The role of skill supply for local industrial dynamics: Evidence from Italian provinces

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Abstract

The digital and green transition, also referred to as "twin transition", is at the core of current EU policy frameworks and academic discussions. Although there is a steadily growing stream of research on effects of this intertwined transformation, evidence on its implications for local economies is still emerging, leaving room for further investigation. In particular, the demand-driven impact of technological transformation has received wide attention in the literature (Card & DiNardo 2002; Goos et al 2014; Acemoglu and Restrepo 2022), while insights on the supply-side of the transition, especially from local perspective, remain scarce to date.

The positive effects of skills and human capital are widely acknowledged in the literature. However, with a few exceptions, most studies usually establish evidence at national level. Some existing contributions have found positive spillover effects of skill supply from universities to local economies (e.g., Kantor and Whalley, 2014). Moreover, an increase in skill supply has been shown to drive the demand of local labour markets for higher skills (Carneiro et al., 2023). Other studies highlight a positive role of universities in fostering regional economic growth (Valero and Van Reenen, 2019) and enhancing productivity (Marrocu et al., 2022). Despite these contributions, the overall knowledge base on the impact of skill supply remains limited.

With this paper we aim to contribute to the stream of literature on digital and green transition and its effects on local economic development. More specifically, our goal is to analyze the role of skill supply – particularly in digital and green domains – at a more granular level for the industrial dynamics in Italy.

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The key pillars of our analysis are the supply of skills from university graduates, and firms' creation and survival. All variables in our study are constructed at provincial (NUTS 3) level. To measure skill supply, we rely on the mandatory reports from the Italian universities detailing their bachelor's and master's programs. These reports, known as "Scheda Unica Annuale", are published annually and contain, among other aspects, information on each course's program and objectives. By analyzing these reports with state-of-the-art machine learning techniques, we identify courses that supply digital and green skills.

As for industrial dynamics, we consider two indicators: entry rate and exit rate of all firms regardless of their legal forms. Entry rate is calculated as the number of newly established firms at time t divided by the number of registered firms in $(t - 1)$. Similarly, the exit rate is obtained by dividing the number of firms exiting the market by the total number of registered firms in the previous year. We retrieve the data from several sources including the Italian National Institute of Statistics (ISTAT) and Eurostat among others. Our dataset has a panel structure covering 106 provinces in Italy from 2018 to 2023.

For the aim of this paper, we estimate a two-way fixed effects model using an industrial dynamics indicator – either the entry rate or the exit rate – as the dependent variable. Our main explanatory variable of interest is the supply of skills from the top 10 degrees in the distribution. To address possible endogeneity concerns, we consider the lagged supply of skills from university graduates. Additionally, we include a set of province-level controls that might be related to firm creation and survival, such as population, the share of services, and a stock of tangible and intangible assets. Finally, we account for unobserved heterogeneity with province and year fixed effects.

Our results highlight a nuanced and non-trivial role of different types of skills for local industrial organization. First, we find that the supply of digital and green skills from the top 10 degrees has a positive and significant effect for the firm entry. This relationship holds after introducing a set of province-level controls, except when accounting for intangible assets, where the differences emerge. In fact, once we control for intangible assets, the effect of digital skill supply seems to vanish, while green skill supply remains significant for the entry rate. Second, our results hold when we expand the analysis to the top 25 courses supplying digital and green skills. In addition, we find notable differences between digital and green skills in relation to firm exit rate: while digital skill supply is negatively associated with the exit rate, green skill supply does not show a significant relation. This finding may reflect differences in industry life cycles between digital and green domains, with the former being more flexible yet, at the same time, riskier, while the latter operates within a more established regulatory framework.

We introduce several robustness checks. In particular, we consider a different group of

skills – language skills – and show that the supply of the top 10 language skills has no significant effect on firm entry or survival. This helps to demonstrate that our results are not expected to be driven by the university size itself. Moreover, we introduce the supply of digital and green skills ("twin skills") and find that their effect closely resembles that one of the top digital skills.

Keywords: skill supply; digital skills; green skills; university graduates; industrial dynamics; local economic performance

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