






PROMETEIA
DISCUSSION
NOTE N. 22



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***IS THE ITALIAN EDUCATION
SYSTEM PRODUCING THE
RIGHT SKILL-MIX FOR
THE FUTURE LABOUR MARKET?***

Main points

-  In a previous Prometeia Discussion Note¹ we showed that Italy is undergoing a rapid demographic transition with important implications for the labour market due to the retirement of very large cohorts of workers. This will result in the inflow to the labour market of much smaller cohorts of young entrants.
-  An unemployment rate of 7.2%, a participation rate of 66.6% - one of the lowest in Europe and an unparalleled proportion of individuals categorised as NEETs (not in education, employment or training) means that the exit from the labour force of large cohorts of pension age individuals should not be a problem.
-  At the same time, job vacancy rates are high, and firms are finding it difficult to recruit workers with the required skills. This means that rather than helping to reduce unemployment or underemployment, these large expected exits from the labour market could exacerbate this mismatch.
-  In this Prometeia Discussion Note we examine the demand side of the labour market in more depth, to identify the bottlenecks. We will show that the pool of available workers does not match the demand for labour. The main mismatches in demand and supply are qualifications/education and location.
-  As viable policy options to correct these imbalances we recommend reforms to the education system, improvements to the job placement system and incentives to increase women's participation in the labour market.

I. Introduction

The demographic evolution Italy is facing will have important consequences for the structure of the labour market. It is unlikely that the large number of baby-boomers (i.e. individuals born between 1950 and the early 1960s) now reaching retirement age will be replaced, in the coming years, by the entry to the market of young workers. A previous Prometeia Discussion Note¹ identified a worker deficit of around 80,000 per year in 2023, reaching at least 100,000 workers by 2030. The gap between retirements and new entrants in 2023 had already reached some 56,000 male and 20,000 female workers. Theoretically, this labour shortage could be satisfied by the large pool of unemployed (around 2 million) and inactive individuals characterizing the Italian labour market. In addition, although the number of individuals classified as NEETs has been falling, their number remains very high compared to other European countries. Raising the participation rate to the EU average (75.5%) would mean having 3.3 million more potential workers. Thus, in terms of available numbers, there should be no shortage of labour. However, the current information on the shortage of labour, the rising numbers of vacancies and firm surveys that highlight the difficulties involved in finding the right types of workers, is at odds with the numbers of unemployed and inactive individuals. It suggests that there is a major mismatch in the characteristics of the supply of and demand for labour.

¹ Prometeia Discussion Note No. 21, *Population Decline and Labour Market Mismatch in Italy*, October 2023.

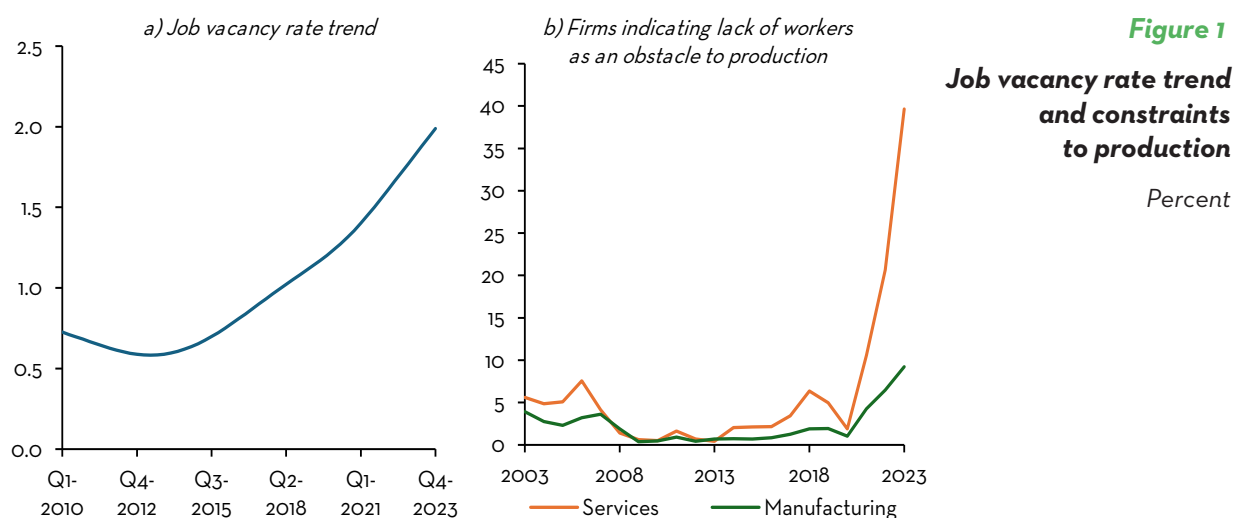
A possible source of mismatch might be the level of education of those entering and leaving the labour market. Older workers now reaching retirement age generally have lower levels of education than younger workers. In 2020, the proportion of individuals with only primary education in the age bracket 60-64 is around 13%, but only around 1% in the age bracket 25-29. Between 2004 and 2020, the number of individuals completing tertiary educations almost doubled – a trend that is projected to continue. These disparities result in gaps between inflows and outflows that are different for low-educated workers (lower than primary, primary and lower secondary school education) compared to high-educated workers. In 2023, the labour market had a deficit of 80,000 low educated workers, but a surplus of workers with higher education. To the extent that workers' education is highly correlated with workers' skills, this means that in- and out-flows are characterised by different skill levels and employers may not be able to find the appropriate skills among the pool of workers available for recruitment.

Education level is likely the main source of the employment mismatch, but other imbalances originate in different levels of labour market segmentation, which reflect both supply and demand factors such as gender and territorial location. In this Note, we examine these possible discrepancies. Section II discusses the information available on labour demand and its characteristics in terms of skills, qualifications and geographic location. Section III examines whether existing pools of potential workers could be used to satisfy worker shortages and why this might not be possible. Section IV concludes this note.

II. Labour demand

a. Aggregate indicators

Aggregate indicators on the state of labour demand are scarce, but those that are available suggest that the Italian labour market is characterized by a high share of unmet demand. The job vacancy rate (Figure 1a) provides a measure of the unsatisfied demand for labour defined as the ratio of open jobs (vacancies) over the sum of open and occupied jobs. This measure provides



The trend for vacancy rate has been calculated using the Hodrick-Prescott decomposition on the original quarterly vacancy rate time series. We aggregated vacancy rate across NACE A21 sectors taking the weighted average of sector-specific vacancy rate, using sector-specific gross value added as weights.

The percentage of firms indicating lack of workers as an obstacle to production is the yearly average of the original quarterly time series.

Source: Prometeia's calculations on Istat data.

information on the job matches employers are expecting/willing to close. Job vacancy rate data are taken from Istituto nazionale di statistica (Istat) and were issued quarterly up to the end of 2023. We complement these data with information (also from Istat) on the percentage of firms reporting a shortage of workers as the main constraint on production (Figure 1b).

These two indicators suggest the presence of unfilled labour demand. The job vacancy rate series shows an increase since 2013. In the last quarter of 2023, open job positions amounted to 2% of total positions. Companies also highlighted the shortage of workers: in 2023, 39% and 9% of services and manufacturing firms who indicated constraints on production, identified the lack of workers as the main obstacle. Thus, despite the large numbers of potentially available workers, there is substantial unfilled labour demand. This could be related to mismatches between available jobs and available workers. In the following subsections, we examine different labour market dimensions to obtain a better understanding of these disparities in educational levels, fields of specialization and geographic location.

b. Education

Vacancies by educational level. The last PDN identified a large gap in education attainment between young and old cohorts (entering and exiting the labour market). We now examine the characteristics of labour demand, focusing on the prevalent level of education of workers employed in a given economic sector. We combine information on workers' education, aggregated by NACE A21 sectors, taken from the Rilevazione sulle Forze di Lavoro (Istat's labour force survey), with NACE A21 sector-specific vacancy rate time series, also from Istat. We characterise each sector by the level of education attained by its workers, based on the following levels: up to lower secondary, up to post-secondary excluding university, and university (tertiary) education.²

We use Istat survey data to characterize job vacancy rates by education level. We calculate education level-specific vacancy rate time series and decompose them into a trend and a cycle. Figure 2 depicts the job vacancy rate trend component, by education.

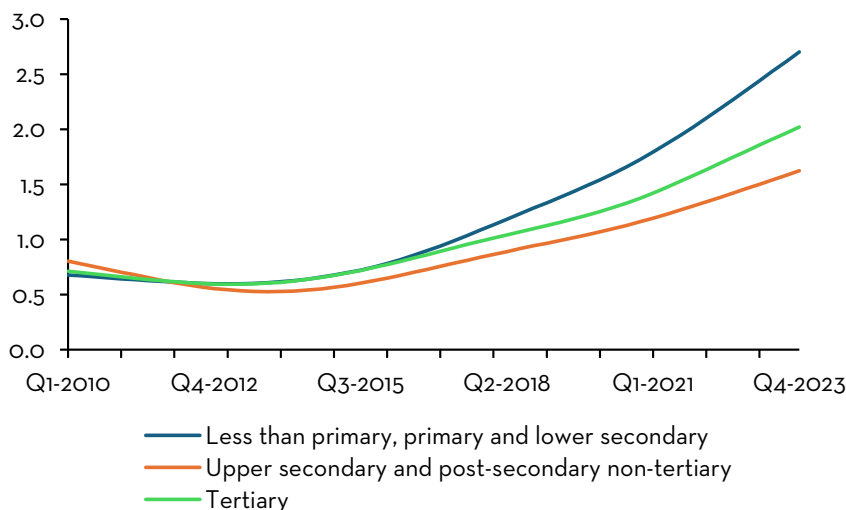


Figure 2
Job vacancy rate trend component by educational levels
Percent

We classified each NACE A21 sector by the modal level of education attained by workers employed in the sector. We aggregated job vacancy rate at the sectoral educational level and calculated education-specific trends following the procedure described in Figure 1 a).

Source: Prometeia's calculations on Istat data.

² The two sectors characterized by low education are Constructions and Agriculture. However, since we have no vacancy data for Agriculture, this group includes only Constructions. High (tertiary) education sectors are Education and Finance/Insurance.

the trends for vacancies in low education sectors and higher education sectors have been similar. However, they began to diverge sharply from 2016. These dynamics are consistent with a labour market facing increasing relative scarcity of low-educated workers and indicates the presence of an education mismatch. The steeper trend for low-education sectors could be the consequence of many low-educated individuals reaching retirement age, boosting demand for other low educated workers, as highlighted in a previous Discussion Note³, coupled with a strong demand in the construction sector. This demand is being unmet since younger generations of workers tend to have higher levels of education.

Firm level data indicate that there is a large share of job positions that is proving difficult to fill.

Excelsior-Unioncamere data on the percentage of planned hires that are hard to fill, reflects the difficulties involved in recruiting suitable workers in a particular territory.³ The number of planned workers is the number of workers employers expect to hire in the future and, therefore, does not correspond to actual vacant positions available in the labour market; we interpret it as expected or planned labour demand, in contrast to vacancy rates which represent actual demand for labour.

In 2023, 45.1% of planned positions were identified as difficult to fill. However, this proportion varies across education levels. Figure 3 (left y-axis) shows the percentage of planned positions identified as hard-to-fill, by education level, whereas the right y-axis shows the percentage of total planned hires by education level. Hires planned for workers with advanced technical education are relatively harder to recruit for, despite constituting only 0.9% of overall planned demand. Positions planned for workers with compulsory and professional education (i.e., low educated workers) represent 56% of total planned demand, including 44%, on average, of hard-to-fill positions. The steeper trend for vacancies in these sectors might be explained by their large share of planned demand, which increases over time. Figure 4 shows that the number of planned hires for workers with professional education increased by about 50% between 2019 and 2023.

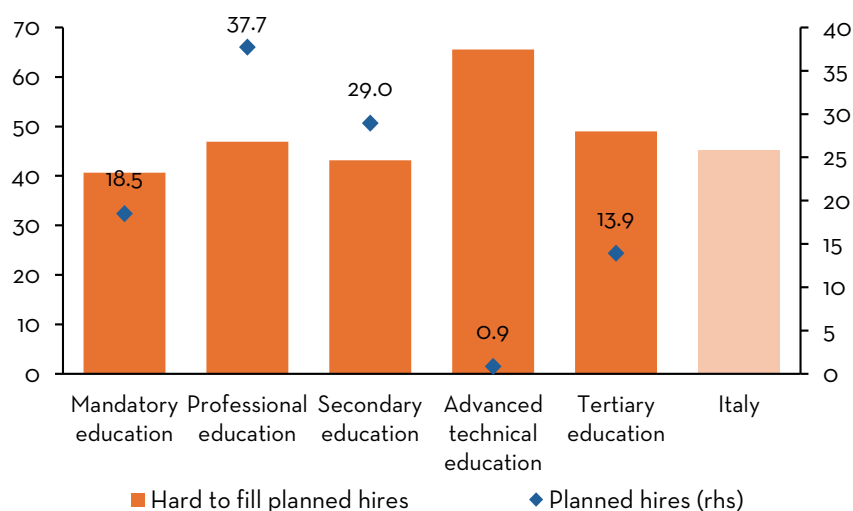


Figure 3
Planned positions by educational levels in 2023
Percent

On the left-axis, we show the proportion of planned positions which are hard to recruit for, relative to the total number of planned positions for a given level of education. On the right axis, we show the proportion of planned positions for a given level of education relative to the total number of planned positions.

Source: Prometeia's calculations on Unioncamere – ANPAL, Sistema Informativo Excelsior data.

³ Excelsior-Unioncamere is a sample survey widely used as an indicator of labour demand. In 2022, the sample was composed of firms in the services and industry sectors registered at the Registro delle Imprese with at least 1 employee; it excludes public administrations, public healthcare firms, schools and universities, associations, professionals not registered with Registro delle Imprese, and firms in the agriculture sector. The sample covered 29% of industry and service firms included in the Istat ASIA database, to a total of 1,355,000 firms and 13,467,000 employees.

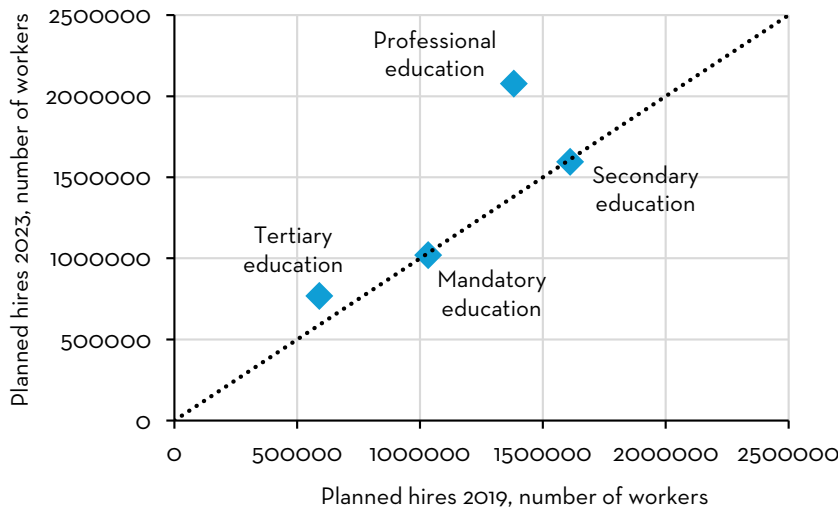


Figure 4
Number of planned hires by education in 2019 and 2023

The dotted line is the 45 degrees line.

Source: Prometeia's calculations on Unioncamere - ANPAL, Sistema Informativo Excelsior data.

Finally, 49% of the positions planned for workers with tertiary education are hard to fill. However, planned demand for this type of worker has not increased as much as demand for workers with professional education and the difficulties in recruiting workers with higher education could be the result of a mismatch between the qualifications of available workers and those required by the firms.

Available data suggest that, although the number of planned positions for highly educated workers accounts for only 14% of total demand, employers are finding it very difficult to recruit them. Using Almalaurea data, we can compare planned demand for graduates to the distribution of new graduates by field of specialization.⁴ In 2022, Italy recorded 281,000 new graduates, the majority (59.7%) of whom were women. The largest share was awarded degrees in engineering and architecture (15% of all new graduates), followed by economics and health and pharmacy (14% of all new graduates). Figure 5 compares the distribution of new graduates to planned demand, by field of specialization. The distributions take different shapes. A large

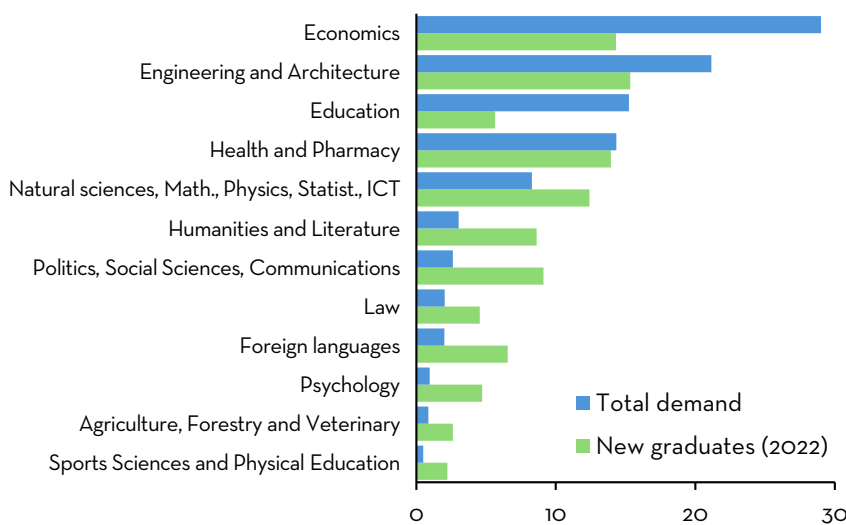


Figure 5
Composition of new graduates (2022) and planned demand (2023)

Percent

Source: Almalaurea (new graduates) and Prometeia's calculations on Unioncamere - ANPAL, Sistema Informativo Excelsior data (total demand).

⁴ The demand of workers within a given field of specialization includes all level of seniority.

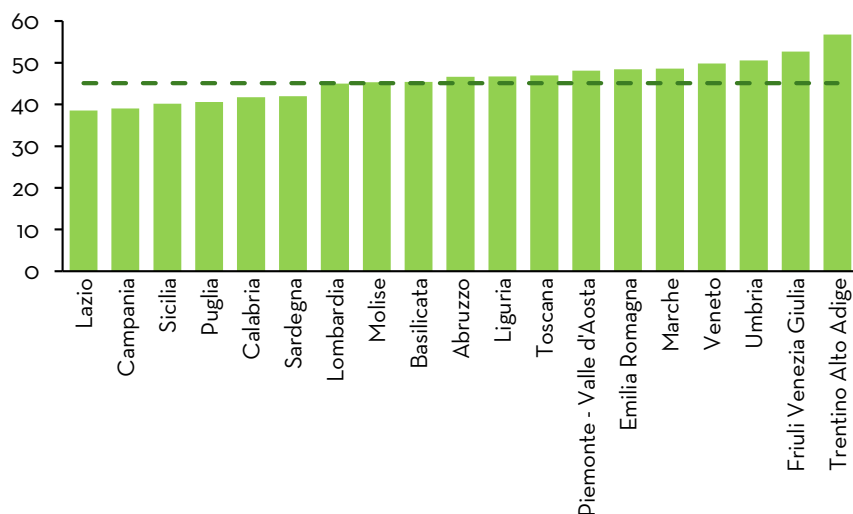


Figure 6
Hard to fill positions by region in 2023
Percent

The dark dashed line represents the Italian average, equal to 45%.

Source: Prometeia's calculations on Unioncamere - ANPAL, Sistema Informativo Excelsior data.

percentage of new graduates chose specializations characterized by a low share of planned demand, which suggests a mismatch between the specialist fields preferred by young cohorts and those required by firms.

c. Territory

We investigate the presence of heterogeneity in the recruitment difficulties of firms, by Italian regions. Figure 6 shows the percentage of hard-to-fill positions across all education levels, by Italian region and shows substantial heterogeneity, with relatively higher ratios in the northern compared to the southern regions of Italy. In fact, all regions characterized by hard to fill ratio lower than the national average of 45% are located in the South.

III. Will the large pool of unemployed and inactive workers meet the demand that will be created in the coming years?

One source of employment that firms might tap to fill previously identified employment gaps are individuals who are not currently employed. Italy is characterized by a relatively large pool of unemployed and inactive workers. In 2023 Q-4, 26% of individuals aged 25-54 years, corresponding to about 5.9 million people, were either unemployed or inactive.⁵ However, given the evidence in the previous Section, we need to identify the factors hampering the match between the pool of available workers and labour demand. We start by looking at education: in the 25 to 54 age group, 15% of individuals not currently employed (around 800,000 individuals) have tertiary education and around 49% (around 2.6 million potential workers) are in the up to secondary education category. Based on these absolute numbers, firms should have relatively little difficulty in recruiting the required workers.

The specialization chosen by non-employed graduates, however, might not be aligned with those required by firms. Figure 7 depicts the specializations chosen by individuals in the age group 25-54 with tertiary education not currently employed. Most have degrees in fields (e.g., social sciences, literature and languages) where the numbers of new graduates, on their own, would be

⁵ Istat, Rilevazione sulle Forze Lavoro, 2023.

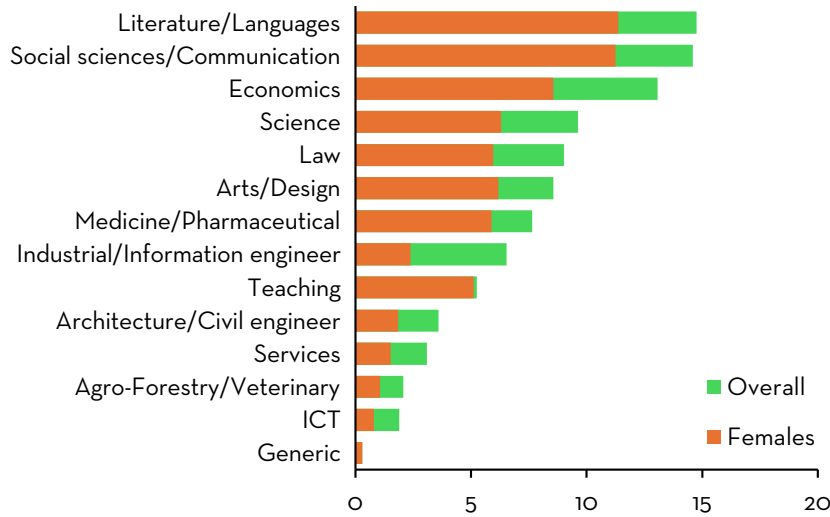


Figure 7
Specialisation of non-employed working age individuals with tertiary education
 Percent

Source: Prometeia's calculations on Istat data.

enough to cover the planned demand. In fact, the percentage of total planned positions hard to fill because candidates do not possess the adequate skills is 12.4%, and it has been increasing in the recent years.⁶ In addition, in almost all specializations, there is a larger share of non-employed women. Overall, 68% of non-employed individuals with tertiary education are women.

As shown in Figure 8, **in the Northern regions, where a high share of planned demand is difficult to fill, employment rates are relatively high, whereas** Southern regions present low employment rates and relatively fewer hard-to-fill positions. At the regional level, there is a negative correlation of -0.77 between the region-specific share of individuals not employed and the region-specific percentage of hard-to-fill positions, across all levels of education. That is, potentially available workers are not located in areas with hard-to-fill positions. This suggests the need for incentives to persuade these pools of available workers to move to areas with demand for workers – especially workers of certain types – and for firms to move production where available labour is relatively abundant.

A large portion of the not employed population corresponds to NEETs. In 2023 Q4, 21% of individuals aged between 20 and 29 years were classified as NEETs and represented around 1.2 million individuals: 54% female and 85% (slightly more than 1 million people) had low or upper/post-secondary education; 13% university graduates; and 61% were currently inactive (not actively looking for a job). The geographic distribution of NEETs is uneven. Figure 9 shows that the Southern regions have much and alarming higher percentages of NEETs relative to the national average, even though almost all Italian regions are characterised by higher percentages of NEETs than the European average.

Adding to recruitment problems is the brain-drain effect. Although relatively contained, the emigration of young people from Italy has a negative impact. In 2020, around 26% of emigrants (ca. 31,000 Italian graduates or 0.4% of total graduates) had a graduate degree. The reasons for migration vary. Some studies find that the main reason for emigration by the most highly qualified workers is lack of recognition and valorisation of human capital. This lack of recognition includes the significant wage gap between Italy and several other European countries. Retaining educated labour, also through the reduction of such gap, would be important in the face of future technological trends.

⁶ Sistema Informativo Excelsior, *La Domanda di Professioni e di Formazione delle Imprese Italiane nel 2023, 2023*. In addition, 28.4% of total planned positions are hard to fill due of lack of candidates and 4.3% for other reasons.

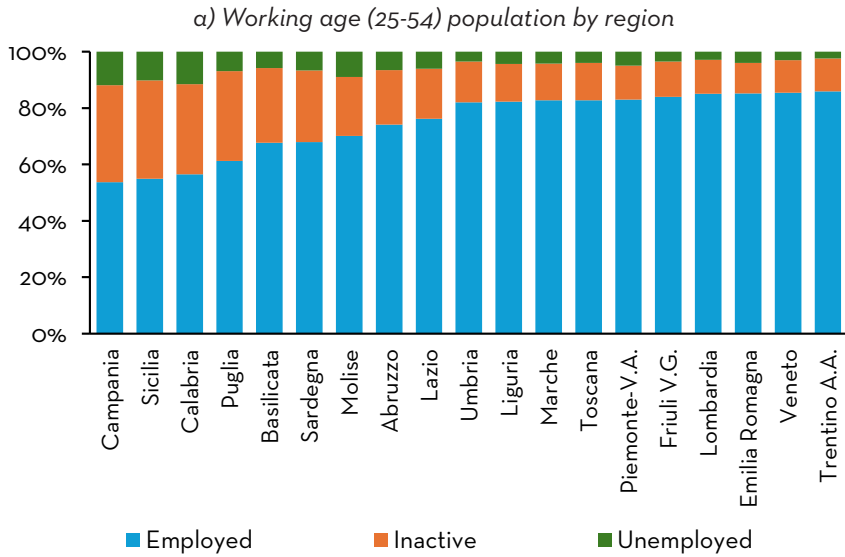
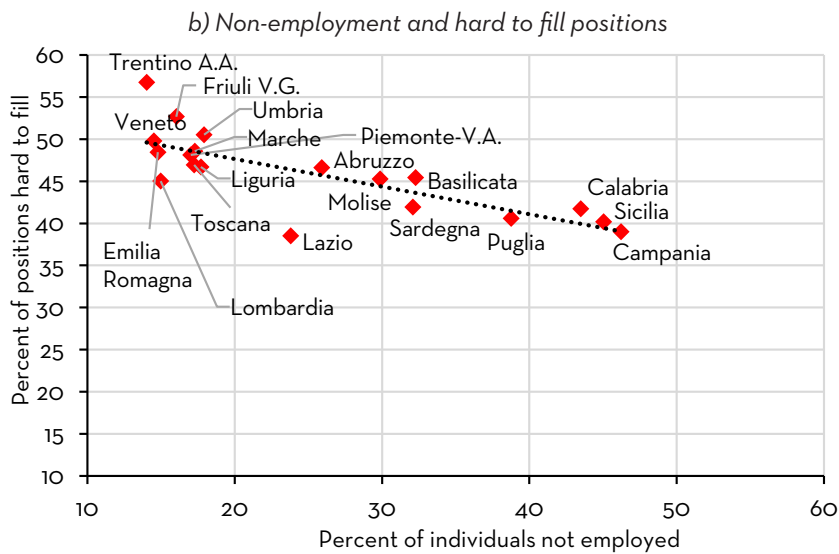


Figure 8
Regional distribution of non-employment and difficulty to recruitment



We calculated the percentage of employed, inactive and unemployed individuals dividing the number of individuals aged 25-54 in each category in each region by the total number of individuals aged 25-54 in each region.

Source: Prometeia's calculations on Istat and Excelsior-Unioncamere data.

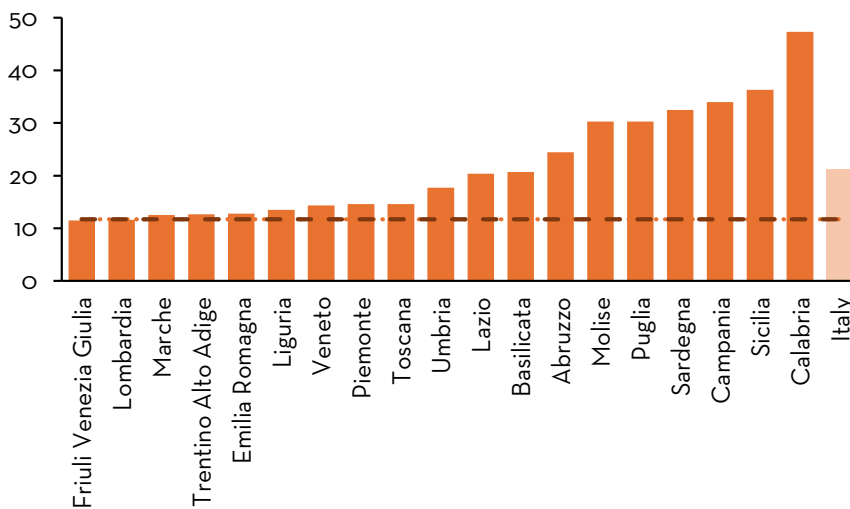


Figure 9
Geographical distribution of NEETs

Percent

We calculated the percentage of individuals not engaged in education, employment or training (NEET) dividing the number of NEET individuals aged 20-29 by the number of individuals aged 20-29 in each region. The darker dashed line represents the European average in 2022, taken from Eurostat.

Source: Prometeia's calculations on Istat data.

IV. Concluding remarks and some policy implications

In sum, the Italian labour market is characterized by unsatisfied demand for both low-education and high-education workers, albeit for different reasons. The increasing trend in unfilled demand for relatively lower-educated workers might be due to the sudden increase in demand for these types of workers (for demographic reasons and due to the sectoral concentration of demand), while the increase in the unfilled demand for higher-educated workers is more likely a result of a mismatch between their field of specialisation and the requirements of hiring firms. Potentially there are available workers whose absolute number is sufficient to cater for existing demand. However, their level of education and skills and their geographic distribution (with a mass in the South of Italy) means that they do not match the labour market demand. In particular, the South of Italy is characterized by relatively low demand for labour in an already saturated labour market.

In the context of policy, the education and training systems should be one of the primary focuses for reforms. First, it is essential that the education and training systems equip individuals with the skills required by employers. Second, the large pool of unemployed workers and those currently outside the labour force should be offered training to improve their skills or to reskill them. Several other European countries provide re-training for unemployed workers and attendance at such courses are often compulsory for eligibility for unemployment pay. The pool of unemployed workers offered re-training should also include recent immigrants.

The other priority should be reducing gender inequality. Almost 70% of non-employed working age individuals with tertiary education are women. Since graduates are the category with the highest share of hard-to-fill positions, the imbalance weighs especially on female graduates. In general, working conditions should be equalized across genders and existing discriminations removed.⁷ At the extensive margin, conditions for access to the labour market should be equal for both genders enabled by the removal of entry barriers and other obstacles that impact women and men differently. This will be crucial for increasing rates of female participation in the labour market; female labour market participation currently lags behind that of men with around 76% of men aged 15 to 64 active in the labour market, compared to around 57% of women in 2023. The retention of women will require improved parental leave schemes, similar to those in other European countries, for both mothers and fathers, the harmonization of salaries across genders and fairer career progression.

In the near future, implementation of the National Recovery and Resilience Plan (NRRP), the Green Transition and the Artificial Intelligence (AI) revolution will change the structure of the Italian labour demand, possibly increasing the labour demand-supply mismatch. Labour demand will adapt to the incentives in place and will lead to the opening of new positions. The extent and speed of opening of these new positions based on new job creation will be determined by the supply of new workers and their skills composition. The most significant impact of the NRRP relative to trend (2014-2019) will be seen in construction, R&D and the computer and electronics sectors.⁸ The burden of the green transition will fall mostly on medium skilled male workers, a category already facing labour market tensions.⁹ In the context of the AI revolution, €41.3bn of NRPP funding have been allocated to digitization, innovation, competitiveness and culture, and €30bn (37% of total funding) are earmarked for education and research, which will

⁷ In 2020, the gender pay gap in Italy amounted to 4.2%.

⁸ Basso G., Guiso L., Paradisi M., Petrella A., *L'occupazione attivata dal Piano nazionale di ripresa e resilienza e le sue caratteristiche*, Bank of Italy Occasional paper No. 747, 2023.

⁹ Vandeplas A., Vanyolos I., Vignani M., Vogel L., *The Possible Implications of the Green Transition for the EU Labour Market*, European Economy, Discussion Paper 176, December 2022.

increase demand for workers with specialized skills in these areas quite significantly. To address these potentially disruptive trends, policymakers must ensure that the existing pool of available workers can be leveraged to fill vacant positions, that new labour market entrants possess the skills required to match labour demand, and that reskilling and upskilling programmes are implemented to allow workers to move across different employment. Finally, a better management of migration flows is a policy issue not to be neglected.

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