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Skill Mismatch and Labour Shortages in the Italian Labour Market

Policy Brief 02

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Skill Mismatch and Labour Shortages in the Italian Labour Market

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Policy Brief

Introduction

The potential mismatch between the skills and qualification of the workforce and the needs of employers is a recurrent issue in the public debate of many countries, including Italy. On the one hand it is often argued that, especially in the wake of the great recession and the consequent downturn of labour demand, highly educated and skilled workers have become more and more willing to accept jobs for which they are excessively qualified. Media reports about university graduates working at call centers have become topical. At the same time, employers often argue that they have difficulties finding adequately trained workers and that this is an important impediment to growth and innovation. Unfortunately, shedding light on the issue of labour market mismatch is difficult for at least two reasons. The first reason is that the very definition of mismatch is nebulous and the same term is often used to indicate a variety of different concepts. The second reason is that, until very recently, the available data did not allow the investigation of mismatch in details, especially from a cross-country perspective.

The objective of this study is to use the best available data and a clear and sound definition to describe the phenomenon of labour market mismatch in Italy. In this policy brief we outline three important findings that are discussed at more length in a full report that will be released later this year. The first issue is the definition of mismatch and its empirical measures. The second issue is the extent of under-skilling and over-skilling in Italy and the important distinction between the two measures. The third issue is the relationship between salaries and the hiring difficulties reported by employers.

Qualification or skill mismatch?

The most common way of investigating mismatch empirically has been to compare workers qualifications with the qualifications needed for their jobs. This information is available in many surveys where interviewed workers are asked both about their educational qualifications and about the qualifications that would be needed to be hired to do their jobs (the exact formulation of these questions may vary across surveys). Workers would be classified as over-qualified when possessing qualifications above the level required for their jobs, under-qualified in the opposite situation

and well-matched when the two coincide. The problem with this definition is that skills and competences are accumulated, and potentially deteriorate, also outside the school environment. Hence, one's formal qualifications do not necessarily correspond to actual competences.

Using the newly available PIAAC data it is now possible to compare qualifications and actual skills. The PIAAC survey can be viewed as a standard representative survey where participants are not only asked about their qualifications (possessed and required) but

they are also given a test to assess their real competences in literacy and numeracy (OECD, 2013 and 2014). It is then possible to compute mismatch based on skills as opposed to qualifications.

Box 1 - Understanding labour market mismatch

The term "mismatch" is often used to refer to rather different concepts. In its more general meaning, **skill mismatch** is defined as the discrepancy between the skills of the workforce (the supply of skills) and the requirements for the available jobs in the economy (the demand for skills) at a given time and place. The exact nature of such discrepancy can, however, be very different across definitions.

From a micro perspective – the one adopted in this work – skill mismatch is a feature of the single job-worker pair, and therefore refers to employed workers only. More specifically, a mismatch arises when a worker possesses a level of skills that is either higher (over-skilled worker) or lower (under-skilled worker) than that required for the job. If one considers educational attainments rather than actual skills, then one speaks of **qualification mismatch**.

A rich strand of studies adopts a more macro concept of mismatch. In this literature, **aggregate mismatch** is defined as the existence of alternative allocations of workers, often meaning both employed and non-employed workers, to jobs, both filled and vacant, that could improve productivity compared to the existing equilibrium. A **labour shortage** is a specific type of aggregate mismatch. It is the discrepancy between the characteristics of available vacancies and those of unemployed workers in a specific occupation, industry or geographical area. In particular, a labour shortage arises when the number of available vacancies exceeds the number of qualified candidates.

Available evidence from PIAAC data points to the fact that qualification and skill mismatch in reality measure two very different things.

Table 1, for example, compares skill mismatch and qualification mismatch in Italy. Skill mismatch is computed accordingly to the OECD methodology (see Box 2, page 3) and focuses in particular on numeracy skills. Qualification mismatch refers to workers whose formal educational attainments are either higher or lower than those usually required for their job.

The table shows that almost 80% of those who are under-qualified are in fact well-matched in terms of skills. Among the over-qualified about 76% are well-matched on skills, while only 19% of them are actually over-skilled. The overlap between the two types of mismatch seems to be quite limited.

These differences arise for different reasons. First of all, the investment in education may be successful to a greater or lesser extent depending on the individuals. For example, some people may go to university but end up learning just enough to get their qualifications and substantially less than their most successful colleagues. Additionally, skills are learned on the job and tend to deteriorate during un-demanding jobs or periods of under-employment. As a result, those, presumably the most skilled, who manage to get the best jobs can accumulate more skills over their careers and the gap between good and bad workers widens over time.

Table 1 - Qualification and skill mismatch (in numeracy) in Italy

Qualification mismatch (self-reported)	Skill mismatch (tested)			
	under-skilled	well-matched	over-skilled	Total
under-qualified	8%	79%	13%	100%
well-matched	8%	77%	15%	100%
over-qualified	5%	76%	19%	100%
Total	7%	77%	15%	100%

Source: Authors' elaboration based on PIAAC data

Box 2 - The Survey of Adult Skills and the OECD measure of skill mismatch

The survey was carried out in 24 countries in 2011-2012, as a part of the OECD's Programme for the International Assessment of Adult Skills (PIAAC). The survey was implemented by interviewing representative samples of adults aged 16 to 65 and provided internationally comparable results. After answering a background questionnaire, respondents were asked to complete a test that measured skills in three domains: literacy, numeracy skills and problem solving. The average sample size was of about 6900 people per country. The sample size for Italy was of 4621 people.

The measure of skill mismatch used in this study was the one officially adopted by the OECD in the context of the PIAAC programme (Pellizzari and Fichen, 2013), with the difference of having applied a finer classification of occupations and having focused on numeracy skills only. More specifically, skill mismatch was computed as follows:

- we identified workers who self-reported being well-matched. These workers do not feel they "have the skills to cope with more demanding duties than those they are required to perform in their current job", but at the same time they do not feel they "need further training in order to cope well with their present duties".
- For each country, we defined the minimum and maximum numeracy skill requirements of an occupation as the minimum and the maximum test scores of the self-reported well-matched workers in that specific occupation. Because of the sample size, we only considered 21 occupational groups (mostly corresponding to a 2-digit ISCO code) and we dropped occupations with less than 50 observations.
- We classified workers as being over-skilled if their test score in numeracy was higher than the maximum requirement for their occupation (that is the maximum score of the self-reported well-matched workers) and under-skilled if their test score was lower than the minimum requirement for their occupation. All workers between the minimum and maximum were classified as well-matched.

One key advantage of this methodology is that it makes limited use of self-reported information, partially overcoming the problem of defining the skill requirements of a job based on a survey of workers and subjective evaluations.

Figure 1 – Distribution of skills by qualification level
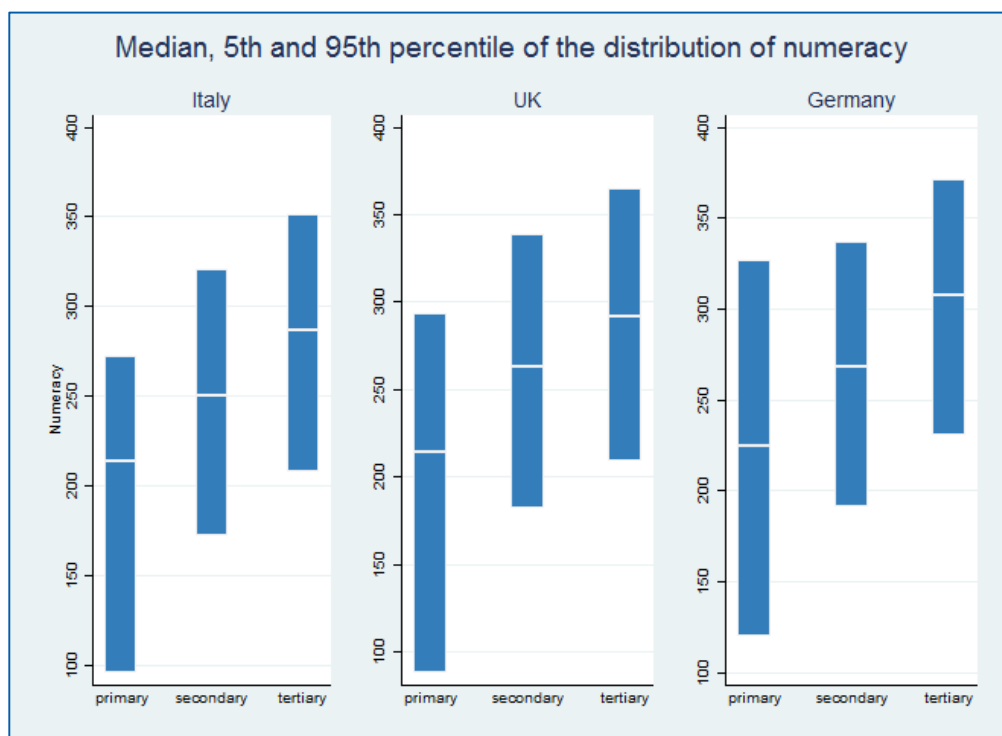
Figure 1 shows the distribution of numeracy skills by formal qualification in Italy, United Kingdom and Germany, and shows a large heterogeneity of skills within qualification groups. It is true that in all three countries the median skill level increases with the level of qualification, however the overlaps in the level of skills of people with different qualifications are large. For example, the best high school graduates perform largely above the median of

university graduates. The worst university graduates have proficiency levels close to the median of workers with primary education. In Italy, proficiency levels overlap even more than in other countries. Thus, Italian qualifications are, on average, less informative about workers actual skills than in other countries, like Germany and the United Kingdom.

Another way to look at the discrepancy between qualifications and skills is presented in Figure 2, which focuses exclusively on university graduates. The graphs plot the distribution of numeracy in different countries for those who have the right qualifications for their jobs and those who are over-qualified.

On average, the distribution of skills of overqualified graduates is slightly shifted to the left and therefore the level of skills of overqualified graduates is poorer, on average, than that of well-matched graduates. As Figure 2 shows, in Italy this shift is more pronounced than in other countries. One possible explanation for the difference between the two distributions is that skills tend to deteriorate faster in less demanding jobs, where graduates are more likely to be overqualified. Another explanation could be that employers are able to discriminate between good and bad graduates, and therefore people with poorer skills end up in jobs where they are overqualified but probably well-matched in terms of skills. In this second case, mismatched graduates would be overqualified for a good reason: they have poorer skills to start with. Both explanations can apply to the Italian case. The Italian economy is still concentrated in traditional sectors and characterized by a large number small firms, many operating with relatively un-innovative technologies. Therefore, the probability of graduates being employed in un-demanding jobs is higher than in other countries. Alternatively, the Italian educational system may be producing formal qualifications that are not a particularly good indication of actual skills.

Figure 2 – The skills of over-qualified and well-matched university graduates
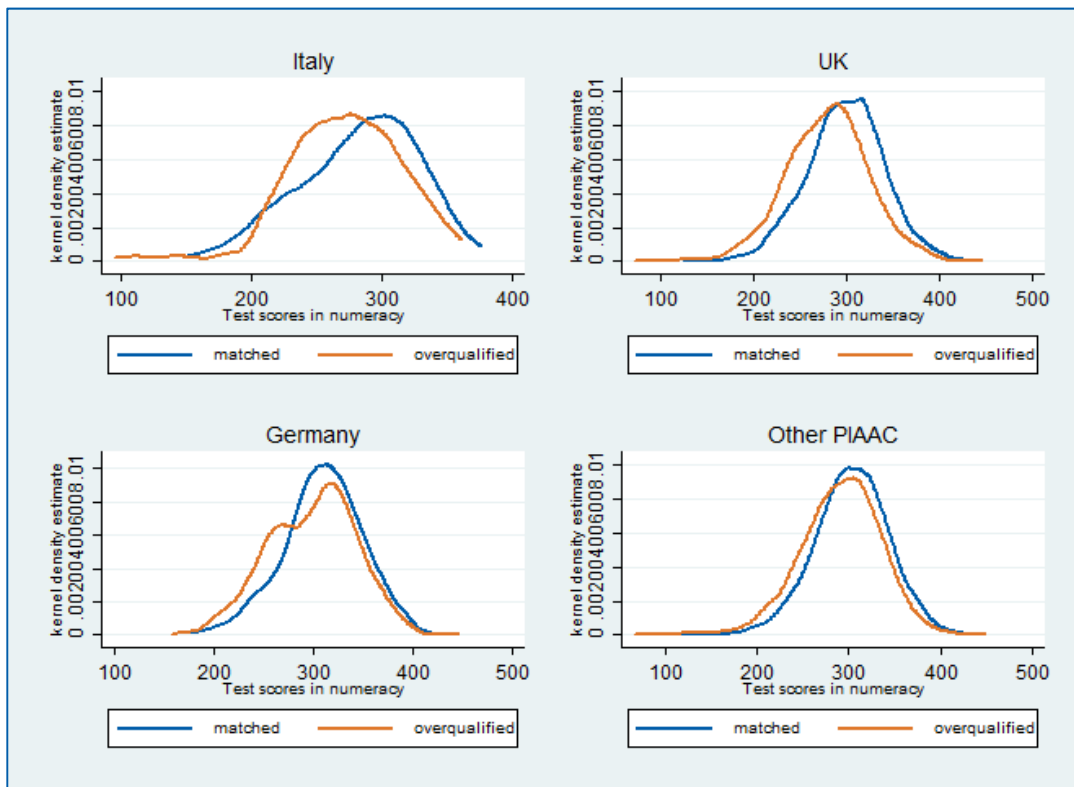
Source: Authors' elaboration based on PIAAC data

To sum up, measuring mismatch simply with formal educational qualifications can be misleading, since schooling has heterogeneous effects across individuals and skills develop and become obsolete also outside the school environment. A measure of mismatch based on skills is certainly a better indicator of a worker's true ability. Of course, this does not mean that the presence of qualification mismatch is not an issue. We should of course be careful about university graduates working in the call centers because apparently these individuals are not reaping the returns of the costly investment they have made. However, the problem relates more to the functioning of the education system than to the efficiency of the labour market in matching the right worker to the right job.

Is over-skilling truly a problem?

Using the PIAAC data and the skill-based definition of mismatch, it is possible to compute the share of currently employed workers who are over- or under-skilled in their jobs(Figure 3). In Italy, about 9% of employees are under-skilled and about 14% are over-skilled. Compared to the other countries, Italy has a slightly smaller fraction of over-skilled workers (14%) and hence a higher fraction of workers who are well-matched in their jobs compared to the PIAAC average (where over-skilled workers are 17%). The average level of under-skilling in PIAAC countries is 9%, which corresponds to the Italian percentage.

Is this good or bad? It is hard to draw definitive conclusions from this descriptive evidence. First of all, one must acknowledge that a certain degree of mismatch is likely to be structural, especially for young workers who need some time to experiment with labour market and to find the right job for them. Secondly, the level of skill mismatch is the result of structural features of the economy, which in turn have an impact on the demand for skills from the employers. The Italian economy typically concentrates in sectors with relatively low technological and innovative capacity and a large number of small firms. Therefore, skilled workers are more likely to be employed in jobs where their skills are not exploited to their full potential. This interpretation is supported by the breakdown of the mismatch indicator by workers' education. Over-skilling is stronger among university graduates (19.6% compared to 13.6% among high-school graduates) and reaches a stunning 30% among university graduates in STEM subjects (Science, Technology, Engineering and Mathematics).

At the same time, since skills also accumulate and deplete on the job, they tend to deteriorate faster in economies where un-demanding jobs are widespread and workers' skills are rarely challenged. In this perspective, the overall disappointing performance of the Italian workforce, with mean proficiency scores significantly below the average of the other OECD countries (Di Francesco 2013; OECD, 2013), could be at least partly attributed to a faster depletion of their skills due to the nature of their jobs. Of course, the initial quality of such skills also matter and the PIAAC results for Italy clearly suggest that the schooling system does not provide workers with the same proficiency as in the other countries, even before they enter the labour market.

It also worth noticing that over-skilling is not necessarily a bad phenomenon, at least when it remains within reasonable magnitudes. Way too often the public discourse on mismatch tends to overlook the fact that the skill requirements for a job are themselves the result of a process of technological innovation, crucial ingredients of which are the skills of the individuals. In other words, the skill requirements of tomorrow's jobs are created by today's workers and their skills. From this perspective, over-skilling does signal that some workers are employed in jobs where their skills are not exploited to their full potential but at the same time, it also indicates that the economy has the potential to improve its

technological capacity and upgrade the requirements for its jobs.

Whereas one can find some positive points for the existence of over-skilling, under-skilling is more clearly a problem. Under-skilling signals that workers have difficulties dealing with the basic tasks in their jobs and unless their ability to carry out those tasks is improved by some form of learning, it is likely that they will remain under-skilled in the future, as the requirements for jobs upgrade due to technical progress. In Italy under-skilling seems to be particularly prominent in skilled blue-collar jobs, where the figure reaches 23% of the employed. These are presumably the jobs where high-quality vocational education is most needed. In contrast to elementary and routine occupations of the manufacturing sector, these are the type of manufacturing jobs that might resist the forces of globalization, and even gain importance in the economies of the advanced world.

Figure 3 - Skill mismatch across PIAAC countries
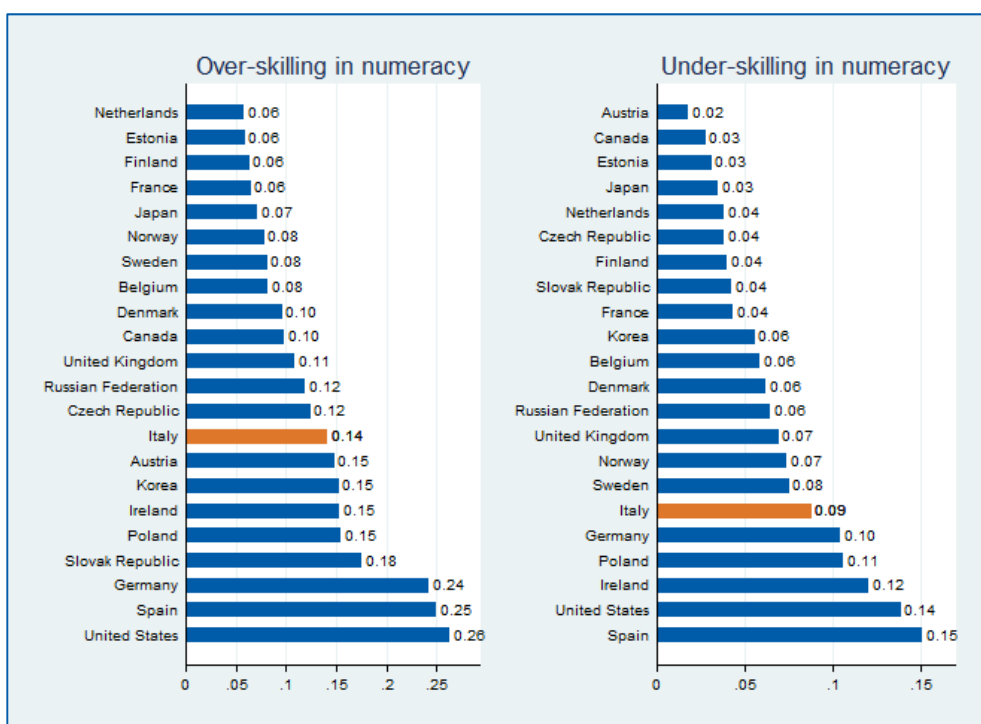
Source: Authors' elaboration based on PIAAC data

Hard to find or hard to pay for?

Another dimension of mismatch that is often discussed in the policy area is the difficulty encountered by employers when looking for appropriate candidates for a vacant job. These so-called "hard-to-fill" vacancies are often interpreted as signals of skill shortages and of a lack of adequate skills in the labour market.

Information on hard-to-fill vacancies can be obtained from surveys of employers who are asked about their unfilled jobs and their expectations about how difficult it will be to fill them. In Italy, this type of data is provided by the Excelsior survey, which collects detailed information on expected recruitments by Italian employers. Accordingly to the 2015 Excelsior survey, Italian employers reported that on average 11% of their vacancies were hard-to-fill, many concentrated in the industrial sector (representing 19% of the firms experiencing hard-to-fill vacancies).

**Figure 4 – Hard-to-fill vacancies and wages**
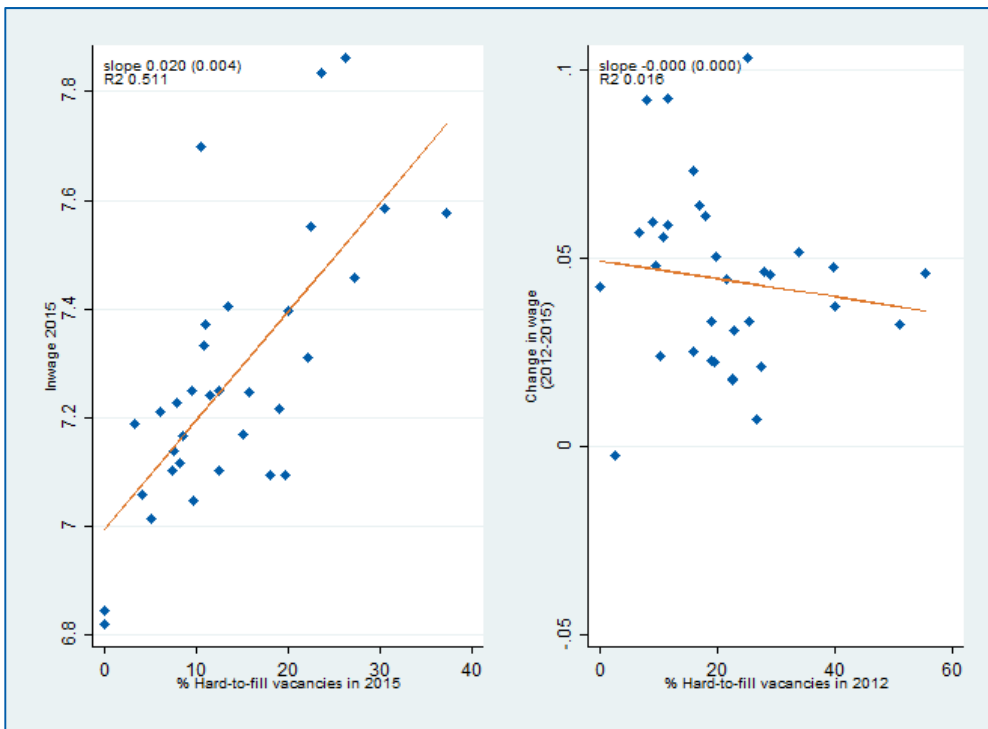
Source: Authors' elaboration based on LFS (Q1-2012 and Q1-2015) and Excelsior data (2012 and 2015)

Employers can use various strategies to increase the attractiveness of a particular job for suitable candidates. One obvious strategy is to improve the working conditions, especially the salary. Figure 4 (left panel) shows that the occupations where hard-to-fill vacancies are higher are also the ones paying higher salaries on average. This is not surprising since the most demanding jobs are presumably the ones that are harder to fill. What is perhaps more surprising is the right-hand panel of Figure 4, which replaces the average salary for the occupation with the growth in the average salary between 2012 and 2015, and replaces the current (2015) percentage of hard-to-fill vacancies with the one reported in 2012. The figure shows that the occupations in which hiring was the most difficult in 2012 were not the ones that saw average salaries increase the most between 2012 and 2015: the relationship is even negative, although really weak (it does not reach the conventional levels of statistical significance). In other words, it seems that employers have not responded to hiring difficulties by making the jobs more attractive to potential candidates, by for example, increasing salaries. One possible reason for this is perhaps the rather centralized system of collective bargaining that makes it difficult for employers to adjust wages to attract more and better job candidates.

Figure 5 - Hard-to-fill vacancies and working conditions
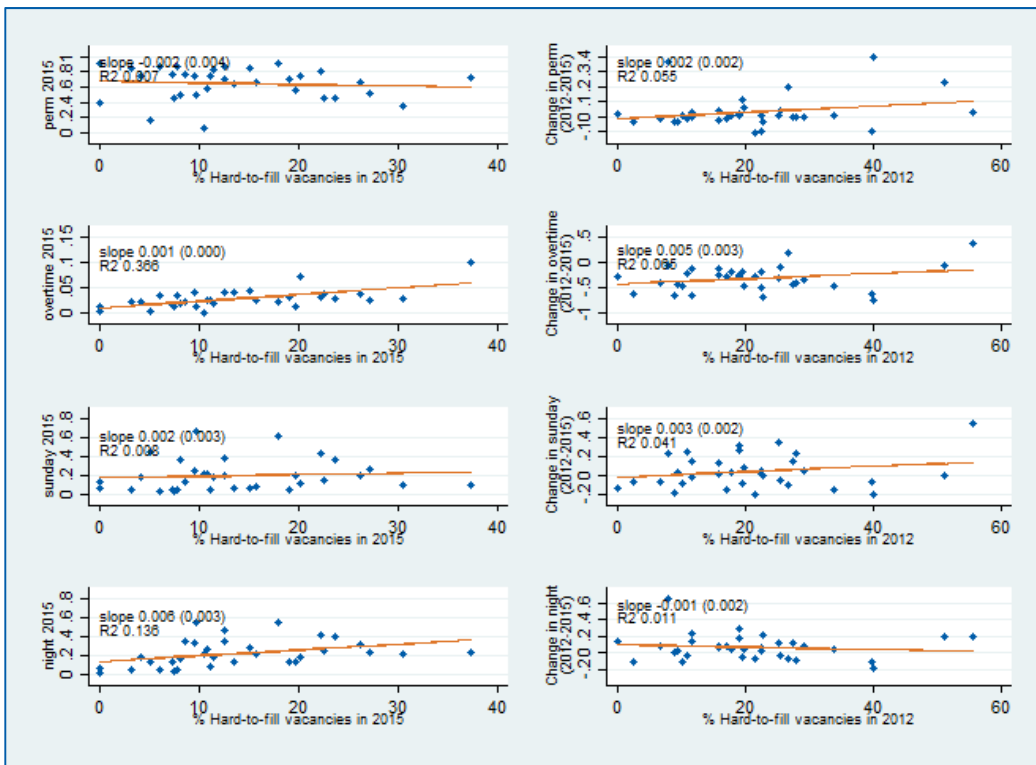
Source: Authors' elaboration based on LFS (Q1-2012 and Q1-2015) and Excelsior data (2012 and 2015)

Note: On the vertical axis, "perm" refers to the share of workers with permanent contracts; "overtime" refers to the share of people working overtime; "sunday" refers to the share of people working on Sunday; "night" refers to the share of people working at night (shifts from 8pm to 5am).

The salary is an important element of the job package but other working conditions also matter. Indeed hard-to-fill occupations seem to be characterized by a strong incidence of some undesirable working conditions, such as overtime and night shifts (Figure 5, left panel). At the same time, there does not seem to have been significant changes in the conditions for these jobs (Figure 5, right panel). Once again the centralized system of collective bargaining might impede adjustment along these other non-pecuniary features of the jobs (flexibility of working hours, for example, is typically negotiated in national collective agreements rather than at local level).

To sum up, Italian employers do seem to face some difficulties hiring appropriate candidates. Still, there is a reason why some jobs are harder to fill, as they appear to be characterized by some undesirable working conditions. Despite reported difficulties, however, recruitment strategies do not seem to have exploited the potential for improving working conditions in order to attract more and better candidates.

Box 3: The Excelsior data

Excelsior is an Italian survey sponsored by the Italian Association of the Chambers of Commerce that provides forecasts of labour market trends and the needs of employers. The survey is carried out every year over a sample of 100,000 private firms, corresponding to about 8% of the total number of Italian firms with least one employee.

Excelsior data provide detailed information about the demand for labour by Italian employers, as well as its distribution across provinces and sectors. Part of the information is gathered from administrative archives (such as the Business Register) covering key characteristics of firms, such as economic activity, number of employees, location, and legal form. A questionnaire administered at the firm level provides specific information about the job profiles that each firm expects to recruit during the year (and, if no hiring is expected, the reasons for this choice).

Key message

- Labour market mismatch has been investigated mostly in terms of qualification mismatch, which can be misleading when the issue of interest is actual workers' skills. The PIAAC data allow for a comparison between qualification and skill mismatch.
- When comparing qualification and skill mismatch in Italy, there are signals that the Italian educational system may be producing formal qualifications that are particularly bad indicators of actual skills.
- The concentration in the Italian economy of traditional sectors and the large number of small firms may be responsible for the high level of over-skilling among university graduates (STEM graduates in particular), as well as for the faster deterioration of their skills. However, over-skilled workers may represent the potential of the Italian economy to innovate and upgrade its job requirements in the future.
- Under-skilling in Italy is particularly prominent in skilled blue-collar occupations, where it reaches 23% of employees (against the Italian and PIAAC average of 9 %). High quality vocational training might alleviate tensions in this specific segment of the labour market.
- Italian employers do face some hiring difficulties. However, the salaries and working conditions of the most difficult jobs to fill do not seem to have improved in recent times. The centralized system of collective bargaining might be an impediment to adjusting salaries and working conditions to attract more and better candidates.

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