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Interregional migration of human capital in Spain

Miguel González-Leonardo ^{a,b,*}, Antonio López-Gay ^{a,b} and
Albert Esteve ^{a,c}

ABSTRACT

While levels of internal mobility have been trending down in many advanced economies, the interregional migration rates of Spanish young adults have increased. This paper analyses the internal movements of the Spanish-born population aged 25–39 between NUTS-2 regions from 1992 to 2018, including sub-periods linked to the Spanish economic context. The analysis incorporates the urban–rural dimension within each region and the educational level of migrants, a variable that has not been included in Spanish internal migration studies. We used flow register data of migration and sociodemographic information from the Labor Force Survey. The results show that migrations between regions have become more unbalanced over time, especially since the 2008 crisis. In addition, a new trend of out-migration from cities in peripheral regions has been detected, which contrasts with the former high level of rural out-migration. A great educational selectivity of out-migrants and a growing internal brain drain have also been found. Moreover, qualified human capital accumulation has been increasing in Madrid.

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internal migration; peripheral regions; shrinking cities; selective migration; interregional brain drain; human capital accumulation

JEL CLASSIFICATIONS

I21; J11; J24; J61; R23

INTRODUCTION

In the global context of decreasing internal migration in most developed countries (Alvarez et al., 2021; Bell & Charles-Edwards, 2013; Champion et al., 2018; Molloy et al., 2011), the interregional mobility rates of Spanish young adults have increased 2.5 times since the 1990s. This revival of internal migration in Spain among the local population, however, has not been documented. Due to the arrival of international migrants since the late 1990s, most of the recent contributions about migration in Spain have focused on the study of immigration (Arango, 2015; Domingo & Cabré, 2015; Reher & Requena, 2011) and on the internal mobility patterns of foreign-born populations (Bayona-i-Carrasco et al., 2017; Gil-Alonso et al., 2015; Recaño, 2016; Reher & Silvestre, 2011). After the 2008 economic crisis, researchers paid more

CONTACT Miguel González-Leonardo  gonzalezm@iiasa.ac.at

^aCentre d* Estudis Demogràfics, Barcelona, Spain

^bDepartment of Geography, Universitat Autònoma de Barcelona, Barcelona, Spain

^cDepartment of Political and Social Sciences, Universitat Pompeu Fabra, Barcelona, Spain

*Present address: International Institute for Applied Systems Analysis, Wittgenstein Centre for Demography and Global Human Capital, Vienna, Austria

attention to foreigners' emigration (Prieto-Rosas et al., 2018) and to the outflows of qualified Spaniards abroad (Domínguez-Mujica et al., 2016; González-Enríquez & Martínez-Romera, 2017; González-Ferrer, 2013).

Despite the abundance of studies analysing the emigration of the Spanish-born population to other countries, it is important to underline that the intensity of these flows is remarkably lower than the levels of interregional migrations within the country. The rise in the internal migration of the Spanish-born population, in addition to being a singular trend in high-income countries, represents a turning point with respect to the decreasing trend experienced in Spain since the 1973 economic crisis (García-Coll & Stillwell, 1999; Recaño, 2004), which followed the massive rural exodus of the 1960s (Cabré et al., 1985; Camarero, 1993; Collantes & Pinilla, 2019). Due to the low intensity of internal migration from 1973 to the end of the 1990s, Spain has usually been characterized as a country with a low intensity of internal migration in comparative studies (Bell et al., 2015; Champion et al., 2018; Rowe & Patias, 2020). In this sense, the recent increase in the interregional mobility of young Spaniards constitutes a paradigm shift and could mean a convergence towards the levels observed in other developed countries.

In this paper, we analyse the interregional migrations of Spanish-born individuals aged 25–39, the most mobile age group in Spain, over the period from 1992 to 2018. The study was developed at the NUTS-2 level, which corresponds to the 17 autonomous communities in Spain with their own regional government (Figure 1). We split the analysed period into five subperiods according to the Spanish economic context: 1992–96, 1997–2001, 2002–07, 2008–13 and 2014–18. First, we analyse interregional flows in absolute and relative terms. Second, due to the territorial heterogeneity within the NUTS-2 units, we distinguish between



Figure 1. Spanish regions (autonomous communities), NUTS-2 units.

Source: Authors' own elaboration.

rural and urban areas in each region. Finally, we add to the analysis the educational profile of migrants, a variable that has not yet been included in the Spanish literature and which has been little addressed in studies on internal migration due to the lack of available data on migrants' characteristics (Faggian et al., 2017).

To do so, we used the Spanish Population Register of Movements to analyse migration flows and the Labor Force Survey to study the educational profile of migrants. The following research questions structure this paper:

- Has the growth in interregional migration of young Spaniards increased inequalities in net migration rates?
- What is the net migration trend in rural and urban areas?
- What is the educational profile of interregional migrants? How does it vary for populations entering and leaving each region?
- How have internal migration patterns by educational attainment changed over time? Have there been significant differences during periods of economic growth and recession?

THEORETICAL BACKGROUND: THE INTERNAL MIGRATION OF HUMAN CAPITAL AND THE SHRINKING CITIES PHENOMENON

As high-income countries have completed their demographic transition, migration has replaced natural growth as the leading cause of demographic change (Rees et al., 2017). Despite the central position of international migration in the academic debate, most long-distance movements take place within country borders (Skeldon, 2008). Globally, the population living outside its birth region but within its native country is 3.5 times greater than the number of individuals residing abroad (Bell & Charles-Edwards, 2013, pp. 12–13). However, these two types of mobility have followed divergent trends. International flows have increased, especially since 1990 (Castles et al., 2014), while interregional movements have experienced a significant decrease in a number of developed states (Bell et al., 2015; Rowe, 2018). Internal migration in the United States has been trending down since 1950 (Molloy et al., 2011), a pattern that became commonly observed after 1980 in a wide range of countries, including Australia, Brazil, Japan, Russia, and certain states in Southeast Asia and Latin America (Abel & Heo, 2018; Champion et al., 2018; Pontarollo & Segovia, 2019). However, interregional migration rates have not experienced a remarkable decrease in some European countries, such as Germany or the UK (Alvarez et al., 2021; Champion et al., 2018), while a few cases have recorded increases for specific population groups, such as the Swedish youth (Bernard & Kolk, 2019) or the southern Italians (Basile et al., 2019). Spanish young adults should also be included among these groups, which contradict the global decreasing trend observed in high-income countries.

Furthermore, the intensity of internal migration varies among countries. While North America, Australia and Northern Europe register high mobility rates, Southern and Eastern European countries show low migration intensities (Bell et al., 2015; Rowe, 2018). However, the low rates observed in Southern Europe and therefore in Spain have not been historically constant. During the 1950s and 1960s, an accelerated process of industrialization and agricultural mechanization took place in Spain (Collantes & Pinilla, 2019). As a consequence, a massive rural exodus and an increase in interregional migrations were experienced (Cabr   et al., 1985; Camarero, 1993). Those rural to urban movements caused one of the most intense rural depopulation processes in Europe (Collantes & Pinilla, 2019). Following the oil crisis in 1973, rural to urban migration lost intensity, and interregional migration moved to a period of low mobility and greater dispersion (Garc  a-Coll & Stillwell, 1999; Reca  o, 2004). In this period, Spain was characterized as a low

mobility country in cross-national comparative studies. Recent works that have analysed the internal migrations of Spaniards (Gutiérrez-Portilla et al., 2018) used gross rates and did not identify the new mobility paradigm among Spanish young adults. The observed increase in interregional migration could indicate that this type of mobility in Spain has been approaching the levels recorded in countries with higher intensity of interregional migration. If so, internal migration could be playing an increasing role in the redistribution of human capital.

On a global scale, some authors have analysed the impact of internal migration on population redistribution from a regional perspective (Rees et al., 2017; Rowe et al., 2019). Other studies have focused on its effect on the demographic dynamics of cities (López-Gay, 2008; López-Gay et al., 2020; Wolff & Wiechmann, 2018) and rural areas (Collantes & Pinilla, 2019; Johnson & Lichter, 2019). To provide a more precise analysis of interregional migratory movements and due to the territorial heterogeneity within each region, we combine both perspectives: regional and urban–rural. There is evidence that highlights a growing polarization not only between regions (González-Leonardo et al., 2020) but also between cities (Martínez-Fernández et al., 2012), which was accentuated after the economic crisis of 2008 (Audirac et al., 2012). To test whether the processes that we analyse in this article are linked to different economic stages, especially to the 2008 crisis, the studied periods are divided according to gross domestic product (GDP) growth and the unemployment rate in Spain.

In addition, an increasing contribution of migratory flows between cities has been documented, together with a decreasing role of rural to urban mobility (González-Leonardo et al., 2019; Rowe et al., 2019). Traditionally, the latter has been the historical constant, first compiled in Ravenstein's (1885) laws. In this new context, there are a few global cities and regions concentrating technological and financial activities and advanced services that act as centres of population attraction (Harvey, 2006; Sassen, 1991). At the same time, peripheral regions and their cities show little competitiveness in the current globalized economy. These areas have significant technological innovation gaps and great out-migration rates of the local youth (Kabisch & Haase, 2011; Sassen, 1991; Soja, 2000), especially among the highly educated (Nelle, 2016; Ubarevičienė & Van Ham, 2017).

Therefore, we consider that it is important to incorporate the educational dimension to understand the recent trends of internal migration. The educational level of internal migrants has rarely been studied from a regional perspective due to the availability of suitable data on migrant characteristics (Faggian et al., 2007, 2017; Franklin, 2003), and it has not been documented in Spain. Most of the quantitative literature on migration that includes the educational level of migrants focuses on international migration, namely on brain drain processes (Docquier & Marfouk, 2006; Docquier & Rapoport, 2012) or global cities attracting highly skilled migrants (Faggian & Royuela, 2010; Florida, 2002). Other contributions to internal migration point out that high levels of educational attainment are associated with an increase in the likelihood of migrating (Bernard & Bell, 2018; Borjas, 1994; González-Leonardo, 2020). Migrants are commonly not a representative sample of the origin population but rather are positively selected individuals (Bernard & Bell, 2018; Docquier & Marfouk, 2006; Gould, 1982). In the case of Spain, in recent decades there has been a remarkable educational expansion (González-Leonardo & López-Gay, 2019), which could be one of the factors triggering the increase in interregional mobility.

Human capital flight, or brain drain, is understood as the loss of qualified labour force (Docquier & Rapoport, 2012). The migratory flows involved in this processes normally move from peripheral areas to cores of the territorial system, commonly global cities (González-Leonardo et al., 2019, 2020; Sassen, 1991). The flight of local talent has negative implications for endogenous development and boosts the accumulation processes in receiving centres (Myrdal, 1957; Docquier & Rapoport, 2012). Mobility is explained as a rational behavior of individuals to

obtain greater returns for their abilities (Sjaastad, 1962), which are better rewarded in top-level places in the territorial hierarchy (Fielding, 1992; Sánchez-Moral et al., 2018). The greater the mismatch between skills and their returns in the labour market at origin, the higher out-migration of qualified human capital (Martin-Brelot et al., 2010). Non-economic factors, such as amenities in various forms, from cultural activities to cosmopolitan environments, should also be considered in the choice of a place of residence (Florida, 2002; Rodríguez-Pose & Ketterer, 2012). However, economic determinants are commonly more important (Martin-Brelot et al., 2010).

DATA AND METHOD

The objective of this study is to investigate the interregional migration of young adults born in Spain between 25 and 39 years old. As mentioned in the introduction, we used NUTS-2 regions as geographical units of analysis, which correspond to the Spanish autonomous communities. Each community has an autonomous regional government that manages certain budgets and competencies. We focused on individuals aged 25 to 39, the group with the highest rates of internal migration in Spain, because we aim to study the mobility of human capital among young adults. Since a large portion of the population under this age group is still enrolled in education (Bernard & Bell, 2018), we started our analysis at the age of 25. Populations born abroad were excluded to avoid interactions with their high levels of internal migration, which is associated to different stages in their migratory itineraries (Recaño, 2016).

Two sources from the Spanish Statistical Office (Instituto Nacional de Estadística – INE) were used for the analysis: the Register of Population Movements (*Estadística de Variaciones Residenciales* – EVR) and the Labor Force Survey (*Encuesta de Población Activa* – EPA). Our study begins in 1992, when the EPA incorporated variables that allow us to identify migrations between regions, and ends in 2018, the last year with available data from the EVR at the time of writing. We defined five periods: 1992–96, 1997–2001, 2002–07, 2008–13 and 2014–18. This categorization responds to the operational criteria of five to six years and matches the different economic cycles. The first two phases, between 1992 and 2001, cover a period of economic expansion, although a small recession took place in the early 1990s. The period 2002–07 is characterized by a strong GDP growth and low levels of unemployment. Between 2008 and 2013, the global financial crisis hit Spain with high intensity. Finally, the economic indicators again reflected a growth period from 2014 to 2018.

We used the EVR to analyse interregional out-migration, in-migration and net migration in each NUTS-2 region. This dataset collects all changes of residence crossing municipal border across 8,130 units. It contains the origin–destination matrices, is released annually and includes basic demographic variables. Using this source, interregional migration matrices were analysed using circular migration diagrams, a visualization method introduced by Abel and Sander (2014) to plot bilateral migration flows. We made use of classical indicators of demographic analysis to explore migration patterns by region: age-specific migration rates (MRs) by groups in five-year age intervals and out-migration rates (ORs), in-migration rates (IRs) and net migration rates (NMRs) for the 25–39-year-old population. The last indicator (NMR) was also computed by three types of areas, following the geographical frame of the *Atlas of Urban Areas of the Ministry of Transport, Mobility and Urbanism* (MITMA, 2020): (1) provincial capitals, which only include the core cities within each NUTS-2 unit; (2) other urban municipalities, which contain suburbs and those municipalities with more than 10,000 inhabitants that are not integrated in urban areas, and (3) rural municipalities, those with fewer than 10,000 inhabitants. Data from the population registers (PRs) between 1998 (when the register became available) and 2019, and the 1991 Census were used as denominators. We used a linear interpolation

to estimate the population of each spatial unit from 1991 to 1998:

$$MR_{x+5}^{t,t+n} = \frac{M_{x+5}^{t,t+n}/n}{(P_{x+5}^{t,t} + P_{x+5}^{t,t+n})/2} * 1000 \quad OR_{25-39}^{i,t,t+n} = \frac{O_{25-39}^{i,t,t+n}/n}{(P_{25-39}^{i,t,t} + P_{25-39}^{i,t,t+n})/2} * 1000$$

$$IR_{25-39}^{i,t,t+n} = \frac{\frac{I_{25-39}^{i,t,t+n}}{n}}{\frac{P_{25-39}^{i,t,t} + P_{25-39}^{i,t,t+n}}{2}} * 1000 \quad NMR_{25-39}^{i,t,t+n} = \frac{(I_{25-39}^{i,t,t+n} - O_{25-39}^{i,t,t+n})/n}{(P_{25-39}^{i,t,t} + P_{25-39}^{i,t,t+n})/2} * 1000$$

where M is the number of migrants; P^t is the initial population; P^{t+n} is the final population; O^i is the number of migrants moving out of the region i ; and I^i is the number of migrants moving into the region i . The first indicator was calculated for individuals from age x to $x + n$ over the period $t + n$. The other three indicators were calculated for populations aged 25–39 years old during the period $t + n$.

Given that the EVR does not provide information on the educational attainment, we used the EPA to study the educational level of interregional migrants. This is a quarterly survey of 160,000 individuals, although the sample size has slightly changed over time. The EPA allows us to identify the migratory status since 1992 according to the region of birth and region of residence (lifetime migration). Initially, we tried to use the region of residence in the previous year to restrict our study to recent movements, but we did not find consistent results due to the insufficient number of cases in this variable at NUTS-2 level. We also attempted to perform the analysis at the NUTS-3 level using the region of birth, but the results were again inconsistent. To analyse the education attainment, we established two categories: university graduates and the population without a university education. Using the annual average of the four quarters, we calculated the percentage of university graduates among the individuals who moved in and out from every region, as well as for the native populations. Finally, we produce an NMR by educational attainment (NMRE) combining flow and stock data from EVR and EPA sources. The NMRE is calculated as the difference between the IR multiplied by the percentage of in-migrants with educational achievement e and the OR multiplied by the percentage of out-migrants with educational attainment e . The NMRE is used to estimate the NMRs by educational level:

$$NMRE_{25-39}^{i,t,t+n} = IR * \sum_{x=t}^{t+n} \left(\frac{Ie_{25-39}^{i,x}}{I_{25-39}^{i,x}} \right) - OR * \sum_{x=t}^{t+n} \left(\frac{Oe_{25-39}^{i,x}}{O_{25-39}^{i,x}} \right)$$

where IR is the in-migration rate; I^i is the number of in-migrants in the region i ; Ie^i is the number of in-migrants with educational attainment e in the region i ; OR is the out-migration rate; O^i is the number of out-migrants from the region i ; and Oe^i is the number of out-migrants with educational attainment e in the region i . All components were calculated for individuals aged 25–39 for time t .

Regarding the limitations of the databases we used in this study, underreporting is the main issue of the EVR. For the emigration of Spaniards abroad, an underestimation ranging from 17% to 35% is reported (Romero-Valiente & Hidalgo-Capitán, 2014). However, there are no estimates of underreporting in interregional migrations. It is also important to note the improvement in the recording interregional migration flows in 1998, when the Population Register was implemented (Martí & Ródenas, 2004). Regarding the EPA, there are limitations and assumptions when we use the place of birth to measure migration. We do not know the precise date when migrants arrived in the current place of residence or when or where they obtained the university degree. However, students' mobility in Spain is low, and most of them choose universities according to the proximity to their parents' place of residence (Reques-Velasco,

2007), which reduces the relevance of the latter effect. Only 10% of Spanish undergraduates move to other regions to receive a university education (Rodríguez-Rodríguez & Domínguez-Mujica, 2019). Moreover, although some migrants left their birth region at an early age and were trained in the destination region, this can also be considered a loss of human capital, talent and skills for the regions of origin (González-Leonardo & López-Gay, 2019).

RESULTS

The increase in interregional out-migration from peripheral regions

Figure 2 represents interregional MRs by age for the Spanish-born population. The classic patterns of mobility are observed: dependent movements at childhood, followed by educational, labour and retirement migration, ending with movements associated with ages of dependency. As mentioned above, mobility related to university education has a low intensity in Spain, and most of the interregional migrants move afterwards, between the ages of 25 and 39. The largest growth in internal migration throughout the analysed period is observed in this age group. The interregional MRs in the 25–39 age group multiplied by 2.5 over the studied period, from 10‰ in 1992–96 to 23‰ in 2014–18. MRs have increased in periods of economic expansion and constriction, but the greatest increase is observed at the turn of the century.

Figure 3 shows the origin–destination matrices of interregional migratory movements for the Spanish-born population aged 25 to 39, using the annual average flow for each period. The outflows were represented closest to the circumference, and the inflows were plotted farther away. The arrow at the end indicates directionality. To ensure comparability among graphs, the size of the axis in each region was set using the period that records the largest number of migrations. In 1992–96, there was an average annual flow of 71,700 young adults. The matrices show that the migratory movements, in general, were quite balanced and in accordance with the volume of the resident population in each region. The 1997–2001 period shows an increase in interregional migration: almost 100,000 movements that crossed regional limits were registered. This was due, in part, to an increase in the size of the age group 25–39 (8% growth compared with the previous period). Out- and inflows increased in most of the regions, although the former experienced a slightly higher rise in the sending peripheral regions with less economic development. These regions are mainly located in inland Spain (Castile and León, Castile-La Mancha and Extremadura) and in the north-western (Galicia

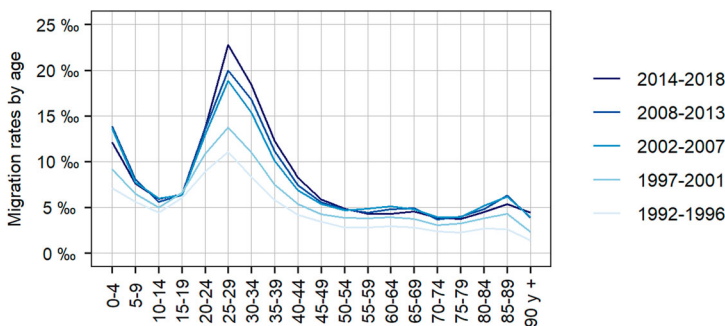


Figure 2. Annual rates (%) of interregional migration for the Spanish-born population by age group: 1992–2018.

Source: Authors' own elaboration using the Register of Population Movements, Population Register and Population Census 1991.

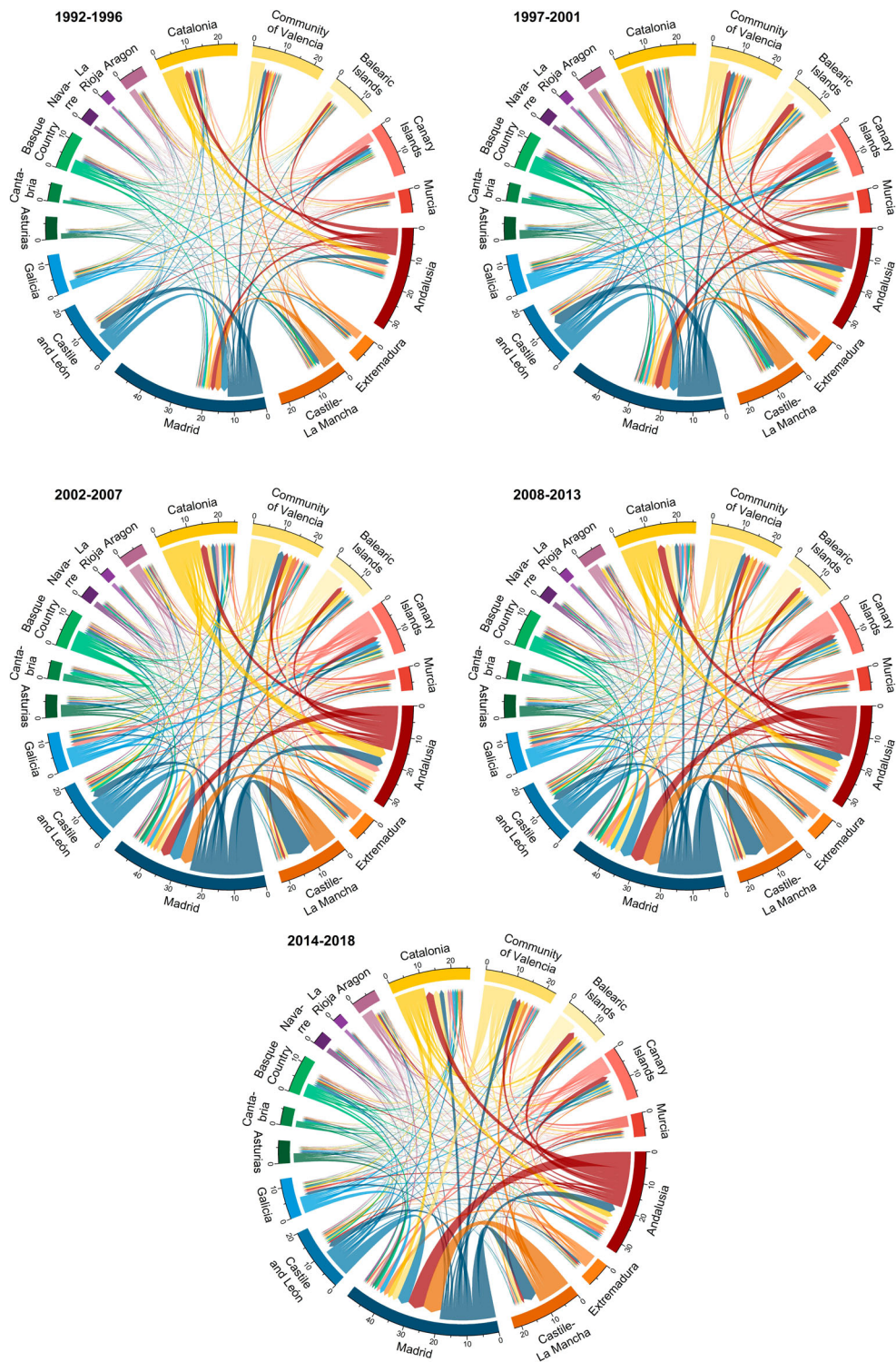


Figure 3. Interregional migration matrices for the Spanish-born population aged 25–39 years old: 1992–2018.

Note: Flows represent the annual average for each period in thousands.

Source: Authors' own elaboration using the *Estadística de Variaciones Residenciales* (EVR).

and Asturias). We also observe an increase in the inflows to the Spanish tourist archipelagos: Canary and Balearic Islands.

From 2002 to 2007, the country experienced a period of great economic growth, and the average interregional annual flow increased by 35%, reaching 135,000 movements. Compared with the previous period, the size of the Spanish-born population in the 25–39 age group grew by only 2%. We identify an increase in in- and outflows in all regions. We also observe a widening of the gap between regions, which produced a more unbalanced scenario. The in-migration flows to the Canary and Balearic Islands stagnated, while the out-migration from both areas increased. In Madrid, which most of its territory comprises the largest Spanish metropolitan area, an acceleration in interregional inflows is registered, as well as an increase in the number of outflows toward the neighbouring region of Castile-La Mancha. This phenomenon corresponds to the process of suburbanization from Madrid towards the north of Castile-La Mancha.

The average annual flow dropped slightly to 132,000 during the crisis from 2008 to 2013 and to 125,000 in the 2014–18 recovery stage. However, the absolute number of flows is strongly determined by the size of the age group 25–39, which experiences a remarkable reduction due to the arrival of small cohorts (22% decrease from 2002–07 to 2014–18). The matrices are similar to those in the period 2002–07, although we observe an increase in inflows to Madrid, while the outflows to Castile-La Mancha show a considerable reduction. Negative balances continue to grow in the inland peripheral regions with an out-migration tradition, as well as in northern Spain and Andalusia. However, due to the reduction in the size of this age group, the trends in absolute numbers become more difficult to observe. Therefore, we calculated relative indicators of out-migration, in-migration and net migration to analyse migrations controlling variations in population size over time.

In general, ORs and IRs grew over time, evidencing a general increase in interregional movements on a continuous basis (Figure 4). However, both indicators did not grow to the same extent in all regions. In the inland peripheral territories surrounding Madrid, which registered strong out-migration before the 1970s (Castile and León, Extremadura, and Castile-La Mancha), outflows experienced a higher increase than inflows over the analysed period, which resulted in an intensification of the negative NMRs. The net rates changed from -4.2% to -9.5% in Castile and León, from 2.2% to -8.1% in Castile-La Mancha, and from -0.5% to 10.1% in Extremadura. Nevertheless, the decreasing pattern was not continuous over time in Castile-La Mancha because of the suburbanization flows from Madrid. Asturias and Galicia in the north and Andalusia in the south shared similar trends, but the negative net migration was less significant.

Some regions with different socio-economic characteristics show positive net migration during the first periods and values close to zero after the economic crisis of 2008. This is the case for the Community of Valencia (Mediterranean), Cantabria (north), La Rioja (inland), Murcia and the Canary Islands (south). The region of Madrid experienced the opposite dynamic and registered a sharp increase in inflows, especially during the last two periods, with a positive NMR of 10.7% in 2014–18, while the values were close to zero before the crisis. The Balearic Islands registered their migratory peak in 1997–2001, with lower positive NMRs between 2002 and 2013, which rose again in 2014–18. Catalonia, whose capital and largest city is Barcelona (the second most populated city after Madrid), registered the lowest ORs and IRs. Net migration presented values close to zero in most of the studied period, although a slight rise in the IR is observed after 2014, which resulted in a positive NMR of 2.9% .

Urban flight from depopulated regions

In recent years, Castile and León, Extremadura and Castile-La Mancha, the inland regions that were most affected by previous episodes of rural depopulation, show high losses of young adults due to internal migration in their provincial capitals, which are mainly small and medium-sized cities (Figure 5). NMRs reached -11% , -9.9% and -9.7% , respectively. This is a new trend

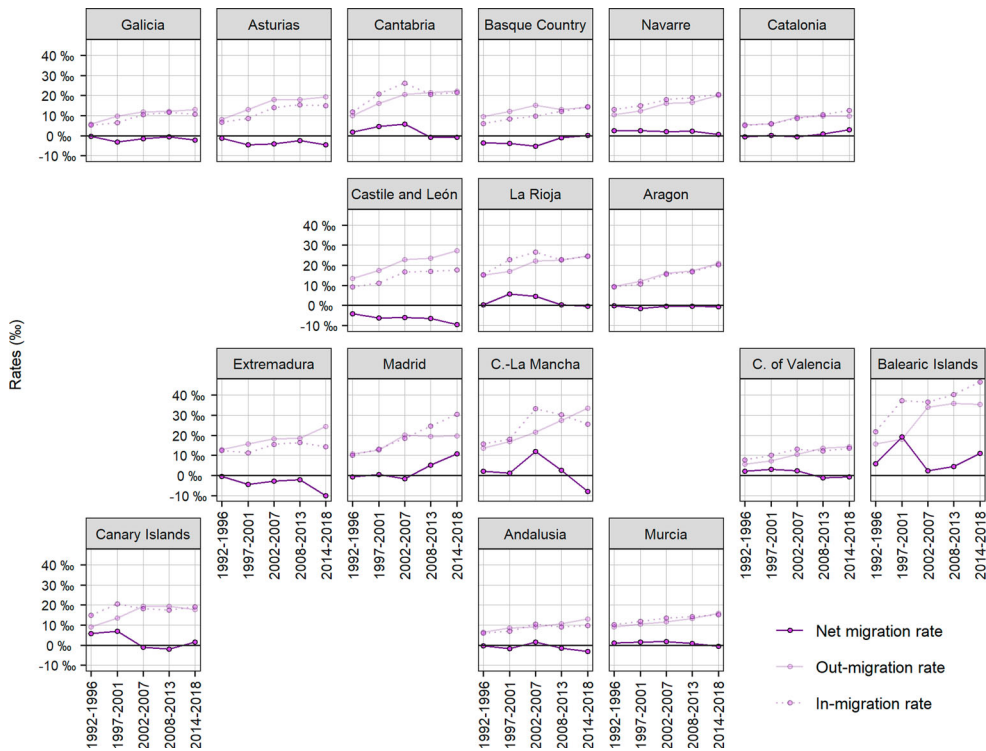


Figure 4. Out-migration, in-migration and net migration rates (%) by region for the Spanish-born population aged 25–39 years old: 1992–2018.

Note: Regions are ordered according to their location.

Source: Authors' own elaboration using the *Estadística de Variaciones Residenciales* (EVR), population registers (PRs) and Census 1991.

compared with the patterns registered before the economic crisis, when negative net migration was mainly circumscribed to rural municipalities. Both rural and urban areas registered increasing population loss by internal migration over time, but the capitals experienced a greater flight of Spanish young adults. We observe a similar trend in the northern periphery regions: Asturias and, to a lesser extent, Galicia and Cantabria. The provincial capitals of Andalusia, the Community of Valencia and Aragon, regions with different development status and locations, also show an incipient urban exodus, although their outflows are of low intensity. We also identify suburbanization flows from Madrid's urban area to small cities and rural settlements of the neighbouring region of Castile-La Mancha in 2002–07.

In Madrid, the positive net migration in the inner city (the capital of Spain) experienced a great growth since 2008 and reached a net rate of 20.1‰ in 2014–18. A positive balance growth is also observed in the Catalan capitals, mainly as a consequence of the growing attractiveness of Barcelona to young adults from other Spanish regions. The net migration in the Basque capitals shift from negative to positive at the end of the period analysed. Nevertheless, the positive net migration is low. In the Balearic Islands, there are not major differences between the three territorial typologies.

Selective migration, brain drain and the accumulation of qualified human capital

As a result of educational expansion, the percentage of Spanish young adults with university studies has grown throughout the last decades for both the total native population and

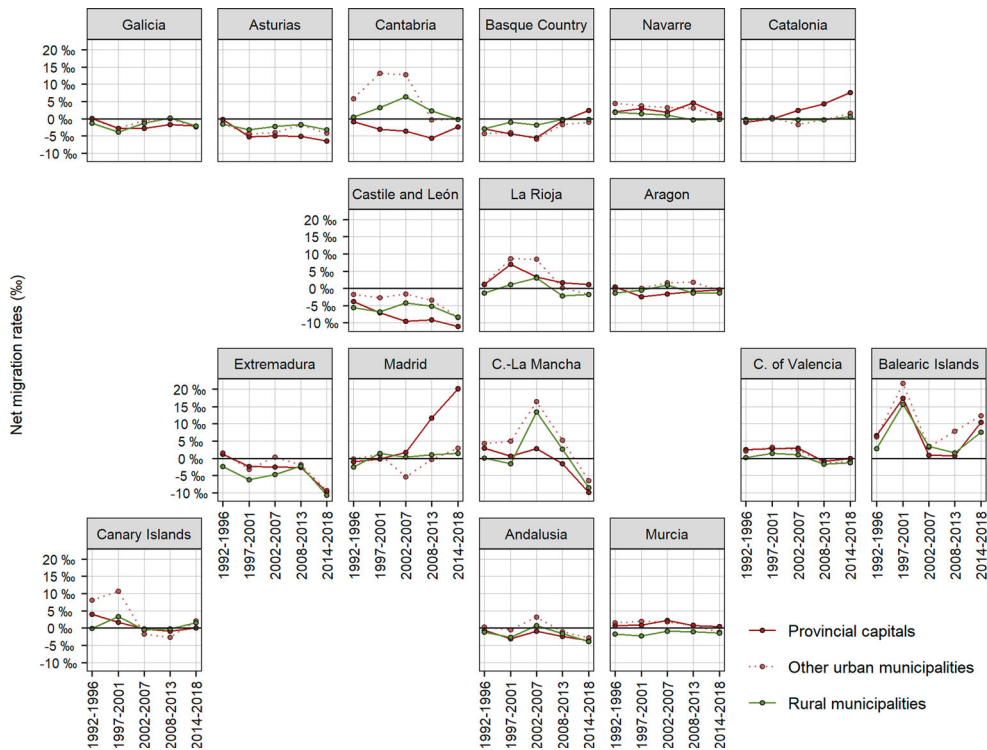


Figure 5. Interregional net migration rate for the Spanish-born population aged 25–39 years old by region and territorial typology (provincial capitals, other urban municipalities and rural areas): 1992–2018.

Note: Regions are ordered according to their location.

Source: Authors' own elaboration using the *Estadística de Variaciones Residenciales* (EVR), population registers (PRs) and Census 1991.

interregional migrants (Figure 6). However, the proportion of university graduates among migrants has grown faster, evidencing stronger mechanisms of selective migration. While the percentage of native young adults with university education rose from 16.2% in 1992–96 to 32.7% in 2014–18, it increased from 17.4% to 42.4% in the case of internal migrants.

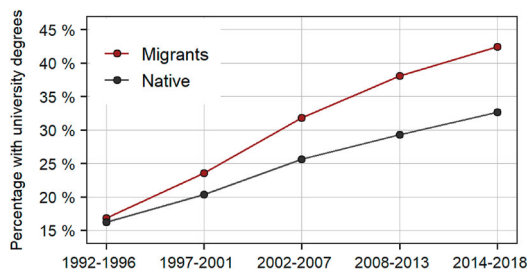


Figure 6. Percentage of interregional migrants and native population with a university degree. Spanish-born individuals aged 25–39 years old: 1992–2018.

Source: Authors' own elaboration using the *Estadística de Variaciones Residenciales* (EVR).

In general, the effect of selective migration is identifiable in almost all regions and periods (Figure 7). In other words, the educational level of individuals who leave their region of birth is higher than that observed for native-born populations. However, we can identify certain nuances. Most of the regions have positive selectivity throughout the analysed period, except Extremadura and Andalusia during the 1990s, Madrid since 2002 and Catalonia since 2008. However, negative selectivity only reached a significant level in Madrid, where 30.7% of the out-migrants and 40.4% of the native-born had university education in 2014–18. The selective migration in peripheral inland regions (Castile and León, Extremadura, and Castile-La Mancha) as well as in north-western regions (Asturias, Galicia and Cantabria) has been strengthened, especially after the financial crisis of 2008. This trend is greatest in Castile and León, where the proportion of out-migrants with university degrees grew from 20.1% in 1992–96 to 57.2% in 2014–18, while the figure rose from 18% to 37% for the native population.

Selective out-migration is generally accompanied by an important gap in the educational achievement between individuals leaving the region and those arriving in. The gap has grown over time and, once again, the inland and northern regions show the greatest gap. The educational profiles of interregional in- and out-migrants were similar in Castile and León in 1992–96, with a percentage of university graduates of 20–25%. However, 25 years later, the proportion grew to 35% among young adults arriving in the region, but to 57.2% in the case of the population leaving Castile and León, the highest figure for out-migrants in the whole country. Out-migrants have been more educated than in-migrants in all regions since 2008, except in Madrid and Catalonia. In the region of Madrid, 65% of residents aged 25–39 and born in

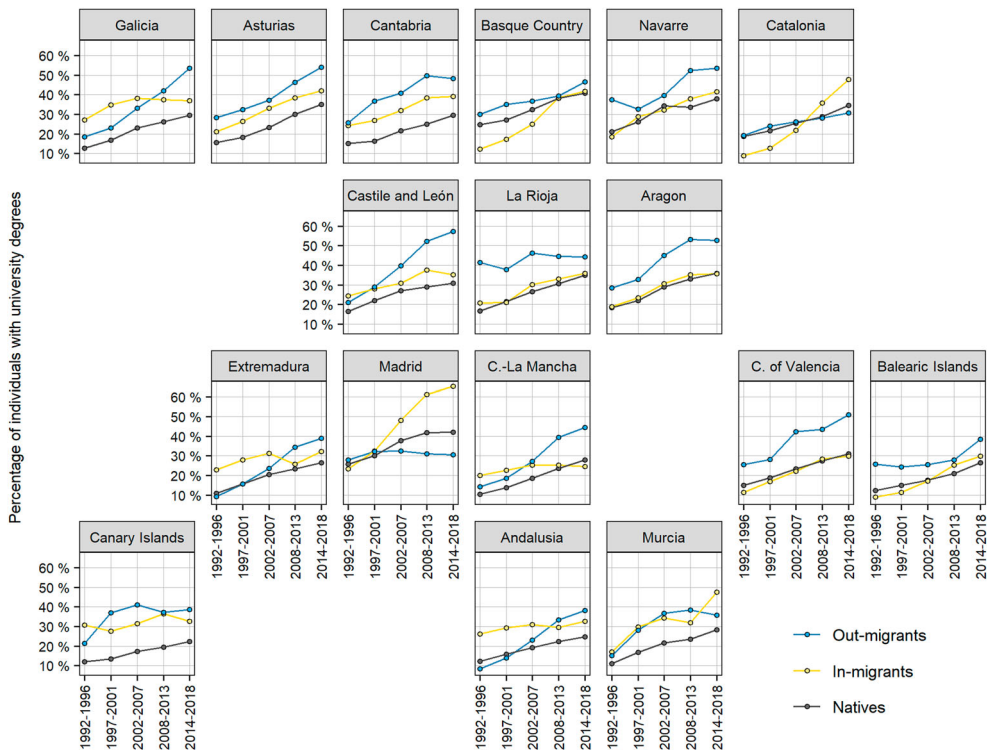


Figure 7. Percentage of university degrees among interregional out-migrants, in-migrants and native populations by region. Spanish-born individuals aged 25–39 yearsold: 1992–2018.

Note: Regions are ordered according to their location.

Source: Authors' own elaboration using the *Estadística de Variaciones Residenciales* (EVR).

other Spanish regions had a university degree in the period 2014–18, a value that double such percentage among the population born in Madrid and living in other Spanish regions, 30.7%. The increase in the educational attainment of in-migrants is very clear, since both groups had values of approximately 25% in 1992–96.

So far, we have separately analysed MNRs and the educational attainment of migrants. Figure 8 combines both variables to estimate the NMRs for young adults by educational level. The intensification of population loss due to internal migration in inland peripheral regions has occurred mainly as a consequence of the increase of negative net rates of university graduates. At the beginning of the analysed period, Castile and León, Castile-La Mancha, Extremadura and Asturias registered net rates close to zero for individuals with both educational levels. Nevertheless, the rate of university graduates shifted to negative in these regions after the 2008 economic crisis and reached high losses during 2014–18. The migratory movements of young adults without a university degree have remained quite stable during the last 25 years, except for the abovementioned case of Madrid's urban sprawl into Castile-La Mancha.

The same trends than in the interior and the north-west are observed in regions with different levels of development located in the north (Galicia and Cantabria), eastern (Aragon, Community of Valencia and Navarra) and south (Andalusia). However, the NMRs of university graduates did not register significant relative losses, while the balance of the population without university education was positive in some cases. Madrid became the most important centre of attraction for highly qualified young people after the 2008 economic crisis. In the 2014–18

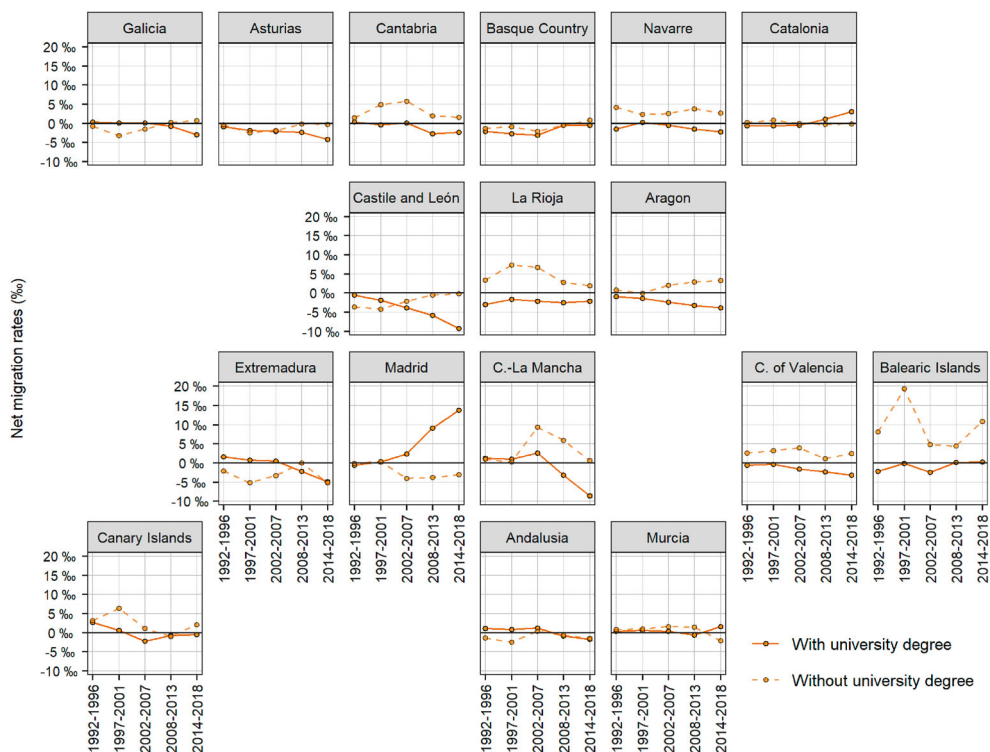


Figure 8. Interregional net migration rates for the Spanish-born population aged 25–39 years by region and educational attainment: 1992–2018.

Note: Regions are ordered according to their location.

Source: Authors' own elaboration using the *Estadística de Variaciones Residenciales* (EVR), population registers (PRs), Census 1991 and *Encuesta de Población Activa* (EPA).

period, it reached a remarkable positive net rate of 15%. The growth of the net rate in Catalonia was entirely due to the migratory gain of qualified young adults, mostly moving to Barcelona. The positive net migration in the Balearic Islands was the consequence of the region's attractiveness to young adults without a university degree.

DISCUSSION AND CONCLUSIONS

In response to our first research question, the increase in the interregional migration of Spanish young adults has brought increasingly unequal population exchanges between regions, driven by growing processes of regional socio-economic inequality. The sending peripheral regions in the interior and north-west of the country, especially the former, have registered increasing negative NMRs. In addition, answering our second research question, the provincial capitals of these regions, which are small and medium-sized cities in Spain, are currently the territories experiencing the most intense negative net migration of young adults, which is contributing to growing processes of urban shrinkage. Following our third research question, we have identified an increase in the selectivity of out-migrants from sending regions that has not been compensated by the educational level of the interregional migrants moving in. In this new scenario, the gap between the educational achievement of in- and out-migrants has increased and, together with a higher propensity to out-migrate, has enhanced the loss of qualified human capital. An incipient out-migration in their capital cities is currently affecting these regions, which suffered intense depopulation dynamics in rural areas during the massive rural exodus of the 1960s. Currently, population flight is no longer a predominantly rural and widespread phenomenon, as was the out-migration wave of the 1960s, but is mainly urban and highly selective in terms of the educational level of out-migrants.

All these changes have accelerated since the 2008 economic crisis. Therefore, in response to the last research question, we observed significant variations between economic stages. In this context, the economic polarization between regions and cities that has been reinforced after the 2008 financial crisis (Audirac et al., 2012; Martínez-Fernández et al., 2012) has had a substantial impact on the patterns and educational composition of internal migration among Spanish young adults. Regions that have been left behind in the new globalized economy have a productive structure based on traditional industries and, consequently, require medium- and low-skilled workforce (Kabisch & Haase, 2011; Nelle, 2016). In this scenario, they are failing to employ the growing number of local college graduates as a result of the educational expansion (González-Leonardo & López-Gay, 2019; Quintini, 2011). Consequently, these regions and their cities show high levels of unemployment and over-education in the labour market among university graduates compared with the national average (Sánchez-Sellero et al., 2013). Nevertheless, as we have observed, not all regions with a low degree of economic development exhibit the same patterns of internal migration. Therefore, there are other factors to be considered in addition to the economic ones. For example, the distance to the major urban centres (Schwartz, 1973; Von Berlepsch & Rodríguez-Pose, 2021). The regions bordering Madrid have greater educational decapitalization than others with a lower development and higher unemployment rates, for example, those in the south. Furthermore, it should be noted that peripheral regions are highly dependent on public employment (Tomaney et al., 2010) and the cutbacks related to the economic crisis may have played a major role in the rising numbers of university graduates leaving the region.

The attractiveness of the global city of Madrid has considerably increased to young adults with university degrees born in other Spanish regions, preliminary due to the city's great economic growth (Rodríguez-Pose & Hardy, 2021). This has been caused by the following factors: the capital effect; the development of radial infrastructures around Madrid; and agglomeration economies, mainly linked to the growth of foreign investment attraction (Basile et al., 2019; Bel,

2012; Rama & Ferguson, 2007), which includes an important share of technological activities involving electronics, telecommunications and different advanced services (Gutiérrez-Portilla et al., 2019). The outflows from Madrid, however, show a negative selectivity. This is a consequence of the displacement of populations with low socio-educational status to the north of Castile-La Mancha due to the high cost of living in Madrid (Pozo-Rivera & Rodríguez-Moya, 2006). According to these authors, many of them continue working in Madrid and commute daily. Catalan urban capitals also show increasing processes of educational capitalization. This dynamic is mainly driven by the inflows of highly qualified young adults to the global city of Barcelona, but figures are very far from those observed in Madrid. The Balearic Islands attract large groups of people, but mainly low-educated individuals to the tourist industries.

Our results have identified a growing trend of urban flight among university graduates from small and medium-sized cities in peripheral regions to global cities. This trend has been strengthened since the 2008 economic crisis and has produced processes of educational decapitalization and urban shrinkage in depopulated peripheral regions, and the human capital accumulation of qualified young adults in global cities, namely in Madrid. Our results seem to be in line with the international literature that supports a polarization between urban areas, with a few global cities concentrating technological, financial, and innovative activities and demanding highly skilled migrants (Florida, 2002; Harvey, 2006; Sassen, 1991).

Cities of the peripheral regions located in the interior of the country and in the north-west are experiencing the opposite process. They have industries with low technological capacity, unable to employ the increasing number of native-born individuals with university degrees. If the described trends remain constant over time, the regional and urban imbalances will grow and will lead to an increasingly polarized territorial scenario, with a growing number of declining cities and a few dominant global cities. It is necessary to be aware that cities in the peripheral regions are the only dynamic enclaves in these territories, given that most rural areas have been depopulated by massive rural to urban movements in previous periods. Public policies should address this issue and pay preferential attention to the economic development of cities located in peripheral regions in order to reduce the territorial polarization driven by today's globalized economy.

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ORCID

Miguel González-Leonardo  <http://orcid.org/0000-0003-2508-7977>

Antonio López-Gay  <http://orcid.org/0000-0001-8892-2816>

Albert Esteve  <http://orcid.org/0000-0001-9916-386X>

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