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Self-Employment vs. Salaried Job

This is the final peer-reviewed author's accepted manuscript (postprint) of the following publication:

Published Version:

University Graduates' Early Career Decisions and Interregional Mobility:
Self-Employment vs. Salaried Job / riccardo fini; Azzurra Meoli; Maurizio Sobrero. - In: REGIONAL STUDIES.
- ISSN 1360-0591. - ELETTRONICO. - 56:6(2022), pp. 972-988. [10.1080/00343404.2022.2069236]

This version is available at: <https://hdl.handle.net/11585/890732> since: 2022-07-15

Published:

DOI: <http://doi.org/10.1080/00343404.2022.2069236>

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This is the final peer-reviewed accepted manuscript of:

Fini, R., Meoli, A., & Sobrero, M. (2022). University graduates' early career decisions and interregional mobility: self-employment versus salaried job. *Regional Studies*, 56(6), 972-988.

The final published version is available online at:

<https://doi.org/10.1080/00343404.2022.2069236>

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University Graduates' Early Career Decisions and Interregional Mobility: Self-Employment vs. Salaried Job

ABSTRACT

We explore the relationship between university graduates' early career decisions and their interregional mobility. We focus on graduates' immediate entry into the labor market, analyzing the antecedents and relations of their career decisions (self-employment vs. salaried job) and mobility choices (staying in their university region or moving). We use a longitudinal dataset of 3,436 students from 62 Italian universities who were surveyed at graduation and one year later. We find that self-employment most likely occurs among those who study and stay in their home region, as well as those who study in a different region and return to their home one. Conversely, salaried positions are more appealing to those who, after graduation, move to a region other than their home one. Individual characteristics explain the decision to enter self-employment or accept a salaried job. In contrast, the decision to move or stay is mainly affected by contextual factors.

INTRODUCTION

Understanding university graduates' entry into the labor market is critical at both the national and regional levels, as educated workers are a key driver of regional development (Ahlin, 2014; Corcoran and Faggian, 2017; Shapiro, 2006). University graduates strengthen local economies with their skilled human capital (Veugelers and Del Rey, 2014), leveraging the knowledge acquired at universities to either support local companies or establish new firms (Astebro et al., 2012; Bramwell and Wolfe, 2008). Therefore, new graduates' decisions about their careers, and where to start them, are central to understanding the geographical extension of universities' economic impact (Corcoran et al., 2010; Faggian and McCann, 2009; Florida, 2002).

Regions can only extract value from their educational systems if a significant share of graduates stay in the area after completing their studies (Faggian et al., 2017). However, graduates

are very likely to move and take advantage of global job opportunities. Furthermore, graduates' early career decisions to enter self-employment or look for salaried positions might affect their mobility choice to stay in the region or leave for another one. For these reasons, scholars have devoted considerable attention to university graduates' mobility choices and career patterns (Bosma and Schutiens, 2011; Hoppe, 2016; Kibler et al., 2014).

Two streams of research have independently explored *how* and *where* university graduates start their careers. On the one hand, the entrepreneurship and career literature has mainly focused on the motivations that lead graduates to prefer self-employment over salaried positions, mostly exploring the determinants of graduates' occupational choices (Krueger, 2000). However, location decisions matter when starting a new business activity or seeking a salaried job. Thus, regional characteristics, local economic development, and innovation ecosystems should not be overlooked when predicting career-related decisions (Reynolds et al., 2004; Shirokova et al., 2015; Walter et al., 2013).

On the other hand, the literature on regional mobility has shown that university graduates are more likely than non-graduates to take advantage of job opportunities (Giannetti, 2003; Mauro and Spilimbergo, 1999). They generally move to a new area after graduation to capitalize on a demand for their developed skills (Winters, 2012) or to achieve better living conditions (Franklin, 2003; Winters, 2012). All this notwithstanding, there is still limited knowledge on what drives fresh graduates' choice to enter self-employment or seek salaried opportunities, and how these factors combine with their mobility decisions.

To fill this void, we reconcile the two abovementioned streams of research and join some recent efforts (Larsson et al., 2017) to simultaneously analyze university graduates' career and mobility decisions. We disentangle the role of individual and contextual factors as determinants of postgraduate self-employment and decisions to move-from or stay-in the same region of their alma mater. By accounting for graduates' origin and pre-graduation movements, we classify them as *stayers* (i.e., graduates who work where they have studied), *return-movers* (i.e., graduates who leave

the study region and return to work in their region of origin), and *onward-movers* (i.e., graduates who work somewhere other than their region of origin and study). In this way, we simultaneously explore the determinants of both mobility and career decisions (Faggian et al., 2006, 2007a; Marinelli, 2013).

Our empirical analysis draws on a nationwide longitudinal dataset of 3,436 working graduates from 62 Italian universities who were surveyed in 2014 (at the time of graduation) and again one year later. The universities are distributed in all 20 regions, which comprise the largest Italian administrative aggregation (NUTS2 level). We therefore observed the same group of students' career and mobility choices across different geographical areas.

The descriptive results indicate that 26% of graduates became self-employed, while the remaining 74% accepted salaried positions. Approximately one-third moved after graduation, while the remaining two-thirds stayed in the region where they studied: 33% of graduates were movers and 67% were stayers. Within movers, return-movers accounted for 30% and onward-movers for 70%.

We performed a series of regression analyses to determine the likelihood of becoming self-employed and/or moving after graduation. The results suggest that self-employment and mobility are codetermined—that is, the likelihood of becoming self-employed is associated with both staying-in or returning-to the home region. In particular, stayers and return-movers are more likely to become self-employed, while onward-movers are more likely to work in salaried positions. Furthermore, the findings reveal that individual characteristics largely explain the likelihood of entering self-employment, while contextual characteristics (such as university social ties) are key to retaining graduates in a region. Additionally, we observed that graduates who move to a place other than their university and home regions are likely to move to places with better employment conditions and start salaried jobs. In contrast, graduates returning to their home region are more likely to enter self-employment, but they generally return to places with less flourishing economic conditions.

THEORETICAL BACKGROUND

University graduates' employment decisions

Because highly educated and skilled individuals are sources of innovation and economic success at both the national and regional levels, scholars from different disciplines have widely analyzed graduates' early entry into the labor market (Florida, 2002; Shapiro, 2006). When graduates enter the job market, they face two alternatives: becoming self-employed or searching for a salaried position. Katz (1992, p. 30) defines employment choices as "the vocational decision process in terms of individuals' decisions to enter an occupation as a wage-or-salaried individual or as a self-employed one". Becoming self-employed involves working independently and setting up a business, which can entail high-risk activities and numerous technical and managerial tasks (Lazear, 2004) in return for higher autonomy and flexibility (Evans and Leighton, 1989; McClelland, 1961). On the other hand, a salaried position is associated with greater occupational safety and, on average, a higher starting pay (Sorenson et al., 2021). Workers generally compensate for lower levels of autonomy and more specialized work activities (Sørensen, 2007a) by having access to a vast amount of information (Aldrich and Ruef, 2006), as well as more opportunities to develop social capital (Burton et al., 2002; Romanelli and Schoonhoven, 2001) and acquire knowledge and skills (Lazear, 2004; Shane, 2000).

To date, a growing stream of research has focused on graduates' choice to become entrepreneurs (*vis-à-vis* to other career choices), analyzing the determinants at both the individual and contextual levels (Astebro et al., 2012). For the former, cognitive studies view the creation of a new venture as an intentional and planned behavior rooted in the enactment of entrepreneurial intentions (see Kautonen et al., 2015 for a review on this topic). Individuals' demographic characteristics, such as age and gender, are relevant here. Regarding age, several studies have shown its positive effect on entrepreneurial entry, as older individuals have more experience and a wider network that they can mobilize to acquire resources (Liao and Welsch, 2003; Shirokova et al., 2015). Meanwhile, scholars have extensively examined the role of gender in the choice to start a new venture (Sexton and Bowman-Upton, 1990; Zhao et al., 2005). Studies have observed that women and men follow very different career patterns (Maxwell and Broadbridge, 2014): with all else being equal, men are more likely to engage in entrepreneurial activities (Shirokova et al., 2015). Finally, the literature

also suggests that skills and competencies significantly influence a firm's creation (Meoli et al., 2020). Indeed, certain groups of highly skilled individuals, such as university graduates, have higher odds of becoming entrepreneurs (Astebro et al., 2012).

Beyond individual characteristics, contextual elements can further influence career decisions (Lent et al., 2000). The first is the family context, which represents the natural environment in which all individuals are embedded. When individuals face important decisions — such as where and how to work after graduation — their family plays a significant role (Edelman et al., 2016). Indeed, families' social and tangible support encourage youth entrepreneurship (Sørensen, 2007b). Second, universities play an active role in supporting and promoting entrepreneurship. Increasingly aware of their own importance in shaping graduates' career choices, universities have begun developing specific courses and activities to support graduates' entrepreneurial pathway (Souitaris et al., 2007). Universities' ties to industrial partners are also impactful, as such relationships provide the networking that is crucial for venture creation (Walter et al., 2013). Finally, regional economies and labor market characteristics have a considerable effect on entrepreneurship rates: the abundance of capital, skilled workers, and complementary assets (such as the presence of well-developed welfare systems) create favorable conditions for entrepreneurship (Kibler et al., 2014). However, the opportunity cost to start a new business in an area replete with salaried opportunities might be too high, resulting in lower entrepreneurial rates vis-à-vis poorer contexts (Bosma and Sternberg, 2014). Furthermore, entrepreneurship might represent one of the only work opportunities in areas with higher unemployment rates (Bosma and Schutjens, 2011).

University graduates' employment mobility decisions

Scholars researching labor economics and interregional mobility have long shown interest in university graduates' subnational mobility (Faggian et al., 2017; Greenwood, 1972; Larsson et al., 2017). Because of their high skill level, such individuals are more likely than others to take advantage of different job opportunities (Giannetti, 2003; Mauro and Spilimbergo, 1999). Because of their life

stage, they tend to have fewer family obligations and are more likely to relocate geographically (Ahlin et al., 2014; Faggian et al., 2017, Krabel and Flöther, 2012; Kodrzycki, 2001; Venhorst et al., 2011).

Scholars have mainly explored graduates' mobility by examining their personal characteristics, their human and social capital, and the economic conditions of the regions that they leave or enter (Krabel and Floether, 2014). First, individual characteristics play a role in the propensity to move. A growing body of literature stresses gender differences in the mobility process: anecdotal evidence suggests that men are more likely than women to move; however, this might not be the case for highly skilled individuals. Indeed, Faggian et al. (2007a) showed that highly skilled women are more likely than men to move—arguably to compensate for the gender gap in work settings. Additionally, past mobility experiences affect the likelihood of relocating in the future: graduates who moved to study are more likely to move again to search for employment (Faggian et al., 2007b). Furthermore, older graduates with children are less likely to move to other regions (Cherry and Tsournos, 2001; Haussen and Uebelmesser, 2018).

Second, human capital approaches to mobility link graduates' stock of education to their propensity to move (Faggian and Mccann, 2009). Graduates are highly skilled individuals who need to make the most of their education, and they tend to move to seek jobs that better match their educational background (Krabel and Floether, 2014; Schwartz, 1976). However, as Ciriaci (2014) showed, universities may play an important role in keeping specialized human capital in their own neighborhood: for instance, the quality of universities' research and teaching affects students' decision to stay in their home region rather than move. Likewise, the social capital that graduates develop while studying can have a meaningful impact. Universities may nurture graduates' social connections — and thereby shape their mobility decisions — by embedding students in internal and external network structures. Through their territorial embeddedness (which expresses the nature and extent of local connections), graduates benefit from their social ties and face a high social cost for leaving (Rouwendal, 1999).

Finally, studies have shown that economic conditions affect individual mobility, especially for highly skilled individuals (Marinelli, 2013; Nifo and Vecchione, 2013). Mobility generally occurs because of regional disparities in income levels or market opportunities, which can prompt individuals to seek better jobs and wealth conditions elsewhere (Venhorst et al., 2011). The choice of where to move is mainly driven by labor market opportunities, which typically arise in metropolitan areas (Ahlin et al., 2014). Beyond labor market conditions, the socioeconomic characteristics of graduates' region of study can guide their choice. Factors such as advanced healthcare systems, high-quality primary and secondary schools, and a robust variety of recreational activities can work to attract and retain highly skilled individuals (Shinnar et al., 2012).

The relation between university graduates' early career decisions and interregional mobility

Consistent with the two aforementioned streams of research, any analysis of regional career mobility must account for two different aspects: the likelihood of entering a specific career (self-employment vs. salaried job) and the possibility of moving (stayers vs. movers). However, existing research has systematically overlooked the extent to which individual and contextual factors affect both postgraduate employment choices and decisions to move-from or stay-in the region of their alma mater.

To fill this void, we study how individual and contextual factors simultaneously influence university graduates' early career decisions and mobility decisions. Some notable contributions have shed light on this issue. For instance, Baltzopoulos and Broström (2013) showed that graduates are more likely to start their entrepreneurial activity in the region where they completed their studies. In a similar fashion, Larsson et al. (2017) argued that graduates are more likely to start businesses in metropolitan areas close to their universities. While both studies confirmed an overlap between alma mater locations and university graduates' start-up destinations, they did not analyze graduates' mobility decision and overlooked other types of career choices, such as salaried positions.

In this study, we simultaneously model both early career and mobility choices—given that factors that shape employability may also influence the decision to stay in the region or move. First,

we assess whether there are differences between graduates' employment choice (i.e., self-employment vs. salaried position) and mobility choice (i.e., staying in the region of study vs. moving). Regarding the former, we focus on the broad category of self-employment, which includes individuals owning a business and/or working as freelance/independent providers. Second, we analyze different types of mobility and compare them to a decision to seek a salaried position. To disentangle different types of mobility, we build on Marinelli's (2013) insights regarding movers and stayers, and divide movers into two categories: return-movers, who enter the labor market in their home region, and onward-movers, who enter the labor market in a region other than the one where they studied or their home region. Building on this classification, we explore how individual characteristics and contextual factors jointly work to attract and retain graduates, as well as mold their employment decisions.

THE EMPIRICAL STUDY

The Italian Context

Our research question requires a setting characterized by variance at both the individual and contextual levels. Thus, we focused on a single country, Italy, characterized by significant socioeconomic differences among its 20 regions (i.e., North vs. South), which represent the largest administrative aggregation (NUTS2). These differences are a structural characteristic of the country and persist over time. In the last 20 years, the GDP of northern Italy has always been two times larger than that of the South, which is mirrored in the former's unemployment rate (three times lower) and growth rate (two times higher) (Banca d' Italia, 2019). Focusing on youth employment in the South, 34% of individuals aged between 20 and 34 are neither in employment, education, nor training (NEET). In the North, this percentage drops to 17% (similar to the 16.5% EU average; Eurostat, 2018). Granted, there are differences even within northern regions: Emilia-Romagna and Lombardy are among the most developed in Europe, with Piemonte and Veneto struggling to return to their past success, and Friuli and Liguria lagging behind.

The country's publicly financed university system has promoted the widespread distribution of universities throughout all regions in order to mitigate these differences. All this notwithstanding, data show that a year after graduation, the occupational rate is 49% in the North vs. 32% in the South (AlmaLaurea, 2015¹). Not surprisingly, the ongoing mobility of university students continues to represent a net gain for the wealthier central and northern regions (Piras, 2005, 2006; Piras and Melis, 2007).

Dataset

Information on the graduates included in this study comes from a survey on Italian graduates' occupational conditions, administered by the AlmaLaurea Interuniversity Consortium (www.almalaurea.it). The consortium was established in 1994 and, as of 2021, involves 75 universities covering approximately 90% of Italian graduates². The survey was administered in two waves: first in 2014 and then twelve months later in 2015. From the first wave, we collected information on students' curricula, family background, and job aspirations at the time of graduation. From the second wave, we gathered information on graduates' employment status with a specific focus on the type, industry, and location of occupation.

We selected graduates who had earned a master's degree or a single-cycle degree (bachelor's and master's combined). We excluded bachelor's degree graduates, as the AlmaLaurea report (2015) showed that 55% of them continued to study for a master's degree. The first wave surveyed 24,750 individuals who had graduated from 62 Italian universities and collected usable information from 23,077 of them (a 93% response rate). A year later, the graduates who completed the first wave received a second survey; of those, 8,386 provided usable responses (for a response rate of 36%). Within this final sample, 3,687 (43.9%) graduates were working, 1,498 (17.9%) had some work experience but were not working at the time of the survey, and the remaining 3,201 (38.2%) were not

¹ Individuals are considered employed if they are involved in a salaried activity, excluding additional formative activities (e.g., internships, Master's and Ph.D. programs, medical school) (source: AlmaLaurea reports on graduates' occupation).

² The AlmaLaurea database does not include two major universities located in Lombardy. The university members of the consortium are listed here: <https://www.almalaurea.it/en/node/209>. Accessed on 14/1/22.

working and had no working experience. Of the 4,699 non-working graduates, 63.1% (2,966) were participating in postgraduate activities (e.g., internship), 9.3% (436) had enrolled in a Ph.D. program, 9.3% (438) had enrolled in a specialty school, 2.5% (118) were pursuing another master's degree, and the remaining 15.8% (741) were neither working nor enrolled in any other program. The main analysis is based on those 3,436 working graduates, since we excluded 251 graduates who moved abroad to work due to a lack of regional information. We included non-working graduates (4,699) in order to conduct the robustness check and further analyses.

We retrieved university data from the second Italian National Evaluation research assessment (Valutazione della Qualità della Ricerca - VQR 2011-2014), which was administered by the Italian government (i.e., Ministero della Università e della Ricerca - MIUR 2017) between 2011 and 2014; the data reflect the research and third mission activities of all Italian universities. In particular, we used data related to social and public engagement. The regional-level data come from Eurostat, the Statistical Office of the European Union.

Dependent Variables

Our first dependent variable, *self-employment*, measures employment choice and is operationalized as a dichotomous variable taking the value of 1 for graduates choosing self-employment and 0 for those picking salaried jobs. The second dependent variable, *mover*, captures graduates' employment mobility. For any given individual, we compared the region where the graduate was working one year after graduation with the region where she completed her studies. The variable takes the value of 1 in the case of mobility and 0 otherwise (i.e., *stayer*).

Of course, graduates who decide to move are not homogeneous. Following Marinelli (2013), we distinguished movers into two groups: graduates working in a region other than the one where they studied and graduates returning to their home region. We set a dichotomous variable taking the value of 1 if a graduate moved to work in a region other than the home region (i.e., *onward-mover*) and 0 if a graduate returned to the home region to work (i.e., *return-mover*).

Explanatory Variables

We classified the independent variables in three groups: (1) *graduate characteristics*, (2) *university characteristics*, and (3) *regional characteristics*.

Graduate characteristics. The dichotomous variable *male* took a value of 1 for men and 0 for women. Based on previous studies suggesting that age influences both the likelihood of moving (Haussen and Uebelmesser, 2018) and career decisions (Shirokova et al., 2015), we included a variable accounting for graduate *age*. We recorded information on graduates' family status through a dichotomous variable *partner*, taking the value of 1 if the graduate was married or lived with a partner and 0 otherwise. Following previous entrepreneurship studies, we also accounted for the role of parents as role models and supporters of entrepreneurial careers (Lindquist et al., 2015). We created a variable called *self-employed parents* that took a value of 1 if either the mother or father (or both) were self-employed and 0 otherwise (this variable is only included in the occupation models – Table 5, Models 1a and 2a). In addition, we followed past studies by accounting for previous mobility (DaVanzo, 1976; Faggian et al., 2007b). We created the variable *university mobility*, taking a value of 1 if a graduate moved for university studies to a region other than the one where she attended high school and 0 otherwise. We considered differences in academic performance using the *grade point average (GPA)* at graduation (i.e., the average of grades obtained by each graduate according to the Italian grading system, ranging between 18 and 30). As the demand for specific qualifications may vary across regions (Haussen and Uebelmesser, 2018; Krable and Flöther, 2012), we applied a variable that captured each graduate's field of study: the dichotomous variable *science, technology, engineering, mathematics, and medicine (STEMM)* took a value of 1 if the graduate was in STEMM and 0 otherwise (i.e., social sciences and humanities). Finally, we controlled for the distance between graduates' study and work locations through the variable *distance: study-work*, operationalized as the logarithmic transformation of the distance in kilometers between the province where the student graduated and the province where the student was working. Moreover, we accounted for the distance between the province of birth and the working location through the variable *distance: birth-work*, measured as the logarithmic transformation of the distance in kilometers between the province where

the student was born and the province where the student was working. Note that we only included the distance variables as regressors in the mobility models (Table 5, Models 1b and 2b).

University characteristics. At the university level, we included four different measures. First, consistent with previous studies (Ciriaci, 2014), we focused on university quality. The variable *rating*, ranging from 0 (lowest quality) to 84 (highest quality), is taken from the 2014 university ranking from the Italian financial newspaper Il Sole 24 Ore (Bolzani et al., 2021). We then developed two measures related to university activities based on the 2011-2014 National Assessment Exercise of the Italian Ministry of University and Research. In this regard, we included the variable *industry relationship*, which assesses a university's relations and involvement with industry (ranging between 0 and 0.41), and the variable *public engagement*, which captures university social engagement (ranging between 0 and 0.76).³ Third, following Minola et al. (2016), we controlled for the extent to which a university is internationalized. We defined the variable *university internationalization* as the percentage of international students enrolled in 2014. For all universities in our sample, we leveraged the European Tertiary Education Register (ETER)⁴ to collect data on the total number of Italian and international students enrolled in bachelor's and master's degree programs (levels 6-7 of education, according to the International Standard Classification of Education). Finally, we controlled for *university location* through the categorical variable *northern, central, or southern university*. Note that the variables capturing *university internationalization* and *university location* were only used as regressors in the mobility models (Table 5, Models 1b and 2b).

Regional characteristics. The Italian region is characterized by significant social and economic differences that shape mobility and career choices (Haussen and Uebelmesser, 2018). All

³ Detailed information on the National Assessment Exercise and the construction of the variables are available on the Agenzia Nazionale di Valutazione del sistema Universitario e della Ricerca (ANVUR) website: <https://www.anvur.it/attivita/vqr/vqr-2011-2014/>. Please refer to "Rapporti finale GEV e ANVUR". Accessed on 14/1/22.

⁴ The European Tertiary Education Register (ETER) (<http://eter.joanneum.at/imdas-eter/>, accessed on 14/1/22) is a project promoted by the Directorate General for Education and Culture of the European Commission, in cooperation with the Directorate General for Research and Innovation and Eurostat. The register provides data on the number of students, graduates, international doctoral students, staff, fields of education, income, expenditure, and descriptive information on their characteristics. The register builds on the results and experience of the EUROpean MICROData collection (EUMIDA).

variables were assessed as of 2014 and retrieved from Eurostat. The variable *employment*, calculated as the employment ratio of individuals aged 15 to 34, captures regional job opportunities. The variable *research workforce* is calculated as the number of employed researchers divided by the employed population in the region. However, graduates move not only because of relevant job opportunities, but also because they are attracted by the availability of local amenities (Faggian et al., 2017) and other regional social aspects. To account for this, we introduced the variables *health* (accounting for the number of available hospital beds per hundred-thousand inhabitants) and *recreation* (accounting for the number of movie theater locations by region per hundred-thousand inhabitants). We only included the health and recreation variables as regressors in the mobility models (Table 5, Models 1b and 2b).

DESCRIPTIVE STATISTICS

To understand the characteristics of graduates' job mobility, we first explored the geographical distribution and features of the total sample of graduates who were surveyed one year after graduation (N=8,386). The highest percentage of graduates were from northern universities (47.4%), followed by southern (30.4%), and central ones (22.2%). These figures align with the national population distribution, as well as the patterns included in the Italian National Institute of Statistics 2016 report (ISTAT, 2016), which showed that 41.3% of graduates are enrolled in northern universities, while 33.0% and 25.7% are in southern and central universities, respectively.

In the full sample of 3,687 working graduates (see Table 1), we observed that one year after graduation, 67.0% (2,470) were stayers (working in the same region where they studied) and 33.0% (1,217) were movers (working in a different region). Among movers, 69.7% (848) were onward-movers and 30.3% (369) were return-movers. The highest occurrence of stayers occurred in the northern regions (58.3%), followed by central (22.0%) and southern (19.7%). Among the onward-movers, 51.8% were working in northern regions, whereas a sizable portion (29.4%) were working abroad. Finally, among return-movers (369), 56.6% moved back to northern regions and 29.3% to southern regions. Figures 1, 2, 3, 4 show the distribution of stayers, movers, onward-movers and

return-movers, respectively. At first glance, our data confirm previous analyses indicating that the northern region's greater attractiveness drives the decision of where to study and work.

Table 1 also shows the distribution of graduates' mobility decisions that are contingent on their employment status. From the full sample, 74.4% (2,743) had a salaried job and 25.6% (944) were self-employed. Among the 2,470 stayers, 71.7% had a salaried job and 28.3% were self-employed. Of the 1,217 movers, 80.0% had a salaried job and 20.0% were self-employed. Within the mover group, 85.6% of the onward-movers (vs. 66.9% of the return-movers) had a salaried job and 14.4% (vs. 33.1%) were self-employed. These patterns suggest that self-employment is most frequent among stayers (absolute values) and return-movers (percentage points).

Insert Table 1 about here

ECONOMETRIC RESULTS

Table 2 reports the means, standard deviations, and minimum and maximum values for the full sample⁵. Tables 3 and 4 report the pairwise correlations for the variables included in the full and mobility models, respectively. All correlations are moderate and do not suggest any multicollinearity issues or systematic bias.

Insert Tables 2, 3, and 4 about here

Consistent with the literature reviewed above, we hold that there is no dominant causality between graduates' employment and mobility choices; rather, the two dimensions are codetermined. To capture this two-way relationship, we estimated graduates' employment choices in each region as a function of mobility and, at the same time, estimated graduates' mobility as a function of employment choice, while controlling for individual and contextual factors.

⁵ As mentioned earlier (p. 11), the sample is reduced to 3,436 individuals because we lacked regional information for 251 graduates who moved abroad to work.

To estimate simultaneous equation models, several mobility studies (Faggian and McCann, 2009; Mendola and Carletto, 2012; Venhorst, 2017) have used a three-stage least squares method (3SLS): a full information estimation that is a logical extension of 2SLS. The 3SLS model is designed to estimate simultaneous equations belonging to the limited information family. However, because the selected dependent variables are not continuous, the 3SLS method may lead to inefficient or even inconsistent estimates. Thus, we implemented a nonrecursive mixed-process model to control simultaneity and the reciprocal relation between employment and mobility (Musson and Russolière, 2020). This model can be estimated in Stata with the conditional mixed process estimator (CMP module) proposed by Roodman (2008, 2009). This user-written command accommodates different types of dependent variables in the system equations. In our case, the system included two binary probit models predicting the likelihood to become self-employed and move.

Models 1a and b in Table 5 were estimated using the full sample (N=3,436). The coefficients reported in the table are probit regression coefficients. The results arising from Model 1a are consistent with the descriptive analysis, with movers being less likely than stayers to become self-employed (-0.054, $p < 0.05$). Individual characteristics explain the likelihood of becoming self-employed: male graduates were less likely to become self-employed than female graduates (-0.152; $p < 0.01$), and age had a negative and significant effect on self-employment (-0.017; $p < 0.01$). Having self-employed parents positively and significantly affected the dependent variable (0.199, $p < 0.01$). Graduates in STEMM fields were more likely to pursue self-employment than those in the humanities and social sciences (0.114, $p < 0.05$). Regarding contextual factors, the results confirm that graduates working in regions with a high employment rate were less likely to enter self-employment (-0.007, $p < 0.01$).

Model 1b exhibits the negative effect of self-employment on the likelihood of moving (-0.831, $p < 0.01$). Previous (university) mobility positively affected future relocation: graduates who changed regions to study were more likely to move after graduation (1.739, $p < 0.01$). Regarding university characteristics, the data show that university-industry relationships negatively affected the probability

of moving after graduation (-1.158, $p < 0.05$). Moreover, we observed a negative effect of international university orientation on the likelihood of moving (-5.267, $p < 0.05$). Finally, considering regional characteristics, graduates were more likely to move to regions with better local amenities (0.001, $p < 0.05$), while they tended to stay in regions with a large research workforce (-2.207, $p < 0.01$).

Next, we estimated Models 2a and b in the movers' subsample ($N=966$). The results indicated a two-way relationship between the choice to become self-employed and the likelihood of moving. Onward-movers were less likely than return-movers to become self-employed (-0.196, $p < 0.10$), while self-employed graduates were less likely to move onward (-0.771, $p < 0.01$). Thus, graduates who moved to work in a region other than their home or study region were more likely to enter a salaried job. Consistent with the full sample results, older graduates were less likely to become self-employed (-0.021, $p < 0.10$). Moreover, having a partner had a positive and significant impact on the likelihood of becoming self-employed (0.262, $p < 0.05$). As observed in the full model, having a self-employed parent had a positive and significant effect on the likelihood of becoming self-employed (0.335, $p < 0.01$).

When examining the likelihood of moving onward (Model 2b), we observed that previous mobility impacts future relocation chances: graduates who moved to study were less likely to move to a region other than their home region (-1.834, $p < 0.01$). Graduating from a university located in the North or Center reduced the probability of moving onward (-1.036, $p < 0.01$ and -0.839, $p < 0.01$, respectively). Meanwhile, university internationalization had a positive and significant impact on the probability of moving onward (5.712, $p < 0.01$). Finally, the regions that were able to attract graduates (i.e., onward-movers) were those with better employment conditions (0.027, $p < 0.05$), a better social system (i.e., health system) (0.003, $p < 0.05$), and more amenities (0.001, $p < 0.05$).

To capture the influence on career on mobility and vice versa, we estimated their marginal effects while keeping all other variables at their means. The results show that stayers' probability of becoming self-employed was 12% points higher than movers, while return-movers' likelihood of becoming self-employed was 27% higher than onward-movers. However, regarding the effects of

career through mobility, the results show that graduates with a salaried job have a higher chance of moving than the self-employed, while the impact of self-employment on mobility is not significant.

Finally, we observed that individual characteristics—like gender, age, and self-employed parents—mainly explain graduates' career choices. Meanwhile, contextual characteristics at the university and regional level are the main drivers of individuals' mobility choices.

Insert Table 5 about here

Robustness Tests

We conducted a series of robustness checks to test the reliability and validity of our estimates. First, given our 37% response rate in the second round, we used a two-step Heckman procedure to correct for potential nonresponse bias (Certo et al., 2016; Heckman, 1976). We ran a probit model to estimate the likelihood of answering in Round 2 and calculated the inverse Mills ratio to be included in the second-stage outcome equation (i.e., occupation and mobility models). We used individuals' web skills ability as an exclusionary restriction, assuming that those who reported a high web skills ability in Round 1 were most likely to answer the web-survey in Round 2. We then re-estimated the logit model that predicted graduates' likelihood of working and/or moving, while including the inverse Mills ratio among the covariates (with robust standard errors). The results were robust, as can be seen in Table A.1 and A.2 (exhibits prefixed with "A" appear in the appendix).

Second, we considered that the decisions to enter self-employment and move to a different region are not random; rather, they may be correlated with the future expected benefits that are associated with how and where graduates enter the job market. To account for this, we used an inverse probability treatment weights approach (IPTW), a technique designed to control for selection into treatment (Azoulay et al., 2009; Fini et al., 2021; Robins et al., 2000). Specifically, the IPTW assigns each individual a weight equal to the inverse of the probability of being treated (i.e., entering self-employment or moving) (Fewell et al., 2004). Therefore, individuals who are unlikely to become entrepreneurs and/or to move are assigned a larger weight than those who are more likely based on a

set of observable characteristics. See Tables A.3 and A.4 for our initial estimates of the two weights. Afterward, we corrected for selectivity and introduced the two weights, one at a time, into the main models. As shown in Table A.5, the results remained robust.

Finally, we used an alternative specification for our main model. We estimated a generalized structural equation model, specifying two dichotomous dependent variables and imposing a mobility-occupation path. The model exhibited results that were qualitatively similar to those obtained in the main analysis (see Table A.6).

Additional analyses

To better understand the full mobility pattern, we complemented the three mode classifications above (i.e., stayers, onward-movers, and return-movers) by grouping the graduates into five different categories according to their current work region, region of study, and home region. First, we divided the stayers (N=2,470) into two subgroups: i) stayers/stayers (if graduates study and work in their region of origin) and ii) movers/stayers (if graduates leave their region of origin to study and then work where they have studied). Second, we classified the movers (N=1,217) into the following three groups: i) movers/return-movers (those who move to a different region to study and then return to the home region to work); ii) movers/onward-movers (those who move to a different region to study and then move to a different region to work), and finally, iii) stayers/onward-movers (those who study in the home region and then move to a different region to work). The descriptive evidence reported in Table A.7 shows that the stayers/stayers, movers/stayers, and movers/return-movers exhibited higher self-employment rates than the movers/onward-movers and stayers/onward-movers. This result is consistent with the main analysis, suggesting that self-employment is less likely to occur among onward-movers.

Second, we scrutinized the negative and significant effect of *male* on self-employment. In the main analysis (Table 5), we operationalized self-employment by including a vast array of occupations considered “independent professions” by the Italian National Institute of Statistics (ISTAT). It is possible that this broad classification shaped the gender effect. We therefore ran the main models

using a more conservative definition of self-employment (i.e., including only pure self-employed). The results, reported in table A.8, showed a negative, but non-significant effect on self-employment entry. This is consistent with some of the previously published research in the field (e.g., Kibler et al., 2014).

Furthermore, our evidence suggests that age has a negative and significant effect the likelihood of becoming self-employed. The literature on entrepreneurial entry presents mixed results on this matter: some studies find that older individuals are more likely to start new firms (Shirokova et al., 2015); others demonstrate that younger people are more active on this front (Alvarez-Herranz et al., 2011; Levesque and Minniti, 2006); and another stream posits an inverse U-shaped relationship between age and entrepreneurial activity (Larsson et al., 2017; Wagner and Sternberg, 2004). As an additional check, we included the age squared term in Table A.9. The robust results suggest the existence of an inverse U-shaped relationship between age and entry into self-employment.

Due to the heterogeneity of the self-employment category, we leveraged the Italian occupation classification by ISTAT⁶ to develop a fine-grained, six-group classification. The first group includes *entrepreneurs* (i.e., individuals who have established a new firm) and accounts for 9.4% of self-employed graduates; the second group includes *intellectual and scientific self-employment occupations*, such as engineers, architects, pharmacists, physicians, and lawyers, and accounts for 59.2% of self-employed graduates. The third group includes *technical consultants* (e.g., computer and chemical technicians), who represent 18% of self-employed graduates. The fourth group includes *administrative consultants* (e.g., accounting consultants), who comprise 3.8% of self-employed graduates. The fifth category is *self-employed salespeople* (8.2%) and the sixth category encompasses *technical-practical occupations*, such as artisans (1.4%).

For the entrepreneurs (the first category), we observed that 8.6% of stayers were entrepreneurs versus 11.7% in the movers sample. The percentage increased to 15.5% in the onward-mover sample

⁶ In 2006, ISTAT produced its occupation classification, which is based on and cross-linkable with the logic of the ISCO (International Standard Classification of Occupations).

and decreased to 7.8% in the return-mover sample. For the onward-mover entrepreneurs, we found that the three most attractive provinces were Milan in Lombardy (22.3%), followed by Rome in Lazio (5.5%), and Modena in Emilia-Romagna (5.5%). Figures A1.a, b, c, and d illustrate the distribution of these six categories across the four groups of graduates (filled histograms) in comparison to the full sample distribution (empty histograms). Looking at the entrepreneurs, we observed very different results compared to the general sample of self-employed. In particular, movers were more likely than stayers to start a new venture. Specifically, the onward-movers were more entrepreneurial than the return-movers. This evidence signals that fresh graduates mainly create new ventures in the most favorable contextual conditions and that their universities play a role in cultivating their social capital.

Comparison with previous research

To increase confidence in the external validity of our findings, we compared our study with a selection of prior works. Using our sample, we first replicated the study conducted by Marinelli (2013), which focused on the differences between onward-movers and return-movers. Beyond substantiating her basic findings, we also showed that onward-movers are more likely to move to regions with more attractive employment and economic characteristics, whereas return-movers tend to move back to less developed regions, mainly in the South and Northeast. The findings from this supplementary analysis, reported in Table A.10, support the existing literature while adding new knowledge about the relationship between mobility and career decisions.

We then replicated the study by Larsson et al. (2017), who focused on the location choice of graduates who become self-employed one year after graduation. Again, we largely mirrored their results. Specifically, as exhibited in Table A.11, we observed that stayers who never moved for university or work are more likely to become self-employed, with the probability increasing in metropolitan regions. Our study also suggests that stayers-stayers are more likely to enter self-employment, and that a relevant portion of self-employed graduates move back to their home region.

DISCUSSION

With this study, we clarify the factors that influence graduates' decision to enter self-employment vs. start a salaried job while either staying or moving after graduation. Consistent with earlier studies (Baltzopoulos and Broström, 2013; Ciriaci, 2014; Larsson et al., 2017; Marinelli, 2013; Venhorst et al., 2011), we uncovered relevant differences across graduates' early career decisions and location choices. Indeed, 67% of graduates worked in their university region one year after graduation, whereas 33% moved to another region. Of the latter, 30.4% returned to their home region (return-movers) and the remaining 69.7% moved to a region other than their birth and study regions (onward-movers). Regarding career decisions, 74.4% of the sample took a salaried job and 25.6% started their own activity. The results indicate that stayers and return-movers are more likely to become self-employed, whereas onward-movers are more likely to enter a salaried job.

Our paper offers some key takeaways. First, we advance that individual characteristics mainly drive career decisions. Younger graduates may be more proactive and willing to take entrepreneurial risks, and are thus more likely to start their own activity. Additionally, we observe that women seem to be more likely to enter self-employment. This result is quite surprising and seems to contradict the literature. However, self-employment was broadly defined in our study, encompassing individuals who either owned a business or worked as freelance/independent providers. Thus, we could argue that females — who are traditionally more disadvantaged than men in the job market (OECD Factbook, 2015-2016) — may be compelled by necessity to enter self-employment. Consistently with Faggian et al. (2007a), our study also suggests that women are more likely than men to return to their home region (where there may be fewer employment opportunities) than move to a region other than the one in which they studied.

Second, our results are consistent with past research showing universities' role in retaining graduates (Ciriaci, 2014). This implies that universities can lower graduates' likelihood of moving by increasing their own engagement with their host territories. Indeed, it seems that a university's quality is a powerful force that can attract potential students and retain alumni. Despite their pivotal

role, however, universities can become oases in a desert if the local economic and social infrastructures are not equally developed. In other words, universities' active participation in the local ecosystem cannot substitute for the presence of complementary elements (Fini et al., 2011). After all, attracting young people to study only has persistent value if they are inclined to remain in the region and bolster local communities.

Third, as documented by other studies (e.g., Faggian and Frankilin, 2014), we found that living standards contribute to attracting graduates to a new region, but do not seem to play a critical role in retaining graduates in the region where they studied. In addition, we observed that graduates who move to regions with good economic conditions are more likely to enter a salaried job than to become self-employed. In contrast, graduates who move back to less developed areas with fewer job opportunities are more likely to become self-employed — a choice seemingly driven more by need than opportunity (Reynolds et al., 2002). Due to the risk and high opportunity costs associated with entrepreneurship, we anticipate that onward-movers become self-employed to exploit a unique market opportunity, while for return-movers, becoming self-employed may be the best option available.

Future research directions and practical implications

In assessing the relation between mobility and career decisions, we found that onward-movers are less likely than return-movers and stayers to become self-employed, but more likely to become pure entrepreneurs when they do. Given these results, future scholars may want to examine the role of social capital in career decisions. For instance, further studies might distinguish between the social capital accrued before and during university studies, and how each affects the relationship between mobility and early career decisions.

Our results also have relevant implications for university and regional politics. Societies should continue incentivizing entrepreneurship among graduates, developing measures to support returnee graduates who may want to start a new venture, as well as supporting stronger interactions between universities and regional institutions. We add further evidence that university education can

reduce inequalities and support younger generations: studying by itself does not compensate for labor market inefficiencies or lacking economic opportunities, but it supports individual growth. A prestigious university committed to providing students with entrepreneurial opportunities in a less-than-vibrant context cannot rejuvenate local economies with new start-ups, especially in less mobile societies like Italy. Thus, policymakers may have more success treating education and entrepreneurial policies as codetermined. Universities should work with local institutions to develop new strategies that support the creation of ad hoc entrepreneurial programs, diversified according to the local characteristics. In more developed areas, where graduates are more likely to remain after graduation for salaried positions, entrepreneurial support should strongly combine existing companies with peer and mentor relationships, as the resulting social capital can spur new venture creation. In less developed areas, the quality of the graduates should be used to attract more investments; the entrepreneurship program could be more directly linked to those investments with sandbox- or challenge-type programs. Of course, local efforts may need to be bolstered with national programs: two recent examples are the 2014 French program (which defined a special status for student entrepreneurs) and the EU Erasmus Program for Young Entrepreneurs (Fini and Sobrero, 2021).

LIMITATIONS AND CONCLUSION

Despite the different designs and analytical choices made to ensure the robustness of our results, this study suffers from some limitations. First, due to data availability, we examined graduates who started working one year after graduation. However, it may take longer than one year to find a job or become self-employed (Chiarello et al., 2021). It would be useful to conduct a longer longitudinal study that can examine how graduates' mobility and career choices change over time. Second, we focused our study at the regional level (NUTS2), as Italian regions are characterized by significant social and economic differences. While this represented a good setting for studying graduates' mobility, further studies may also want to test our models at the provincial level (NUTS3). Finally, we focused on graduates' mobility after graduation. Future research could better disentangle graduates' multiple mobility decisions (i.e., university and job mobility), the relative magnitude of

the roles of different institutions (e.g., universities and companies), and the geographical variance in institutions' ability to guide a broad set of policy decisions within their territories.

Notwithstanding these limitations, our results offer novel insights into graduates' mobility and career choices, unpacking the differences between salaried positions and self-employment. Universities and policymakers can leverage these findings to retain and attract graduates soon after graduation. As territories increasingly compete for students with more global opportunities, human capital-centered approaches should carefully consider those elements that influence momentum and strengthen local attractiveness.

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Table 1:
Contingency table: Graduates' mobility decisions and employment status

Occupation	Stayers (Full sample, N=3,687)	Movers (Mobility sample, N=1,217)	Onward-movers (Mobility sample, N=1,217)	Return-movers	Total
Salaried job	1,770	973	726	247	<i>100.0</i>
	<i>64.5</i>	<i>35.5</i>	<i>74.6</i>	<i>25.4</i>	
	<i>71.7</i>	<i>80.0</i>	<i>85.6</i>	<i>66.9</i>	
Self-employment	700	244	122	122	<i>100.0</i>
	<i>74.2</i>	<i>25.8</i>	<i>50.0</i>	<i>50.0</i>	
	<i>28.3</i>	<i>20.0</i>	<i>14.4</i>	<i>33.1</i>	
Total	2,470	1,217	848	369	<i>100.0</i>
	<i>67.0</i>	<i>33.0</i>	<i>69.7</i>	<i>30.3</i>	
	<i>100.0</i>	<i>100.0</i>	<i>100.0</i>	<i>100.0</i>	

The sample includes all graduates, including the 251 who moved abroad (and not included in the multivariate analysis). % *in italics*.

Table 2: Descriptive statistics

Variable	Mean	Std. Dev.	Min.	Max.
Self-employment	0.26	0.44	0.00	1.00
Mover	0.28	0.45	0.00	1.00
Onward-mover*	0.62	0.49	0.00	1.00
Age	27.00	5.28	23.00	62.00
Male	0.46	0.50	0.00	1.00
Partner	0.18	0.38	0.00	1.00
University mobility	0.37	0.48	0.00	1.00
Self-employed parents	0.21	0.40	0.00	1.00
GPA	27.41	1.67	19.83	30.00
Field: STEMM	0.58	0.49	0.00	1.00
Distance: study-work	2.23	2.44	0.00	8.00
Distance: birth-work	2.94	2.44	0.00	8.00
U: northern university	0.57	0.49	0.00	1.00
U: central university	0.22	0.41	0.00	1.00
U: southern university	0.21	0.41	0.00	1.00
U: industry relationship	0.20	0.14	0.00	0.41
U: public engagement	0.54	0.18	0.00	0.76
U: rating	56.93	19.79	0.00	84.00
U: internationalization	0.06	0.04	0.01	0.36
R: employment	65.05	11.92	36.90	76.30
R: research workforce	0.56	0.12	0.27	0.70
R: health	385.22	43.26	312.77	472.60
R: recreation	394.47	227.37	14.00	863.00

N=3,436 as information on the regional characteristics for the 251 graduates who moved abroad was not available.
*N=966. Self-employment=0 when salaried job=1 (and vice versa); mover=0 when stayer=1 (and vice versa);
onward-mover=0 when return-mover=1 (and vice versa).

Table 3: Correlation table (full sample)

Full Sample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
1 Mover	1.00																						
2 Self-employment	-0.07	1.00																					
3 Age	-0.01	-0.05	1.00																				
4 Male	0.03	-0.05	-0.02	1.00																			
5 Partner	0.00	-0.04	0.44	-0.08	1.00																		
6 University mobility	0.36	0.00	0.02	0.04	0.05	1.00																	
7 Self-employed parents	-0.02	0.07	-0.08	-0.01	-0.04	0.01	1.00																
8 GPA	0.02	0.02	-0.10	-0.08	-0.05	-0.01	-0.01	1.00															
9 Field: STEMM	0.01	0.02	-0.04	0.20	-0.02	0.06	-0.02	-0.10	1.00														
10 Distance: study-work	0.72	-0.09	0.00	0.02	-0.01	0.20	-0.01	0.02	0.05	1.00													
11 Distance: birth-work	0.25	-0.01	0.01	0.01	0.03	0.72	0.01	-0.01	0.05	0.37	1.00												
12 U: northern university	-0.03	-0.05	-0.15	0.01	-0.01	0.21	0.02	-0.03	0.05	-0.01	0.18	1.00											
13 U: central university	-0.02	0.02	0.09	0.02	0.04	-0.09	-0.01	-0.02	-0.05	-0.08	-0.12	-0.61	1.00										
14 U: southern university	0.06	0.04	0.10	-0.03	-0.02	-0.17	-0.01	0.05	-0.01	0.09	-0.10	-0.60	-0.27	1.00									
15 U: industry relationship	-0.08	-0.04	-0.10	0.08	0.01	0.24	0.02	-0.09	0.17	-0.07	0.21	0.45	-0.05	-0.49	1.00								
16 U: public engagement	-0.03	-0.04	0.00	0.00	0.00	-0.02	-0.02	0.00	-0.02	-0.03	0.02	0.36	-0.15	-0.29	0.30	1.00							
17 U: rating	0.00	-0.07	-0.07	0.04	0.02	0.21	0.00	-0.03	0.11	0.02	0.18	0.63	-0.14	-0.61	0.57	0.41	1.00						
18 U: internationalization	-0.03	-0.04	-0.11	0.09	0.02	0.38	0.02	-0.06	0.16	-0.09	0.20	0.51	0.05	-0.67	0.48	0.07	0.50	1.00					
19 R: employment	0.15	-0.10	-0.13	0.06	0.03	0.10	0.00	0.02	0.03	0.12	0.06	0.59	0.00	-0.71	0.36	0.26	0.55	0.47	1.00				
20 R: research workforce	-0.14	-0.01	-0.11	0.05	-0.01	0.10	0.00	-0.01	0.03	-0.19	-0.03	0.25	0.09	-0.39	0.29	0.13	0.14	0.41	0.35	1.00			
21 R: health	-0.14	0.05	0.08	-0.02	0.05	-0.10	-0.02	0.04	-0.03	-0.16	-0.11	-0.45	0.41	0.13	-0.13	-0.26	-0.32	-0.13	-0.33	0.33	1.00		
22 R: recreation	0.27	-0.04	-0.08	0.04	-0.01	0.12	0.02	0.05	-0.04	0.16	0.05	0.02	0.11	-0.14	0.06	-0.04	-0.08	0.10	0.29	0.48	0.18	1.00	

N=3,436. Pairwise correlations above |0.05| are significant at 0.05.

Table 4: Correlation table (mobility sample)

Mobility sample	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
1 Onward-mover	1.00																						
2 Self-employment	-0.22	1.00																					
3 Age	-0.14	-0.05	1.00																				
4 Male	0.15	-0.05	-0.02	1.00																			
5 Partner	-0.08	-0.04	0.44	-0.08	1.00																		
6 University mobility	-0.56	0.00	0.02	0.04	0.05	1.00																	
7 Self-employed parents	-0.09	0.07	-0.08	-0.01	-0.04	0.01	1.00																
8 GPA	0.13	0.02	-0.10	-0.08	-0.05	-0.01	-0.01	1.00															
9 Field: STEMM	0.04	0.02	-0.04	0.20	-0.02	0.06	-0.02	-0.10	1.00														
10 Distance: study-work	0.30	-0.09	0.00	0.02	-0.01	0.20	-0.01	0.02	0.05	1.00													
11 Distance: birth-work	-0.38	-0.01	0.01	0.01	0.03	0.72	0.01	-0.01	0.05	0.37	1.00												
12 U: northern university	-0.20	-0.05	-0.15	0.01	-0.01	0.21	0.02	-0.03	0.05	-0.01	0.18	1.00											
13 U: central university	0.00	0.02	0.09	0.02	0.04	-0.09	-0.01	-0.02	-0.05	-0.08	-0.12	-0.61	1.00										
14 U: southern university	0.22	0.04	0.10	-0.03	-0.02	-0.17	-0.01	0.05	-0.01	0.09	-0.10	-0.60	-0.27	1.00									
15 U: industry relationship	-0.01	-0.04	-0.10	0.08	0.01	0.24	0.02	-0.09	0.17	-0.07	0.21	0.45	-0.05	-0.49	1.00								
16 U: public engagement	-0.04	-0.04	0.00	0.00	0.00	-0.02	-0.02	0.00	-0.02	-0.03	0.02	0.36	-0.15	-0.29	0.30	1.00							
17 U: rating	-0.16	-0.07	-0.07	0.04	0.02	0.21	0.00	-0.03	0.11	0.02	0.18	0.63	-0.14	-0.61	0.57	0.41	1.00						
18 U: internationalization	-0.10	-0.04	-0.11	0.09	0.02	0.38	0.02	-0.06	0.16	-0.09	0.20	0.51	0.05	-0.67	0.48	0.07	0.50	1.00					
19 R: employment	0.29	-0.10	-0.13	0.06	0.03	0.10	0.00	0.02	0.03	0.12	0.06	0.59	0.00	-0.71	0.36	0.26	0.55	0.47	1.00				
20 R: research workforce	0.31	-0.01	-0.11	0.05	-0.01	0.10	0.00	-0.01	0.03	-0.19	-0.03	0.25	0.09	-0.39	0.29	0.13	0.14	0.41	0.35	1.00			
21 R: health	0.13	0.05	0.08	-0.02	0.05	-0.10	-0.02	0.04	-0.03	-0.16	-0.11	-0.45	0.41	0.13	-0.13	-0.26	-0.32	-0.13	-0.33	0.33	1.00		
22 R: recreation	0.37	-0.04	-0.08	0.04	-0.01	0.12	0.02	0.05	-0.04	0.16	0.05	0.02	0.11	-0.14	0.06	-0.04	-0.08	0.10	0.29	0.48	0.18	1.00	

N=966. Pairwise correlations above |0.05| are significant at 0.05.

Table 5:
Simultaneous equations model estimates

	Model 1a	Model 1b	Model 2a	Model 2b
	[Full sample]		[Mobility sample]	
	Self-employment (0/1)	Mover (0/1)	Self-employment (0/1)	Onward-mover (0/1)
Mover	-0.054** (0.022)			
Onward-mover			-0.196* (0.101)	
Self-employment		-0.831*** (0.150)		-0.771*** (0.171)
Age	-0.017*** (0.006)	-0.023*** (0.008)	-0.021* (0.011)	-0.019 (0.012)
Male	-0.152*** (0.048)	-0.129* (0.077)	0.045 (0.101)	0.207* (0.120)
Partner	-0.047 (0.069)	-0.132 (0.110)	0.262** (0.132)	0.101 (0.168)
University mobility	0.162*** (0.055)	1.739*** (0.569)	0.125 (0.224)	-1.834*** (0.677)
Self-employed parents	0.199*** (0.056)		0.335*** (0.118)	
GPA	0.006 (0.014)	-0.016 (0.023)	0.001 (0.029)	0.021 (0.033)
Field: STEMM	0.114** (0.049)	0.114 (0.078)	0.004 (0.100)	-0.081 (0.117)
Distance: study-work		0.866*** (0.318)		0.288*** (0.109)
Distance: birth-work		-0.230*** (0.086)		0.102* (0.057)
U: northern university		-0.079 (0.159)		-1.036*** (0.379)
U: central university		-0.014 (0.130)		-0.839*** (0.315)
U: industry relationship	-0.275 (0.222)	-1.158** (0.456)	-0.276 (0.429)	0.203 (0.507)
U: public engagement	0.041 (0.149)	0.482* (0.292)	0.151 (0.278)	0.289 (0.342)
U: rating	-0.002 (0.002)	-0.001 (0.003)	-0.006* (0.003)	-0.005 (0.004)
U: internationalization		-5.267** (2.222)		5.712*** (2.195)
R: employment	-0.007*** (0.003)	0.017 (0.011)	-0.006 (0.005)	0.027** (0.012)
R: research workforce	-0.089 (0.224)	-2.207*** (0.856)	0.506 (0.467)	0.315 (0.584)
R: health		-0.001 (0.001)		0.003** (0.002)
R: recreation		0.001** (0.000)		0.001** (0.000)
Constant	0.252 (0.449)		0.062 (0.963)	
Observations	3,436	3,436	966	966
Log-likelihood (0)		-2638.348		-831.097
Log-likelihood		-2351.039		-804.045

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Note: For variable “university location”, we omitted the category “southern university”; self-employment = 0 when salaried job = 1 (and vice versa); movers = 0 when stayers = 1 (and vice versa); onward-movers = 0 when return movers = 1 (and vice versa). The coefficients reported in the table are probit regression coefficients.

Figure 1: Distribution of stayers in Italy
(Percentage of stayers by region)

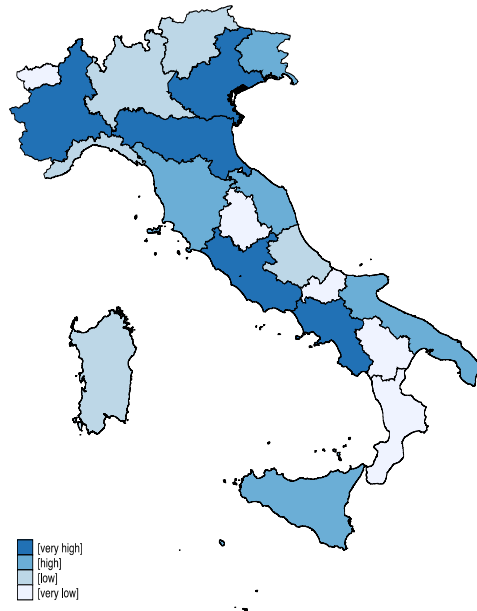
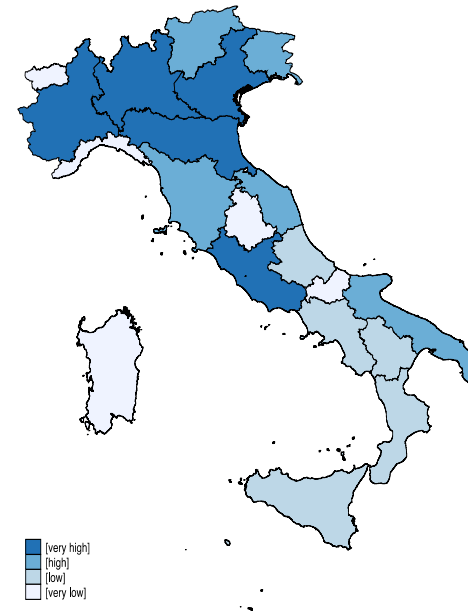


Figure 2: Distribution of movers in Italy
(Percentage of movers by region)



Class breaks (e.g., very low) correspond to quantiles of the distribution of the given variable attribute (e.g., percentage of stayers by region, percentage of movers by region) so each class includes approximately the same number of polygons.

The AlmaLaurea database does not include two major universities located in Lombardy. The members of the consortium are listed at <https://www.almalaurea.it/en/node/209>.

Figure 3: Distribution of onward-movers in Italy
(Percentage of onward-movers by region)

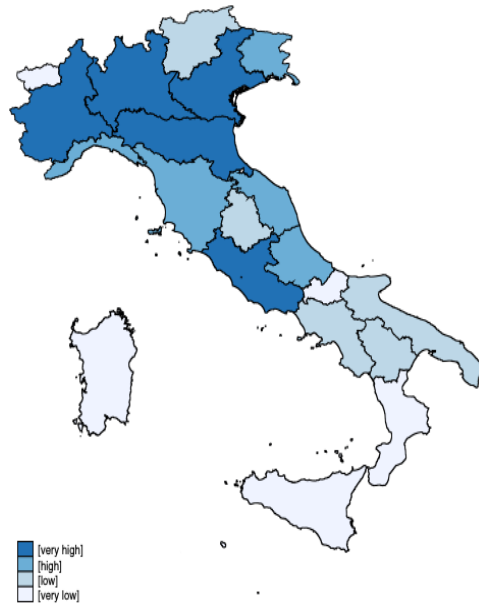
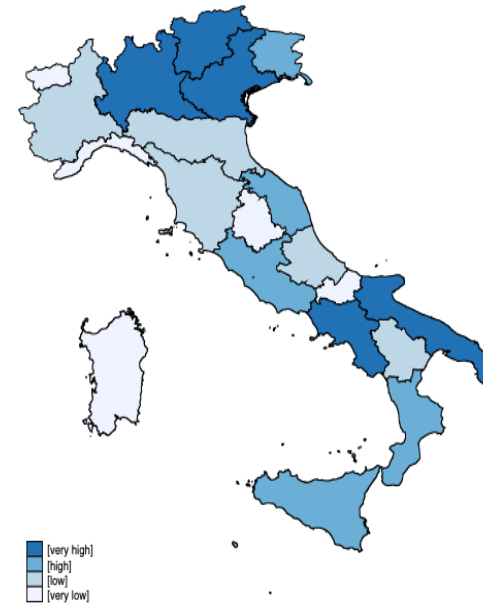


Figure 4: Distribution of return-movers in Italy
(Percentage of return-movers by region)



Class breaks (e.g., very low) correspond to quantiles of the distribution of the given variable attribute (e.g., percentage of stayers by region, percentage of movers by region) so each class includes approximately the same number of polygons.

The AlmaLaurea database does not include two major universities located in Lombardy. The members of the consortium are listed at <https://www.almalaurea.it/en/node/209>.