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Abstract

Skills mismatch - the sub-optimal use of an individual's skills in their occupation - can be a source of dissatisfaction for workers and a brake for productivity growth.

In order to quantify this phenomenon, the economic literature relies on qualitative studies that include certain biases linked to the fact that individuals are questioned on the perception of their own skills, but also those expected in the occupation concerned. Quantitative approaches also exist, which conversely consist of observing differences in skill levels by occupation.

In our view, a difference in the level of skills within an occupation is not sufficient to infer that a skills mismatch exists. Since skills-mismatch are the result of a disparity between the supply and demand of labour, the quantifying of skills-mismatch must therefore be based on the mechanisms involved in this disparity and not just a simple measurement of skill levels. We propose to include in our measurement the level of education and field of training, which are key markers of an individual's skill level in the labour market. This makes it possible to identify, among individuals whose skill level differs from others within an occupation, those whose training profile can explain this situation.

We prefer to use the term 'apparent skills mismatch' to refer to the situation of individuals whose skill level is substantially different from others. In our view, an apparent skills mismatch does not necessarily mean that individuals are employed in jobs that do not match their skill level, but rather relates to their performance (i.e. whether they perform their duties well or poorly). Our study is based on basic literacy and numeracy skills data from the OECD's 2012 PIAAC (International Assessment of Adult Competencies) survey, a unique international survey of adult skills.

Among those employed in the occupations observed, 29% of individuals have an apparent skills mismatch within their occupation. This occurs in both skilled and unskilled occupations. The situation in France is similar to that observed for its European neighbours in terms of the structure of the skills mismatch. Nevertheless, by occupation, workers in France have a lower level of basic skills relative to those of other European countries.

Of the 29% of individuals with an apparent skills mismatch in their occupation, 11% of those employed in the occupations observed have an apparent skills mismatch in relation to the proxy for their occupation, but not in relation to their training profile. For these individuals, this apparent skills mismatch may mean they are in jobs that are inappropriate to their skill level, i.e. they may be over/under-skilled. As such, it would be preferable for such individuals to work in an occupation more in line with their skill level or to access more training to correct this apparent skills mismatch. However, this mismatch may also reveal differences in training profile within the occupation.

In the occupations observed, 18% of those employed show a mismatch within their occupation and in relation to their training profile, mainly by being below the proxy for their occupation and training profile. Among these individuals, some are in jobs that are mismatched with respect to their skill levels. For others, the mismatch does not relate to their job, but is more a matter of their performance at work, whether they perform well or poorly. We estimate that about two-thirds of the individuals with an apparent skills mismatch in relation to their occupation and training profile are likely to be over/under-skilled. This approximation is only intended to give an order of magnitude. It would be preferable for these individuals to work in an occupation where the skills required are more in line with their own skill level. While a career change is not always possible, especially for older people, continuing education can play an important role in increasing the skill level of individuals. Furthermore, in occupations with the lowest median skill scores, the apparent skills mismatch for individuals whose skill score is below the proxy for their occupation and training profile has more to do with poor individual performance than with over/under-skilling, and particularly concerns people without qualifications. Continuing education efforts should focus on this group.

Keywords: skills, training, occupation, level of education, labour market

A new approach to skills mismatch

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January 2021

Introduction

In its 2019 report, the french National Productivity Board (NPB) posited skills mismatch as a potential explanatory factor for the slowdown in productivity in France². The term "skills mismatch" refers to the sub-optimal use of an individual's skills in the activity he or she performs, i.e. an under-use of skills or, conversely, a situation where the skill level is below that required.

Several methods have been developed in the economic literature to try to measure the degree of skills mismatch in different countries.

Some approaches, which can be described as "subjective", are based on data from surveys that ask employees how they feel about their job (Allen and van der Velden, 2001; Green and McIntosh, 2007; Hauret and Marguerit, 2020)³. Skills mismatch refers to a situation where an employee feels that his or her skill level does not match the level required for the job, either because it is too high or because he or she feels that it is too low in relation to the needs of the job. For example, in 2015, 45% of workers in France, Luxembourg and Germany

¹ The authors would like to thank the Directorate for Research, Studies and Statistics (Dares), the members of the National Productivity Board (Conseil National de Productivité - CNP) and the OECD for their advice and data provision.

² NPB (2020), *First report - Productivity and competitiveness: where does France stand in the Euro zone?*

³ Allen J. and van der Velden R. (2001), "Educational Mismatches versus Skill Mismatches: Effects on Wages, Job Satisfaction, and On-the-Job Search", *Oxford Economic Papers*, vol. 53(3), pp. 434-452, February; Green F. and McIntosh S. (2007), "Is there a Genuine Under-utilisation of Skills Amongst the Over-qualified?". *Applied Economics*, 39(04), p 427-439, February; Hauret L. and Marguerit D. (2020), "L'inadéquation des compétences au Luxembourg : un employé sur deux concerné", *Les rapports du Liser* (Luxembourg Institute of Socio-Economic Research), August.

considered their skills to be mismatched to their jobs according to the responses to the European Working Condition Survey (EWCS)⁴. Workers in all countries surveyed reported being more often over-skilled than under-skilled (Hauret and Marguerit, 2020⁵). However, these methods may be subject to measurement bias because they are based on individuals' perceptions of their own skills, as well as those expected in the occupation concerned. Individuals may therefore tend to overestimate their skills ("overconfidence effect"), or conversely, they may undervalue themselves and attribute their success to external factors such as luck, relationships or chance, rather than to their own skills ("imposter syndrome").

Other approaches make it possible to infer the existence of a skills mismatch by defining the level of skills required using a quantitative method. These consist of establishing a proxy for the level of skills required for each occupation, and then considering the individuals furthest away from this proxy as having mismatched skills (Quintini, 2014⁶, McGowan and Andrews, 2015⁷, Pellizzari and Fichen, 2017⁸). The process of measuring a skills mismatch consists of two steps. First, the OECD's PIAAC Adult Skills Survey asks workers whether they feel that they "have the skills needed to cope with tasks that are more demanding than those they have to perform in their current job" and whether they "need further training to cope well with their duties". The skill scores of workers who give negative answers to these two questions are used to create a quantitative scale of the skills needed to perform tasks for each occupation (single-digit ISCO). In a second step, using this scale of skill scores, minimum and maximum threshold values are determined so as to define what it means to be a "well-matched worker". Respondents who score below (or above) this minimum (or maximum) threshold in their occupation are considered to have mismatched skills.

Based on the PIAAC survey data, it appears that the vast majority of workers considered to be skill mismatched when a subjective approach is used are ultimately not deemed to have mismatched skills when the second approach is adopted (Pellizzari and Fichen, 2017). In France, 20% of employees are said to be skill mismatched, with 11% being "over-skilled" while 9% are "under-skilled". In comparison, 25% of German employees and about 33% of Italian and Spanish employees are reported to be skill mismatched (McGowan and Andrews, 2015).

One of the limitations of this approach is that differences in skill levels between individuals working in the same occupation are not necessarily indicative of a skills mismatch, but may relate to differences in individual performance. A simple measure of variance cannot therefore isolate only those individuals who are in a job that is inappropriate to their skill level. In our view, the indicator needs to be able to identify cases where the signals enabling a match between the skills held (supply) and skills required (demand) have not worked properly.

⁴ Which of the following statements would best describe your skills in your own work? a. I need further training to cope well with my duties; b. My present skills correspond well with my duties; c. I have the skills to cope with more demanding duties.

⁵ *Op. cit.*

⁶ Quintini G. (2014), "[Skills at Work: How Skills and their Use Matter in the Labour Market](#)", *OECD Social, Employment and Migration Working Papers*, No. 158, OECD Publishing, Paris.

⁷ Adalet McGowan M. and Andrews D. (2015), "[Labour Market Mismatch and Labour Productivity: Evidence from PIAAC Data](#)", *OECD Economics Department Working Papers*, No. 1209, OECD Publishing, Paris.

⁸ Pellizzari M. and Fichen A. (2017), "[A new measure of skill mismatch: theory and evidence from PIAAC](#)", *IZA Journal of Labor Economics*, vol. 6(1), December.

To do this, we propose a method of measuring skills mismatch that takes into account the heterogeneity of occupations, as well as individuals' education and training, i.e. the highest level of education attained and their field of training. This makes it possible to identify which individuals with an apparent skill mismatch - i.e. those with a substantially different skill level vis-à-vis others within their occupation - have a training profile that can explain the difference in skill level. This approach makes it possible to infer whether an apparent skill mismatch relates to an individual being in a job that is inappropriate to their skill level or to the individual's performance. In both cases, continuing education has an important role to play in correcting the apparent skills mismatch, especially for individuals with the lowest skill levels.

1. The link between skill level and training profile

This study is based on data from the OECD's 2012 PIAAC survey, which is a unique source providing an international comparison of adult skills on a harmonised basis⁹. The next survey is planned for 2022.

1.1. The general skill score increases with the level of education, and there are bigger gaps in numeracy than in literacy

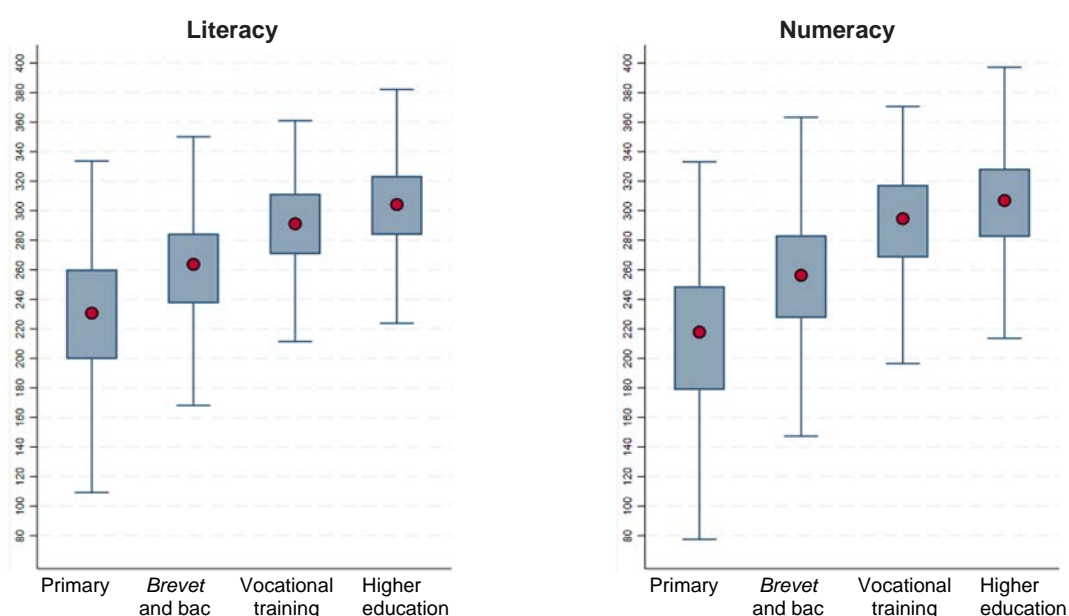
The average general skill score observed¹⁰ increases with the level of education. The average skill score according to the PIAAC survey in France, as in other countries, is higher for individuals with a post-baccalaureate level of education (290 for those with vocational qualifications and 303 for those with non-vocational higher education qualifications) than that observed for individuals whose highest-level qualification is the baccalaureate or pre-baccalaureate *brevet* (254). The general skills score achieved by individuals with no qualifications is 213. At a given level of education, these differences are more pronounced for numeracy than for literacy (see Figure 1).

Differences in skill scores between individuals are also smaller for the most highly educated. The higher the level of education, the lower the inter-decile and inter-quartile ratios. There is therefore less heterogeneity in the overall level of skills observed among the most highly educated.

⁹ See annex.

¹⁰ The average skills score is calculated as the average of the literacy and numeracy scores obtained by individuals based on their responses to the PIAAC survey questionnaire.

Figure 1 - PIAAC score by level of education attained



Note: the extremes correspond to the 1st and 9th deciles. The rectangles represent the 1st and 3rd quartiles, the red dot is at the median.

Source: PIAAC 2012, OECD, Calculations by France Stratégie

The differences are particularly marked for individuals without post-baccalaureate qualifications, as shown by the inter-decile ratios in the following table.

Table 1 - Inter-decile ratios for basic skill scores in France according to the level of education

INDEX (D9-D1)/D9	Post-baccalaureate qualification	Pre-baccalaureate qualification
General index	35%	61%
Literacy	36%	59%
Numeracy	40%	73%

Source: PIAAC 2012, OECD, Calculations by France Stratégie

1.2. Disparities in average skill scores by field of training

Disparities in average general skill scores are also observed from the PIAAC survey for different fields of training. The average skill score for individuals who have received training in "science and technology" is 281, compared with 254 for those with training in services (sales, administration, etc.).

Table 2 - Determinants of the PIAAC skill score

Dependent variables	Overall PIAAC score		PIAAC numeracy score		PIAAC literacy score	
Individual control						
Individual control	Yes	Yes	Yes	Yes	Yes	Yes
Education						
Reference: primary, lower secondary or upper secondary education of basic education						
<i>Brevet</i> and baccalaureate	32.8*** (1.52)	31.6*** (2.11)	36.9*** (1.79)	35.2*** (2.46)	28.8*** (1.54)	28.1*** (2.13)
Vocational training and other higher vocational education	65.1*** (2.06)	63.1*** (2.63)	73.6*** (2.47)	71.1*** (3.11)	56.7*** (2.09)	55.0*** (2.73)
Higher education	78.6*** (1.75)	75.9*** (2.56)	88.0*** (2.12)	84.8*** (2.94)	69.2*** (1.76)	67.0*** (2.62)
Field of training						
Reference: lack of specialisation						
Social sciences		0.32 (1.98)		-0.26 (2.26)		0.92 (2.16)
Science and technology		9.31*** (2.16)		12.25*** (2.45)		6.38*** (2.36)
Health and social care		-2.65 (2.86)		-4.46 (3.33)		-0.84 (2.91)
Services		-7.47*** (2.15)		-8.56*** (2.53)		-6.38*** (2.20)
Constant	214.0*** (7.63)	218.0*** (7.71)	193.0*** (8.62)	198.5*** (8.69)	235.0*** (7.94)	237.6*** (8.07)
Comments	4.33	4.33	4.33	4.33	4.33	4.33
R-2	0.35	0.36	0.35	0.36	0.31	0.31

Standard deviations in brackets

*** p<0.01, ** p<0.05, * p<0.1

Note: for each regression the following individual controls were used: Age, Age², Gender, Region

Source: PIAAC 2012, OECD, Calculations by France Stratégie

In order to establish the determinants of the skill score, a linear regression of the average skill score is carried out firstly for the level of education, and secondly, for both the level of education and field of training, controlling for individual characteristics (age, gender, region) in each regression used.

All other things being equal, and controlling for individual characteristics as well as field of training, an individual with a university-level qualification scores 75 points higher in the assessment of general basic skills (numeracy and literacy) than an individual with only the primary, lower secondary or upper secondary level of basic education.

The linear regression confirms what can be seen from the descriptive data, namely that the skill score increases with the level of education. Furthermore, it appears that at an equivalent level of education, individuals with science and technology training have the highest skill scores, while those with training in services have the lowest skill scores.

1.3. Unsurprisingly, the average skill level observed for an occupation increases with the proportion of people with qualifications

Looking at the average skill scores observed by occupation (ISCO)¹¹, it is not surprising that the higher the proportion of people with qualifications working in an occupation, the higher the average skill score. For reasons of statistical reliability, only those occupations for which we have sufficient observations from the PIAAC survey are included in this study, i.e. 89% of the¹²employed population.

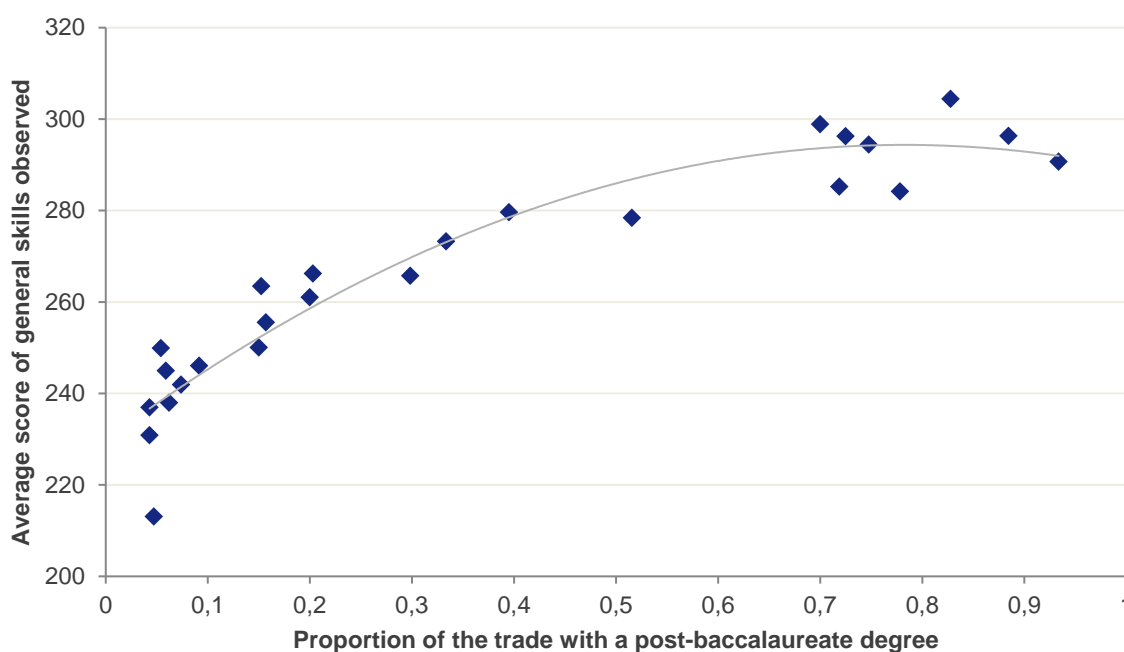
As a corollary, the average general skill scores observed are the lowest among the ISCO categories with the highest proportion of workers with education below or equivalent to the second stage of basic education. Among these occupations, there is also a lower score for numeracy than for literacy.

The occupations with the highest proportions of people with qualifications are naturally those with the highest average skill scores observed. For example, among managers and executives in management, production and specialised services, almost 83% have a post-baccalaureate qualification, and their average skill score is 304. In comparison, among individuals working in skilled construction and related occupations, excluding electricians, only 4% have a post-baccalaureate qualification, and their general skill score is around 231 (see Figure 2).

¹¹ Here we use the two-digit ISCOs.

¹² These occupations are: cleaners and helpers; skilled building and related occupations, excluding electricians; machine and plant operators; health professionals; labourers in mining, construction and public works, manufacturing and transport; food processing, woodworking, garment and other craft and related trades; drivers and mobile plant operators; personal services workers; skilled metal, mechanical construction and related occupations; market-oriented skilled agricultural workers; shopkeepers and salespersons; protective services workers; office clerks; science and technology associate professionals; accounting and purchasing; accounting, finance and administration associate professionals; legal, social and related associate professionals; health associate professionals; health professionals; legal, social and cultural professionals; business administration professionals; information and communications technology professionals; administrative and commercial managers; teaching professionals; senior officials and chief executives, production and specialised services managers.

Figure 2 - Skills and level of education attained by occupation



Note: in most occupations, the differences between literacy and numeracy skill scores are relatively small.

Source: PIAAC 2012, OECD, Calculations by France Stratégie

2. Determining a skills mismatch

We have opted for the term 'apparent skills mismatch' to refer to the situation of individuals whose skill level is substantially different from others. We will cover the issue of under/over-skilling in a second step, when analysing the apparent skills mismatch. In our view, differences in skill levels do not necessarily mean that individuals are in jobs that are inappropriate to their skills level.

2.1. Description of the method and the different types of mismatch

Following the example of the quantitative methods developed in the economic literature, we established a proxy for the "expected" level of skills by occupation. While Quintini (2014) and McGowan and Andrews (2015) use the responses from the PIAAC survey, which asks workers whether they believe they "have the skills to cope with more demanding duties than those required by their current job" and whether they consider they "need further training to cope well with their duties" to construct a quantitative scale of skills required to perform tasks for each occupation (single-digit ISCO), we favour a method based on the skill scores observed for each occupation in the PIAAC survey. This allows us to avoid possible biases that may exist when individuals are asked about their skills and the level required in their occupation. We established a proxy for the expected skill level using the median and one standard deviation of the skill scores observed in the PIAAC survey for each occupation (two-digit ISCO). An 'apparent skill mismatch' exists when an individual's skill level is outside one standard deviation from the median score for his/her occupation. 29% of the people employed in the selected ISCO categories show an apparent skills mismatch within their occupation in France.

The training profile, i.e. the highest level of education attained by an individual and his/her field of training, is generally a good indicator of skills level. As shown by the linear regression carried out in the first part of this study, there is a link between an individual's skills level and his/her training profile. However, in some cases the skills level may not match the training profile. The use of the training profile as a signal of skills level in the recruitment process may then prove unreliable, and result in individuals being in inappropriate jobs given their skill level. In other cases, the individual's skill level is in line with his/her training profile, but the signal representing this may be misunderstood by employers, and once again lead to an apparent mismatch of skills within the occupation. Taking only the standard deviation relating to the proxy for the occupations does not allow us to capture the mechanism by which the mismatch occurs; we therefore decided to incorporate the training profile into our study. Using international comparisons, we can infer potential differences in the structures and levels of skills between France and other countries.

In the same way as for the occupations, we established a proxy for the skill level by training profile (combining the highest level of education attained and the field of training) using the median and one standard deviation of the skill scores observed in the PIAAC survey. Individuals whose skill score is outside the standard deviation of the median skill score for their training profile are considered to have a skills mismatch with their training profile.

From this, we can identify four different scenarios :

- **a skills mismatch within the occupation, combined with a training profile mismatch.** In this case, the individual has a skill level that is more than one standard deviation above (or below) the median skill score for his/her occupation and training profile. The training profile is, in this case, not a good indicator of the skills held by the individual and the labour market has not been able to appreciate this. We therefore have a dysfunction on the supply and demand side of the labour market;
- **a skills mismatch within the occupation.** The individual has a skill level above (or below) the standard deviation from the median skill score for his/her occupation. He/she is within the standard deviation of the median skill score for his/her training profile. Here, the training profile is a good indicator of skills, but despite this, the labour market has not properly appreciated this information. The dysfunction is thus on the supply side;
- **a skills mismatch with the training profile.** The individual has a skills level above (or below) the standard deviation of the median skill score for his/her training profile. He/she is within the standard deviation of the median skill score for his/her occupation. Here, the training profile is not a good indicator, but the labour market may have perceived this and drawn on other information when making the match;
- **no apparent skills mismatch in terms of profile and occupation.** The individual's skill level is within the standard deviation of the median skill score for his/her occupation and training profile.

2.2. Training profiles

The training profiles are a combination of the highest level of education attained and the different fields of training. We selected four categories for education - primary, *brevet*-baccalaureate, higher vocational education (BTS, DUT) and higher education (university

studies, *grandes écoles*) - and five fields of training¹³. This makes twenty combinations, but only thirteen have a sufficient number of observations to be deemed observable. As mentioned above, for each combination of training profile, the median score for general skills was established. Individuals whose skill score is outside the standard deviation of the median score are considered to have a skills mismatch according to their training profile. Table 3 summarises the median general skill scores and standard deviations.

**Table 3 - Median general skill scores and standard deviations
by training profile**

	No specialisation	Social sciences and humanities, arts	Science and technology	Health and social care	Services
Primary	225 +-50	-	-	-	-
Brevet and baccalaureate	259 +-39	267 +-38	267 +-40	255 +-35	250 +-38
Higher vocational education	-	286 +-35	300 +-32	290 +-38	287 +-33
Higher education	-	299 +-35	318 +-34	294 +-35	-

Note: each box indicates the median score observed in basic general skills and the standard deviation. For individuals with a higher vocational education qualification and training in services, a median score of 287 was observed, with a standard deviation of 33. Some combinations were not used for reasons of statistical reliability (insufficient number of observations) or non-observation of the combination.

Source: PIAAC 2012, OECD, Calculations by France Stratégie

3. Characterisation of individuals with mismatched skills

3.1. At the national level

Of the 29% of individuals with an apparent skills mismatch in their occupation, 61% (or 17.6% of those employed in the occupations observed) also have an apparent skills mismatch in their training profile. For these individuals, the traditional mechanisms for matching labour supply and demand have not worked well, and the labour market has not been able to identify their skill levels. 11.4% of those employed in the occupations observed have an apparent skills mismatch with their occupation proxy, but not with their training profile. For these individuals, this apparent skills mismatch may mean they are in a job inappropriate to their skill level. If this is the case, it would be preferable for them to work in an occupation more in line with their skill level; however, the mismatch may also reflect a wide range of training profiles within the occupation, without there being a mismatch in individuals' skills.

In addition, 9.4% of those employed in the occupations observed have a skills mismatch in their training profile but no skills mismatch in their occupation, and 61.6% of those employed

¹³ Social sciences and humanities (law, economics, sociology, history, geography, languages, art and pedagogical sciences), science and technology (courses in science, computer science, mathematics, natural sciences, engineering, construction), health and social care, services (sales, administration) and no specialisation.

in the occupations observed have no skills mismatch in either their occupation or their training profile.

Table 4 – Apparent skills mismatch in occupation and training profile

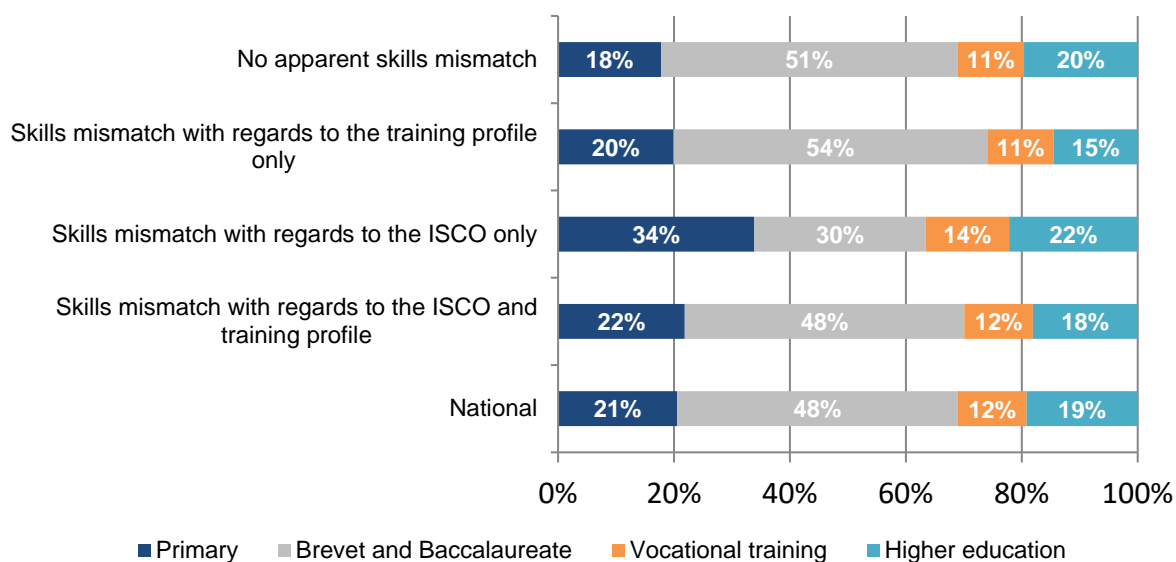
	Mismatch in relation to training profile	No mismatch in skills in relation to training profile
Mismatch in relation to occupation	17.6%	11.4%
No mismatch in relation to occupation	9.4%	61.6%

Note: 17.6% of individuals have a skill level above (or below) the standard deviation of the median skill score for their occupation and training profile.

Source: PIAAC 2012, OECD, Calculations by France Stratégie

Among the individuals with skill mismatches in relation to their occupation alone, the least qualified are over-represented (34% have reached a primary level of education). It is necessary to distinguish individuals according to the position of their skill level in relation to the proxies to observe differences according to the level of education.

Figure 3 - Type of apparent skills mismatch and level of education



Note: this chart shows the distribution of the highest qualification held according to the type of mismatch observed. Among individuals with a skill level that represents a mismatch in relation to the proxy for their occupation only, 34% have not gone beyond primary, lower secondary or upper secondary basic education. At the national level, among those employed in the occupations observed, 21% have this level of education. Thus, individuals with a primary level of education are over-represented among those with an apparent mismatch with respect to their occupation and profile, at a rate of 13%.

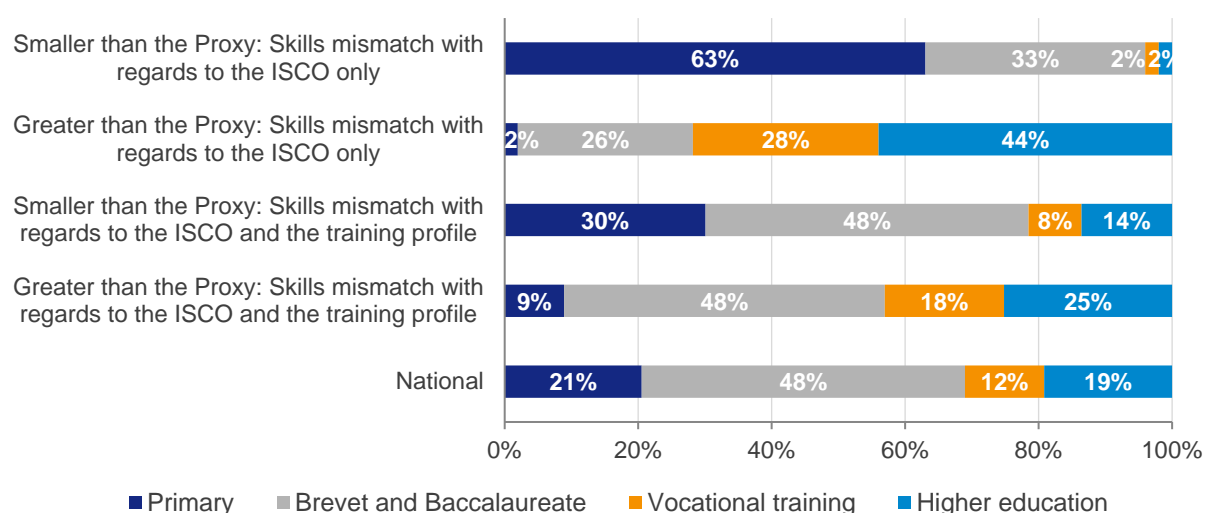
Source: PIAAC 2012, OECD, Calculations by France Stratégie

We then focused our analysis on the apparent skills mismatch by occupation, combined (or not) with an apparent skills mismatch by training profile.

Those with few qualifications are over-represented among individuals whose skill score is below the proxy for their occupation. Holders of a post-baccalaureate qualification are over-represented among individuals whose skill score is higher than the proxy for their occupation.

Among individuals with an apparent skills mismatch due to a skill level below the proxy for their occupation, 96% hold a baccalaureate at best. For those with an apparent skills mismatch in terms of occupation and training profile by a score below the proxy, 78% hold the baccalaureate at most. Holders of a baccalaureate or lower account for 69% of the total population observed. Conversely, the most highly educated are over-represented among individuals with an apparent skills mismatch with scores above the proxy. Thus, 72% of the individuals among the occupations observed with a skill score higher than the proxy for their occupation have a post-baccalaureate qualification (28% have a higher vocational education qualification and 44% have a higher education qualification). Moreover, 43% (18% and 25% respectively) had a skill score above the proxy for both their occupation and training profile. Holders of post-baccalaureate qualifications represent 31% of the total population observed (12% have a higher vocational education qualification and 19% hold a higher education qualification).

Figure 4 - Proportion of individuals with skill scores below or above the proxies for occupation and training profile, by level of education



Note: the distribution of qualifications held according to the type of mismatch observed is shown in this chart, with a breakdown according to the individual's position in terms of the apparent skills mismatch. Among individuals whose skill level is higher than the proxies for their occupation and training profile, only 9% have not gone beyond the primary, lower secondary or upper secondary level of basic education. At the national level, among those employed in the occupations observed, 21% have this level of education. Thus, individuals with a primary level of education are under-represented among those with a skill level above the proxies for their occupation and training profile (-12%).

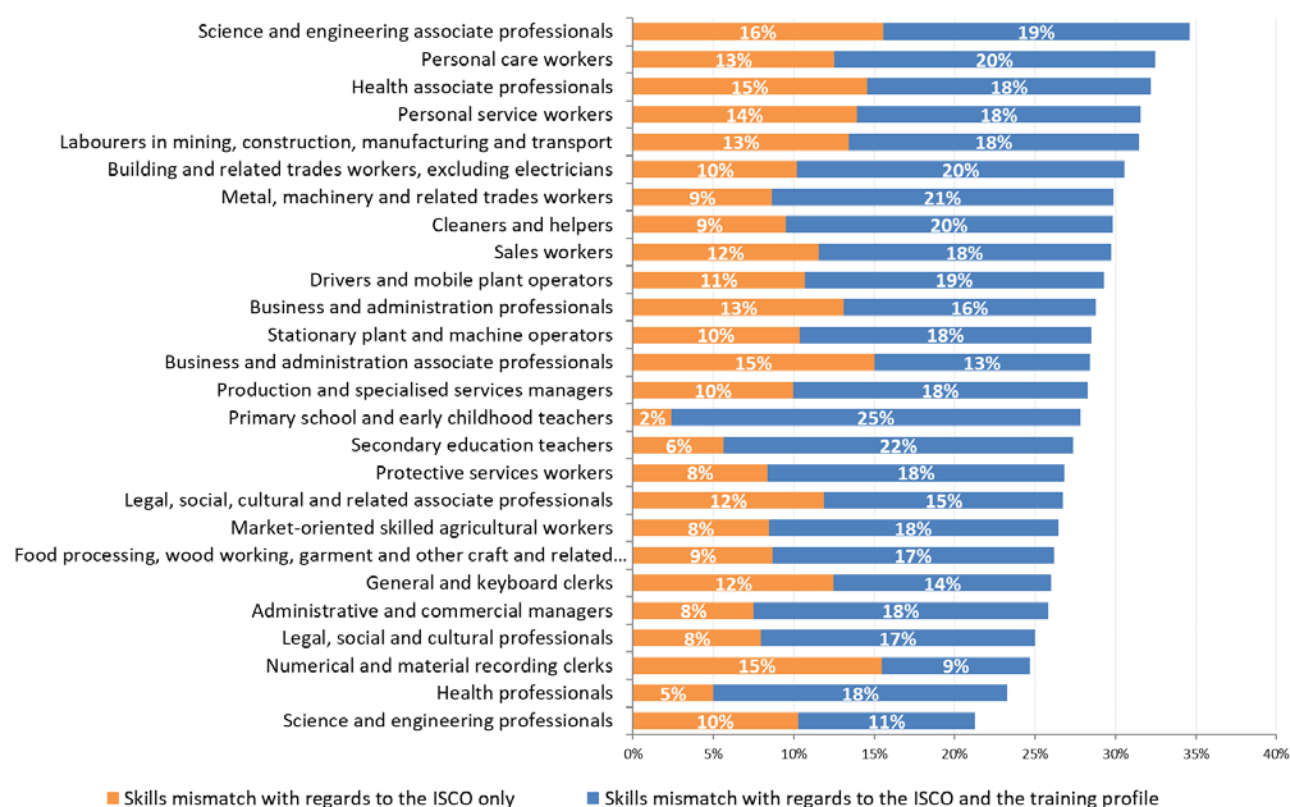
Source: PIAAC 2012, OECD, Calculations by France Stratégie

An apparent skills mismatch is significant in some occupations, whether skilled and unskilled.

Of the occupations for which we have sufficient data for analysis, some have a significant proportion of individuals with an apparent skills mismatch. This applies to both skilled and unskilled occupations.

There are more individuals with an apparent skills mismatch both in their occupation and their training profile. For "science and engineering associate professionals", 19% of individuals have an apparent skills mismatch in terms of their occupation and training profile and 16% in terms of their occupation alone. For "personal care workers", the proportions are 20% and 13% respectively.

Figure 5 – Apparent skills mismatch by ISCO category



Scope: Occupations with at least 62 observations in the 2012 PIAAC survey.

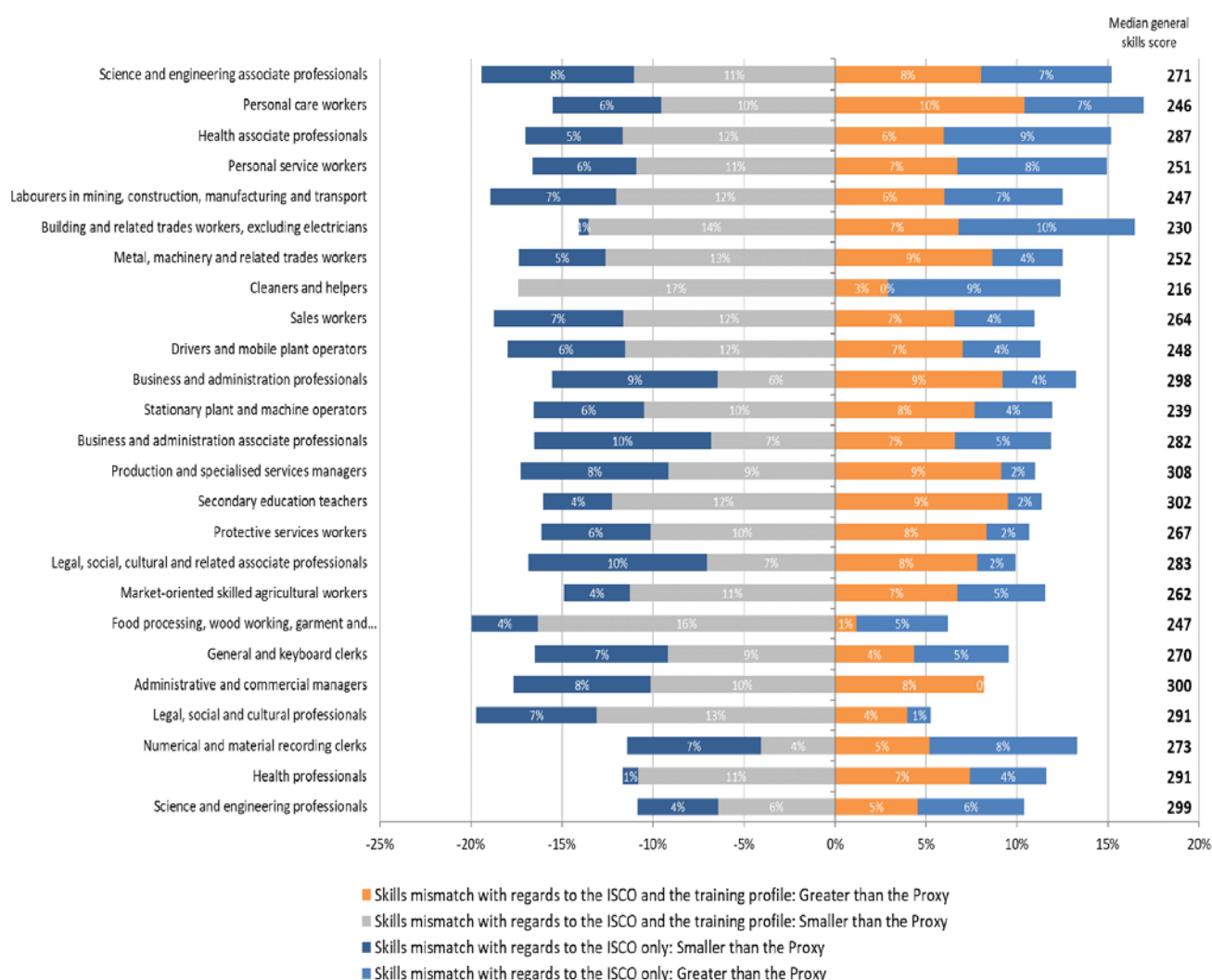
Note: the proportion of the workforce with an apparent skills mismatch in occupation only and those with an apparent skills mismatch in both the occupation and training profile are shown by occupation.

Source: PIAAC 2012, OECD, Calculations by France Stratégie

In some occupations, mismatches are primarily accounted for by individuals whose skill levels are below the proxies for their occupation and training profiles. This is the case, for example, for "building and related trade workers, excluding electricians" (14%), "metal, machinery and related trade workers" (13%) and "cleaners and helpers" (17%). These occupations have a large proportion of people with no qualifications and the lowest skill scores. Moreover, a key feature of building occupations and cleaners and helpers is that a large proportion of the

workers have an immigrant background¹⁴. Although the educational level of the immigrant population is improving, it remains heterogeneous and lower than that of the non-immigrant population¹⁵. This could explain why a significant proportion of workers in these occupations have a lower literacy and numeracy skill score than the proxy for their occupation and training profile.

Figure 6 - Proportion of individuals with skill scores above or below the proxies for their occupation and training profile by ISCO category



Note: the proportion of the workforce with an apparent skills mismatch in relation to their occupation only and those with apparent skills mismatches in relation to both their occupation and training profile is shown by occupation, with a breakdown according to their position in relation to the proxies for the occupation and occupation/training profile.

Source: PIAAC 2012, OECD, Calculations by France Stratégie

¹⁴ Mini C. (2012), "Emploi et chômage des immigrés en 2011", Dares analyses no. 77, October.

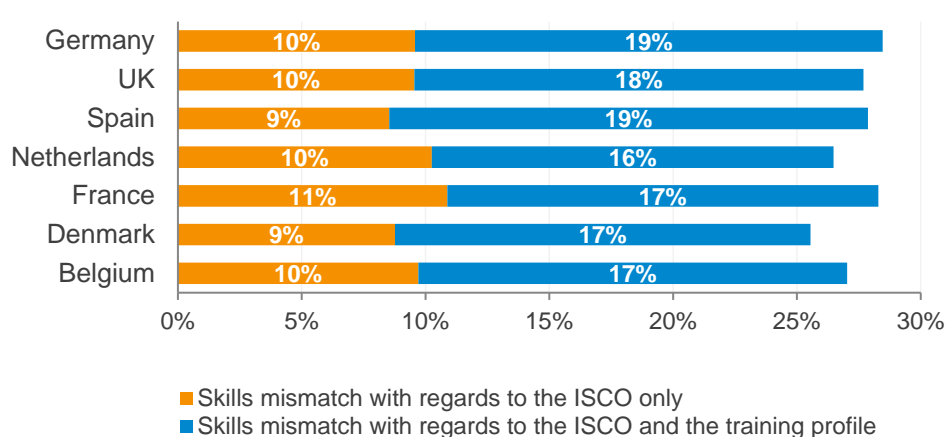
¹⁵ France Stratégie (2019), *The impact of immigration on the labour market, public finances and economic growth*, report for the National Assembly, July.

3.2. International comparisons

Skills mismatch is not particular to France but also concerns its European neighbours in similar proportions.

Between 9% and 11% of individuals show an apparent skills mismatch with their occupation and between 17% and 19% of individuals show an apparent skills mismatch with both their occupation and training profile. To make an international comparison, we selected occupations for which there were sufficient observations in all the countries studied. This may mean slight discrepancies for France compared to the results presented above. With our new selection, only 57% of the population in employment in France was observed, with similar rates for the other countries.

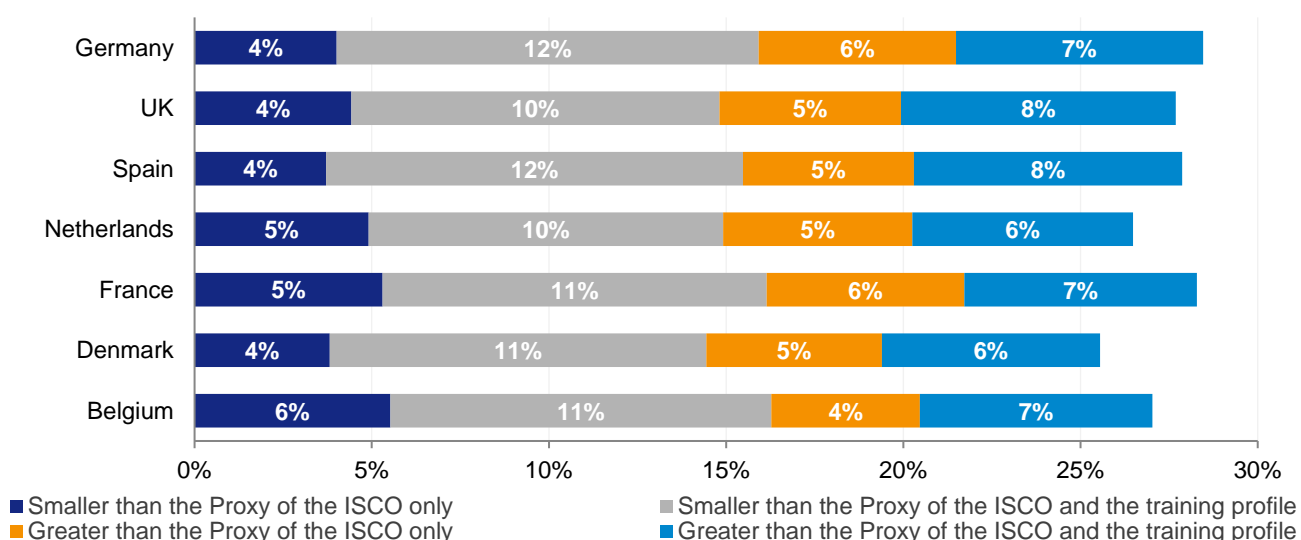
Figure 7 – Apparent skills mismatch by country



Note: in all countries, the proportion of individuals with skill scores below the proxies for both the occupation and training profile is higher in all countries than the proportion of individuals with a higher score.

Source: PIAAC 2012, OECD, Calculations by France Stratégie

Figure 8 - Proportion of individuals with scores above and below the proxies for occupation and training profile

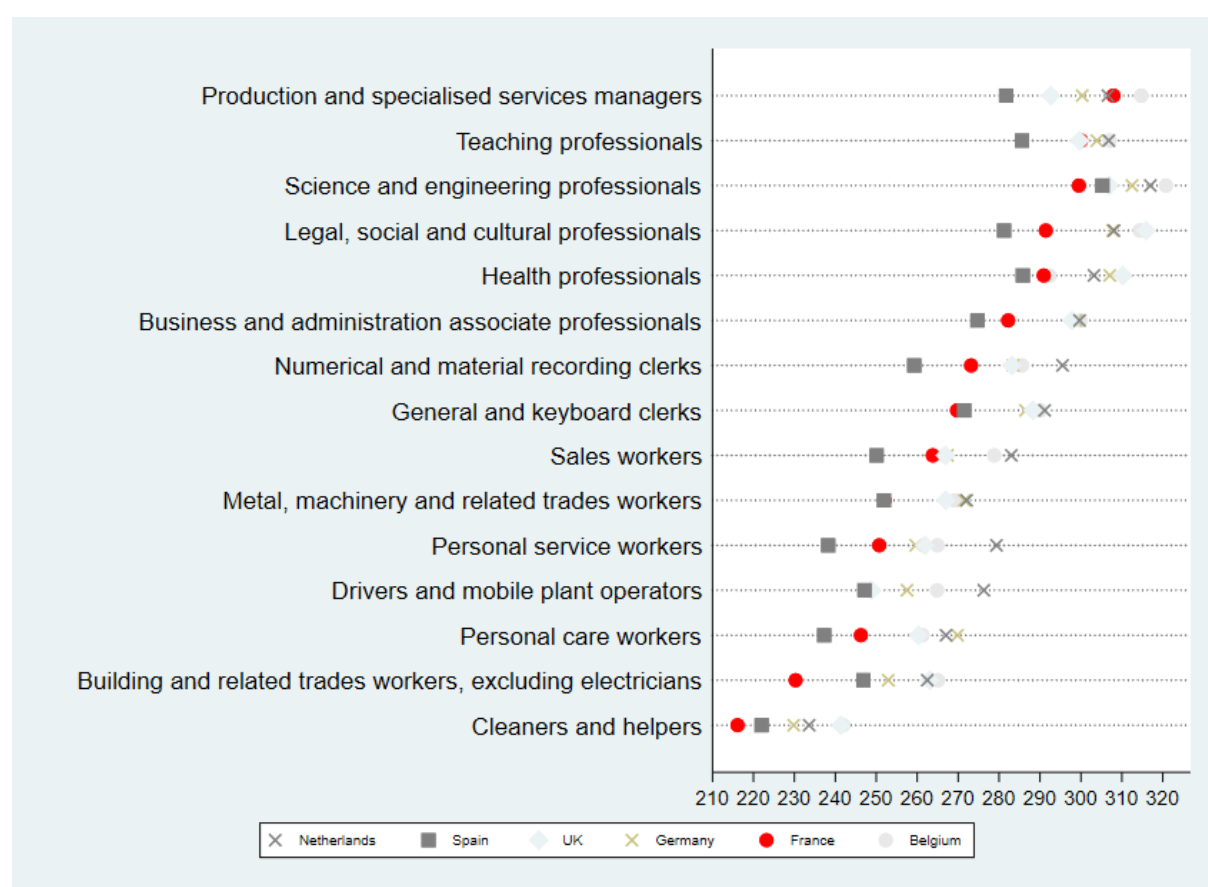


Note: in both Germany and France, individuals with apparent skill mismatches whose skill level is higher than the proxy for their occupation represent 6% of the workforce in employment observed in these countries.

Source: PIAAC 2012, OECD, Calculations by France Stratégie

These results indicate that France does not differ from other European countries in terms of the structure of the apparent skills mismatch. Nevertheless, there is a difference in adult skill levels for the occupations studied: the level of skills of people in employment is relatively low for France compared to other European countries, as shown in the following chart.

Figure 9 - Median general basic skill scores by occupation in different European countries



Source: PIAAC 2012, OECD, Calculations by France Stratégie

4. From skills mismatch to under/over-skilling

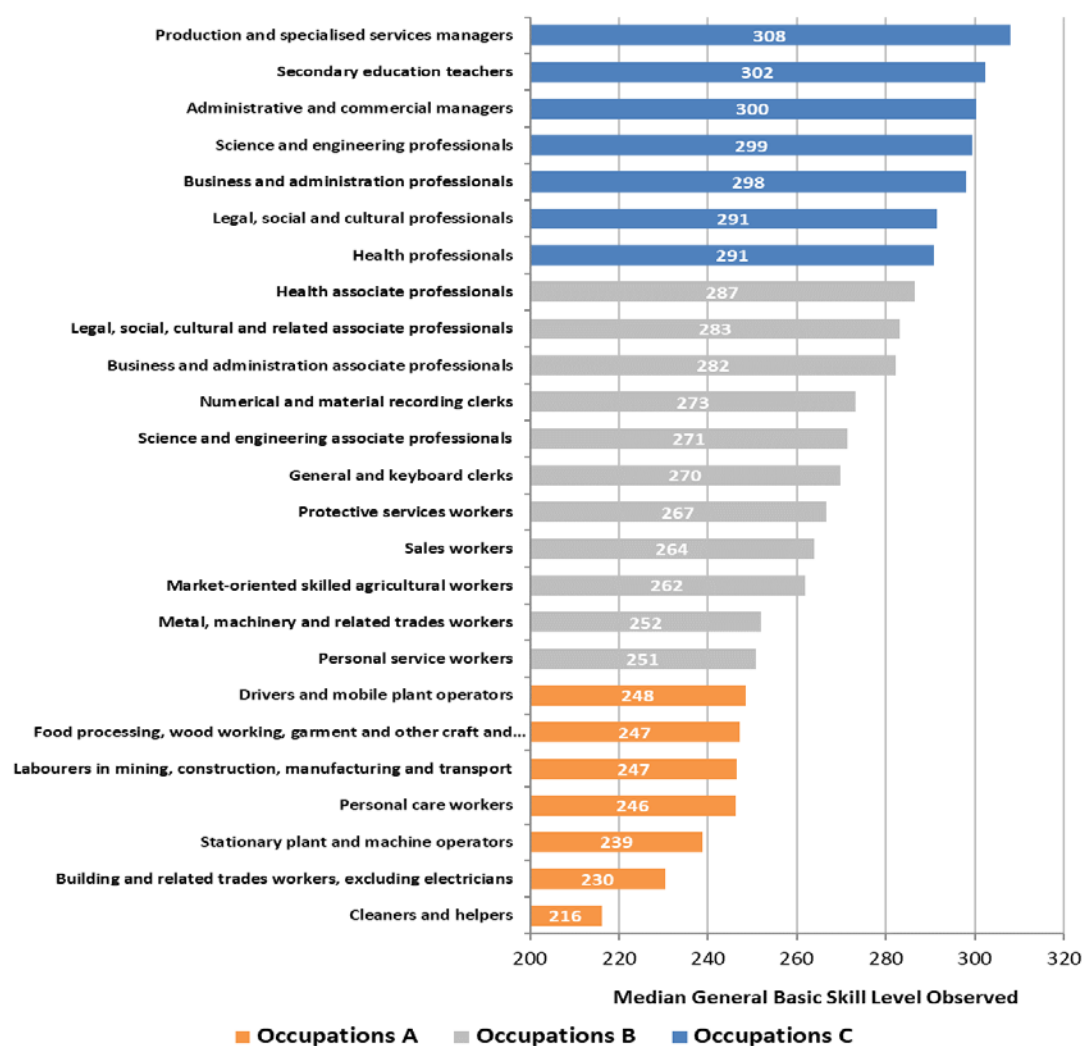
The significant difference in the general skill level of individuals in relation to the standard deviation of the median skill score for their occupation and/or their training profile shows an apparent skills mismatch, which in our view does not necessarily represent under/over-skilling, i.e. a situation where individuals are in jobs that are inappropriate to their skill level. Let us take the example of "cleaners and helpers" whose median general skill score is among the lowest for all ISCO categories. 17% of individuals in this category have a PIAAC survey skill score that is below the standard deviation of the median score for their occupation and training

profile. It would appear that rather than being in a job inappropriate to their skill level, these individuals require training.

We have established a classification in order to refine our analysis of the skills mismatches observed. This allows us to better understand what is due to individuals being in jobs inappropriate to their skill level and what may stem from their work performance. It is important to note that the distinction between skill level and performance is not necessarily clear-cut, depending on the case, but it enables us to identify the skills mismatch in the labour market more effectively.

We first distinguish between three categories of occupation according to their median level of general skills. The first category includes the occupations with the lowest median skill scores, according to the PIAAC survey (fourth quartile). The second category contains the occupations with median skill scores in the middle of the range (second and third quartiles), and the third category represents occupations with the highest skill scores (first quartile).

Figure 10 - Occupation categories according to median general skill score

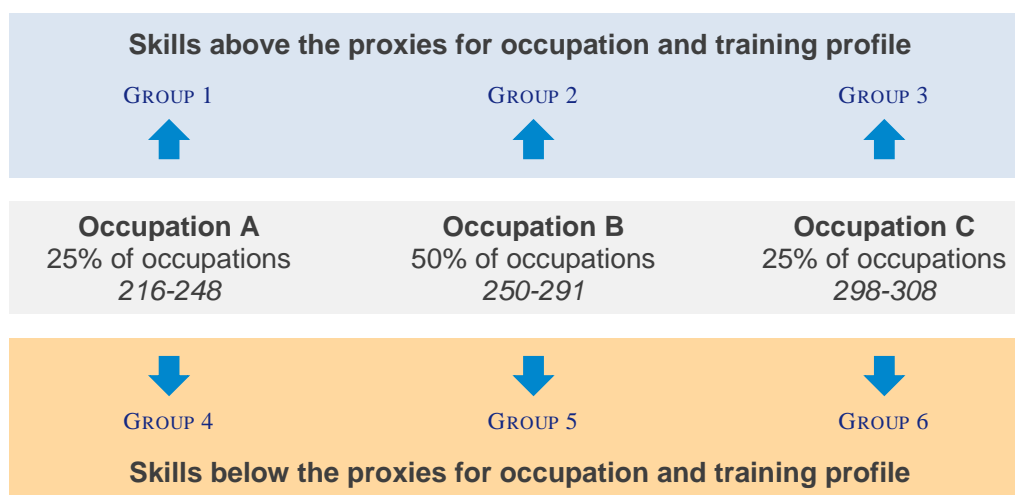


Note: the "cleaners and helpers" occupation (median general skill score of 216) belongs to the quartile of occupations with an apparent skills mismatch that have the lowest median skill scores (category A).

Source: PIAAC 2012, OECD, Calculations by France Stratégie

For each category, we observed the characteristics of individuals whose skill level is above or below the proxies for the occupation and training profile using PIAAC survey data (age, gender, self-reported health status, self-reported job satisfaction, possible need for training, whether respondents consider they have the skills to cope with more demanding duties). This enables us to gain a better understanding of the profile of individuals and to analyse their apparent skills mismatch in more detail.

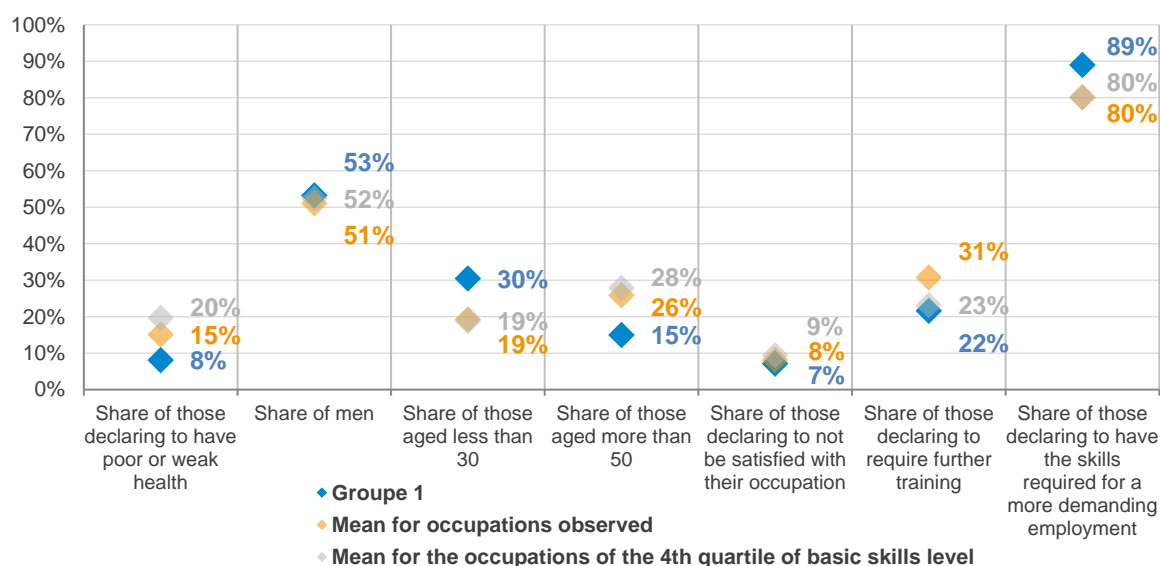
Figure 11 - Structure of the classification of skills mismatches by occupation category and positioning in relation to the proxies for the occupation and training profile



Source: France Stratégie

In the first category of occupations with the lowest median skill scores, individuals with skill levels above the proxies for their occupation and training profile (Group 1) are relatively young compared to the national average (for the occupations observed) or to occupations in Group A (30% are under 30 years of age compared to 19% and 19% respectively), report that they are generally in good health, do not express a greater need for training than the national average, but are more likely to report being able to perform more demanding duties (89% versus 80% for all occupations observed in this study).

**Figure 12 - Characteristics of individuals in Group 1,
Group A occupations and at national level**

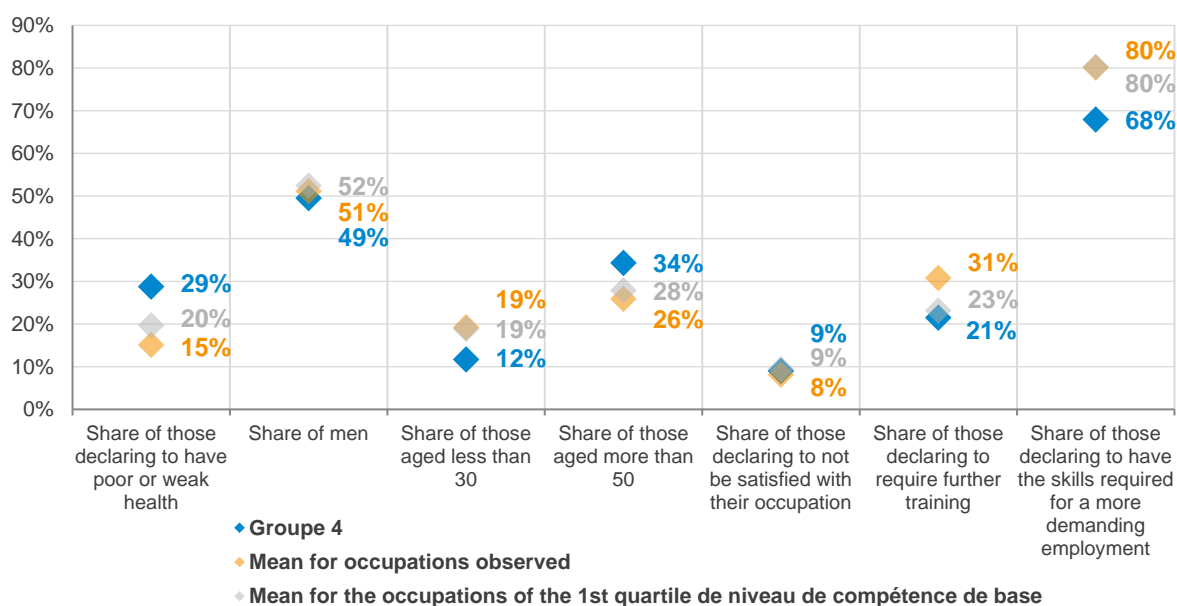


Source: PIAAC 2012, OECD, Calculations by France Stratégie

These observations indicate a skills mismatch in the sense that these individuals declare themselves capable of performing more demanding duties and have a skill score above the proxies for their occupation and training profile. This does not mean that they would not benefit from training, but rather that the analysis tends to show that they are in jobs that are inappropriate to their skill level.

For the same category of occupations with the lowest skill scores, but for individuals with skill levels below the proxies for their occupation and training profile (Group 4), the characteristics are different. Compared to the national average and to the average for these occupations, these individuals report more poor health, are older, do not express a need for training, and a smaller proportion of them say they are able to perform more demanding duties (68%, compared to 80% for all occupations observed and occupations in Group A). In this case, the apparent skills mismatch is more indicative of a low individual skill level than of a skills mismatch. The low skill level could be addressed through training and coaching to achieve a higher level of basic skills. We recall here that these occupations have one of the lowest median skill levels in France.

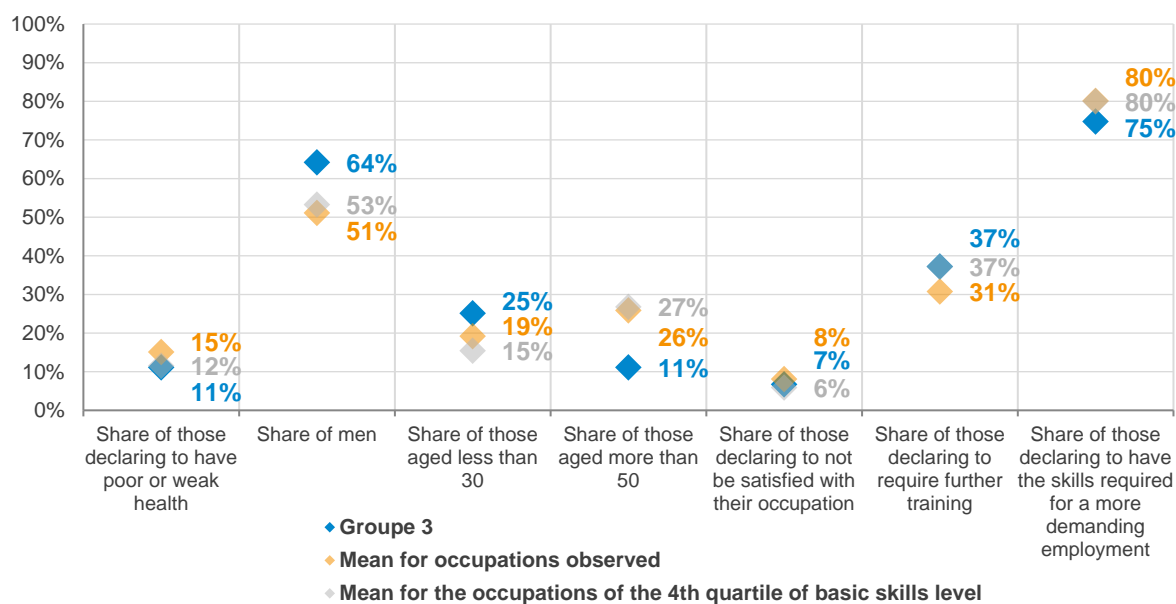
**Figure 13 - Characteristics of individuals in Group 4,
Group A occupations and at national level**



Source: PIAAC 2012, OECD, Calculations by France Stratégie

For the occupations with the highest median scores, we looked at the characteristics of individuals whose skill scores are above the proxies for their occupation and profile (Group 3). Compared to the national average and to the first quartile occupations, the individuals whose skill level is above the proxies for their occupation and training profile are more likely to be young men who do not report that they are dissatisfied with their work and who feel, to a lesser extent, that they have sufficient skills to perform more demanding tasks (75% compared to 80% for all occupations observed and 80% for occupations in Group A). In this case, the apparent skills mismatch observed does not necessarily indicate a skills mismatch, but rather attests to superior individual performance.

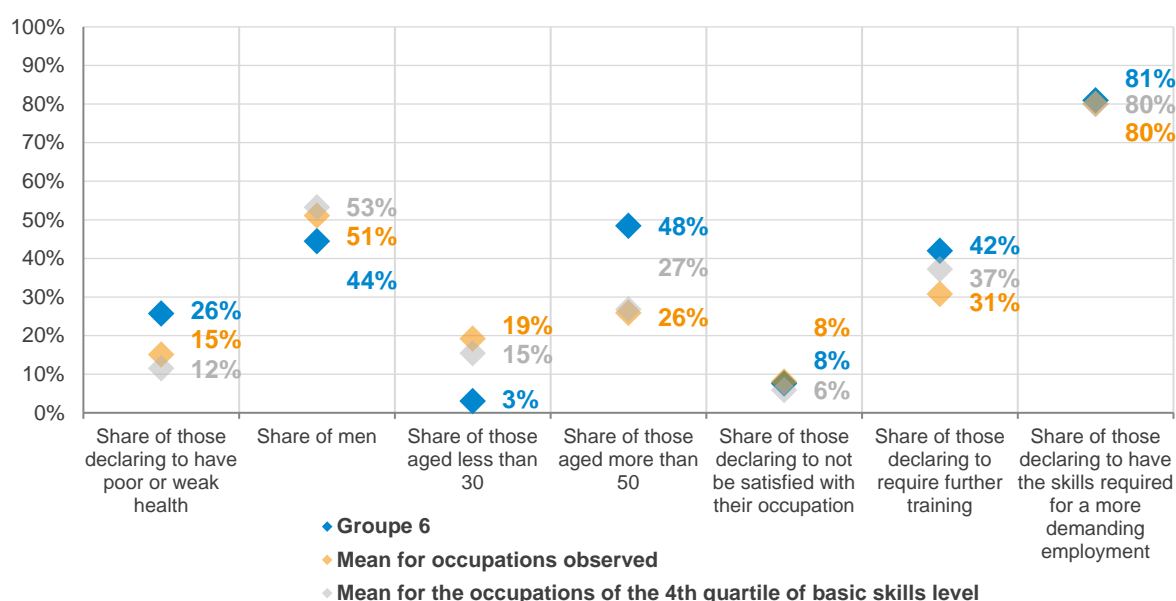
**Figure 14 - Characteristics of individuals in Group 3,
Group C occupations and at national level**



Source: PIAAC 2012, OECD, Calculations by France Stratégie

For these same occupations, individuals with lower skill levels than the proxies for occupation and training profile (Group 6) are more likely to be women, over 50 years of age (48%) and in poor health, report more than average dissatisfaction with their jobs and need training. For this category, the question of whether jobs are appropriate to skill levels could be reviewed.

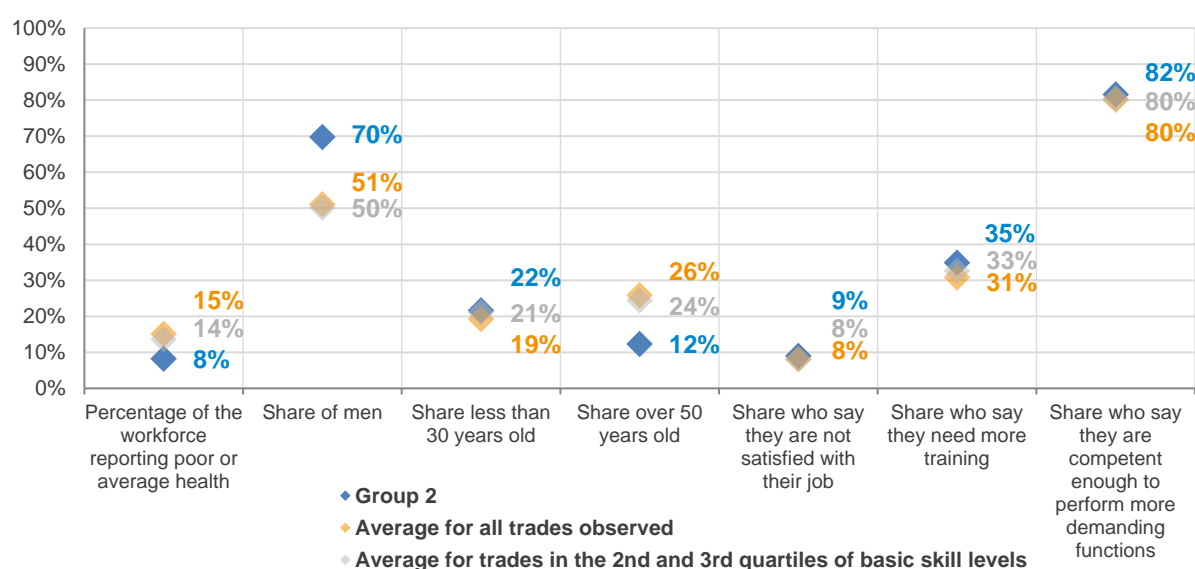
**Figure 15 - Characteristics of individuals in Group 6,
Group C occupations and at national level**



Source: PIAAC 2012, OECD, Calculations by France Stratégie

For the occupations with a median skill score in the middle of the range, individuals with a skill score above the proxy for the occupation and training profile (Group 2) are generally young, and generally report being in good health compared to the national and occupation group average. They report more of a need for training when their skill level is above the proxy for the occupation and their training profile. Nevertheless, the proportion of individuals reporting that they are satisfied with their jobs and have the skills to perform more demanding duties is around the national and occupation group average. These individuals, who more often than not have higher vocational education qualifications (19% compared to 17% for occupation Group A and 12% at the national level), should be working in an activity more in line with their skill level.

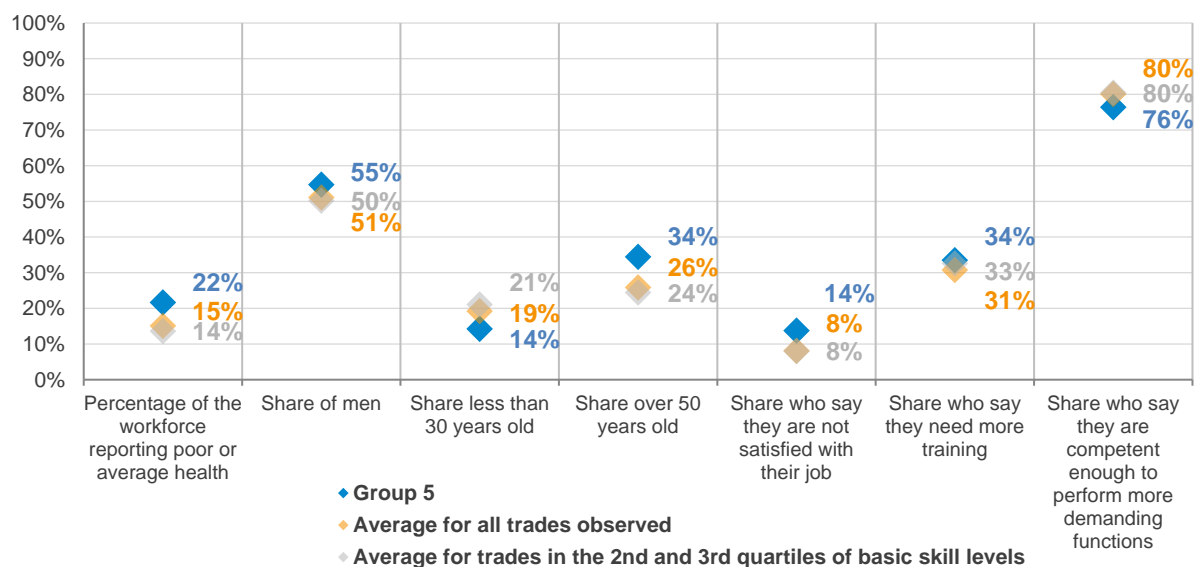
Figure 16 - Characteristics of individuals in Group 2, Group B occupations and at national level



Source: PIAAC 2012, OECD, Calculations by France Stratégie

For these same occupations, individuals whose level of education is below the proxy for their occupation and training profile are more likely to be over 50 years of age and to report poorer health. They more often report being dissatisfied with their jobs and needing training than the national average. The apparent skills mismatch may more likely mean that these individuals are in jobs that are inappropriate to their skill level. Support for a career change and more training would be desirable.

**Figure 17 - Characteristics of individuals in Group 5,
Group B occupations and at national level**



Source: PIAAC 2012, OECD, Calculations by France Stratégie

Conclusion

Although based on stylised facts, our analysis enables us to infer whether an apparent skills mismatch relates to under/over-skilling or performance. Based on this classification and by observing the workforce in each category, we estimate that about two-thirds of the individuals with an apparent skills mismatch in relation to their occupation and training profile may be under/over-skilled - or about 12% of those employed in the occupations observed. This figure is only an approximation and is intended only to give an order of magnitude. Nevertheless, it is important to consider that a difference in skill levels within an occupation does not necessarily constitute a skills mismatch, but may also relate to individual performance. In the case of inadequate individual performance, further training plays an essential role. Indeed, as we have been able to show, age is a significant factor in cases of apparent skills mismatch. The feasibility of a career change decreases with age, which reinforces the role that continuing education should play in these cases.

Annex 1 The OECD's PIAAC survey

The aim of the OECD's PIAAC (Programme for the Assessment of Adult Competencies) survey - also known as the Survey of Adult Skills - is to gain a better understanding of the competencies that individuals living in OECD countries possess and how they apply them in their occupations. The assessment of skills in an adult population, as designed by PIAAC, focuses on the use of literacy and numeracy in everyday life and work. The main goal is to examine whether respondents have a sufficient level of mastery to cope with the changes and demands of the world of work and daily life. This household survey uses the concepts of "literacy" and "numeracy" to refer to the literacy and numeracy skills used in everyday situations. The PIAAC project is based on computer-based tests. It places the people surveyed in situations using digital environments (website, email, spreadsheet, etc.).

The PIAAC survey is a unique source providing an international comparison of adult skills on a harmonised basis. No other comparable exercise exists. The survey was first carried out in 2012 and the next cycle is planned for 2022.

For France, the PIAAC survey has a sample of approximately 7,000 respondents. The occupations of the individuals surveyed are classified according to the ISCO (International Standard Classification of Occupations) nomenclature. The focus is on the basic skills observed in the PIAAC survey. The indicators of skills observed are obtained from the scores achieved by individuals on the various tests in the PIAAC survey, which provide an understanding of their level of basic literacy and numeracy skills. The overall skills indicator is a simple average of the numeracy and literacy skill scores.