308
Percentile in African distribution:	50 <sup>th</sup>	41 <sup>st</sup>	66 <sup>th</sup>	90 <sup>th</sup>	99 <sup>th</sup>
Percentile in European distribution:	6 <sup>th</sup>	2 <sup>nd</sup>	15 <sup>th</sup>	42 <sup>nd</sup>	79 <sup>th</sup>

*Table 6: Migration scenarios and corresponding skill percentiles in sub-Saharan Africa and Europe.  
Source: Own computations based on PIAAC and STEP data.*

It is furthermore possible to restrict the samples to specific sectors for which the OECD economies’ demand for skilled labor is expected to be particularly high in the near future. Comparing the skill level in these sectors to the corresponding sectoral skill levels in the sub-Saharan African economies is informative regarding whether African workers in a given sector can be expected to fill the skill demands in the corresponding European sector. Exemplarily, the samples are restricted to workers employed in the relatively skill-intensive sections “J” (Information and communication) and “M” (Professional, scientific and technical activities) according to the International Standard Industrial Classification (ISIC).

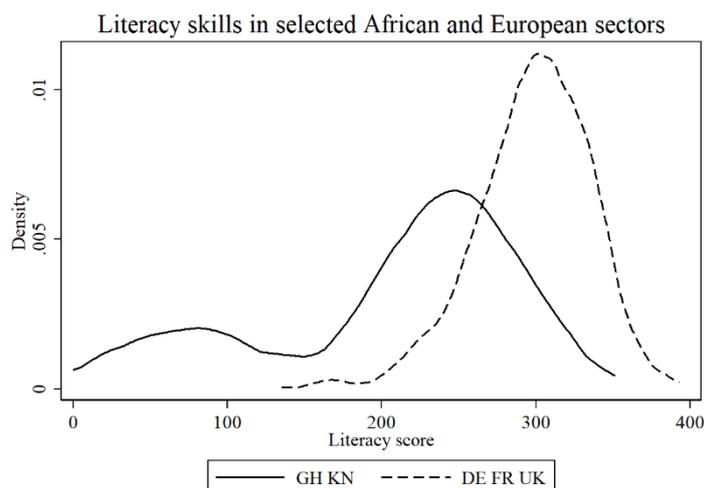


Figure 7: Distribution of skills in skill-intensive ISIC sections in sub-Saharan Africa and European OECD countries. Source: Own depiction based on PIAAC and STEP data.

Figure 7 shows that in comparison to the unrestricted skill distributions presented in Figure 6, the restriction considerably flattens the lower end of the skill distribution in Ghana and Kenya. However, the focus on the two skill-intensive sections also decreases the variance of the European skill distribution. As a result, the overlap between the two distributions decreases, suggesting that the focus on specific skill-intensive sectors and industries does not increase the potential for skilled labor migration from African to European countries.

## 4 Implications

### Skills and employment rates in OECD countries

The issue of skilled labor migration calls for giving consideration not only to the potential supply of skilled workers in the sending country, but also to the potential employability of migrant workers in the receiving countries conditional on the migrants' skill levels. Figure 8 shows a kernel-weighted local polynomial smoothing of the relationship between the literacy skills (X axis) and the average employment rate (Y axis) for individuals younger than 40 years in the three OECD sample countries. The average employment rate falls steeply from almost 90% to approx. 70% when the average literacy score falls from 250 to 200 points.

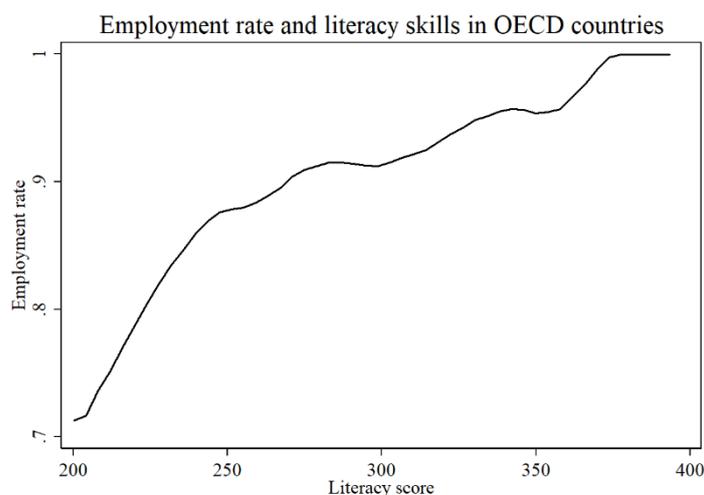


Figure 8: Skills and employability in OECD countries. Source: Own depiction based on PIAAC data.

The implication of this graph is that the median skilled worker in the two sub-Saharan African countries not only corresponds to a low-skilled segment of the labor markets in the three OECD countries, but also to a segment whose employability is already a matter of concern.

*Schooling and skill acquisition in sub-Saharan African countries*

The low level of skills in the two sub-Saharan African countries raises two questions: What are the reasons for the low skill level, and what could potentially be done in these countries to raise the skill level of the working-age population? Schooling and education more generally are often put forth as such means. However, it is by now well-documented that school attendance in sub-Saharan Africa does not sufficiently translate into learning, that this finding is partly grounded in a lack of competences on the side of teachers, and that the recent growth of school enrollment still has to be met with an adequate improvement in school and educational quality (Bashir et al., 2018; Bietenbeck et al., 2017; Bold et al., 2017; Mtibi, 2016; World Bank, 2018).

Scatterplots of the literacy skill scores against the individual years of education for Ghana and Kenya point in the direction of the existing evidence: They suggest that school attendance and formal education more generally are ineffective means for equipping large parts of the population with skills. As displayed in the left panel of Figure 9, the average literacy score is essentially flat at approx. 100 points across the range of zero to nine years of education completed in Ghana. As shown in the right panel, the gain in literacy skills for every additional year of formal education is somewhat steeper in Kenya, but in both countries, more than ten years of formal education are required to raise the average literacy score above 200. As previously indicated, in both sub-Saharan African countries, the literacy skill scores are very dispersed at almost every level of educational attainment, with many individuals performing far above respectively far below the average in the literacy skill assessment for a given amount of years of education. One potential explanation for this pattern is that the quality of schools and other educational institutions is similarly dispersed within the two countries.

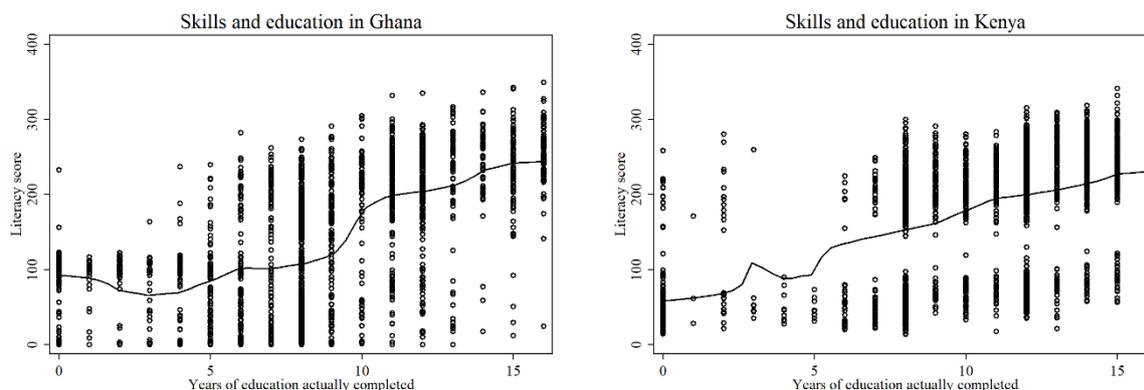


Figure 9: Skills and years of education in African countries.  
Source: Own depiction based on STEP data.

With the given data, it is not possible to disentangle the effects of educational reforms, ageing, and labor market experience on skills. However, a simple sample split along two age groups at least suggests that younger cohorts in the two sub-Saharan African countries possess better skills than older ones. Figure 10 displays kernel density estimates of the literacy scores obtained by Ghanaians aged 20-24 years (left panel) and 30-34 years (right panel) respectively. Again, one density is estimated for each plausible value of the literacy scores. The estimates suggest a substantial improvement in the distribution of literacy skills for the younger cohorts, as the global mode of the kernel density estimate shifts rightwards from about 100 for the 30-34-year-olds to more than 200 points for the 20-24-year-olds. Nevertheless, there remains a considerable ‘thick tail’ at the low end of the literacy skill distribution. Figure 11 shows the corresponding kernel density estimates based on the literacy scores of young Kenyan adults. The right panel suggests a less precarious skill distribution for the 30-34-year-olds in Kenya compared to Ghana, while the distribution for the 20-24-year-olds displayed in the left panel suggests further improvements for the younger cohorts also in Kenya.

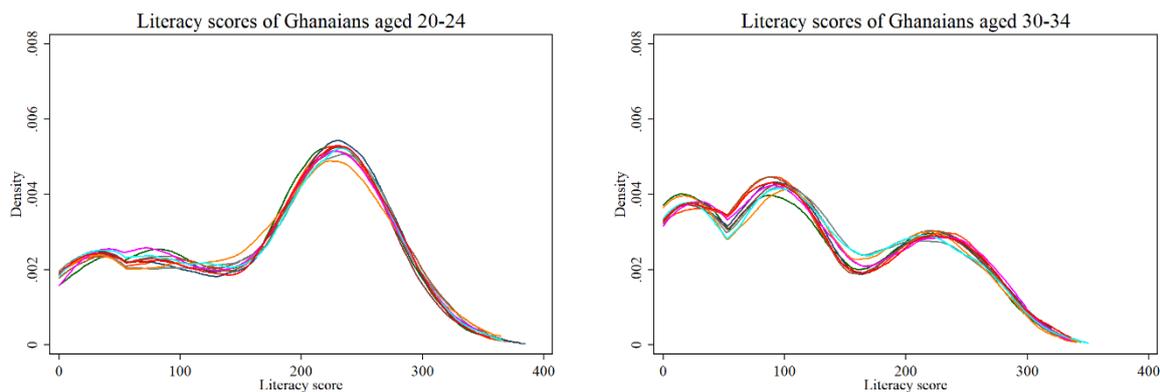


Figure 10: Literacy score distributions of Ghanaians of different age groups.  
Source: Own depiction based on STEP data.

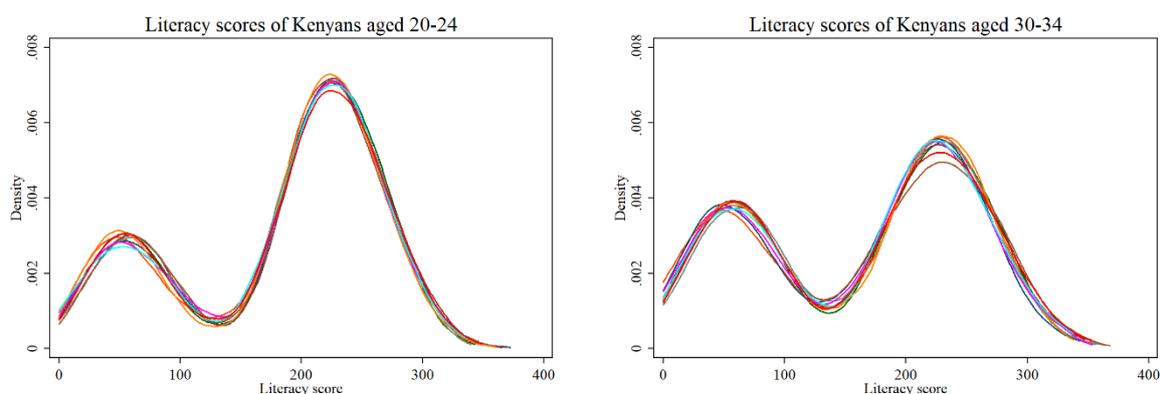


Figure 11: Literacy score distributions of Kenyans of different age groups.  
Source: Own depiction based on STEP data.

## 5 Conclusion

First, regarding the state of skills in African labor markets: There exists limited, but useful data on the skills of the urban working-age population in two sub-Saharan African countries: Ghana and Kenya. The results of the literacy skill assessments performed by the STEP surveys in these two countries correlate reasonably strongly with other skill measures and economically relevant outcomes in order to rely on the literacy skills as a continuous, informative, and comparable measure of skills more generally. Estimates of the skill density functions for the Ghanaian and Kenyan labor markets suggest that these labor markets are heavily polarized in terms of skills: While a growing share of the workforce attains a somewhat acceptable level of literacy, a considerable segment remains essentially unskilled.

Second, regarding the comparison of African to European labor markets in terms of skills: The workforce in the two sub-Saharan African countries is significantly less skilled than in the European OECD countries. Disparities in skills are large between the African and the European countries even at the same levels of formal educational attainment. Any schemes for legal skilled migration from Africa to Europe would hence risk overestimating the skill level of migrants if they assessed skills only based on the migrant’s formal education. There are similar implications for the brain drain vs. brain gain literature (Docquier and Marfouk, 2006; Docquier and Rapoport, 2012; Méango, 2016): If there is positive selection on skills into migration and if skills are in even shorter supply than formal education, then the diagnosis of a brain drain in terms of formal education will likely underestimate the drain in terms of skills.

Third, regarding the implications for potential migration scenarios and EU migration management: Intentions toward enabling more skilled and legal labor migration from African to EU countries will unavoidably invoke a trade-off: On the one hand, if the corresponding schemes and programs are aimed at reasonably skilled African workers that could mitigate the looming skill shortage in European

labor markets, then the migration demand will tap into the very sparse supply of these skilled workers in the African labor markets. The consequence will likely be a brain drain among the few ‘brains’ that are vitally needed to sustain and accelerate growth in sub-Saharan African economies. For the same reason, migration pathways that select on high skill levels will not form an effective policy tool for managing the migration pressures from Africa, as they will simply not be accessible for large segments of the African populations. On the other hand, if the legal labor migration schemes and programs are content with skill levels that are abundant in sub-Saharan African labor markets, then these initiatives will rather worsen than mitigate the skill shortage in Europe, as the ‘typical’ worker in the two relatively advanced economies of Ghana and Kenya exhibits a skill level that is found only in low-skilled and unstable occupations in Europe nowadays.

Forth, formal education in sub-Saharan Africa is part of the skill shortage problem and has yet to become part of the solution. This is demonstrated by the noisy and partly even flat relationship between skills and formal education in the two sub-Saharan African countries. In this regard, the human capital index (HCI) presented in the most recent World Development Report (World Bank, 2019) casts doubts on the prospect of sub-Saharan African countries being able to realize the human capital potential of their populations in the foreseeable future:

*“The human capital index ranges between 0 and 1. The index is measured in terms of the productivity of the next generation of workers relative to the benchmark of complete education and full health. An economy in which the average worker achieves both full health and full education potential will score a value of 1 on the index.” (World Bank, 2019, p. 62)*

With a score of 0.52, Kenya’s HCI is the highest among non-insular sub-Saharan African countries in 2018, placing the country at rank 94 out of 157 globally. Ghana, with a score of 0.44, trails behind at rank 116. Many other sub-Saharan African countries that have been important sending countries of irregular migrants to Europe in recent years, such as Ethiopia (rank 135) and Nigeria (rank 152), have much worse outlooks. In this regard, it is laudable that the EU and its member states have already launched initiatives and partnerships with the African Union (AU) and African countries in order to boost the development of labor market-oriented skills there (European Commission, 2018b), such as the AU-EU Skills for Youth Employability Programme. However, these programs cannot substitute addressing the shortcomings of the educational sectors in African countries, for the main reason that work-related trainings already require a certain level of fundamental skills such as literacy and numeracy.

Fifth, collection of data on skills needs to continue and be broadened both in developing countries and among recent and potential migrants to Europe. Given that the STEP surveys date back to 2013, they will become outdated soon in light of the technological advancement and its potential impact on skills. A particular focus of future data collection should be put on skills within specific occupations and on the effectiveness of skill trainings, which would require surveying the same individuals before and after the trainings and ideally also after their actual migration and integration into the European labor markets.

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