International Labour Organization | Open Library of Humanities

Capsada-Munsech, Queralt, and Luis Ortiz-Gervasi. 2025. "Crowding Out or 'One-Size-Fits-All' Occupations? A Regional Exploration of Youth Overeducation in Spain". *International Labour Review* 164 (2): 1–23. https://doi.org/10.16995/ilr.18846.

International Labour Review

Crowding out or "one-size-fits-all" occupations? A regional exploration of youth overeducation in Spain

Queralt Capsada-Munsech, University of Glasgow, School of Education, queralt.capsada-munsech@glasgow.ac.uk (corresponding author)

Luis Ortiz-Gervasi, Universitat Pompeu Fabra, Department of Political and Social Sciences, luis.ortiz@upf.edu

Abstract. *Little attention has been paid to supply- and demand-side factors explaining regional variation in youth overeducation. These factors might be drivers of a crowding out effect, where workers at a given level of education are expelled from their "matched" labour market positions by workers with a higher level of educational attainment. Controlling for interregional migration, we explore this scenario applying time-series cross-sectional analysis to data from the Spanish Labour Force Survey (1987–2016). Our results show that both supply- and demand-side factors contribute to explaining regional differences and that an increase in the overeducation rate among young people with tertiary education displaces those with only upper secondary education towards overeducation, but not unemployment.*

Keywords: *overeducation, youth employment, labour market analysis, crowding out, Spain, education, higher education.*

This article is also available in French, in *Revue internationale du Travail* 164 (2), and Spanish, in *Revista Internacional del Trabajo* 144 (2).

1. Introduction

In recent years, educational expansion has grown faster than the demand for education in many Member countries of the Organisation for Economic Co-operation and Development (OECD). The subsequent educational mismatch has led to increasing attention among academics and policymakers to overeducation (i.e. having educational qualifications that exceed those required to adequately perform one's job), especially among young people (Quintini 2011). Empirical studies suggest that overeducation is neither a negligible nor a temporary phenomenon (Verhaest and van der Velden 2013) and that it is associated with several negative outcomes, such as a wage penalty (Mavromaras, McGuinness and Fok 2009), lower satisfaction with one's education and current job (Ortiz-Gervasi and McGuinness 2018) and higher labour turnover (Tsang, Rumberger and Levin 1991). Most studies on overeducation have focused on the individual level; yet the increasing salience of the phenomenon has brought attention to national-level factors (e.g. Croce and Ghignoni 2012; Verhaest and van der Velden 2013) and, to a lesser extent, to regional-level factors (e.g. Davia, McGuinness and O'Connell 2017). The clear regional disparities in terms of overeducation in countries such as Austria, Greece (Davia, McGuinness and O'Connell 2017), Italy (Meliciani and Radicchia 2016) and Spain (Ramos and Sanromá 2013; Sánchez-Sánchez and Fernández-Puente 2021) call for further research on the influence of supply- and demand-side factors on youth overeducation at the regional level.

In this article, we thus explore the regional factors affecting overeducation and its possible displacement effects on young people with lower levels of educational attainment. We contribute to the literature on overeducation in four ways. First, previous research on overeducation at the regional level has mainly focused on the size of regional labour markets and workers' distance from large metropolitan areas (Büchel and van Ham 2003; McGoldrick and Robst 1996), but it has not explicitly considered different traits of regional labour markets. Second, recent empirical research has looked at potential drivers of overeducation at the regional level for the working age population (Davia, McGuinness and O'Connell 2017), but not specifically for young people, who are more likely to be affected by overeducation than adult workers (Dekker, de Grip and Heijke 2002; Frei and Sousa-Poza 2012; Vahey 2000). Third, a substantial part of the academic literature on overeducation has focused on the duration of the phenomenon at the individual level and the scant attention paid to the evolution of the phenomenon in the aggregate has focused on the national level (e.g. Green and Zhu 2010; Kiersztyn 2013; Korpi and Tåhlin 2009; Vera-Toscano and Meroni 2021). Fourth, the potential consequences of university graduates' overeducation for other groups with lower levels of educational attainment, such as a crowding out effect towards unemployment, have mostly been explored at the individual level (e.g. Klein 2015; Pollmann-Schult 2005), while only a few empirical studies have looked at the aggregate level (Habibi and Kamis 2021; Hansson 2007).

With a view to exploring these research questions, the remainder of this article is organized as follows. The second section examines the national- and regional-level factors that the literature has found to influence overeducation. The third section reflects on the relevance of the case of Spain in considering our research question. Our data are presented in the fourth section and our analytical strategy in the fifth. We present and discuss our results in the sixth section, then summarize our findings and offer some conclusions in the seventh section.

2. National and regional factors affecting overeducation

National-level explanations for overeducation are usually classified into supply- and demand-side labour market factors. Among the supply-side factors, a rapid increase in the supply of higher education qualifications is positively associated with the overeducation rate (Groot and van den Brink 2000; Hartog 2000). Yet more recent studies show that, despite the rapid increase in tertiary educational attainment among young people in European

countries, the overeducation rate among young university graduates decreased by a third from 2000 to 2016 (Delaney et al. 2020). Among university graduates, at least, results suggest that the absolute share of highly skilled labour is not as important in explaining cross-national differences in overeducation as the quality and orientation of educational systems/programmes (Verhaest and van der Velden 2013). Some studies have posited the strength of vocational education systems as an indicator of overeducation, where countries with more developed vocational systems display lower rates of overeducation (Mavromaras and McGuinness 2012; McGuinness, Bergin and Whelan 2018). However, other studies report no evidence to support this view when the overeducation rates for young people with tertiary and upper secondary education are considered separately (Delaney et al. 2020).

Among the demand-side factors, youth unemployment is a well-known demand-side predictor of overeducation, as a shortage of jobs tends to reduce young graduates' reservation wage, pushing them to accept jobs below their education level (Croce and Ghignoni 2012; Davia, McGuinness and O'Connell 2017). Another relevant demand-side factor is the temporary employment rate. Previous research shows that fixed-term contracts are positively associated with overeducation in labour markets (e.g. in Italy) where temporary contracts might be used as a stepping stone towards an adequately matched job, while in countries with more segmented labour markets (e.g. in Spain) the association between temporary employment and overeducation is negative, as individuals prefer job security to a fixed-term contract even at the expense of overeducation (Ortiz 2010). Lastly, investment in research and development (R&D) has been found to be negatively associated with the incidence of overeducation, owing to the generation of highly skilled work associated with R&D (Di Pietro 2002; Ghignoni and Verashchagina 2014).

To date, the limited research on overeducation at the regional level is based on the hypothesis that the size of the local labour market influences graduates' likelihood of finding a good match. Evidence from western Germany and Finland shows that the smaller the labour market, the higher the risk of overeducation (Büchel and van Ham 2003; Jauhiainen 2011). Approaching the size of the labour market by measuring "travelling time to the nearest agglomeration", Büchel and van Ham (2003) found that workers' geographical mobility helped avoid overeducation. Similarly, empirical evidence based on data for Finland suggested that the probability of overeducation certainly depends on the regional level, as workers living in larger regional labour markets are at a lower risk of being overeducated (Jauhiainen 2011).

In sum, the regional approach to the study of overeducation has mostly focused on the size of the labour market or the distance of the individual from large metropolitan areas, not on the traits of regional labour markets. The aim of this article is, precisely, to contribute to this literature by considering supply- and demand-side factors at the regional level that might influence the risk of overeducation among young people. We consider two different levels of educational attainment for which overeducation may be conceivable: tertiary and upper secondary education. To our knowledge, there have been no previous attempts to account for possible regional differences in overeducation and, at the same time, consider a possible variation in the effect of these factors across levels of educational attainment and over time.

We argue that, as at the national level, regional differences in the incidence of overeducation may be rooted in both supply- and demand-side factors, conditional on geographical mobility. This might be particularly the case in countries with wide regional labour market disparities. Regions might have a higher (lower) incidence of overeducation owing to an excess (deficit) in the supply of qualifications. From a demand-side point of view, the regional economy might not be able to accommodate an increase in the qualifications of the cohorts entering the labour market. This mismatch might result in youth unemployment or an investment in R&D at this geographical level (Sánchez-Sánchez and Fernández-Puente 2021; Summerfield and Theodossiou 2017).

Mechanisms connecting regional supply- and demand-side factors with cross-regional differences in overeducation should take interregional migration into consideration, as it is a natural corrector of regional differences in overeducation (Waldorf and Yun 2016). Yet in one of the few regional approaches to the study of overeducation, Meliciani and Radicchia (2016) find that, in the case of Italy – a labour market with high regional disparities – migration only partially reduces overeducation. The same limited evidence of the corrective effect of migration has been found for Spain: commuting and migration only help male university graduates and only to a limited extent (Romaní, Casado-Díaz and Lillo-Bañuls 2016). Based on these assumptions, we formulate the following hypotheses:

Hypothesis H1: After accounting for interregional migration, an increase in the regional supply of highly qualified young workers (level and change over time) is positively associated with an increase in the regional rate of overeducation among young tertiary graduates.

Hypothesis H2: After accounting for interregional migration, an increase in the regional demand for qualifications (level and change over time) is negatively associated with the regional rate of overeducation among young tertiary graduates.

In the case of upper secondary-educated youth, an additional factor may be considered. Tertiary-educated workers who are unable to find a suitable job may crowd out upper secondary-educated youth from their "adequately matched" natural positions in the labour market, displacing them into lower positions on the occupational scale (i.e. positions for which they are overeducated) or into unemployment (Bar-Haim, Chauvel and Hartung 2019). This crowding out effect has been found in the Netherlands, where the risk of unemployment among workers with lower levels of educational attainment seems to increase where overeducation among higher education graduates is more prevalent (Ponds et al. 2016), and in the United States, where a similar dynamic has been found between high school and university graduates (Habibi and Kamis 2021). However, a previous comparison of 26 OECD countries did not reveal any crowding out effect due to educational expansion, except in the case of Spain (Hansson 2007). This exception adds credibility to our attempt to consider possible crowding out dynamics in Spain. A previous study based on theoretical models reports that, in Spain, new tertiary graduates aged 21–25 "seem to be increasingly filling both the more skilled jobs … and the semi-skilled ones" (Dolado, Felgueroso and Jimeno 2000, 947). Analysing the 1977–98 period, these authors built an econometric model emphasizing the potential existence of a crowding out effect, according to which "a combination of rigid labour market institutions and an increase in the relative supply of higher educated workers harms the training prospects of lower educated workers" (Dolado, Felgueroso and Jimeno 2000, 943). However, the model was not empirically tested. On this basis, we formulate the following hypothesis relating to crowding out:

Hypothesis H3a: After accounting for interregional migration, an increase in the regional overeducation rate among young tertiary graduates is positively associated with an increase in overeducation and/or the unemployment rate among young people with upper secondary education ("crowding out effect").

Alternatively, a sufficiently high number of job vacancies not requiring tertiary education may accommodate both the overeducation of those at the top of the educational scale and the employment of those in the middle. Interestingly, in their comparative analysis of occupational change in Germany, Spain, Switzerland and the United Kingdom, Oesch and Rodríguez-Menés (2011) found that Spain was the only country with a positive net employment change in the middle quintile of the job quality distribution over the 1990–2008 period. Such a "one-size-fits-all" scenario would allow an increase in the rate of overeducation among those with tertiary education without any consequences in terms of either overeducation and/or unemployment among young people with upper secondary education:

Hypothesis H3b: After accounting for interregional migration, an increase in the regional overeducation rate among young tertiary graduates is unrelated to overeducation and/or the unemployment rate among young upper secondary education graduates ("one size fits all").

3. Spain as a case study

To assess the influence of supply- and demand-side factors and the possibility of a crowding out effect, we needed to select a country with high rates of youth overeducation and cross-regional variation. Moreover, it was essential to have access to adequate data for a long period of time, including supply- and demand-side variables at the regional level. We selected Spain, first, because cross-national analysis of overeducation among university graduates shows Spain to be the European country with the highest rate of overeducation (Verhaest and van der Velden 2013), while the rate is also high when considering the whole working age population (Davia, McGuinness and O'Connell 2017). This is the case despite a comparatively large proportion of workers with a low level of educational attainment (i.e. ISCED level 2 or below),[1] which is similar to the case in Italy (McGuinness, Bergin and Whelan 2018, 997). Second, the Spanish labour market presents high cross-regional dispersion in terms of overeducation, only surpassed by Italy, Austria and Greece, for female workers (Davia, McGuinness and O'Connell 2017; Sánchez-Sánchez and Fernández-Puente 2021). It also displays wide and persistent regional disparities in unemployment rates, as "migration responds little to economic variables" (Jimeno and Bentolila 1998, 40). The same lack of geographical mobility that prevents adjustment and convergence in terms of unemployment may also do so in terms of overeducation. Yet it is worth noting that, despite comparatively low internal mobility, cross-regional mobility in Spain varies by educational level and regional characteristics, which can influence overeducation rates (González-Leonardo 2020). Third, data from different sources allow us to conduct analyses at the regional level for a long time period.

While results for a specific country case are not directly inferable to others, this study will offer a reference point for European and OECD countries with similar educational expansion, incidence of overeducation and regional disparities when considering the regional factors relevant to youth overeducation and its consequences in terms of crowding out effects.

4. Data

We use quarterly data from the Spanish Labour Force Survey (*Encuesta de Población Activa* – EPA) from the first term of 1987 to the fourth term of 2016, covering a time span long enough to allow for the exploration of overeducation change across regional labour markets in Spain.[2] Although EPA data are available from 1964 to 2024, we restrict our study period owing to the lack of data for relevant demand-side variables (e.g. temporary employment rate) before 1987 and to exclude the period of Spain's transition from dictatorship to democracy, characterized by an unstable economic, social and political situation that influenced labour market outcomes (e.g. no trade unions were recognized). Likewise, our analysis does not extend past the last quarter of 2016 owing to the lack of relevant regional data to control for supply- and demand-side factors beyond that point. The units of analysis are 17 Spanish regions at NUTS 2 level,[3] which correspond to Spain's 17 Autonomous Communities and does not include the autonomous cities of Ceuta and Melilla.[4] Unlike other studies, we do not divide our analyses by sex because there is no evidence of prevalence of overeducation among Spanish women (García-Serrano and Malo-Ocaña 1997) and the division would further reduce the regional samples, increasing the error terms and limiting the statistical power

[1] Educational attainment is based on the measures of the International Standard Classification of Education 2011 (ISCED-2011).

[2] Spanish National Statistics Institute (Instituto Nacional de Estadística – INE), "Resultados Trimestrales", Encuesta de Población Activa (EPA). https://www.ine.es/dyngs/INEbase/es/operacion.htm?c=Estadistica_C&cid=1254736176918&menu=resultados&idp=1254735976595.

[3] The Nomenclature of Territorial Units for Statistics (NUTS, from the French Nomenclature des Unités territoriales statistiques) divides each EU country into three levels: NUTS 1 – major socio-economic regions; NUTS 2 – basic regions (for regional policies); and NUTS 3 – small regions (for specific diagnoses).

[4] These autonomous cities in North Africa are excluded from the analysis owing to the small size and singularities of their labour markets.

of the analyses. Besides, this reduction would make it especially challenging to conduct the analysis for the first years of the series, when female labour participation was lower in Spain. This would significantly limit the time length of our analysis, a crucial element in our study as it employs time-series cross-sectional (TSCS) analysis. From a theoretical perspective, previous cross-national studies show a negative association between female labour market participation and the overeducation rate (McGuinness, Bergin and Whelan 2018), where countries with legislation on gender equality and affordable childcare prevent occupational downgrading in respect of women. We do not think this relevant at the regional level, as legislation on the subject does not substantially change across regions and might affect young women to a lesser extent, especially in a country like Spain, where fertility rates are comparatively low and where, on average, women have their first child when they are older. Since our focus is on young people, we understand that gender differences due to childcare are lower compared to the whole working age population. We nevertheless acknowledge that there is an interesting line of research to be explored, focusing on potential gender differences in (youth) overeducation.

4.1. Dependent variables

We use the overeducation rate for tertiary-educated youth to explore the variation across regions and the supply- and demand-side factors influencing it (hypotheses *H1* and *H2*). The regional rate of overeducation is calculated using quarterly and yearly data for workers aged 16 to 34 who have attained a tertiary education level (ISCED levels 5–6). Based on data availability, we follow a "job analysis" approach, which provides an objective measure of overeducation. This measurement of overeducation is considered rigorous and appropriate for single-country studies (Capsada-Munsech 2019). Although one of its limitations is that it does not consider the diversity of jobs within one occupation, we still consider it more appropriate and feasible than a "realized matches" objective measurement, where indicators focus on the relative position of the individual in comparison with the rest of workers, which does not make sense when studying aggregate data and the influence of the rate in one year on subsequent years. Moreover, realized matches indicators require the researcher to select an (arbitrary) cut-off point (e.g. one standard deviation above the mean) to consider individuals as overeducated and, as Ortiz and Kucel (2008) have argued, educational qualifications are less subject to researchers' arbitrariness. Unfortunately, the EPA does not include any subjective measure of overeducation, making it impossible to compare the results of an objective measure with a worker's assessment measurement.

To calculate our job analysis objective measure, we regard ISCED levels 5–6 graduates as overeducated if they are not employed in ISCO-08[5] occupation groups 1–2 at the 1-digit level.[6] The natural logarithm of the tertiary overeducation rate is computed to obtain a log-normal distribution. The overeducation rate for tertiary-educated youth is considered one year later (t_{+1}, forwarded variable) to explore the potential influence of supply- and demand-side factors in t_0 on overeducation at t_{+1}.

When considering the possibility of a crowding out effect of tertiary-educated youth on upper secondary-educated youth (hypotheses *H3a* and *H3b*), both the overeducation and unemployment rates of young people with upper secondary education are used as dependent variables. Following the same job analysis approach, we regard as overeducated those workers who have attained at most upper secondary education or post-secondary non-tertiary education (i.e. ISCED levels 3–4) and are not employed in ISCO-08 levels 1–4

[5] ISCO-08: International Standard Classification of Occupations 2008. We harmonized the occupational classification across time (from CNO-74 and CNO-94 to CNO-2011) following the guidelines of the EPA data provider (INE) and employing their suggested conversion matrix to convert previous years' occupational classification to the most up-to-date ISCO-08 (CNO-2011 in Spanish national classification, equivalent to ISCO-08).

[6] The conversion matrix only allows us to be precise in the harmonization of individuals' occupations across time at the 1-digit level.

occupations. The standard definition of the unemployment rate is used for young workers with at most ISCED levels 3–4.[7] In both cases, we first compute the natural logarithm of the overeducation and unemployment rates, and also forward the dependent variable values to see if an increase in the overeducation rate for those with tertiary education at t_0 influences the overeducation and/or unemployment rate of those with upper secondary education at t_{+1}.

4.2. Supply- and demand-side variables

Several supply- and demand-side factors are included in the analysis to account for regional differences in overeducation (see table SA1 in the supplementary online appendix for a detailed description of variable computation, period and sources). Owing to the variety of scales and data distributions used, all predictor variables are standardized. Among supply-side factors, we measure the supply of tertiary graduates, as previous research shows a positive association with the overeducation rate (Groot and van den Brink 2000; Hartog 2000), while others show the opposite (Delaney et al. 2020). To approach this concept, we use the *activity rate for tertiary-educated youth* (aged 16–34), the *activity rate for the tertiary-educated population* (aged 16 and over) and the *graduation rate* for people aged 25–29. Since they are alternative indicators of the same latent factor, they are introduced separately in the multivariate analysis as robustness checks.

Among the demand-side factors, we introduce the *unemployment rate for tertiary-educated youth* (aged 16–34), as it has been shown to be positively associated with the overeducation rate (Croce and Ghignoni 2012; Davia, McGuinness and O'Connell 2017). We also introduce the *youth temporary employment rate* (workers aged 16–34) and the *temporary employment rate* (aged 16–64), as temporary employment is a relevant phenomenon in the Spanish labour market (Polavieja 2003), where it has been negatively associated with overeducation, although the association is positive in other countries such as Italy (Ortiz 2010). We introduce unemployment and temporary employment rates separately in the multinomial analyses because they are strongly associated with one another. In this regard, Baccaro et al. (2016) show that the main driver of cross-national differences in temporary employment rates is the unemployment rate. Studying the case of Spain, Arranz, García-Serrano and Toharia (2010) found that "individuals who become unemployed due to the end of a temporary contract are more likely to exit unemployment by finding another temporary job and less likely to exit through permanent jobs, self-employment or inactivity" (p. 67). In other words, temporary employment and unemployment may easily become two sides of the same trap, especially in a segmented labour market like Spain's. To approach the investment in R&D, which has been shown to be negatively associated with the overeducation rate (Di Pietro 2002), we use the variables *employment in high-technology sectors*, *employment in less knowledge-intensive sectors*, *employment in R&D*, *R&D expenditure per inhabitant* and *R&D expenditure in purchasing power standard* (PPS). Availability of data for different periods limits their use across models. Since all these indicators are attempting to measure the same characteristic, they are introduced separately as robustness checks.

In addition to supply- and demand-side factors, the regional demographic balance is included in the analysis as a control. It considers births (+) and deaths (–), as well as immigration (+) and emigration (–) in the region (de la Fuente (2016) for the period 1987–2015). It captures potential changes in the number of people in the regional labour market and youth interregional migration for educational and/or employment purposes. Ideally, we would like to restrict this measure to young people only and disaggregate it by educational level. However, to our knowledge, de la Fuente (2016) is the only existing source that displays the regional demographic balance for such a long period. Some demographic studies, based on the Spanish Census data for 2001 and 2011, have measured cross-regional

[7] Number of people aged 16–34 with at most ISCED levels 3–4 divided by the number of active people aged 16–34 with at most ISCED levels 3–4, multiplied by 100.

youth migration rates by educational level (González-Leonardo, Recaño and López-Gay 2020). Unfortunately, we cannot make use of these more detailed data as we need yearly data for the whole period under study in order to conduct our analyses.

5. Analytical strategy

We use TSCS analysis to explore the regional variation in the overeducation rate across time and regions. TSCS allows us to look at the influence that the change of the factor variables at a time point (t_0) might have on the dependent variable of interest at the next time point (t_{+1}). This is the most appropriate econometric approach for addressing our hypotheses and the most feasible with the data available. TSCS data typically display both contemporaneous correlations across units (spatial correlation) and unit-level heteroscedasticity (serial correlation), which produce a downward bias of the estimates of the standard errors in ordinary least squares regression. Following Beck and Katz (1995), we use panel-corrected standard error (PCSE) models to account for this serial and spatial correlation and get better inferences than linear models estimated from TSCS data (Bailey and Katz 2011). PCSE is more efficient than other techniques in dealing with spatial and serial correlation derived from TSCS data (Beck and Katz 1995). We also tested for first-order autocorrelation (*xtserial* Stata command) to see if observations in the past are affecting those in the future. The results for each independent variable in relation to the dependent variable were statistically significant, and we corrected our models accordingly (*xtpcse … , corr(ar1)* – Stata command).

In addressing hypotheses *H1* and *H2*, we employ the following equation:

$$\begin{aligned} \ln\_\text{OVERED3}\, it_{+1} = {} & \beta_0 + \beta_1 \ln\_\text{OVERED3}\, t_0 + \beta_2\, \text{z}\_\text{DEMOGRAPHIC}\_\text{B}\, it_0 \\ & + \beta_3\, \text{z}\_\text{SUPPLY}\, t_0 + \beta_4\, \text{z}\_\text{DEMAND}\, t_0 + \varepsilon_{0it} \end{aligned} \tag{1}$$

where *i* stands for the region (Autonomous Community); *t* stands for the year; and ε is the error term. ln_OVERED3 is the overeducation rate for tertiary-educated youth. This is used at t_{+1} as a dependent variable and at t_0 as an independent variable. z_DEMOGRAPHIC_B is a standardized control variable for demographic balance; z_SUPPLY is a vector of supply-side variable(s); and z_DEMAND is a vector of demand-side variable(s).

We use a similar equation for hypotheses *H3a* and *H3b*, where the dependent variables ln_OVERED2 and ln_UNEMPL2 stand for the overeducation and unemployment rates of upper secondary-educated youth. The main supply-side factor is the share of overeducated youth with tertiary education, who might displace youth with upper secondary education towards overeducation and/or unemployment.

$$\begin{aligned} \ln\_\text{OVERED2}\, it_{+1}\, [\ln\_\text{UNEMPL2}]\, it_{+1} = {} & \beta_0 + \beta_1 \ln\_\text{OVERED3}\, t_0 + \beta_2\, \text{z}\_\text{DEMOGRAPHIC} \\ & \_\text{B}\, it_0 + \beta_3\, \text{z}\_\text{DEMAND}\, t_0 + \varepsilon_{0it} \end{aligned} \tag{2}$$

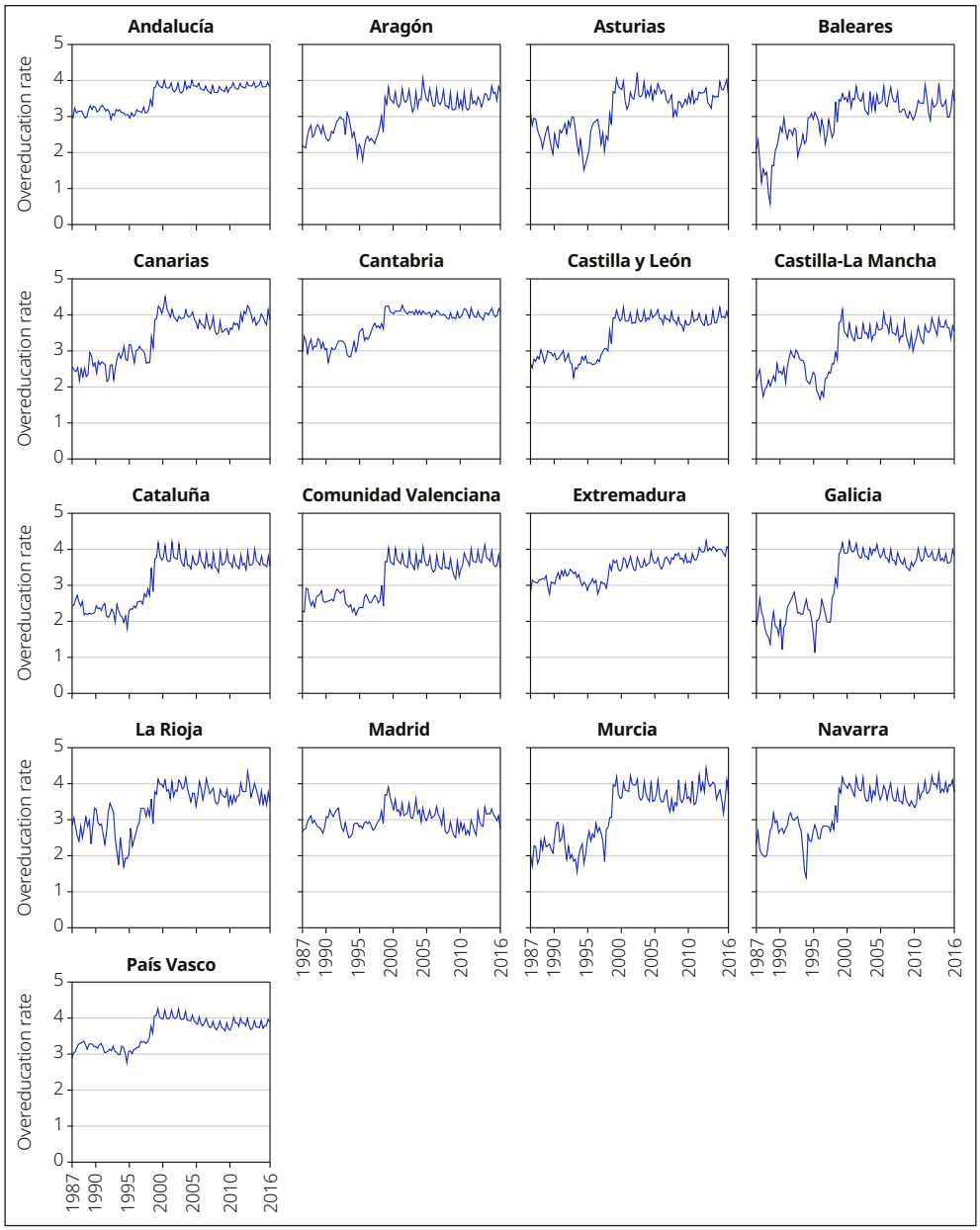
Since EPA data had to be complemented with other statistical sources, and information is not available for all the variables over the complete period of analysis, the panel is not balanced. Following previous studies (e.g. Wakeford 2004), we address this data limitation by employing the analytical strategy of dividing our sample into two subperiods detailed in table SA2 in the supplementary online appendix.

6. Results and discussion

6.1. Regional variation in overeducation

The initial descriptive analysis of the overeducation rate for tertiary- (figure 1) and upper secondary-educated youth (figure 2) suggests regional variation in overeducation, but a similar evolution over time. Figure 1 displays the natural logarithm of the overeducation rate

Figure 1. Natural logarithm of the overeducation rate for tertiary-educated youth across Spanish regions (1987–2016)



Note: Regions (NUTS 2) ordered alphabetically.
Source: Our own calculations based on EPA data.

for tertiary-educated youth across regions from 1987 to 2016, revealing a positive upward trend. This trend is similar to the one found at the national level by McGuinness, Bergin and Whelan (2018) using labour force survey data for the first decade of the twenty-first century. They show that in peripheral European countries such as Greece, Ireland, Italy, Portugal and Spain, the overeducation rates for the whole working population have increased at a steeper rate than in Central and Eastern European countries.

In most Spanish regions, a steady increase is observed over the 1990s, broken by a steep increase at the end of the twentieth century and a subsequent stabilization in the first decades of the twenty-first century. This steep increase is possibly due to a methodological

change in the classification of educational qualifications, derived from an educational reform that restricted access to upper secondary education (FP I – *Ciclos Formativos de Grado Medio* and *Bachillerato*) to those who had achieved a lower secondary education (*Educación Secundaria Obligatoria* – ESO) diploma.[8] Moreover, some courses that used to be considered post-secondary non-tertiary education (ISCED 1997, level 4) (e.g. FP II – *Ciclos Formativos de Grado Superior*) went to being considered short-cycle tertiary education (ISCED 5) with the new ISCED 2011. Even if the content of these courses and the qualification requirements in the labour market did not really change, we do see an increase in the overeducation rate and stabilization due to the inclusion of some vocational courses that used to be classified as ISCED 4 (e.g. FP II – *Ciclos Formativos de Grado Superior*) as ISCED 5 in the 2011 classification. Unfortunately, we cannot differentiate these courses from the rest, as we do not have detailed information to indicate which courses are general (ISCED 54, formerly ISCED 5a) and vocational (ISCED 55, formerly ISCED 5b) under ISCED 2011.

Another important change is that before 2000, the educational classification provided in the EPA included categories such as "three years of tertiary education completed (first cycle), without degree eligibility", which we consider as being tertiary-educated because, before the educational expansion period in Spain (early 2000s), being enrolled in tertiary education was regarded as an asset by employers. Thus, some people might have accessed jobs with a tertiary education requirement even though they had not yet obtained the corresponding qualifications (i.e. they were undereducated). Once the series changed in 2000, only people who had obtained a tertiary education qualification were included in these categories.

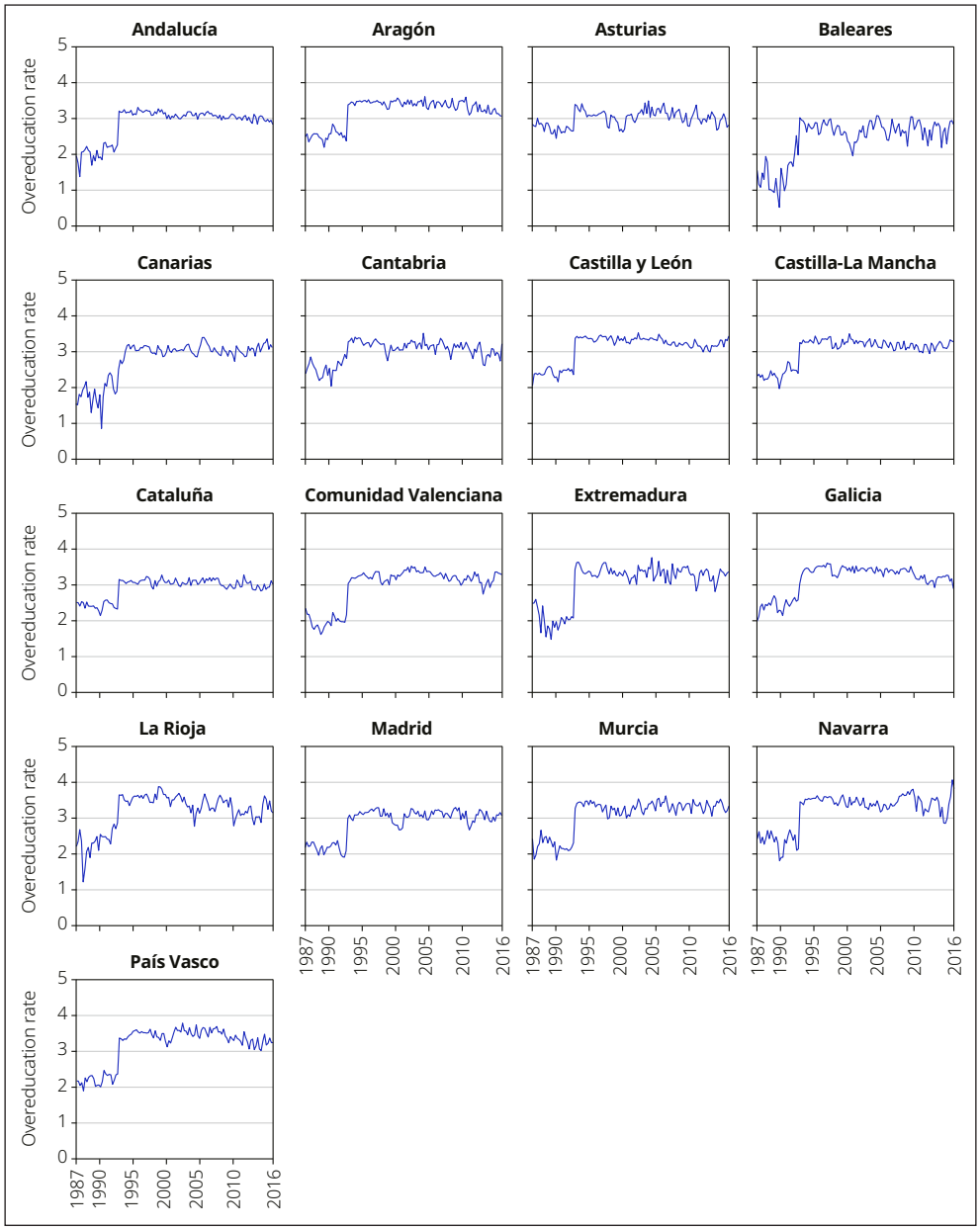
Following the treatment of other instances of structural breaks in TSCS analysis (e.g. Kelly and Witko 2012), we performed the Chow test (Chow 1960) to establish whether the break in the series (between 1999 and 2000) has an influence on the predictors, testing it for all independent variables. In all cases, the test result was statistically significant, meaning that the break in the series does have an influence on that variable trend.[9] Accordingly, we incorporated a step dummy variable (i.e. value 0 before 2000 and value 1 from 2000 onwards) in the analyses to control for the break. We ran the models with and without the break dummy. When including the break dummy, the magnitude of the coefficients decreases but the sign of the coefficients does not change, meaning that the series break affects our dependent variable, but not enough to explain cross-regional variation in overeducation over time.

Figure 2 replicates figure 1 for upper secondary-educated youth. The analysis also shows cross-regional variation in overeducation but a similar overall trend across regions. It is not surprising to see a comparatively high overeducation rate among upper secondary-educated youth in Spain, as previous studies show that this is the case in peripheral European countries (i.e. Greece, Iceland, Ireland, Italy, Portugal and Spain) (Delaney et al. 2020). There is also a break in this trend in the late 1990s. Again, the steep change in the statistical series is possibly due to the legislative change that reclassified some vocational and technical degrees previously considered upper secondary education as tertiary non-university education, followed by a methodological change in the EPA. This legal reclassification was also accompanied by a formal upgrade of the entry requirements for the courses and, therefore, of the skills acquired with this qualification. We also ran the Chow test here and results came back statistically significant. Therefore, we also incorporated the break step dummy variable in the corresponding analyses, to clean up any possible effects of the break in the series on our results.

[8] Organic Law 1/1900 on the General Organization of the Education System, of 3 October 1990 (known by its Spanish acronym LOGSE).

[9] See Chow test results in table SA3 in the supplementary online appendix.

Figure 2. Natural logarithm of the overeducation rate for upper secondary-educated youth across Spanish regions (1987–2016)



Note: Regions (NUTS 2) ordered alphabetically.
Source: Our own calculations based on EPA data.

6.2. Supply- and demand-side factors influencing regional overeducation

Moving to the second objective of this article, we explore supply- and demand-side factors[10] that may influence regional overeducation differences. Tables 1 (period 1) and 2 (period 2) present the association between supply- and demand-side factors and the overeducation rate for tertiary-educated youth one year later. To provide a more intuitive interpretation, we followed Palmer (2011) and transformed the regression coefficients into percentage changes.[11]

[10] Table SA4 in the supplementary online appendix shows cross-regional and time variation of supply- and demand-side factors for each period under study.

[11] Percentage changes are calculated as (exp(coefficient)–1)*100. Full regression table results are available in tables SA5 and SA6 in the supplementary online appendix.

Table 1. Percentage changes in the overeducation rate for the tertiary-educated youth associated with supply- and demand-side factors, period 1 (1987–2016)

	M1	M2	M3	M4	M5	M6	M7	M8	M9
Demographic balance (Y)	1.82	0.37	1.18	1.46	−1.04	−0.06	1.49	−0.62	0.25
Supply-side factors									
Activity rate for tertiary-educated youth (Q)	−8.56***	−5.44***	−8.50***						
Population with tertiary education (Y)				7.69***	10.41***	10.31***			
Graduation rate (Y)							5.76***	6.22***	7.29***
Demand-side factors									
Youth unemployment rate (Q)	−0.05			1.71			1.50		
Youth temporary employment rate (Q)		9.95***			15.84***			15.49***	
Temporary employment rate (Q)			3.44**			6.19***			5.59***

*, ** and *** indicate statistical significance at the 10, 5 and 1 per cent levels, respectively.

Notes: Percentage changes in the overeducation rate for the tertiary-educated youth in t_{+1} associated with a one standard deviation unit increase of supply- and demand-side factors in t_0. Percentage change calculated as (exp(coeff)–1)*100, based on TSCS regression models; Q for quarterly data, Y for yearly data.

Source: Our own calculations based on EPA and complementary sources.

In table 1 (period 1, 1987–2016), we can see that, contrary to hypothesis *H1*, an increase of one standard deviation in the activity rate for tertiary-educated youth in t_0 is associated with a decrease of 5.44 to 8.56 per cent in the overall overeducation rate for tertiary-educated youth in t_{+1}, in line with the results obtained by Delaney et al. (2020). One possible reason for this negative sign is that the regional activity rate among youth works as a proxy for a more dynamic regional labour market, which more effectively accommodates new tertiary-education graduates into the labour market. While we do not have space to focus on this issue in this article, it would be interesting to test this hypothesis in future studies, controlling for GDP per capita and growth. These results hold even when controlling for youth unemployment and the (youth) temporary employment rate. As regards the other two supply-side factors, results are in line with hypothesis *H1* and some previous studies (Groot and van den Brink 2000; Hartog 2000). An increase of one standard deviation in the population with tertiary education is associated with a positive percentage change ranging from 7.69 to 10.41 per cent in the overeducation rate for tertiary-educated youth one year later. A large pool of tertiary graduates, possibly already well positioned in the labour market, may logically delay the job match of fresh young workers with tertiary education. Similarly, an increase of one standard deviation in the graduation rate in t_0 is associated with a percentage increase ranging from 5.76 to 7.29 per cent in the overeducation rate for tertiary-educated youth one year later. In this case, the classic explanation applies; in other words, an increase in the supply of new graduates increases competition for high-skilled jobs, pushing some university graduates into jobs for which they may be overeducated. Thus, these results suggest that the supply-side variables employed here are not equivalent, as they capture different phenomena.

Moving now to demand-side factors, overall, we can see that an increase in the youth unemployment rate in one year is associated with a percentage change ranging from –0.05 to 1.50 per cent in the overeducation rate for tertiary-educated youth one year later. Yet these results are not statistically significant, suggesting that the influence of youth unemployment on the overeducation of tertiary-educated youth is negligible when considering this long period. Furthermore, these results are not in line with previous academic literature considering shorter time periods (Croce and Ghignoni 2012; Davia, McGuinness and O'Connell 2017; Sánchez-Sánchez and Fernández-Puente 2021). Youth unemployment might be a relevant predictor of overeducation among tertiary-educated youth when looking at shorter periods highly influenced by educational expansion (as is the case for Spanish university graduates at the end of the twentieth century and the beginning of the twenty-first), but this does not seem to be the case when a longer period is considered. The longer the period is, and the more diverse it subsequently becomes, the higher the possibility of cancelling effects (for one period it is negative, for the other positive), which would result in an overall negligible effect of youth unemployment.

Conversely, results for the (youth) temporary employment rate are statistically significant. An increase of one standard deviation in the youth temporary employment rate is positively associated with a 9.95 to 15.84 per cent change in the overeducation rate for tertiary-educated youth one year later. The results for the overall temporary employment rate work in the same direction, but the associated percentage change is smaller (3.44 to 6.19 per cent). These results contradict Ortiz's (2010) study. Using European Community Household Panel data (1994–2001), he found that being employed in a fixed-term contract was negatively associated with overeducation in Spain (i.e. preference for job security explanation) but positively associated in Italy (i.e. stepping stone explanation). However, his study explored a much shorter time period and did so at the individual level. We hypothesize that the difference in results is explained by our longer research period and by our focus on the aggregate level and evolution of the phenomenon. The growth of the (youth) temporary employment rate is possibly associated with the growth of economic sectors that do not so easily accommodate workers with tertiary education (Baranowska and Gebel 2010; Polavieja 2003).

Moving to table 2 (period 2, 1999–2016), while a one standard deviation change in the activity rate of tertiary-educated youth in t_0 is still negatively associated with the overeducation rate for tertiary-educated youth in t_{+1} (ranging from –9.33 to –9.52 per cent), the percentage of the population with tertiary education now also presents a negative association with the dependent variable, showing that a standard deviation increase in the share of the population with tertiary education in t_0 is associated with a percentage change ranging from –5.76 to –11.13 per cent in the overeducation rate for tertiary-educated youth in t_{+1}. Again, the supply of highly skilled adult workers seemingly contributes to a decrease in overeducation among tertiary-educated youth because it creates a more dynamic labour market. However, considering that the magnitude of the coefficient for the youth activity rate is also greater than in the analysis for the previous period (table 1, 1987–2016), the dynamism of the labour market in absorbing university graduates seems stronger from 1999 onwards. The influence of the graduation rate on the overeducation rate for tertiary-educated youth remains similar to that in period 1, except for the fact that the size of the percentage change is reduced (2.18 to 4.79 per cent in period 2 compared with 5.76 to 7.29 per cent in period 1).

With regard to demand-side factors, a change of one standard deviation in the share of employment in high-technology sectors in one year is negatively associated with the overeducation rate for tertiary-educated youth one year later (–4.14 to –6.42 per cent). This confirms that the risk of overeducation among tertiary-educated youth might be lower in regions with more dynamic economic sectors where growth entails a higher demand for highly skilled workers. We initially expected the share of employment in less knowledge-intensive sectors to have a positive influence on the overeducation rate for tertiary-educated youth. However, results show a small but negative association (–1.05 to –1.98 per cent). It might be the case that an increase in the number of less knowledge-intensive jobs also leads to a more dynamic economy, complementing the jobs created by high-technology sectors and reducing the likelihood of overeducation among workers regardless of their educational attainment. Similarly, expenditure on and employment in R&D are also negatively associated with the overeducation rate for tertiary-educated youth, providing further evidence for this argument, in line with the findings of previous research on European countries (Di Pietro 2002; Ghignoni and Verashchagina 2014). However, results for the share of people employed in R&D show a less consistent pattern.

Overall, our results suggest that cross-regional differences in the growth of the overeducation rate for tertiary-educated youth are due not only to growth in the supply of tertiary education but also to demand-side characteristics.

It could be argued that part of this cross-regional difference might be strongly driven by the Madrid Region because of a federal district effect upon people who live in nearby regions (e.g. Castilla-La Mancha and Castilla y León) but work in Madrid. Previous studies have confirmed that Madrid is the region that receives the largest number of university graduates from other Spanish regions, and from its neighbours in particular (González-Leonardo 2020; González-Leonardo, Recaño and López-Gay 2020 – using Spanish census data). Furthermore, a case study of the Castilla y León region shows that, since the beginning of the twenty-first century, those emigrating from the region are predominantly university-qualified youth, mainly heading to Madrid city (González-Leonardo and López-Gay 2019 – also using Spanish census data). Given previous evidence, as a robustness check, we ran all the models without including the regions of Madrid, Castilla-La Mancha and Castilla y León, and all results hold both substantively and in terms of statistical significance.[12]

[12] The results are available upon request.

Table 2. Percentage changes in the overeducation rate for the tertiary-educated youth associated with supply- and demand-side factors, period 2 (1999–2016)

	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15
Demographic balance (Y)	0.59	−0.27	−0.17	−0.13	−0.02	−0.68	−1.32	−0.96	−1.21	−1.30	−0.35	−2.18	−0.99	−0.92	−0.71
Supply-side factors															
Activity rate for tertiary-educated youth (Q)	−9.33***	−9.33***	−9.52***	−9.52***	−9.52***										
Population with tertiary education (Y)						0.02	−5.76***	−11.13***	−7.24***	−8.21***					
Graduation rate (Y)											4.79***	0.24	3.86**	2.27*	2.18*
Demand-side factors															
Employment in high-technology sectors (Y)	−4.14***					−5.21***					−6.42***				
Employment in less knowledge-intensive sectors (Y)		−0.56					−1.98***					−1.05*			
People employed in R&D (Y)			−1.75*					5.97***					−4.92***		
Spending on R&D euro/inhabitant (Y)				−3.15***					0.99					−5.10***	
Spending on R&D PPS (Y)					−2.96***					2.12					−4.91***

*, ** and *** indicate statistical significance at the 10, 5 and 1 per cent levels, respectively.

Notes: Percentage changes in the overeducation rate for the tertiary-educated youth in t_{+1} associated with a one standard deviation unit increase of supply- and demand-side factors in t_0. Percentage change calculated as (exp(coeff)−1)*100, based on TSCS regression models; Q for quarterly data, Y for yearly data.

Source: Our own calculations based on EPA data and complementary sources.

6.3. Crowding out or "one size fits all"?

Table 3 considers relevant supply- and demand-side factors predicting the overeducation and unemployment rates of upper secondary-educated youth for period 1 (1987–2016), while table 4 displays the same analyses for period 2 (1999–2016).[13] In both cases, the most relevant supply-side variable is the overeducation rate for tertiary-educated youth, as we are interested in assessing to what extent overeducated tertiary-educated youth might be crowding out young people with upper secondary education into overeducation and/or unemployment.

Table 3 shows that a one standard deviation change in the overeducation rate for tertiary-educated youth in t_0 is strongly associated with a statistically significant percentage change in the overeducation rate for upper secondary-educated youth in t_{+1} (28.40 per cent), but only when introduced in the model in combination with the youth unemployment rate (M1), which has been shown to be a strong predictor of overeducation (Croce and Ghignoni 2012; Davia, McGuinness and O'Connell 2017). When introduced in combination with the (youth) temporary employment rate (M2 and M3), the predictive power of the overeducation rate for tertiary-educated youth vanishes in favour of (youth) temporary employment. When considering the results for the unemployment rate for upper secondary-educated youth, table 3 shows that the overeducation rate for tertiary-educated youth seems to have a statistically significant influence (–16.81 per cent) only when combined with the youth unemployment rate (M4). Including the overall youth unemployment rate helps us to control for its effect and see the net effect other variables have on the unemployment rate of upper secondary-educated youth. In subsequent models, when the overeducation rate for tertiary-educated youth is included with the (youth) temporary employment rate (M5 and M6), its predictive power vanishes again, with a standard deviation change of the (youth) temporary employment rate in one year negatively associated with the unemployment rate of upper secondary-educated youth one year later (–3.95 and –10.24 per cent, respectively). Thus, these results suggest that the overeducation rate for tertiary-educated youth might contribute to the overeducation rate for upper secondary-educated youth, but not to their unemployment. Similarly, while (youth) temporary employment also contributes to overeducation, it prevents unemployment to some extent.

Table 3. Percentage changes in the overeducation and unemployment rates for upper secondary-educated youth associated with supply- and demand-side factors, period 1 (1987–2016)

	Overeducation			Unemployment		
	M1	M2	M3	M4	M5	M6
Demographic balance (Y)	3.73*	2.66	2.88	–5.60***	–3.08**	–2.36
Overeducation rate for tertiary-educated youth (Q)	28.40***	5.99	24.48	–16.81***	–2.94	–6.45
Youth unemployment rate (Q)	0.31			12.30***		
Youth temporary employment rate (Q)		9.94***			–3.95***	
Temporary employment rate (Q)			7.21***			–10.24***

*, ** and *** indicate statistical significance at the 10, 5 and 1 per cent levels, respectively.

Notes: Percentage changes in the overeducation and unemployment rates for upper secondary-educated youth in t_{+1} associated with a one standard deviation unit increase of supply- and demand-side factors in t_0. Percentage change calculated as (exp(coeff)–1)*100, based on TSCS regression models; Q for quarterly data, Y for yearly data.

Source: Our own calculations, based on EPA data and complementary sources.

[13] Full regression results are available in tables SA7 and SA8 in the supplementary online appendix.

Table 4. Percentage changes in the overeducation and unemployment rates for upper secondary-educated youth associated with supply- and demand-side factors, period 2 (1999–2016)

	Overeducation					Unemployment				
	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
Demographic balance (Y)	1.34*	1.27**	1.37*	1.31*	1.15	–3.61*	–3.58**	–4.45**	–3.70**	–5.88***
Overeducation rate for tertiary-educated youth (Q)	46.23***	44.05***	46.08***	49.48***	49.33***	–22.20**	–21.42**	–23.36**	–21.42**	–14.62**
Employment in high-technology sectors (Y)	0.62					–2.28				
Employment in less knowledge-intensive sectors (Y)		–11.22***					4.91			
People employed in R&D (Y)			6.23***					1.65		
Spending on R&D euro/inhabitant (Y)				6.22***					1.02	
Spending on R&D PPS (Y)					6.82***					1.45

*, ** and *** indicate statistical significance at the 10, 5 and 1 per cent levels, respectively.

Notes: Percentage changes in the overeducation and unemployment rates for upper secondary-educated youth in t_{+1} associated with a one standard deviation unit increase of supply- and demand-side factors in t_0. Percentage change calculated as (exp(coeff)–1)*100, based on TSCS regression models; Q for quarterly data, Y for yearly data.

Source: Our own calculations, based on EPA data and complementary sources.

Results in table 4 show that the growth of the overeducation rate for tertiary-educated youth in the previous year is in all cases positively associated with an increase in the overeducation rate for those with upper secondary education in the current year, remaining statistically significant, with percentage changes ranging from 44.05 to 49.48 per cent. These results hold even when controlling for the range of demand-side factors considered in the analysis. Contrary to our findings for the overeducation rate for tertiary-educated youth, the results show that most demand-side factors in t_0 (i.e. employment and expenditure in R&D) are associated with an increase in the overeducation rate for upper secondary-educated youth in t_{+1}. These factors possibly reflect the relative growth of occupations that are more prone to accommodate skills provided by higher education than those provided by mid-level education. Such employment growth is more decisive in reducing overeducation among young tertiary-educated workers than among their upper secondary-educated peers.

Conversely, the growth in the share of employment in less knowledge-intensive sectors reduces overeducation among upper secondary-educated youth (–11.22 per cent). Therefore, empirical evidence supports hypothesis *H3a*, suggesting that the regional overeducation rate among tertiary-educated youth in t_0 is positively associated with an increase in the overeducation rate among upper secondary-educated youth in t_{+1}. However, a consistent negative association is found between the overeducation rate for tertiary-educated youth in t_0 and the unemployment rate for upper secondary-educated youth in t_{+1} (–14.62 to –23.36 per cent). Among the demand-side factors, none show statistically significant results. Thus, employing tertiary-educated youth in occupations for which they are overeducated does not seem to be necessarily associated with an increase in the unemployment rate for upper secondary-educated youth. Employment growth may accommodate the employment of both, guaranteeing that unemployment does not grow among the latter. Since tertiary-educated youth are partly crowding out their upper secondary-educated peers towards overeducation but not towards unemployment, these results lean towards hypothesis *H3b*, in line with the Job Competition Theory of hierarchically ordered worker and job queues (Thurow 1975). The job queue is long enough to employ youth with tertiary and upper secondary education and avoid unemployment, but it comes at the expense of employment for both groups in jobs for which they are overqualified. These results are also partly in line with the findings by Oesch and Rodríguez-Menés (2011), which show a positive net employment change in the middle quintile of the job quality distribution, which would accommodate an increase in the rate of overeducation among tertiary-educated youth without any consequence among youth with upper secondary education. Although we also find that this increase does not impact unemployment among upper secondary-educated youth, we do find that it affects their overeducation rate. As indicated by previous studies (Mavromaras and McGuinness 2012; McGuinness, Bergin and Whelan 2018), one potential explanation for the Spanish case could lie in the weakness of vocational education pathways, which makes it more difficult for upper secondary-educated youth to find an adequately matched job.

7. Conclusions

In this article, we have explored the role of supply- and demand-side factors in relation to cross-regional differences in overeducation among tertiary- and upper secondary-educated youth in Spain. First, our results confirm the importance of the supply-side factors, given that an increase in the regional activity rate among tertiary graduates in one year is positively associated with an increase in overeducation in the following year. Yet, in addition to an excess supply of tertiary graduates, cross-regional differences in overeducation among them are also related to demand-side factors, such as youth unemployment and (youth) temporary employment. More specifically, the functioning of regional labour markets, their sectoral and occupational structure, and investment in R&D are also influential factors in providing an adequate education–job match. In sum, our analyses suggest that while educational expansion can lead to a regional oversupply of tertiary graduates and

contribute to overeducation, regional demand-side factors are also relevant in explaining and promoting youth overeducation. Accordingly, policies seeking to promote an adequate education–job match should bear in mind both regional supply- and demand-side factors. This is especially relevant to countries with high regional disparities (e.g. Italy), where the relevance of supply- and demand-side factors in explaining youth overeducation might vary across regions.

Second, our results also confirm a crowding out effect associated with overeducation, as the growth in the overeducation rate among tertiary graduates in one year is positively associated with the growth in overeducation among upper secondary-educated youth in the following year. However, we find no crowding out effect of overeducation among tertiary-educated youth in terms of unemployment among their upper secondary-educated peers. One possible explanation for this is that the employment growth in many of the periods considered was enough to accommodate the overeducation of both tertiary- and upper secondary-educated youth without leading to an increase in unemployment among the latter. Economic growth might have been insufficient to guarantee adequately matched jobs for both groups, but sufficient to avoid unemployment among those with lower qualifications as a result of being crowded out of their jobs by those with higher qualifications. (Youth) temporary employment practices are one of the remedial policies that may prevent youth unemployment. Thus, the main policy implication of these results is that in order to guarantee adequate youth employment, it is not enough to look at youth unemployment figures. The adequacy of the match between youth education and employment requirements is an important element to bear in mind in ensuring that young people access quality jobs where their skills can be fully utilized.

Acknowledgements

We are grateful for comments from the journal editors and three anonymous reviewers that helped us improve the article. We would also like to thank Florentino Felgueroso and María Ángeles Davia-Rodríguez for their advice and support on working with labour force data, Miguel González-Leonardo for his advice on the availability of data on interregional mobility of qualified workers in Spain, and Miguel Ángel Malo for reading and providing comments on an earlier version of this article.

Competing interests

The authors declare that they have no competing interests.

References

Arranz, José M., Carlos García-Serrano, and Luis Toharia. 2010. "The Influence of Temporary Employment on Unemployment Exits in a Competing Risks Framework". *Journal of Labor Research* 31 (1): 67–90. https://doi.org/10.1007/s12122-009-9078-1.

Baccaro, Lucio, Rüya Gökhan Koçer, Jorge Galindo, and Valeria Pulignano. 2016. "Determinants of Indefinite Contracts in Europe: The Role of Unemployment". *Comparative Sociology* 15 (6): 794–838. https://doi.org/10.1163/15691330-12341412.

Bailey, Delia, and Jonathan N. Katz. 2011. "Implementing Panel-Corrected Standard Errors in R: The pcse Package". *Journal of Statistical Software, Code Snippets* 42 (1): 1–11. https://doi.org/10.18637/jss.v042.c01.

Baranowska, Anna, and Michael Gebel. 2010. "The Determinants of Youth Temporary Employment in the Enlarged Europe: Do Labour Market Institutions Matter?" *European Societies* 12 (3): 367–390. https://doi.org/10.1080/14616690903165434.

Bar-Haim, Eyal, Louis Chauvel, and Anne Hartung. 2019. "More Necessary and Less Sufficient: An Age-Period-Cohort Approach to Overeducation from a Comparative Perspective". *Higher Education* 78 (3): 479–499. https://doi.org/10.1007/s10734-018-0353-z.

Beck, Nathaniel, and Jonathan N. Katz. 1995. "What to Do (and Not to Do) with Time-Series Cross-Section Data". *American Political Science Review* 89 (3): 634–647. https://doi.org/10.2307/2082979.

Büchel, Felix, and Maarten van Ham. 2003. "Overeducation, Regional Labor Markets, and Spatial Flexibility". *Journal of Urban Economics* 53 (3): 482–493. https://doi.org/10.1016/S0094-1190(03)00008-1.

Capsada-Munsech, Queralt. 2019. "Measuring Overeducation: Incidence, Correlation and Overlaps across Indicators and Countries". *Social Indicators Research* 145 (1): 279–301. https://doi.org/10.1007/s11205-019-02112-0.

Chow, Gregory C. 1960. "Tests of Equality between Sets of Coefficients in Two Linear Regressions." *Econometrica*, 28 (3): 591–605. https://doi.org/10.2307/1910133.

Croce, Giuseppe, and Emanuela Ghignoni. 2012. "Demand and Supply of Skilled Labour and Overeducation in Europe: A Country-Level Analysis". *Comparative Economic Studies* 54 (2): 413–439. https://doi.org/10.1057/ces.2012.12.

Davia, María A., Seamus McGuinness, and Philip J. O'Connell. 2017. "Determinants of Regional Differences in Rates of Overeducation in Europe". *Social Science Research* 63 (March): 67–80. https://doi.org/10.1016/j.ssresearch.2016.09.009.

Dekker, Ron, Andries de Grip, and Hans Heijke. 2002. "The Effects of Training and Overeducation on Career Mobility in a Segmented Labour Market". *International Journal of Manpower* 23 (2): 106–125. https://doi.org/10.1108/01437720210428379.

de la Fuente, Ángel. 2016. "Series largas de algunos agregados demográficos regionales, 1950–2015 (RegDat–Dem versión 5.0)". Estudios sobre la Economía Española – 2016/14. Madrid: FEDEA e Instituto de Análisis Económico.

Delaney, Judith, Seamus McGuinness, Konstantinos Pouliakas, and Paul Redmond. 2020. "Educational Expansion and Overeducation of Young Graduates: A Comparative Analysis of 30 European Countries". *Oxford Review of Education* 46 (1): 10–29. https://doi.org/10.1080/03054985.2019.1687433.

Di Pietro, Giorgio. 2002. "Technological Change, Labor Markets, and 'Low-Skill, Low-Technology Traps'". *Technological Forecasting and Social Change* 69 (9): 885–895. https://doi.org/10.1016/S0040-1625(01)00182-2.

Dolado, Juan J., Florentino Felgueroso, and Juan F. Jimeno. 2000. "Youth Labour Markets in Spain: Education, Training, and Crowding-Out". *European Economic Review* 44 (4–6): 943–956. https://doi.org/10.1016/S0014-2921(99)00050-1.

Frei, Christa, and Alfonso Sousa-Poza. 2012. "Overqualification: Permanent or Transitory?" *Applied Economics* 44 (14): 1837–1847. https://doi.org/10.1080/00036846.2011.554380.

García-Serrano, Carlos, and Miguel Ángel Malo-Ocaña. 1997. "¿Es diferente el desajuste educativo de las mujeres?" *Información Comercial Española* 760: 117–128.

Ghignoni, Emanuela, and Alina Verashchagina. 2014. "Educational Qualifications Mismatch in Europe: Is it Demand or Supply Driven?" *Journal of Comparative Economics* 42 (3): 670–692. https://doi.org/10.1016/j.jce.2013.06.006.

González-Leonardo, Miguel. 2020. "Migraciones internas, inmigración exterior y emigración de españoles hacia el extranjero: un balance por nivel educativo. ¿Es España un país de baja movilidad?" *Documents d'Anàlisi Geográfica* 66 (3): 591–627. https://doi.org/10.5565/rev/dag.596.

González-Leonardo, Miguel, and Antonio López-Gay. 2019. "El nuevo paradigma de las migraciones internas en España: migrantes urbanos más móviles y cualificados. El caso de Castilla y León". *Scripta Nova. Revista Electrónica de Geografía y Ciencias Sociales* 23: Article No. 609. https://doi.org/10.1344/sn2019.23.21615.

González-Leonardo, Miguel, Joaquin Recaño, and Antonio López-Gay. 2020. "Selectividad migratoria y acumulación regional del capital humano cualificado en España". *Investigaciones Regionales/Journal of Regional Research* 47 (2): 113–133. https://doi.org/10.38191/iirr-jorr.20.013.

Green, Francis, and Yu Zhu. 2010. "Overqualification, Job Dissatisfaction, and Increasing Dispersion in the Returns to Graduate Education". *Oxford Economic Papers* 62 (4): 740–763.

Groot, Wim, and Henriëtte Maassen van den Brink. 2000. "Overeducation in the Labor Market: A Meta-Analysis". *Economics of Education Review* 19 (2): 149–158. https://doi.org/10.1016/S0272-7757(99)00057-6.

Habibi, Nader, and Arnold Kamis. 2021. "Reaching for the Stars and Settling for the Moon: Recent Trends in Overeducation of US Workers 2002–2016". *Journal of Education and Work* 34 (2): 143–157. https://doi.org/10.1080/13639080.2021.1897551.

Hansson, Bo. 2007. "Effects of Tertiary Expansion: Crowding-Out Effects and Labour Market Matches for the Higher Educated". OECD Education Working Papers No. 10. Paris: OECD.

Hartog, Joop. 2000. "Over-Education and Earnings: Where are we, where should we go?" *Economics of Education Review* 19 (2): 131–147. https://doi.org/10.1016/S0272-7757(99)00050-3.

Jauhiainen, Signe. 2011. "Overeducation in the Finnish Regional Labour Markets". *Papers in Regional Science* 90 (3): 573–588. https://doi.org/10.1111/j.1435-5957.2010.00334.x.

Jimeno, Juan F., and Samuel Bentolila. 1998. "Regional Unemployment Persistence (Spain, 1976–1994)". *Labour Economics* 5 (1): 25–51. https://doi.org/10.1016/S0927-5371(96)00019-X.

Kelly, Nathan J., and Christopher Witko. 2012. "Federalism and American Inequality". *Journal of Politics* 74 (2): 414–426. https://doi.org/10.1017/s0022381611001678.

Kiersztyn, Anna. 2013. "Stuck in a Mismatch? The Persistence of Overeducation during Twenty Years of the Post-Communist Transition in Poland". *Economics of Education Review* 32 (February): 78–91. https://doi.org/10.1016/j.econedurev.2012.09.009.

Klein, M. 2015. "The Increasing Unemployment Gap between the Low and High Educated in West Germany: Structural Or Cyclical Crowding-Out?" *Social Science Research* 50 (March): 110–125. https://doi.org/10.1016/j.ssresearch.2014.11.010.

Korpi, Tomas, and Michael Tåhlin. 2009. "Educational Mismatch, Wages, and Wage Growth: Overeducation in Sweden, 1974–2000". *Labour Economics* 16 (2): 183–193. https://doi.org/10.1016/j.labeco.2008.08.004.

Mavromaras, Kostas, and Seamus McGuinness. 2012. "Overskilling Dynamics and Education Pathways". *Economics of Education Review* 31 (5): 619–628. https://doi.org/10.1016/j.econedurev.2012.02.006.

Mavromaras, Kostas, Seamus McGuinness, and Yin King Fok. 2009. "Assessing the Incidence and Wage Effects of Overskilling in the Australian Labour Market". *Economic Record* 85 (268): 60–72. https://doi.org/10.1111/j.1475-4932.2008.00529.x.

McGoldrick, KimMarie, and John Robst. 1996. "Gender Differences in Overeducation: A Test of the Theory of Differential Overqualification". *American Economic Review* 86 (2): 280–284.

McGuinness, Seamus, Adele Bergin, and Adele Whelan. 2018. "Overeducation in Europe: Trends, Convergence, and Drivers". *Oxford Economic Papers* 70 (4): 994–1015. https://doi.org/10.1093/oep/gpy022.

Meliciani, Valentina, and Debora Radicchia. 2016. "Informal Networks, Spatial Mobility and Overeducation in the Italian Labour Market". *Annals of Regional Science* 56 (2): 513–535. https://doi.org/10.1007/s00168-016-0752-y.

Oesch, Daniel, and Jorge Rodríguez-Menés. 2011. "Upgrading or Polarization? Occupational Change in Britain, Germany, Spain and Switzerland, 1990–2008". *Socio-Economic Review* 9 (3): 503–531. https://doi.org/10.1093/ser/mwq029.

Ortiz, Luis. 2010. "Not the Right Job, but a Secure One: Over-Education and Temporary Employment in France, Italy and Spain". *Work, Employment and Society* 24 (1): 47–64. https://doi.org/10.1177/0950017009353657.

Ortiz, Luis, and Aleksander Kucel. 2008. "Do Fields of Study Matter for Over-Education? The Cases of Spain and Germany". *International Journal of Comparative Sociology* 49 (4–5): 305–327. https://doi.org/10.1177/0020715208093079.

Ortiz-Gervasi, Luis, and Seamus McGuinness. 2018. "Overeducation among European University Graduates: A Constraint or a Choice?" In *European Youth Labour Markets: Problems and Policies*, edited by Miguel Ángel Malo and Almudena Moreno Mínguez, 157–174. Cham: Springer.

Palmer, Christopher. 2011. *Interpretation of β in Log-Linear Models*. https://web.mit.edu/cjpalmer/www/beta_in_log-linear_regression.pdf.

Polavieja, Javier G. 2003. "Temporary Contracts and Labour Market Segmentation in Spain: An Employment-Rent Approach". *European Sociological Review* 19 (5): 501–517.

Pollmann-Schult, Matthias. 2005. "Crowding-out of Unskilled Workers in the Business Cycle: Evidence from West Germany". *European Sociological Review* 21 (5): 467–480. https://doi.org/10.1093/esr/jci033.

Ponds, Roderik, Gerard Marlet, Clemens van Woerkens, and Harry Garretsen. 2016. "Taxi Drivers with a PhD: Trickle Down or Crowding-Out for Lower Educated Workers in Dutch Cities?" *Cambridge Journal of Regions, Economy and Society* 9 (2): 405–422. https://doi.org/10.1093/cjres/rsw008.

Quintini, Glenda. 2011. "Over-Qualified or Under-Skilled? A Review of Existing Literature". OECD Social, Employment and Migration Working Papers, No. 121. Paris: OECD.

Ramos, Raúl, and Esteban Sanromá. 2013. "Overeducation and Local Labour Markets in Spain". *Tijdschrift voor economische en sociale geografie* 104 (3): 278–291. https://doi.org/10.1111/j.1467-9663.2012.00752.x.

Romaní, J., J.M. Casado-Díaz, and A. Lillo-Bañuls. 2016. "On the Links between Spatial Variables and Overeducation". *Applied Economics Letters* 23 (9): 652–655. https://doi.org/10.1080/13504851.2015.1095996.

Sánchez-Sánchez, Nuria, and Adolfo Cosme Fernández-Puente. 2021. "Overeducation, Persistence and Unemployment in Spanish Labour Market". *Journal of Economic Studies* 48 (2): 449–467. https://doi.org/10.1108/JES-07-2019-0315.

Summerfield, Fraser, and Ioannis Theodossiou. 2017. "The Effects of Macroeconomic Conditions at Graduation on Overeducation". *Economic Inquiry* 55 (3): 1370–1387. https://doi.org/10.1111/ecin.12446.

Thurow, Lester C. 1975. *Generating Inequality: Mechanisms of Distribution in the U.S. Economy*. New York: Basic Books.

Tsang, Mun C., Russell W. Rumberger, and Henry M. Levin. 1991. "The Impact of Surplus Schooling on Worker Productivity". *Industrial Relations: A Journal of Economy and Society* 30 (2): 209–228. https://doi.org/10.1111/j.1468-232X.1991.tb00786.x.

Vahey, Shaun P. 2000. "The Great Canadian Training Robbery: Evidence on the Returns to Educational Mismatch". *Economics of Education Review* 19 (2): 219–227. https://doi.org/10.1016/S0272-7757(98)00029-6.

Vera-Toscano, Esperanza, and Elena C. Meroni. 2021. "An Age–Period–Cohort Approach to the Incidence and Evolution of Overeducation and Skills Mismatch". *Social Indicators Research* 153 (2): 711–740. https://doi.org/10.1007/s11205-020-02514-5.

Verhaest, Dieter, and Rolf van der Velden. 2013. "Cross-Country Differences in Graduate Overeducation". *European Sociological Review* 29 (3): 642–653. https://doi.org/10.1093/esr/jcs044.

Wakeford, Jeremy. 2004. "The Productivity–Wage Relationship in South Africa: An Empirical Investigation". *Development Southern Africa* 21 (1): 109–132. https://doi.org/10.1080/0376835042000181444.

Waldorf, Brigitte, and Seong Do Yun. 2016. "Labor Migration and Overeducation among Young College Graduates". *Review of Regional Research* 36 (2): 99–119. https://doi.org/10.1007/s10037-015-0101-0.