4

THE SPATIAL DISTRIBUTION OF POPULATION IN SPAIN AND ITS ECONOMIC CONSEQUENCES

THE SPATIAL DISTRIBUTION OF POPULATION IN SPAIN AND ITS ECONOMIC CONSEQUENCES

1 Introduction

The highly uneven demographic dynamics in different areas of Spain and their economic and social causes and consequences have gradually gained ground in the public debate in recent years. According to the February 2019 CIS barometer (a public opinion poll conducted by a public research institute), 88% of the general public considered rural depopulation in Spain to be a quite or very serious problem. In October 2020, the Recovery, Transformation and Resilience Plan for the Spanish economy, which will inform how the European funds are absorbed up to 2023, reflected the public's concern by including as its first guiding policy the "Urban and rural agenda, the fight against rural depopulation and the development of agriculture".

Meanwhile, the outbreak of the pandemic has sped up the structural change in two realms linked to the population's decisions on where to live: digitalisation and remote working. According to the National Statistics Institute (INE) survey on the impact of COVID-19, more than 30% of the firms that have implemented remote working and more than 20% of those that have resorted to e-commerce during the pandemic will continue to do so in the future.[1] In addition, the possible impact of these changes on people's decisions as to where to live can already be glimpsed in some indicators. For example, drawing on Ministry of Transport, Mobility and Urban Agenda data, housing transactions in rural municipalities have risen from 11% of all transactions between January 2013 and December 2019 to 15% in September 2020.[2] Also, according to INE Migration Statistics, the first half of 2020 was the first six-month period since the global financial crisis that began in 2008 in which the province of Madrid had a negative inter-provincial migration balance.

Against this background, the availability of a detailed analysis of the factors driving how the population and economic activity are distributed in Spain is a priority. Such analysis should lay the foundations for diagnosing the situation, enabling in turn all facets of the economic policies to be discussed; in other words, a broad analytical framework that includes both the policies' benefits and the costs that any measure incurs.

This chapter describes in detail the spatial distribution of population in Spain and its relationship to several important economic matters. After this

1 See Indicadores de confianza empresarial. Módulo de opinión sobre COVID-19.

2 Gupta et al. (2021) document an increase in rents in the suburbs of the main US cities compared with rents in the respective city centres throughout 2020. In addition, as house prices followed the same pattern, albeit less markedly, they conclude that the increase in relative demand in the peripheries has a structural component.

introduction, Section 2 places Spain in the context of the global trend towards greater urbanisation, as a result of the process of economic development that has also been observed in many other advanced economies. However, some idiosyncrasies are documented compared with the European experience: Spain has a higher percentage of uninhabited areas and a higher concentration of population. These two characteristics result in a greater incidence of municipalities that are at risk of depopulation in Spain and that also present significant shortcomings in terms of access to various services. Furthermore, in recent decades, the loss of momentum in smaller Spanish urban areas is shown to have catalysed the rural depopulation process. Section 3 analyses in detail these population dynamics in Spanish cities. Specifically, the migration of younger adults to larger urban areas is identified as a prominent factor. A panoramic view of the factors lying behind this pattern is also provided. Furthermore, the section documents a growing concentration of workers in high-skilled occupations in the major cities, resulting in increased labour income disparities both within and between urban areas. Lastly, in light of the evidence presented in the chapter, Section 4 offers some general considerations on how public policies should be designed.

2 The distribution of population in rural and urban areas

2.1 Urbanisation around the world and in Spain

Cities exist because the social interactions resulting from physical proximity benefit people in manifold ways. Having the population and economic activity concentrated in relatively small areas of the territory enables access to services to be granted at a lower cost per person and facilitates interaction between firms and workers, with the consequent productivity gains. Thus, while there are costs associated with spatial concentration, which will be discussed below, agglomeration economies, which arise when the synergies stemming from physical proximity are harnessed, largely explain the concentration of the population in general and the existence of cities in particular.

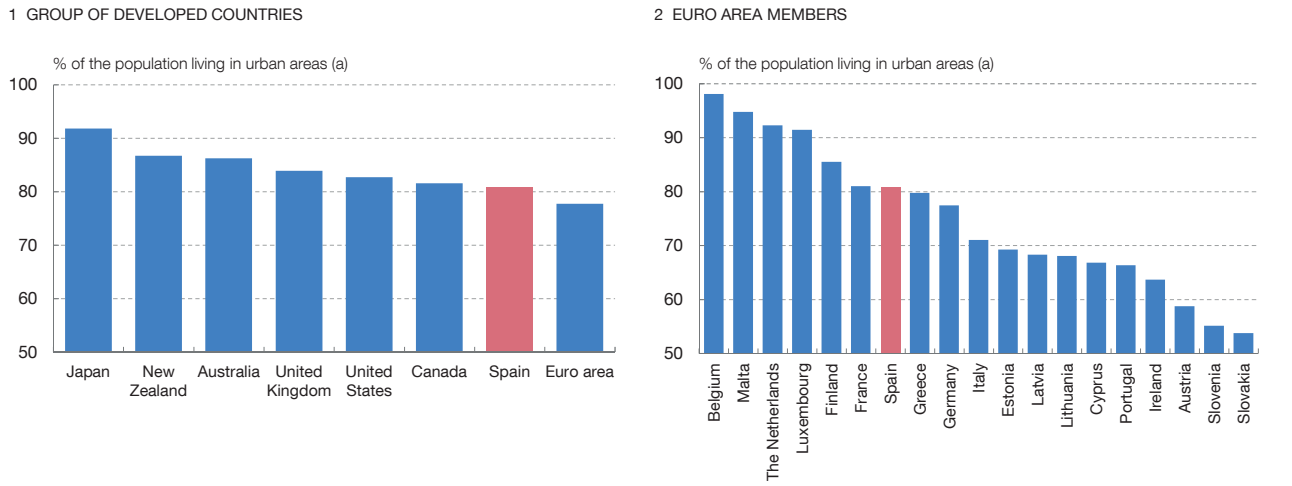
Set against the global trend towards urbanisation, the percentage of the population residing in cities in Spain is in line with that of other advanced economies. Drawing on United Nations data, the global percentage urban practically doubled between 1950 and 2020, from 29.6% to 56.2%.[3] In the case of Europe, North America, Australia and Japan, 81.4% of the population was urban in 2020. In other words, eight of every ten people in the developed world lived in cities in 2020. A similar trend can be seen in Spain. The Spanish percentage urban stood at 80.8%

3 The percentage urban is defined here as the percentage of the population living in municipalities with 10,000 inhabitants or more. This definition considered by the United Nations facilitates the comparison with different countries around the world. For more details on how these statistics were constructed, see 2018 Revision of World Urbanization Prospects, United Nations.

Chart 4.1

THE HIGH PERCENTAGE URBAN IN SPAIN IS PART OF THE GLOBAL URBANISATION TREND

The percentage urban in Spain was in line with that of other developed countries in 2020. According to the United Nations, the Spanish percentage urban was somewhat below that of Japan, the United Kingdom and the United States, slightly above that of Germany and Italy, and practically the same as that of France and Greece.



SOURCE: United Nations.

a According to the United Nations definition, urban areas are those municipalities or local administrative units with 10,000 or more inhabitants.

DOWNLOAD

in 2020, slightly above the euro area as a whole, but below the other developed countries (see Chart 4.1). In addition, the latest available United Nations projections point to the percentage of the population living in urban areas continuing to increase, to 68.4% globally and 86.6% in the more developed countries taken as a whole by 2050. It should be highlighted that while the percentage urban is an indicator that reflects the population agglomeration process over recent decades, it is a variable that may prove to be imperfect when analysing the degree of population concentration in a specific territory. First, because it depends on the definition of administrative unit considered. Second, because it does not take into account the population density in the different geographical areas. In light of this, using more granular data on the population's places of residence enables more accurate information on its degree of concentration to be extracted.

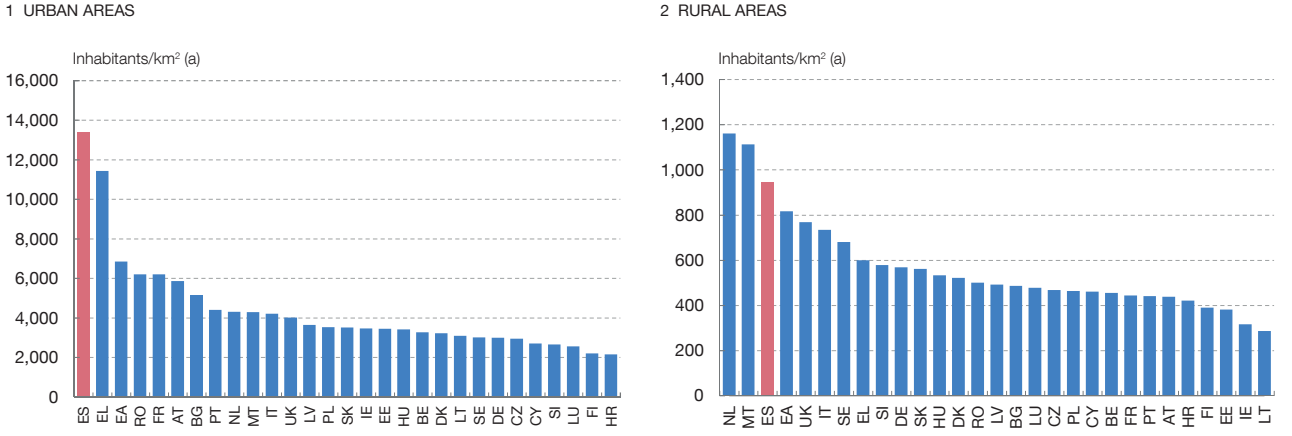
In any event, the concentration of population in Spain is very high compared with the other European countries. Drawing on Eurostat data on population density in Europe,[4] the concentration of population in Spain is among the highest in Europe in both urban and rural population centres. Specifically, Spain has an average

4 These statistics are based on a division of the European territory into a grid of 1 km^2 cells and reflect the number of inhabitants living in each cell (0 if the cell is uninhabited and a positive number if the cell is inhabited). For further details, see Population Grids, Eurostat Statistics explained.

Chart 4.2

THE CONCENTRATION OF POPULATION IN SPAIN IS HIGHER THAN IN OTHER EUROPEAN COUNTRIES

The Spanish population is more highly concentrated than in other European countries. The population-weighted density is very high compared with Europe in both urban and rural areas. This is because of the high percentage of uninhabited territory in Spain, which is an outlier from a European standpoint (see Box 4.1), and a greater concentration of population in the inhabited areas.



SOURCE: Eurostat.

a The measurement of density considered refers to the population-weighted average number of inhabitants per km². In other words, it captures the average number of people living within a 1 km² radius around each inhabitant of a rural or urban area.

DOWNLOAD

population density[5] of 13,369 and 946 inhabitants per km² in its urban and rural areas, respectively, compared with 6,839 and 816 for the euro area as a whole (see Chart 4.2). Conversely, according to the traditional measurement of density, which considers both the inhabited and uninhabited areas, Spain is slightly below the euro area as a whole, with 94 and 104 inhabitants per km², respectively. In other words, in addition to a high concentration of population in the inhabited surface area, a large expanse of the Spanish territory is uninhabited, such that only 12.7% is inhabited[6] in Spain, compared with 67.8% in France, 59.9% in Germany and 57.2% in Italy. Indeed, this figure is only comparable with that of the most remote areas of the Scandinavian countries (see Gutiérrez et al. (2020b)). Lastly, it should be highlighted that Spain's geo-climatic particularities do not appear to be the sole explanation for the high level of concentration and low settlement density that make Spain a unique case in Europe in terms of the spatial distribution of population (see Box 4.1). While the extremely high concentration of the Spanish population in a small part of the territory could be related to various factors (see Box 4.1), the lack of historical information at a sufficient level of spatial granularity impedes a sufficiently thorough analysis of the concentration of population over time. Therefore, the percentage urban in Spain over the last 70 years is analysed below by comparing it

5 This measurement refers to the average number of people living within a 1 km² radius around each inhabitant of a rural or urban area. Specifically, it is calculated as the population-weighted average number of inhabitants/km² in a specific geographical area.

6 The percentage of inhabited territory refers to the percentage of cells (km²) with at least one inhabitant.

internationally. This analysis casts light on the factors explaining, at least partially, the current distribution of population in Spain.

2.2 The Spanish urbanisation process, 1950-2018

The percentage of the population living in urban areas has increased significantly in Spain since 1950, although two clearly distinct stages can be identified. While there is no objective delimitation between rural and urban areas, since the sociodemographic, economic and cultural characteristics inherent in each of them form a whole, the definition of rural area considered in this chapter refers to all municipalities that have not had more than 10,000 inhabitants between 1950 and 2018 and that, in addition, are not part of a functional urban area.[7] Based on this definition, between 1950 and 2018 the percentage urban increased by more than 20 percentage points (pp) and now stands slightly above 80%. Two distinct phases in this urbanisation process can be identified. A first stage, which was characterised by particularly strong migration from rural to urban areas among the different provinces during the "rural exodus" between 1950 and the culmination of the industrialisation process in the 1980s. And a second, subsequent stage coinciding with the establishment of Spain's regional governments and the development of the welfare state, in which the percentage urban continued to grow, albeit at a much slower pace (see Chart 4.3). The characteristics of, and the connection between, the two stages are analysed below.

In the first stage, dubbed the rural exodus, the percentage urban increased significantly, from 59.6% to 79.6% between 1950 and 1991. The rural-urban migration which took place in Spain during that period was part of a structural shift, reflected by the increased weight of industry and services in the economy, to the detriment of agriculture. This process, common to the economies of other countries, is due to changes in relative productivity, such that the primary sector is able to produce with fewer workers and, at the same time, the population demands more manufactured goods and services as its income increases (see González-Díez and Moral-Benito (2019)). In addition, economies of scale and agglomeration economies are more conducive to the production of such goods and the provision of services being concentrated in urban areas, giving rise to the rural exodus. Thus, the agricultural sector's lower weight and the increased percentage urban would be two manifestations of the same structural transformation associated with the development of any economy (see Michaels et al. (2012)). Indeed, countries' percentage urban and level of economic development are intimately connected; Spain is part of the group

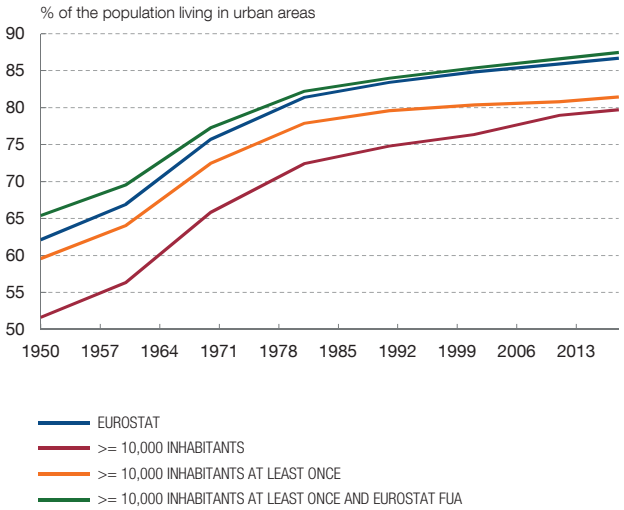
7 According to Eurostat, a functional urban area is defined as a city and its commuting zone and therefore consists of a densely inhabited city and a less densely populated commuting zone whose labour market is highly integrated with the city (see Section 3 of this chapter for a detailed discussion of urban areas as a whole in Spain). Gutiérrez et al. (2020a) provide more details on the different definitions of rural and urban areas in Spain.

Chart 4.3

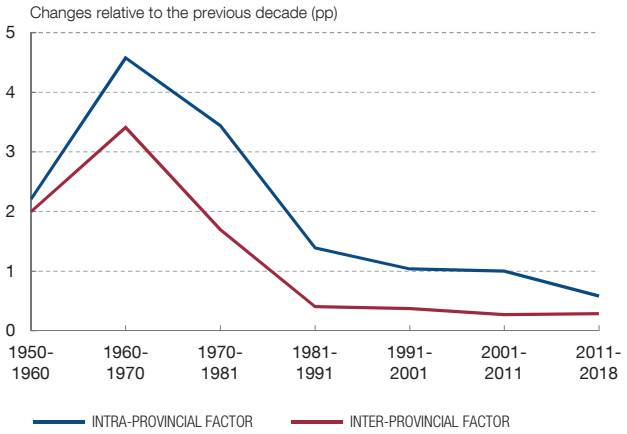
URBANISATION IN SPAIN OVER THE LAST 70 YEARS IS CHARACTERISED BY TWO DISTINCT PHASES

The percentage urban increased sharply between 1950 and the end of the 1980s. From the 1990s onwards, the percentage urban increased at a much more moderate pace. In addition, the rural-urban inter-provincial migration component was particularly significant during the first stage (1950-1991), but has stood at practically zero since 1991.

1 PERCENTAGE URBAN. DIFFERENT DEFINITIONS (a)



2 BREAKDOWN OF THE CHANGES IN THE PERCENTAGE URBAN (b)



SOURCES: Banco de España and Eurostat.

a Eurostat: population in urban municipalities as defined by Eurostat; >= 10,000 inhabitants: population in municipalities with at least 10,000 inhabitants in that year; >= 10,000 inhabitants at least once: population in municipalities with at least 10,000 inhabitants at some point during the 1950-2018 period; >= 10,000 inhabitants at least once and Eurostat FUA: population in municipalities with at least 10,000 inhabitants at some point during the 1950-2018 period or in municipalities belonging to functional urban areas as defined by Eurostat.

b The change in percentage urban at the national level can be broken down into two terms which reflect the change in percentage urban and population weights of each province. The intra-provincial factor increases, for example, in the event of rural-urban migration within the same province. The inter-provincial factor rises, for example, in the event of rural-urban or urban-urban migration from less urbanised to more urbanised provinces. See Gutiérrez et al. (2020a) for more details.

DOWNLOAD

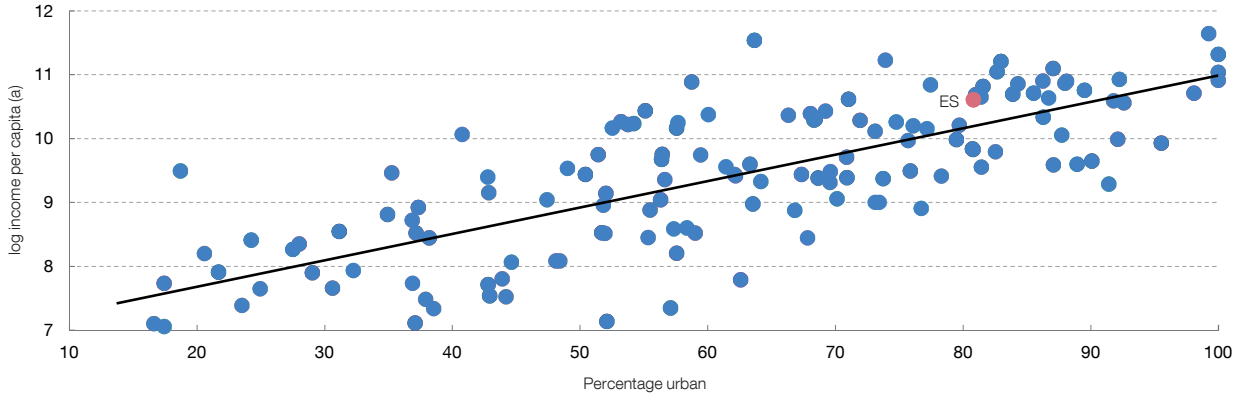
of more developed countries with high per capita incomes and percentages urban by international standards (see Chart 4.4).

Migration flows between regions during the rural exodus could explain, at least partly, the current distribution of economic activity in Spain. While the structural shift from an agriculture-based economy to an industry and services-based one is inseparable from the increase in percentage urban, rural-urban migration flows may present different patterns depending on the point in time when this structural transformation occurs (see Henderson et al. (2018)). Specifically, if the structural transformation occurs when mobility and transport costs are high, migration from rural to urban areas tends to be observed within each region, resulting in a more uniform industrialisation across different parts of the territory (see Eckert and Peters (2018)). However, deagriculturalisation and urbanisation had still not taken place in Spain by the mid-20th century, when mobility and transport costs were already relatively low by broad historical standards. Indeed,

Chart 4.4

THERE IS A CLEAR POSITIVE CORRELATION BETWEEN INCOME PER CAPITA AND PERCENTAGE URBAN AT THE INTERNATIONAL LEVEL

The structural shift from an essentially agriculture-based economy to one based on industry and services triggers an increase in countries' level of well-being and their percentage urban.



SOURCES: United Nations and Penn World Table version 10.0.

a Income per capita refers to 2019 and is measured in USD adjusted for purchasing power parity. For more details, see https://www.rug.nl/ggdc/productivity/pwt/?lang=en.

DOWNLOAD

the agricultural sector still accounted for 36.5% of the Spanish economy in 1960. This was much higher than in countries such as the United States or Germany, where it only accounted for 5.7% and 13.7% of total employment, respectively. Thus, the deagriculturalisation and urbanisation that began in the early 1960s in Spain were accompanied by a relatively high proportion of inter-regional rural-urban migration compared with other countries[8] (see Chart 4.5). In other words, the fact that Spanish industrialisation was completed relatively late in comparison with other developed countries could have contributed at least partly to the greater concentration of the population and economic activity in certain regions observed today (see Box 4.2).

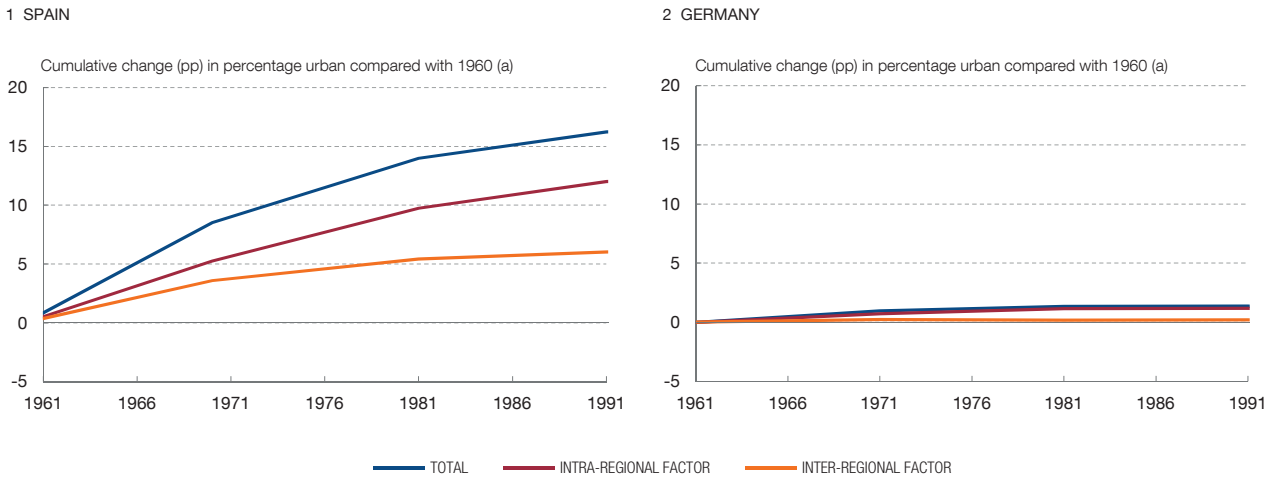
In the second stage, from the 1990s onwards, the percentage urban continued to increase, but at a significantly slower pace. Once the structural transformation of the economy was complete, and coinciding with the development of the welfare state in Spain, the percentage urban increased very slightly from 1991 onwards. Specifically, the percentage urban grew by barely 2 pp to stand slightly above 80% at present. This increase in the percentage urban was underpinned by population

8 During this period, the rural-urban migration process was accompanied by an increase in external migration to Latin America from the end of the 1940s and to industrialised Europe from the 1960s. However, the scale of this external migration was significantly smaller than domestic migration flows. Specifically, between 1960 and 1974 more than 50,000 Spaniards emigrated to Europe per year, compared with close to 400,000 who migrated internally (see Arroyo Pérez (2003)).

Chart 4.5

THE PERCENTAGE URBAN IN SPAIN ROSE SHARPLY BETWEEN THE 1960s AND THE 1990s

The structural transformation of the Spanish economy from the 1960s onwards triggered the rural exodus and the increase in the percentage urban. However, other countries, such as Germany, had already completed this process as of the early 20th century.



SOURCES: Banco de España and Eurostat.

a The change in percentage urban at the national level can be broken down into two terms which reflect the change in percentage urban and population weights of each region. The intra-regional factor increases, for example, in the event of rural-urban migration within the same region. The inter-regional factor rises, for example, in the event of rural-urban or urban-urban migration from less urbanised to more urbanised regions. See Gutiérrez et al. (2020a) for more details.

DOWNLOAD

growth in urban areas compared with population declines in rural areas due, above all, to ageing, as analysed below (see Chart 4.6.2).

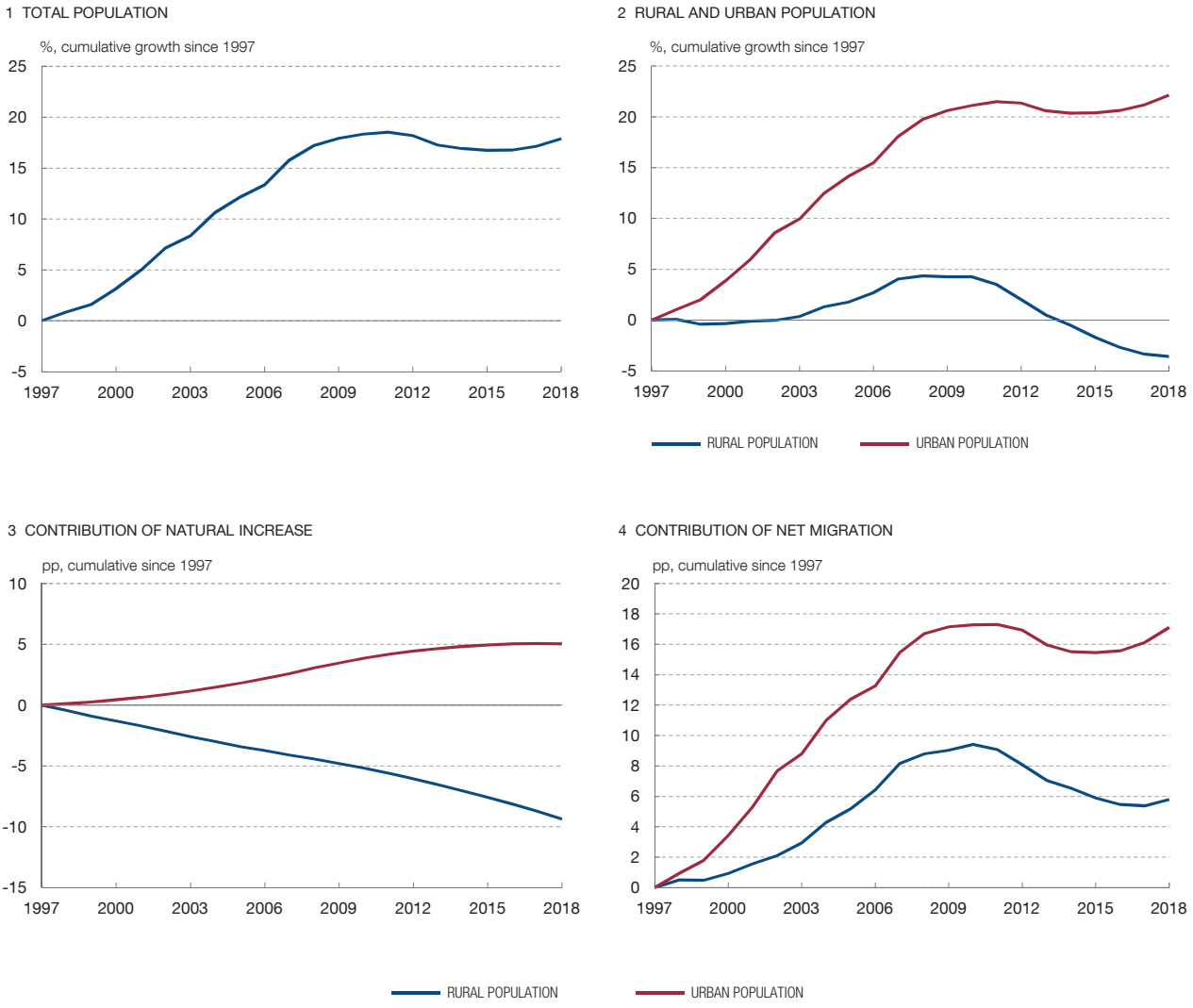
The key factor in this second stage was not migration, as in the rural exodus, but the natural population growth differential between rural and urban areas. In other words, an old population in the rural areas resulting from the rural exodus led deaths to outnumber births from the 1990s onwards, continually sapping momentum from rural municipalities' population dynamics. Hence, natural growth meant that the population in rural municipalities fell by 10 pp between 1997 and 2018, whereas it made a positive contribution of 5 pp in urban municipalities (see Chart 4.6.3). Furthermore, there is a positive correlation between population growth at the municipal level during the rural exodus and natural growth in the most recent period. More specifically, the rural municipalities that experienced negative natural growth over the last two decades were precisely those which underwent population declines over the 1950-1991 period (see Chart 4.7).

Net migration in this latest period also contributed to the slight increase in the percentage urban, albeit to a lesser degree. Overall, rural municipalities underwent positive net migration during the economic upswing up to 2010, in part due to international migration. However, both internal and external migration have

Chart 4.6

URBANISATION HAS CONTINUED SINCE THE 1990s, ALBEIT AT A SLOWER PACE

The slight increase in the percentage urban since 1997 is due to the different population dynamics in rural and urban areas. The rural population as a whole fell slightly between 1997 and 2018, mainly as a result of negative natural growth year after year. The urban population increased significantly thanks to natural increase and positive net migration.



SOURCES: Banco de España and INE.

DOWNLOAD

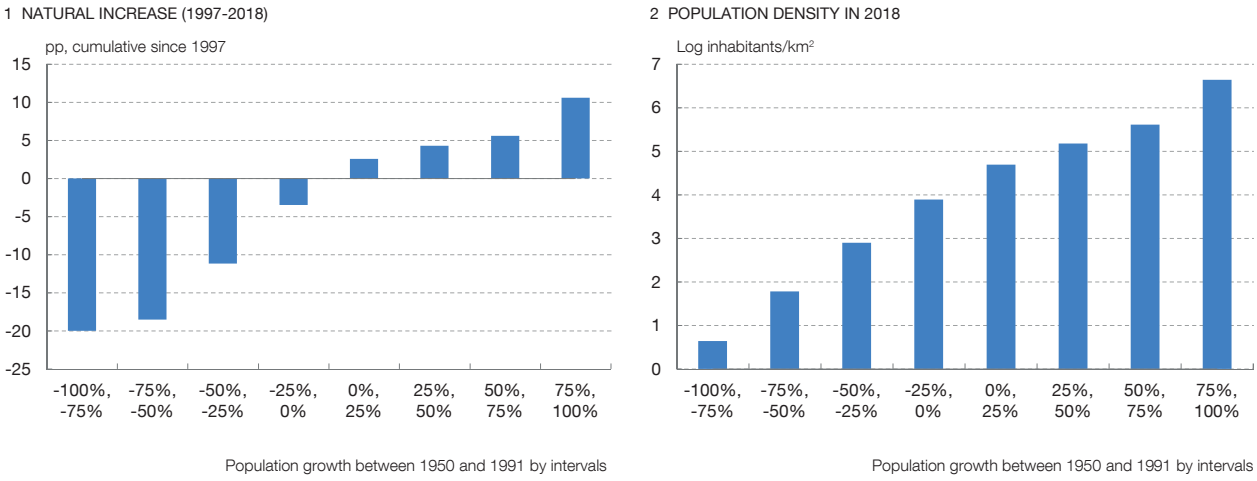
turned negative since then and, as a result, contributed to the rural depopulation in the years following the global financial crisis that began in 2008. Thus, net migration contributed 6 pp to rural population growth between 1997 and 2018, as opposed to the 17 pp contribution in urban municipalities (see Chart 4.6.4).

Lastly, population dynamics across rural municipalities have been somewhat heterogeneous in the most recent period. Specifically, most population declines in rural areas have arisen in smaller rural municipalities far away from urban areas

Chart 4.7

POPULATION DYNAMICS DURING THE RURAL EXODUS LARGELY DETERMINE RECENT DEVELOPMENTS

The municipalities with steeper population declines during the rural exodus (1950-1991) had a worse negative natural population balance between 1997 and 2018 and have a lower population density at present.



DOWNLOAD

SOURCES: Banco de España and INE.

(Gutiérrez et al. (2020a) offer a more detailed analysis of these developments). The following subsection describes the different municipalities according to the severity of the demographic challenge they face.

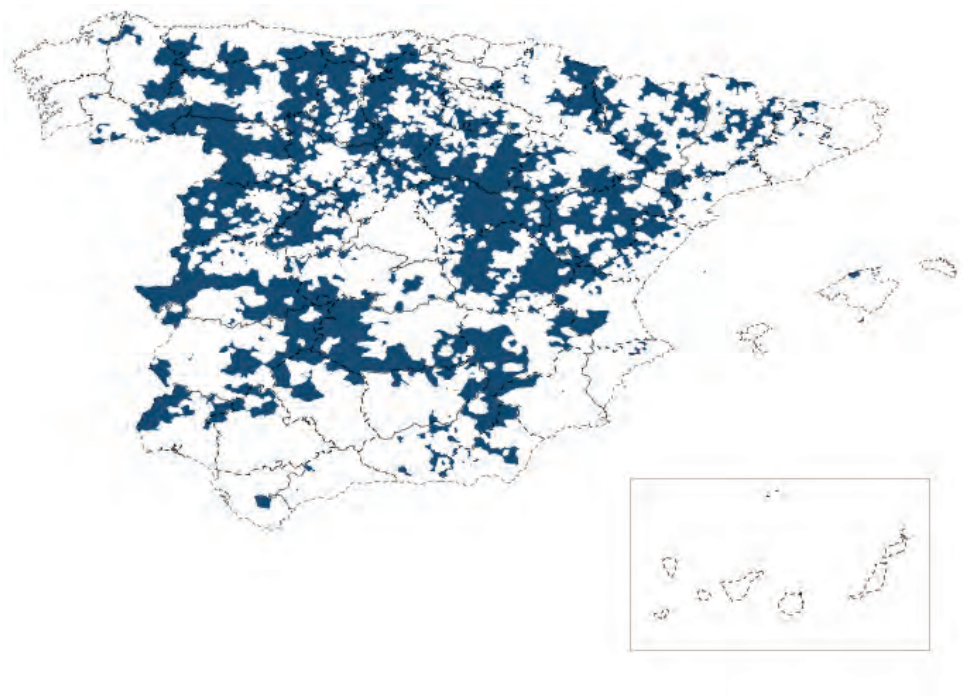
2.3 The municipalities at risk of depopulation and access to services in rural areas

There are a number of rural municipalities whose long-term survival may be under threat should their recent population dynamics continue. Within the gradual urbanisation process described in the preceding subsection, rural depopulation has been particularly pronounced in some municipalities that, unlike others, did not benefit from the positive migration flows of the 2000s. In other words, there are many rural municipalities that not only record negative natural growth year after year, but whose populations also declined continuously over the last two decades, even during the expansionary phase when the overall rural population grew. These would be the municipalities at risk of depopulation, whose viability appears to be under threat, insofar as the related secular population decline could be considered irreversible and could potentially trigger their disappearance (see Recaño (2017)). The disappearance of these municipalities could also represent a threat to the environment, in terms, for example, of a higher incidence of wildfires and lower biodiversity, if no mitigating measures are implemented.

Chart 4.8

A SIGNIFICANT SHARE OF SPANISH MUNICIPALITIES ARE AT RISK OF DEPOPULATION (a)

A total of 3,403 municipalities at risk of depopulation are identified. These account for 42% of municipalities in Spain and for 2.3% of the population, approximately 1,000,000 inhabitants.



SOURCES: Banco de España and INE.

a Municipalities at risk of depopulation are defined as those with negative population growth between 2001 and 2018, a negative natural population balance since 2001 and a population density below 12.5 inhabitants per km^2.

The incidence of municipalities at risk of depopulation in Spain is far higher than in the euro area as a whole. Based on population-decline and low-density criteria, 3,403 municipalities at risk of depopulation are identified.[9] These account for 42% of municipalities in Spain and for 2.3% of the population, approximately 1,000,000 inhabitants (see Chart 4.8). While the scarcity of data hinders an international comparison,[10] the available evidence suggests that these percentages exceed those for the rest of the euro area. Taken as a whole, 10% of the rest of the euro area's municipalities are at risk of depopulation. In particular, the 42% of municipalities at risk of depopulation in Spain contrasts with the figures for other euro area countries such as Germany, France and Italy, where only 1%, 7% and 4%,

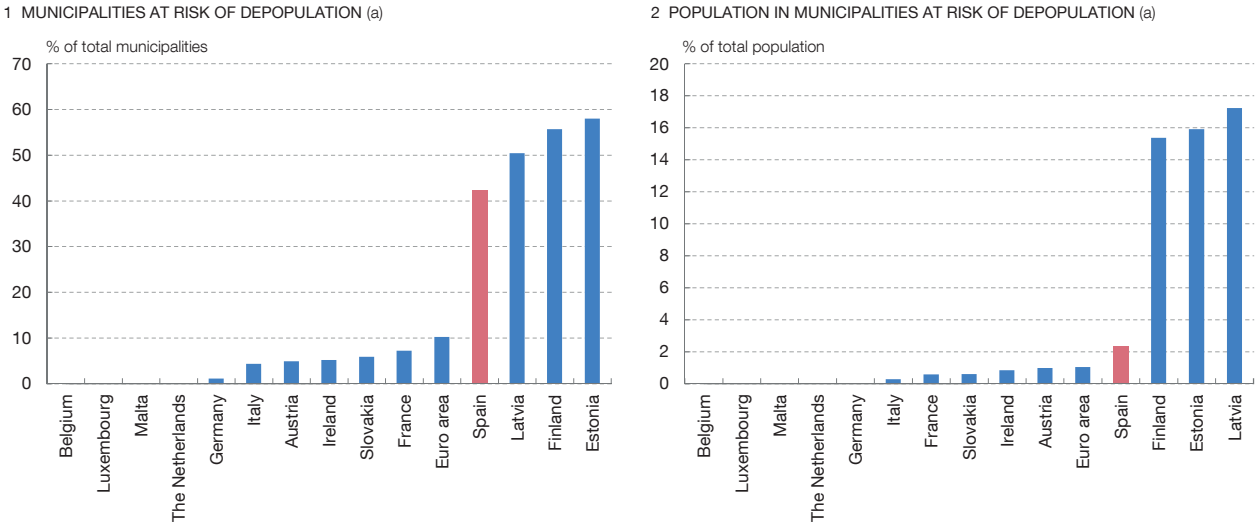
9 Defined here as those municipalities with negative population growth between 2001 and 2018, a negative natural population balance since 2001 and a population density of below 12.5 inhabitants per km^2. This definition is based on that considered in European Parliament Resolution P8_TA (2019)0303 on the European Regional Development Fund and on the Cohesion Fund to identify areas facing natural or demographic handicaps and challenges. The main difference is that here the period from 2001 to 2018, rather than from 2007 to 2017, is considered. The pre-global financial crisis period was included since it was deemed relevant to determining the municipalities with persistent population declines, in light of the wildly different population dynamics before and after 2007 detailed in the preceding subsection, at least in the case of Spain.

10 Specifically, insufficient data are available for Portugal, Greece, Lithuania, Slovenia and Cyprus, and information on Austria, the Netherlands, Luxembourg, Ireland and Estonia is only available to 2011.

Chart 4.9

COMPARED WITH THE REST OF EUROPE, IN SPAIN THE INCIDENCE OF MUNICIPALITIES AT RISK OF DEPOPULATION IS VERY HIGH

In Spain the incidence of municipalities at risk of depopulation and the percentage of the population living in those municipalities are above those for the euro area as a whole. Specifically, they are much higher than other euro area members such as France, Italy and Germany, and are slightly lower than countries farther north such as Latvia, Finland and Estonia.



SOURCES: Banco de España and Eurostat.

a Municipalities at risk of depopulation are defined as those with negative population growth between 2001 and 2018, a negative natural population balance since 2001 and a population density below 12.5 inhabitants per km^2.

DOWNLOAD

respectively, of municipalities are at risk.[11] However, the Spanish incidence of municipalities at risk of depopulation is in line with countries located farther north, such as Finland, Estonia and Latvia where the percentages are around 50% (see Chart 4.9). A common characteristic among these countries and Spain is the high percentage of uninhabited territory (see Gutiérrez et al. (2020b)). This could explain the difficulties that the smallest rural municipalities face in attracting and retaining population, since they are surrounded by vast expanses of empty land that further isolates inhabitants.[12] Rural areas at risk of depopulation in Spain display idiosyncrasies compared with other rural and urban areas.

Rural and urban municipalities display a series of significant differences in facets such as orography, demographics and/or socioeconomic situation (see

11 In Spain, 2.3% of the population lives in municipalities at risk of depopulation, as opposed to 0.05%, 0.6% and 0.3% in Germany, France and Italy, respectively.

12 Note that, unlike the high percentage of uninhabited territory, a high number of municipalities or local administrative units in the countries with a higher incidence of municipalities at risk of depopulation does not appear to be a common characteristic that could explain this phenomenon. Specifically, there are 18 municipalities at risk of depopulation per 100,000 inhabitants in Spain, compared with 14, 56 and 14 in Germany, France and Italy, respectively, and 6, 17 and 6 in Finland, Estonia and Latvia, respectively. For the European Union as a whole, there are 21 at-risk municipalities per 100,000 inhabitants.

Table 4.1

RURAL MUNICIPALITIES HAVE A SET OF DIFFERENT CHARACTERISTICS AND SIGNIFICANTLY LESS ACCESS TO SERVICES COMPARED WITH URBAN MUNICIPALITIES (a)

Rural municipalities in Spain are significantly different from urban ones in aspects such as orography, demographics and/or socioeconomic situation. In addition, rural municipalities have significantly less access to on-site and digital services. This gap is considerably wider in the case of rural municipalities at risk of depopulation.

	All	Urban	Rural	Rural (not at risk)	Rural (at risk of depopulation)
Population in 2018	5,794	47,975	1,258	2,072	320
Dependency ratio	0.51	0.23	0.53	0.37	0.72
Share of female population (%)	44.46	48.75	44.00	46.22	41.44
Share of foreign population (%)	8.33	13.48	7.74	9.22	5.81
Distance to provincial capital (km)	44	33	45	41	51
Distance to coast (km)	127	65	133	107	163
Height above sea level (m)	677	324	715	573	878
Temperature (ºC)	12.95	15.47	12.68	13.60	11.63
Share of agriculture in employment (%)	7.15	3.01	7.66	6.12	9.84
log income per capita	9.20	9.19	9.20	9.20	9.20
House prices (€/m^2)	1,132	1,572	1,058	1,160	823
Property tax (rate)	0.58	0.68	0.57	0.60	0.54
Road tax	86.85	117.81	83.52	90.04	76.52
log debt per capita	3.39	5.87	3.12	3.98	2.20
Protest vote (%)	18.25	23.50	17.69	18.69	16.53
Regionalist vote (%)	11.33	11.94	11.27	17.49	4.09
Distance to basic services (km)	20.60	2.15	22.59	13.76	32.03
Distance to other services (km)	24.73	8.40	26.49	19.21	34.88
Broadband coverage (100 MBps)	26.30	82.75	20.22	33.46	4.96
No bank branch (%)	53.34	0.00	59.07	42.06	78.70
Number of municipalities	8,116	788	7,328	3,925	3,403

SOURCES: Banco de España and INE.

a Although the variables considered in the table are self-explanatory, more details on how they were built at the municipal level can be found in Alloza et al. (2021) and Gutiérrez et al. (2020b).

Table 4.1).[13] Demographically, compared with urban municipalities, rural ones are smaller (1,258 inhabitants as against 47,974) and older (dependency ratio — defined as the ratio of the over-64s to those aged 16 to 64 — of 0.53 compared with 0.23), and women (44% versus 49%) and foreigners (7.7% versus 13.5%) account for smaller shares of the population. Rural municipalities are also more remote, because of their more unfavourable geographical conditions in terms of greater height above sea level (714 metres versus 324 metres) and greater distance from the provincial capital (45 km compared with 32 km) and the coast (133 km versus 65 km). As regards socioeconomic aspects, agriculture accounts for a larger share of their employment

13 See Alloza et al. (2021) for a more detailed description of how the different indicators used in this subsection were developed and their differences across rural and urban municipalities. Most of the indicators considered refer to 2011 when the latest available census took place. The definitions of the variables considered in the analysis can also be found in Table 4.2.

and they have a lighter tax burden and a lower incidence of what the political science literature has dubbed the protest vote,[14] which in Spain, unlike in other countries, appears to be a markedly urban phenomenon (see Rodríguez-Pose (2018)).

As regards the provision of services, access to services is worse in rural municipalities than in urban ones. There are alternative measurements that can be used jointly to explore the differences between rural and urban areas in terms of accessibility to different services. Specifically, Kompil et al. (2019) have developed a generic indicator for access to services measured in terms of distance in kilometres to the nearest local services in each municipality, taking local services to mean facilities such as a primary school, a health clinic and a sports centre.[15] A citizen from a rural municipality has to travel on average 22.59 km to access the different local services, compared with 2.15 km on average for a citizen from an urban municipality (see Table 4.1).[16] Alloza et al. (2021) find that some of these differences in accessibility to physical services can be explained by factors such as geographical particularities or the lighter tax burden in rural municipalities for those taxes regulated at municipal level.[17] In addition, as analysed in the last section of this chapter, the provision of these services on a minimal scale makes their cost per inhabitant higher in the smaller rural municipalities.

Rural municipalities also have significantly less access to financial services. Drawing on Banco de España data, 59% of rural municipalities were branchless in 2020. In addition, the available time series show that this percentage has increased significantly since 2008, when it stood at 48% (see Jiménez and Tejero (2018) for a detailed analysis of the bank branch consolidation process in Spain). While branch closures in rural areas can be justified by the search for profitability and by falling demand,[18] they affect the population, above all in relation to access to cash that cannot be covered, unlike other banking services, by online banking. Hence, banks have adopted a series of measures to offset the closures, such as mobile banking buses and financial agents, which regularly serve customers in those branchless municipalities. Other available alternatives are cashback and, more recently, bilateral agreements between different banks and Correos, the public postal service, to provide access to cash at post offices.

---

14 Defined as the percentage of votes for recently established political parties at the extremes of the political spectrum. In the specific case of Spain, it refers to the percentage of votes for VOX and Unidas Podemos in the 2019 general election. Both parties have parliamentary representation and were established after the financial crisis that began in 2008.

15 Note that the regulatory dimension regarding what type of services must be subject to specific public service obligations is not addressed here. See Alloza et al. (2021) for an analysis of this matter.

16 These differences are also observed when considering a supplementary measurement of access to services based on the distance in kilometres to the nearest petrol station, school, ATM or hospital, obtained on the basis of the geolocation of these establishments available from various online sources. The authors are grateful to Kiko Llaneras for sharing the data. For more details see "Un mapa del contraste entre el campo y la ciudad", *El País*.

17 These include property tax (IBI), the tax on business activity (IAE), road tax (IVTM), the tax on buildings, installations and other works (ICIO) and the tax on increase in urban land value (IVTNU).

18 Martín-Oliver (2019) analyses the main driving factors of this process, considering demand-side and supply-side factors.

Access to digital services is also worse in rural municipalities than in urban ones. The information published by the Ministry of Economic Affairs and Digital Transformation[19] for 2019 documents a significant lack of access to broadband and, therefore, to digital services in rural municipalities. Focusing on 100 MBps broadband, the speed considered necessary to hold a videoconference, for example, rural municipalities have significantly less access than urban ones. In particular, just 20% of rural households have 100 MBps broadband coverage, compared with 83% of urban households. Furthermore, as documented by Alloza et al. (2021), unlike the on-site services addressed above, factors such as geographic location and taxation at the municipal level lie behind a very small portion of this digital access gap.

In the specific case of rural municipalities at risk of depopulation, all the rural-urban differences described above are significantly heightened. For example, the dependency ratio in municipalities at risk of depopulation is 0.72, as against 0.37 in the other rural municipalities and 0.23 in urban ones; i.e. in municipalities at risk of depopulation there is almost one working-age inhabitant per inhabitant aged over 65, whereas in the other rural municipalities and in the urban ones there are almost three and more than four, respectively. As regards accessibility to services, the gap in rural municipalities at risk of depopulation is much wider. On average, inhabitants of municipalities at risk of depopulation have to travel more than 30 km to the nearest school, health clinic, petrol station or sports centre, compared with 14 km on average for inhabitants of other rural municipalities and 2 km on average for those of urban ones. As regards financial services, 79% of municipalities at risk of depopulation are branchless, far more than the other rural municipalities (42%) and the urban ones (0%). Lastly, with regard to access to digital services, just 5% of households have access to 100 MBps broadband in municipalities at risk of depopulation, compared with 33% and 83% of households in other rural municipalities and urban ones, respectively.

In sum, within the rural world a general distinction should be drawn between two quite different realities. While the differences between rural municipalities taken as a whole and urban ones are significant in areas such as orography, demographics and service accessibility (rural municipalities are more remote, their populations are older and they suffer a service provision gap), the differences are significantly more pronounced in municipalities at risk of depopulation.

2.4 Cities as a driving force for rural development

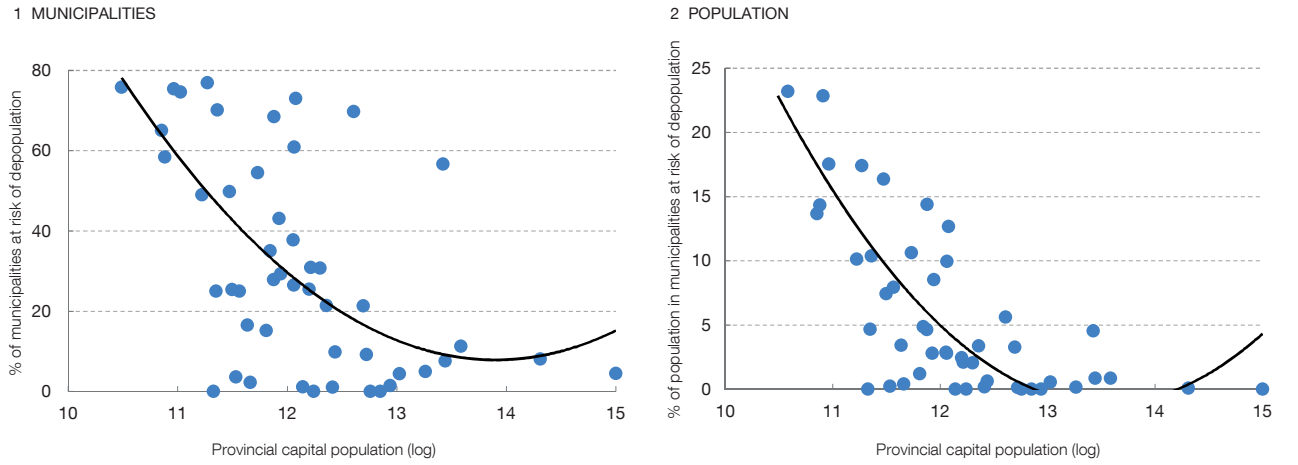
The traditional distinction between urban and rural areas is becoming increasingly blurred. Nowadays the places where people live, work and consume largely span both urban and rural areas, which are increasingly connected economically, demographically and environmentally. For example, according to the

19 See Cobertura banda ancha, Avance Digital.

Chart 4.10

THE PROVINCES WITH BIGGER PROVINCIAL CAPITALS HAVE A LOWER INCIDENCE OF MUNICIPALITIES AT RISK OF DEPOPULATION

There is a clear negative correlation between provincial capital size and percentage of municipalities at risk of depopulation in each province. The percentage of the population living in those municipalities in each province and the size of the respective provincial capital are also significantly negatively correlated.



SOURCES: Banco de España and INE.

DOWNLOAD

INE's first mobility study based on mobile phone data conducted in 2019, even in those rural municipalities not forming part of an urban area,[20] approximately 10% of their employed population spent a minimum of four hours a day at least twice a week in an urban area in the same province. In addition, these interactions between urban and rural areas may be expected to be even more important in the future, insofar as digitalisation and the implementation of remote working will increase the dissociation between the place of residence and the place of work.

Those regions with more developed urban areas also have more dynamic rural areas and, therefore, a lower incidence of municipalities at risk of depopulation. For Spanish provinces, there is a clear negative correlation between the size of the provincial capital and the percentage of municipalities at risk of depopulation (see Chart 4.10). In other words, those provinces whose capital is smaller are also the provinces with a higher incidence of municipalities at risk of depopulation relative to total municipalities in the province. This correlation suggests that urban areas act as a driving force for their surrounding rural areas in a kind of rural-urban symbiosis.

20 A municipality is considered to belong to a functional urban area if at least 15% of its employed population works in the main city and it borders other municipalities in the same area. In Spanish municipalities with fewer than 2,000 inhabitants, the commuting-rate threshold is higher: from 1,000 to 2,000 inhabitants, 25% of the employed population; from 500 to 1,000, 35%; from 100 to 500, 45%, and from 0 to 100, 50%.

Table 4.2

THE URBAN POPULATION ACTS AS A DRIVING FORCE BEHIND THE GROWTH OF RURAL AREAS

Rural municipalities close to urban centres tend to show greater momentum in terms of their inter-censal growth. In addition, this association is stronger the bigger the urban centre, as can be seen when comparing columns 1 and 4 below. Furthermore, this impact is also significant when considering the sample of municipalities at risk of depopulation (column 5).

Urban area definition (a)	(1) [50,000]	(2) [100,000]	(3) [250,000]	(4) [500,000]	(5) [500,000]
Initial population	0.018	0.014	0.013	0.017	0.017
(standard error)	(0.011)	(0.011)	(0.012)	(0.011)	(0.011)
Urban population within 0-50 km	0.005***	0.005***	0.006***	0.008***	0.007***
(standard error)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Urban population within 50-100 km	-0.000	0.000	0.000	0.004***	0.002***
(standard error)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
# obs	83,365	83,365	83,365	83,365	40,654
R2	0.437	0.436	0.435	0.436	0.579
Sample of municipalities	All	All	All	All	At risk
Fixed effects, municipality	Yes	Yes	Yes	Yes	Yes
Fixed effects, census	Yes	Yes	Yes	Yes	Yes

SOURCES: Banco de España and Beltrán Tapia et al. (2017).

a The dependent variable in the regressions is inter-censal growth (approximately every 10 years) in each municipality over the 1900-2011 period. Columns 1 to 5 refer to the different definitions of urban population depending on whether the reference urban area has more than 50,000, 100,000, 250,000, or 500,000 inhabitants. ***p<0.01, **p<0.05, *p<0.1.

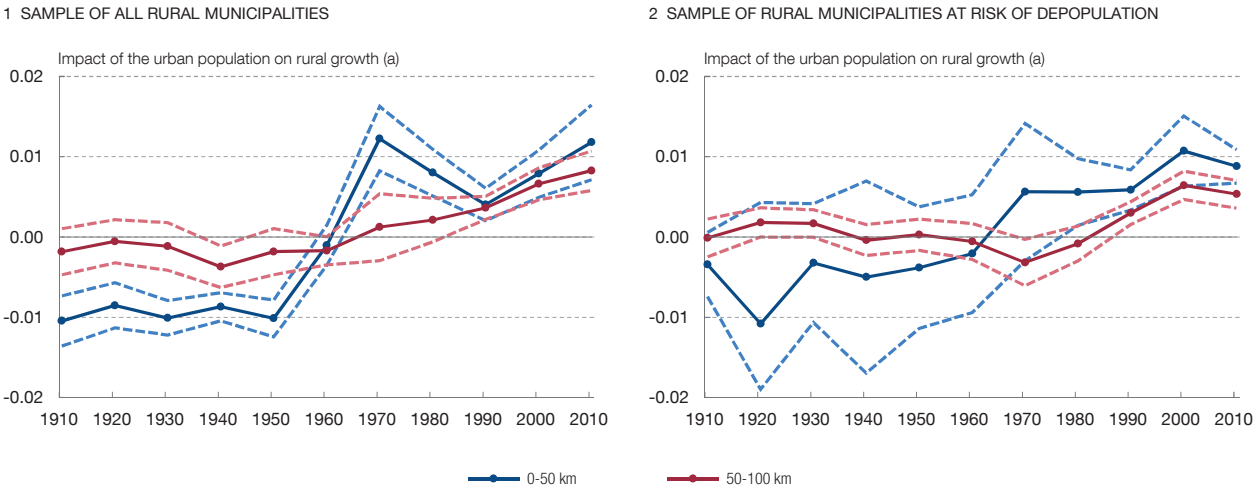
The available evidence corroborates the hypothesis of the urban population having a positive impact on the rural population. Specifically, for the 1900-2011 period the inter-censal population growth of each rural municipality is regressed on the size of the urban population within a radius of 0-50 and of 50-100 km around the municipality. Columns (1) to (4) of Table 4.2 show the estimated coefficients when the urban population size is defined as cities with more than 50,000, 100,000, 250,000 and 500,000 inhabitants, respectively. As can be seen, those rural municipalities more exposed to an urban population within a 50 km radius showed greater inter-censal growth throughout the 20th century and at the beginning of the 21st. In addition, this impact is greater the bigger the city nearby the rural municipality. Cities of more than 500,000 inhabitants (column 4) have the highest coefficient. These cities approximately correspond to the average size of Spanish provincial capitals when considering not only their main municipality, but also the group of municipalities comprising their urban area. In this case it is also observed that the impact of the urban population is sizeable even within a 50-100 km radius, i.e. larger urban areas have a larger impact.[21] Lastly, the

21 These regressions are slight variants of the approach considered in Beltrán Tapia et al. (2017). Note that different exercises were also considered that corroborate the robustness of the estimates presented in this subsection. For example, the results remain practically unchanged when considering only rural municipalities not forming part of functional urban areas, when excluding from the sample the municipalities of Madrid and Barcelona, and when considering radii of 0-25, 25-50 and 50-100 km as in the original paper. The authors are grateful to Francisco Beltrán Tapia for kindly sharing the data.

Chart 4.11

THE URBAN POPULATION HAS HAD A MORE FAVOURABLE IMPACT ON RURAL AREAS IN RECENT DECADES

Larger urban populations are associated with greater population growth in the rural municipalities located within a radius of 0-50 km or 50-100 km around the urban centre (see Table 4.2). This favourable impact has been far stronger in recent years, when commuting costs have been lower.



SOURCES: Banco de España and Beltrán Tapia et al. (2017).

a Charts 4.11.1 and 4.11.2 are based on similar regressions to those used in columns 4 and 5 of Table 4.2, respectively. In other words, inter-censal population growth in rural municipalities is regressed on the size of the urban population within a radius of 0-50 km and of 50-100 km for the 1900-2011 period. However, unlike the specifications of Table 4.2, the coefficients associated with the urban population within the two radii were allowed to vary for each inter-censal period (decade).

DOWNLOAD

urban population's impact is estimated to be positive even when limiting the sample to rural municipalities at risk of depopulation. Based on the coefficients estimated in column (5) of Table 4.2, an increase of ten inhabitants in the Spanish provincial capitals would result in an increase of 1.5 inhabitants in the group of municipalities at risk of depopulation located within a 50 km radius around those capitals.

The impact of urban areas on rural municipalities is particularly strong in recent decades, as the costs of travelling between rural and urban areas have fallen. In the case of the United States in the early 20th century, when commuting costs were high, cities' greater momentum drew the population away from neighbouring rural areas because it was more attractive to workers to live near their workplace in the same city. Conversely, in the second half of the 20th century, when commuting costs fell as cars became more widely used, greater urban momentum was associated with greater momentum in nearby rural areas, because workers found it more attractive to live in the latter and commute to their workplace in the city (see Cuberes et al. (2019)). This pattern also arose in Spain. As shown by Chart 4.11, the positive impacts estimated in Table 4.2 for the 1900-2011 period are due mainly to the estimated impact in the most recent decades, when transport costs were lower in Spain. However, the estimated impact was immaterial or even negative in the early 20th century.

This result is particularly interesting in light of the sudden surge in remote working in response to the COVID-19 pandemic. Specifically, remote working could in fact reduce the costs of commuting between cities and rural areas, insofar as employees' ongoing presence at their normal workplace would not be required.[22] Hence, rural municipalities could attract some workers from the cities and thereby start an endogenous rural growth process, as the new inhabitants demand certain services be provided. These effects could even benefit municipalities at risk of depopulation, directly in those cases where employees work from home most or all of the working week and indirectly, in the medium term, via the development of intermediate municipalities that would act as a driving force for the remotest rural areas. In this regard, strengthening the measures that facilitate mobility between larger centres with the capacity to act as a driving force and the neighbouring rural areas would be key to increasing the former's ability to boost the latter.[23] Urban areas could thus prove to be allies of the rural areas in a kind of rural-urban symbiosis, particularly against the backdrop of remote working and digitalisation in the post-pandemic scenario. However, for the time being very high uncertainty surrounds the persistence and intensity of these health crisis-induced patterns of behaviour and, consequently, the possibility of the population trends described being observed.

All things considered, the loss of momentum in some Spanish cities in recent years could have exacerbated rural depopulation in some provinces. In the presence of cities' impact on rural municipalities, including those at risk of depopulation, the higher incidence of rural depopulation in certain provinces could be due, at least partly, to the cities in those provinces having less momentum. A detailed analysis of recent population dynamics in Spanish cities is therefore essential in order to understand the factors behind these developments. This is the purpose of the following section.

3 Spanish cities' population dynamics and their causes

3.1 Migration flows towards big cities

Given some cities' scant demographic momentum and its possible role in the rural depopulation documented in the preceding section, this section analyses in detail urban areas taken as a whole and their recent population dynamics in Spain. To this end, Eurostat's standard definition of urban areas at the European level and the greater availability of information at the individual level enable new economic activity-related dimensions, such as migration and the distribution of

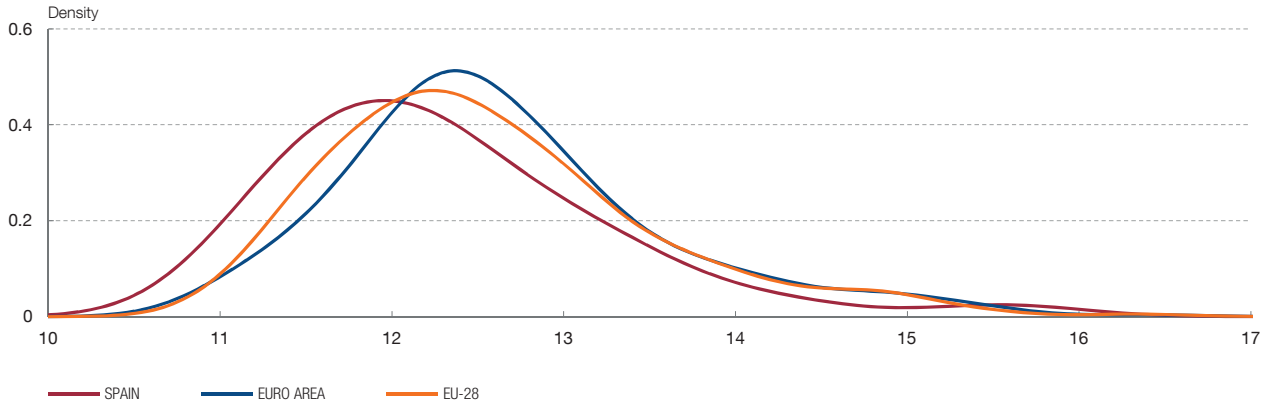
22 According to the Spanish Labour Force Survey, the percentage of workers working from home more than half the week in Spain has risen from 4.8% in 2019 to 16.2% in 2020.

23 This is one of the policies adopted in the case of Japan, via the "compact and connect" strategy (see Section 4 of this Chapter).

Chart 4.12

SPANISH CITIES ARE ON AVERAGE SMALLER THAN OTHER EUROPEAN CITIES

Based on Eurostat's standardised definition of urban area, Spanish cities are smaller than their European counterparts. However, the population distributions in the different cities are not statistically different. For example, the percentage of the population living in Spain's largest urban area (21%) is practically the same as the percentage for the euro area as a whole (23%).



DOWNLOAD

SOURCE: Eurostat.

workers in the different cities, to be explored. In this section the terms city and urban area are used interchangeably, although strictly speaking the figures refer to urban areas at all times.[24]

Compared with other European cities, the first noteworthy characteristic of Spanish cities is their smaller size. On average, Spanish urban areas had 439,322 inhabitants in 2018, 20% less than the average size of urban areas in the rest of the euro area. However, apart from this average size disparity, the population is no more densely concentrated in the largest Spanish urban areas (see Chart 4.12).[25] For example, the largest urban area in Spain accounts for 21% of the total population, compared with 23% in the other euro area countries (if the two largest urban areas are considered, these percentages would be 36% in Spain and 34% in the euro area).

As regards population dynamics, the population in Spanish cities increased during the 2000s, thanks, above all, to positive net international migration. Drawing on Residential Variation Statistics, positive net migration in all Spanish

24 According to Eurostat, a functional urban area consists of a city and its commuting zone, which, therefore, form an integrated labour market. Specifically, a municipality is considered to belong to an urban area if at least 15% of its employed population works in the main city and it borders other municipalities in the same area. Based on this definition, 718 urban areas (or cities for the purposes of this section) are identified in the European Union and 74 in Spain. For more details, see Methodological manual on territorial typologies, EU Publications.

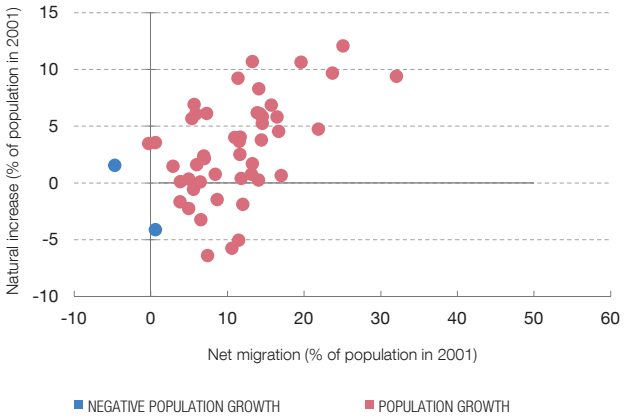
25 Note that the differences between the population distributions in Chart 4.12 are not statistically significant according to the Kolmogorov-Smirnov test.

Chart 4.13

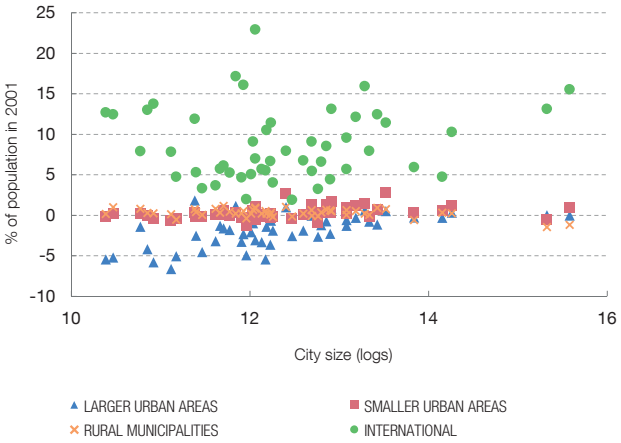
INTERNAL MIGRATION TO LARGER URBAN AREAS HAS CONTRIBUTED TO POPULATION DECLINE IN SMALLER URBAN AREAS THROUGHOUT THE 2001-2018 PERIOD

Over the last two decades, internal migration to larger urban areas has resulted in less momentum in smaller urban areas in Spain. This loss of momentum was offset by international migration during the 2000s, but in recent years this has not been the case.

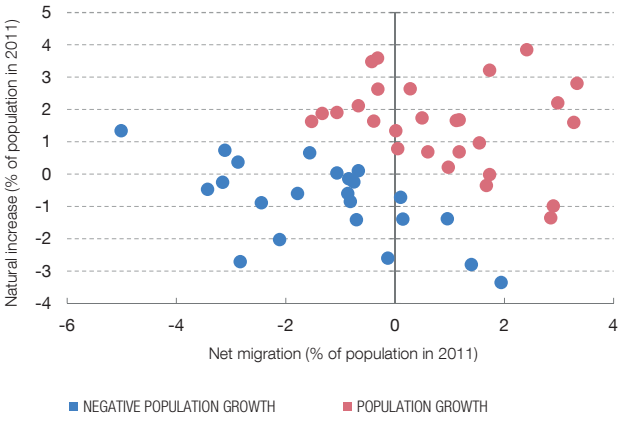
1 SPANISH URBAN AREAS. NATURAL INCREASE AND MIGRATION (2001-2018) (a)



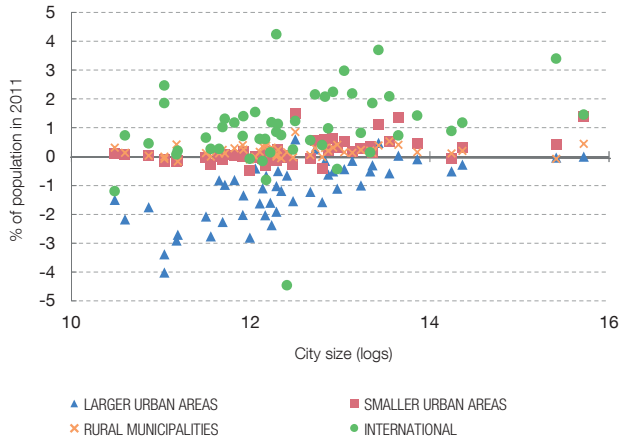
2 BREAKDOWN OF NET MIGRATION BY ORIGIN-DESTINATION (2001-2018) (b)



3 SPANISH URBAN AREAS. NATURAL INCREASE AND MIGRATION (2011-2018) (a)



4 BREAKDOWN OF NET MIGRATION BY ORIGIN-DESTINATION (2011-2018) (b)



SOURCE: INE.

a As explained in the main text, an urban area consists of a city and its commuting zone whose labour market is highly integrated with the city. See https://op.europa.eu/s/oLPh for more details.

b Four shapes are shown for each urban area. These denote the respective net migration balance over the period vis-à-vis larger urban areas in Spain, smaller urban areas in Spain, rural municipalities in Spain and international destinations.

DOWNLOAD

cities was due mainly to international migration, in a general setting in which the country as a whole received particularly sizeable migration flows during the first decade of the 21st century. This momentum contrasts with the significant negative net internal migration to practically all Spanish cities. Net migration to rural or smaller urban areas was on a much smaller scale (see Chart 4.13).

Since 2011 smaller Spanish urban areas have undergone population decline. This downward pattern has persisted over the last decade due to internal migration to larger urban areas. However, the difference compared with the 2000s is that net international migration fell drastically after the financial crisis that began in 2008. Hence, international migration ceased to offset the population decline in small urban areas arising from emigration to larger ones. This resulted in the population declining in practically half the Spanish urban areas between 2011 and 2018 (see Chart 4.13).

Lastly, the protagonists of these inter-city migration flows in Spain are mostly younger adults. Specifically, 90% of total internal migration-related population declines in Spanish cities is explained by population flows to larger urban areas of those aged between 18 and 39. In sum, the pattern of internal migration by younger adults to larger urban areas has been a constant theme over the last two decades. The question of why young adults move to larger cities is addressed in the following subsection.

3.2 The advantages and disadvantages of big cities

An individual's decision to move from a small to a larger urban area is based on comparing the costs and benefits associated with such move. The costs and benefits inherent in the size of cities must be analysed to understand the pattern of migration flows to larger urban areas documented in the preceding subsection. Broadly speaking, a larger urban area is associated with advantages in the form of higher productivity levels and a more efficient provision of public and private services. However, it is also linked to disadvantages related to the various costs of congestion. Some manifestations of these three forces are described below.

From a production standpoint, the spillover effects arising between workers and firms when a large number of these agents gather in a specific spatial area result in higher levels of productivity for firms which, in turn, give rise to higher wages for workers. In other words, agglomeration economies make firms and workers more productive in larger urban areas. There are three explanations for this: (i) a larger market facilitates access to a wider variety of suppliers and workers, in addition to a more efficient shared use of transport infrastructure; (ii) a larger local market also provides for a better match between employers and employees or suppliers and customers; and (iii) a larger market also catalyses more effectively interactions between firms and workers, resulting in the transfer and accumulation of knowledge that fosters the development and adoption of new technologies and business practices.

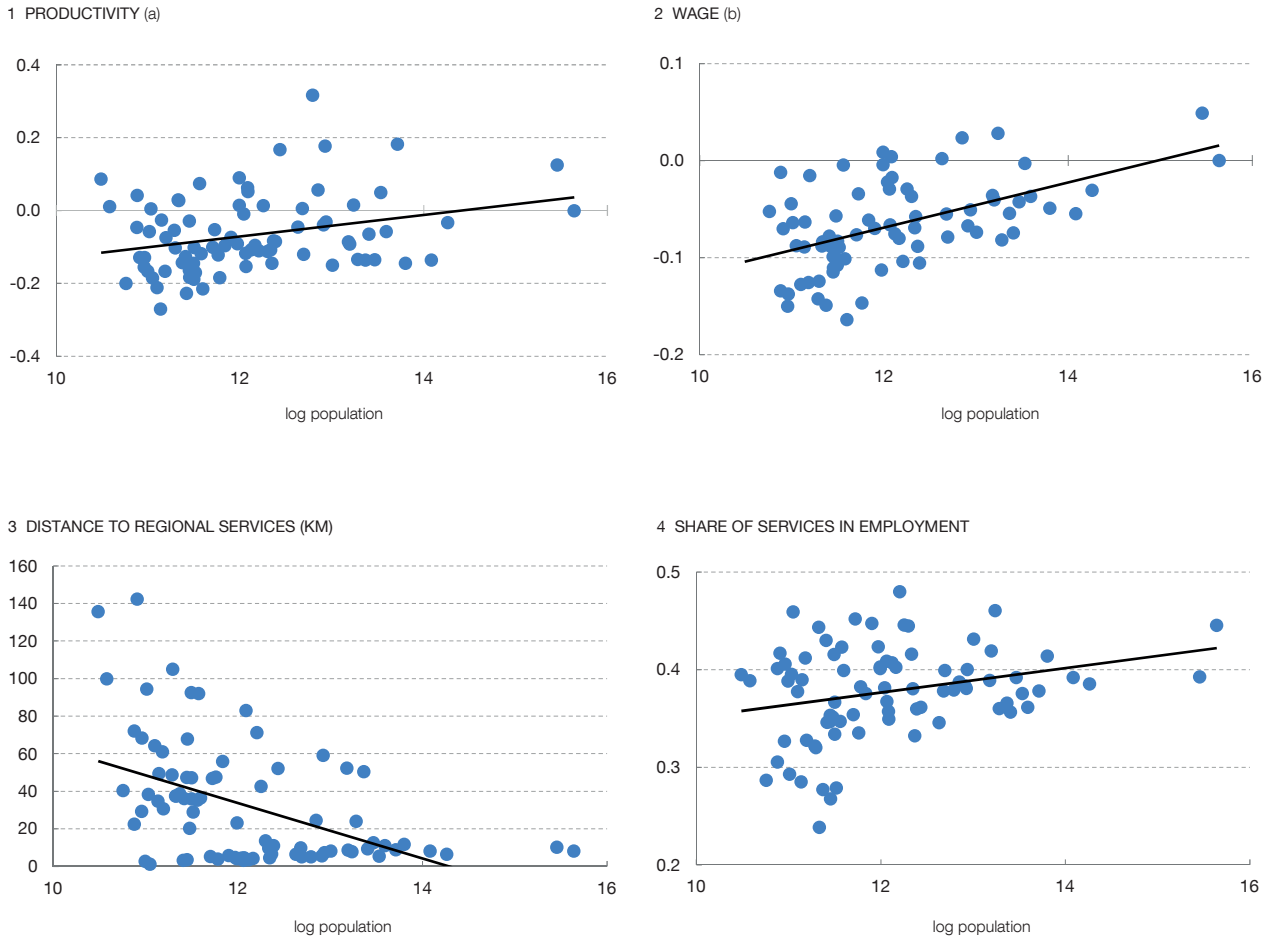
While in practice it is hard to quantify these effects, in the literature there is a consensus on the assumption that they are sizeable.[26] In the case of Spain,

26 For a summary of this literature, see Duranton and Puga (2020).

Chart 4.14

THERE ARE PRODUCTIVITY, WAGE AND SERVICE-ACCESS BENEFITS ASSOCIATED WITH CITIES' LARGER SIZE

Productivity and wages are higher in larger urban areas, even for firms and workers with the same observable characteristics and in the same sectors. In addition, larger urban areas offer a wider range of services that are provided more efficiently.



SOURCE: Banco de España.

a Productivity in each city takes into account the differences in observable characteristics of the firms located in the different cities. Specifically, drawing on data from the Banco de España's Central Balance Sheet Data Office, a firm-level productivity regression was conducted on a series of firm characteristics (size, sector of activity, age and level of indebtedness) and a group of fixed effects for each city. These fixed effects capture the average productivity of firms in each city after stripping out the composition effects that might contaminate the comparison of average productivity among cities.

b The wage in each city takes into account the differences in observable characteristics of the workers located in the different cities. Specifically, drawing on MCVL data, the logarithm of each worker's wage was regressed on observable characteristics (education, experience and sector of activity) and a group of fixed effects for each city. These fixed effects capture the average wage of workers in a city once the composition effects have been stripped out.

DOWNLOAD

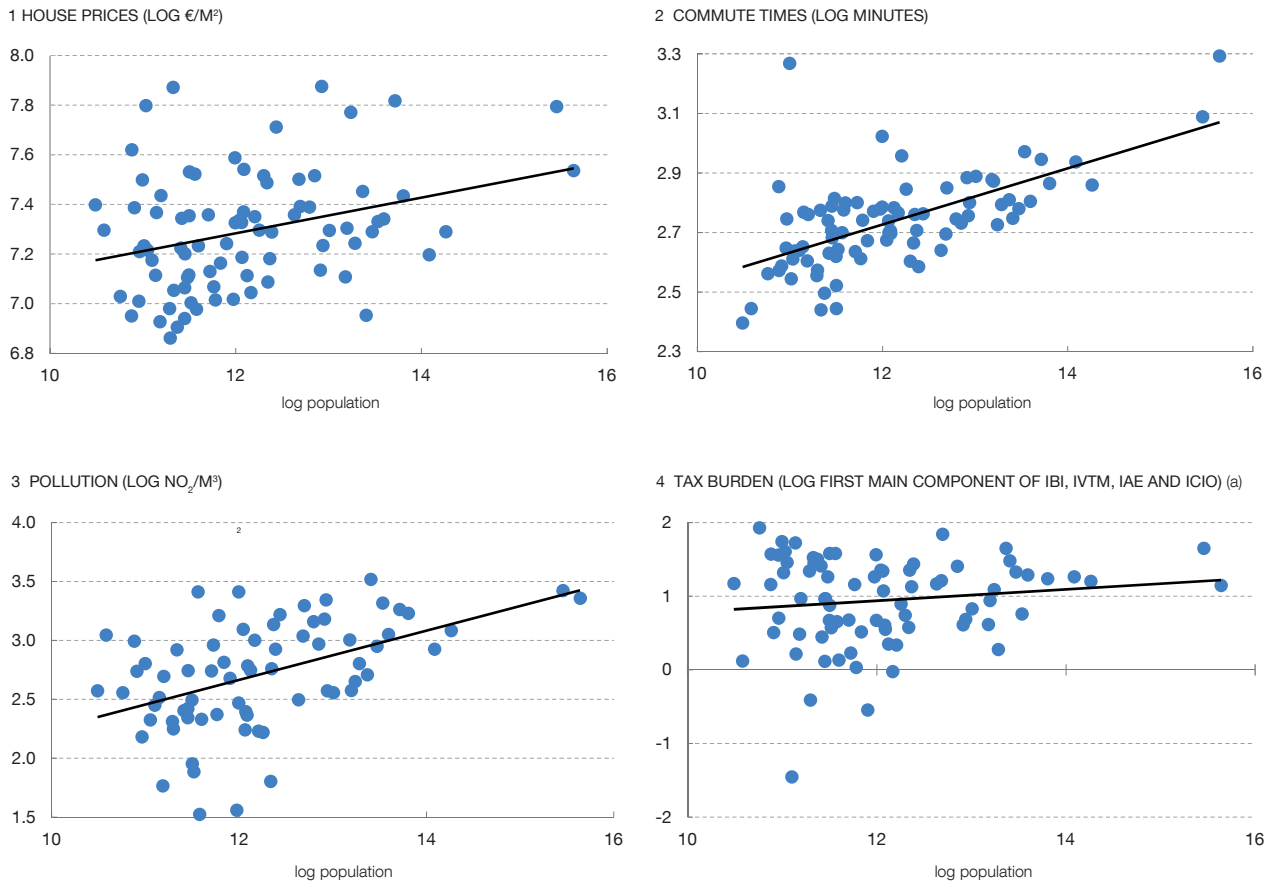
Chart 4.14 shows the positive correlation between the size of cities and the average productivity of their firms.[27] In keeping with the elasticities in the literature, a 1% increase

27 Here, average productivity refers to the logarithm of total factor productivity. Furthermore, the elasticity or premium associated with the size of cities is calculated by controlling for differences in the observable characteristics of the firms located in the different cities. In particular, drawing on data from the Banco de España's Central Balance Sheet Data Office, a firm-level productivity regression was conducted on a series of firm characteristics (size, sector of activity, age, and level of indebtedness) and a group of fixed effects for each

Chart 4.15

A SERIES OF COSTS ASSOCIATED WITH BIGGER CITY SIZE APPEAR IN VARIOUS FORMS OF CONGESTION

Larger city size is associated with greater congestion. The highest levels of congestion appear in the form of higher house prices, longer commute times, more pollution and a heavier tax burden.



SOURCE: Banco de España.

a IBI: property tax; IVTM: road tax; IAE: tax on business activity; and ICIO: tax on buildings, installations and other works.

DOWNLOAD

in a city's population is associated with an average rise of 0.029% in the productivity of its firms. The effect of agglomeration economies is also reflected in workers' wages (see Chart 4.15). The largest cities have higher average wages, even after controlling for workers' observable characteristics, such as education, experience and sector of activity.[28] Specifically, a 1% increase in a city's size seems to be associated with an increase of 0.046% in the average wage of its workers. This evidence for Spain is consistent with that available for other countries (see Combes et al. (2010)).

city. These fixed effects capture the average productivity of firms in each city after stripping out the composition effects that might contaminate the comparison of average productivity among cities.

28 This elasticity is calculated using a similar methodology to that used for firms. Drawing on social security administrative labour records (MCVL) data, the logarithm of each worker's wage was regressed on observable characteristics (education, experience and sector of activity) and a group of fixed effects for each city. These fixed effects capture the average wage of workers in a city once the composition effects have been stripped out.

The provision of services is also more efficient in larger urban areas. This results in better accessibility and the availability of a wider range of products for consumers. For example, the largest urban areas have a much wider range of food products and restaurants (see Handbury and Weinstein (2015)). In terms of access to on-site public services, the higher population density in big cities means that the average distance to the nearest point of service (e.g. a hospital) is shorter for a given number of citizens per service. Indeed, Chart 4.14 reflects the negative correlation between city size and distance to the nearest hospital or university. It also depicts the greater weight of the services sector in the larger urban areas.[29]

The congestion inherent in large urban centres is another of the costs associated with their larger size. House prices can be deemed an indicator of congestion, insofar as higher prices are the result of demand outweighing supply. Indeed, the positive correlation between city size and house prices is a widely documented stylised fact. Specifically, the estimated elasticity between city size and house prices for Spain exceeds the elasticities estimated for productivity and wages (see Chart 4.15). Higher house prices are usually accompanied by higher commuting costs, insofar as residents move further away from the centre and the transport infrastructure becomes congested, as reflected by the positive correlation between commute time and city size in Spain (see Chart 4.15). Accordingly, the greater congestion in the larger urban areas also tends to be associated with a heavier tax burden (see Chart 4.15), as the local authorities try to alleviate the costs of congestion through transport infrastructure investment which incurs high economic costs.

The costs associated with the pollution that residents of large urban areas suffer are also noteworthy. A greater population agglomeration within cities may result in their residents being more exposed to pollution, as can be observed in Spain (see Chart 4.15). This may be associated with a reduction in life expectancy (see Carozzi and Roth (2020)) and makes citizens of large urban areas extremely willing to assume certain costs in order to reduce their exposure to particulate matter (see Chay and Greenstone (2005)). However, available evidence for the United States points to residents in larger urban areas being responsible for fewer greenhouse gas emissions and fewer particulates per person than residents in smaller urban areas, resulting in an overall benefit. This is due to more energy efficient means of transport and the differences in emissions associated with home heating (see Glaeser and Kahn (2010)).

However, the costs and benefits associated with city size discussed in this subsection ignore the potential heterogeneity in the effects analysed.

29 See Ahlfeldt and Pietrostefani (2019) for a detailed analysis of the other benefits associated with the larger size of cities in terms of amenities and greater accessibility to various services.

Specifically, it could be the case that certain population groups obtain more or less benefits from city size, as analysed below.

3.3 Concentration of high-skilled employment in big Spanish cities

The younger population comprise most of the migration flows from smaller urban areas to big cities, presumably in search of better professional opportunities, and also for greater opportunities for leisure and other amenities. Although enhanced access to services in large urban areas cannot be quantified precisely on an individual basis, a detailed analysis of individual gains in employment conditions achieved by migrants to big cities may be made drawing on MCVL data. Specifically, of all the workers who moved from a smaller to a larger urban area to work between 2005 and 2018, 51% were unemployed in their area of origin, 10% were employed but in a lower social security contribution group and 16% were paying contributions in the same professional category but with a lower wage. Accordingly, three of every four migrations to larger urban areas resulted in better employment conditions, either on the extensive margin (access to employment) or the intensive margin (access to more highly skilled and/or better paid employment). However, do some workers benefit more than others from pursuing their professional activity in larger urban areas?

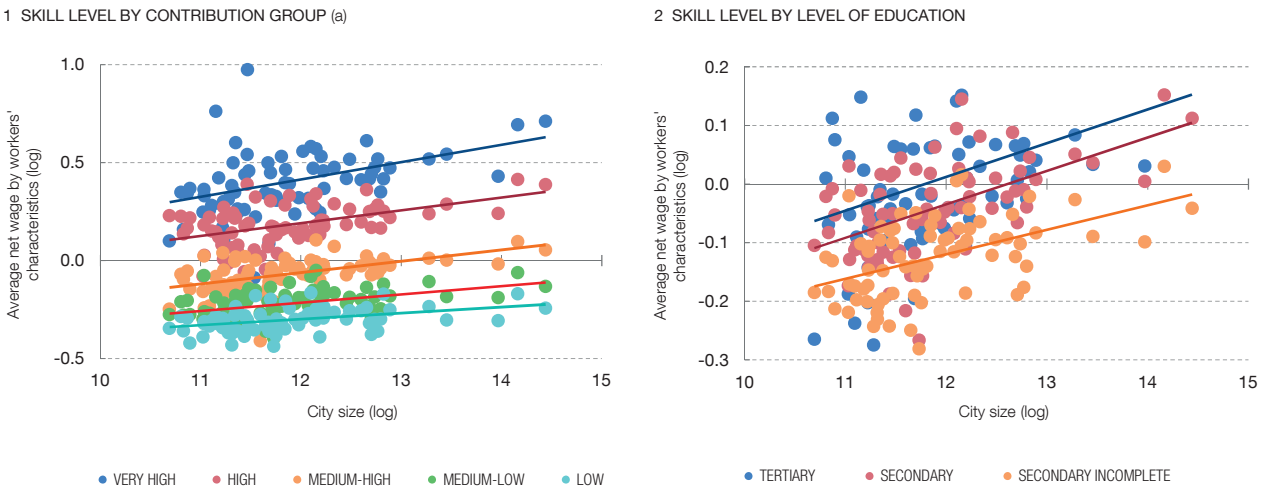
The best indicator available on individual gain is the wage premium associated with working in big cities, which is also higher for workers in more highly skilled occupations. As discussed in the previous subsection, estimated elasticity for the average worker is 0.046, which may be interpreted as the wage premium associated with city size. However, this average elasticity masks a significant degree of heterogeneity across workers' skill levels.[30] Specifically, the wage premium for workers in very highly skilled occupations is 0.106, whereas for workers in low-skilled occupations it is 0.030 (see Chart 4.16). By way of illustration, these elasticities mean that the wage of a worker in a high-skilled occupation in Madrid will be 33.2% higher than the wage of a worker in an equivalently skilled occupation in Cáceres, whereas this premium for a worker in a low-skilled occupation will be 9.5%, given the comparative size of the urban areas of Madrid and Cáceres. As regards the reasons for these wage premia, the available evidence shows that workers who move to larger urban areas obtain an immediate premium through the channels described in the previous subsection and, also, that over time they build up more valuable experience than in smaller urban areas.

30 Workers' skill levels are proxied by their contribution group and their education level, both of which are available in the MCVL. Specifically, skill levels are considered very high for contribution group 1, high for groups 2 and 3, medium-high for groups 4 to 6, medium-low for groups 7 to 9 and low for group 10. In the case of education, a distinction is drawn between three levels: high for workers with tertiary education, medium for those who have completed secondary education, and low for those who have not completed secondary education. For more details, see Moral-Benito and Quintana (2021).

Chart 4.16

THE WAGE PREMIUM ASSOCIATED WITH CITY SIZE IS HIGHER FOR WORKERS IN HIGH-SKILLED OCCUPATIONS

Wages are higher in bigger cities, even when comparing equivalent workers in terms of experience, age and sector of activity. The wage premium is significantly higher for workers in more highly skilled occupations, measured in terms of contribution group and level of education.



SOURCES: Banco de España and MCVL.

a Each dot denotes the fixed city-group effect drawing on a regression on observable characteristics (education, experience and sector of activity) of the log wage of each worker and a set of fixed city-skill group effects. These fixed effects capture the average wage of workers in a city and their skill group, after stripping out the composition effects. Skill levels are considered very high for contribution group 1, high for groups 2 and 3, medium-high for groups 4 to 6, medium-low for groups 7 to 9 and low for group 10.

DOWNLOAD

However, the added value of this valuable experience gained in big cities persists even when the workers return to their areas of origin (see De la Roca and Puga (2017)).

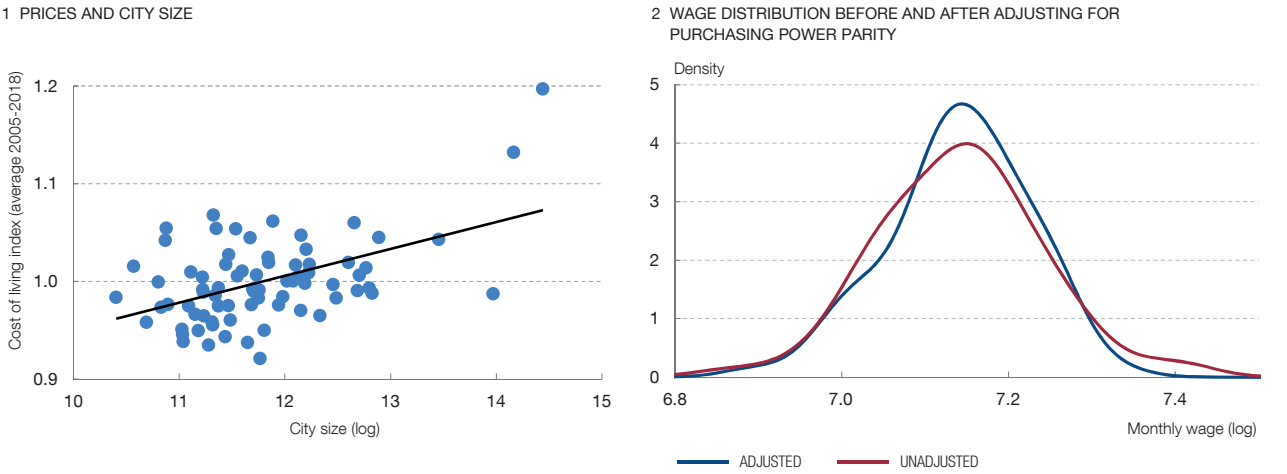
Nevertheless, differences in the cost of living are one important aspect that can affect wage comparisons between urban areas. For instance, according to the Residential Rental Price Index (RRPI) of the Ministry of Transport, Mobility and Urban Agenda, the average rental price in Madrid was €13.2 per m^2 in 2018, compared with €5.0 in Cáceres. In consequence, a cost of living index must necessarily be considered for the different cities of Spain in order to compare wages adjusted to reflect purchasing power, to provide a more accurate indicator of workers' actual welfare. According to the index calculated in Forte-Campos et al. (2021),[31] prices are

31 The cost of living index draws on data from the Household Budget Survey (HBS), the CPI series by province compiled by the INE and the RRPI of the Ministry of Transport, Mobility and Urban Agenda. Specifically, drawing on the RRPI, the price per m^2 of housing in apartment blocks at the urban area level is obtained. Local prices for consumption groups – food, beverages and utilities – are obtained from the HBS (these goods account for some 50% of total household expenditure). For all other consumption groups local prices are estimated drawing on the correlation between inflation at provincial level for those groups and inflation at the provincial level for groups for which local price information is available. Lastly, the prices of each group are weighted according to the respective proportion of spending (HBS).

Chart 4.17

COST OF LIVING DIFFERENCES ARE SIGNIFICANT AMONG CITIES AND AFFECT WAGE COMPARISONS

Prices (the cost of living) are higher in bigger cities. Once wages are adjusted to reflect purchasing power parity in each city, wage differences among big and small cities become significantly smaller.



DOWNLOAD

SOURCES: Banco de España and MCVL.

higher in larger urban areas, especially in Madrid and Barcelona, where average cost of living indices are some 20% higher than in the other Spanish cities. In consequence, wage differences between cities are significantly smaller when wages are compared in terms of purchasing power parity (see Chart 4.17).

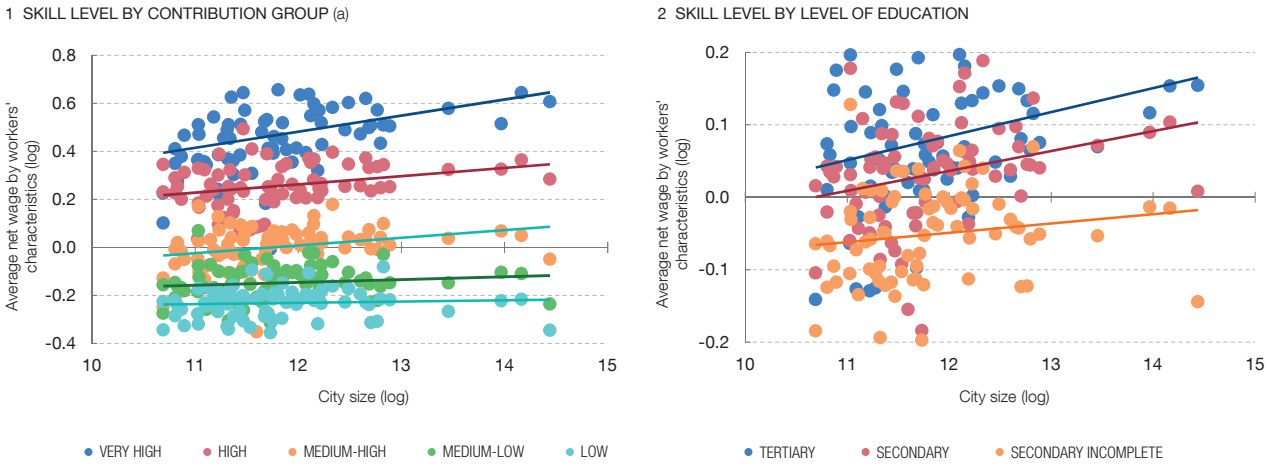
Once wages are adjusted to reflect purchasing power, the wage premia associated with city size are lower, and even disappear for workers in low-skilled occupations. Although the wage premium in big cities decreases significantly for all groups of workers when cost of living differences are considered, it only disappears for workers in low-skilled occupations. Specifically, elasticity for workers in high-skilled occupations drops from 0.106 to 0.071, while for workers in low-skilled occupations it falls from 0.03 to 0.00. In other words, wages of workers in low-skilled occupations are no higher in larger urban areas once purchasing power is taken into account (see Chart 4.18). Continuing with the previous example, this means that the wage premium for workers in high-skilled occupations in Madrid compared with workers in equivalently skilled occupations in Cáceres falls from 33.2% to 22.2%, but from 9.5% to 0% for workers in low-skilled occupations.

These differences in wage premia between groups of workers have significant effects on the composition of the population dynamics of Spanish cities. Specifically, there is a high level of heterogeneity in net migration to large urban

Chart 4.18

THE WAGE PREMIUM ASSOCIATED WITH CITY SIZE DECREASES SIGNIFICANTLY OR EVEN DISAPPEARS WHEN COST OF LIVING DIFFERENCES AMONG CITIES ARE TAKEN INTO ACCOUNT

When wages are adjusted to reflect purchasing power parity, the wage premium associated with city size decreases significantly for workers in more highly skilled occupations and disappears for workers in low-skilled occupations.



SOURCES: Banco de España and MCVL.

a Each dot denotes the fixed city-group effect drawing on a regression on observable characteristics (education, experience and sector of activity) of the log wage of each worker and a set of fixed city-skill group effects. These fixed effects capture the average wage of workers in a city and their skill group, after stripping out the composition effects. Skill levels are considered very high for contribution group 1, high for groups 2 and 3, medium-high for groups 4 to 6, medium-low for groups 7 to 9 and low for group 10.

DOWNLOAD

areas according to workers' skill levels. MCVL data for the period 2005-2018 show that the larger urban areas received a higher proportion of skilled workers. For instance, Madrid and Barcelona received each year the equivalent of 0.86% and 0.36% of all workers in very highly skilled occupations in the country overall, equivalent to some 10,000 and 4,400 workers, respectively. Yet it is interesting to note that the larger urban areas have a negative net balance in the case of workers in low-skilled occupations. For example, between 2005 and 2018 Madrid and Barcelona saw net outflows of workers in low-skilled occupations amounting to the equivalent of 0.03% and 0.02% of the national total of workers in those occupations, some 1,600 and 1,100 workers per year, respectively (see Chart 4.19).

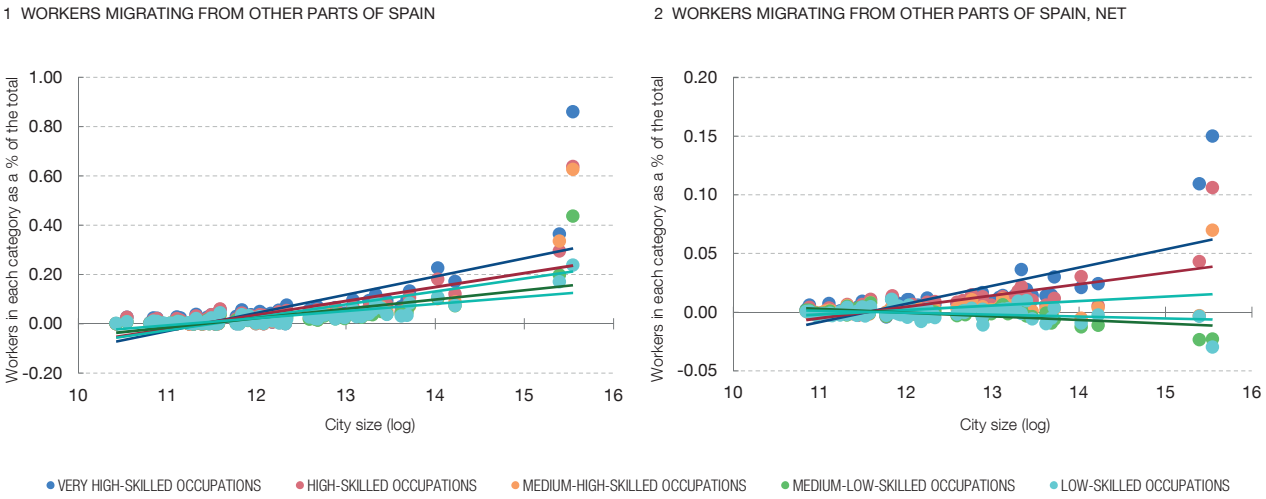
As a result of all these patterns, Spain is tending towards a growing concentration of workers in high-skilled occupations in a small number of big cities.[32] This may create greater income disparity, not only between but also within cities, as shown by the wage differences between different contribution groups in the same city and the same contribution groups in different cities (see Chart 4.19). Indeed, drawing on information from the tax authorities, between 2005 and 2018

32 This trend is also documented in the case of the United States (see Berry and Glaeser (2005)).

Chart 4.19

BIGGER CITIES RECORD NEGATIVE NET MIGRATION IN THE CASE OF WORKERS IN LOW-SKILLED OCCUPATIONS

Although there was more migration to larger urban areas than to smaller ones among workers in occupations of all skill levels, the difference is most acute among workers in more highly skilled occupations. Also, considering not only migration to but also migration from each city, the bigger cities recorded a negative net balance in the case of workers in low-skilled occupations over the period 2005-2018.



DOWNLOAD

SOURCES: Banco de España and MCVL.

labour income dispersion increased both within and between the different cities.[33] In addition, the larger urban areas have higher levels of labour income heterogeneity among their workers than the smaller urban areas (see Chart 4.20).

4 Some public policy considerations

Place-based public policies account for a significant part of public budgets. For example, at the European level there are widespread policies in place that seek to mitigate the effects of the demographic deficit in certain regions: two of the five European Investment and Structural Funds, namely the European Regional Development Fund (ERDF) and the European Agricultural Fund for Rural Development (EAFRD), together with the common agricultural policy (CAP), include among their explicit objectives balanced growth in the different regions of the European Union or economic development in rural areas. In addition, the European Social Fund (ESF)

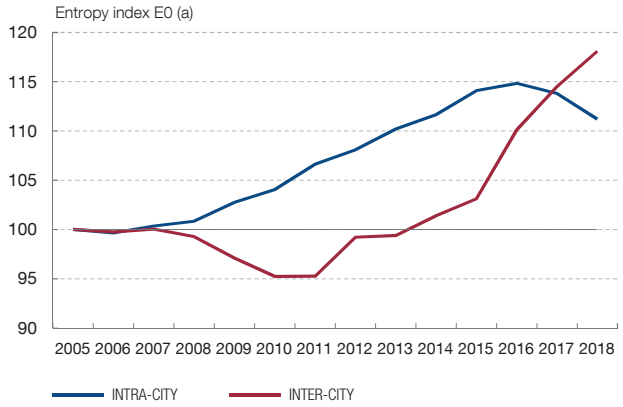
33 Specifically, the data contained in the 2005-2018 Personal Income Tax Samples (Muestras IRPF 2005-2018 IEF-AEAT (Declarantes)) are used to construct a Theil entropy index (mean log deviation), to break down the aggregated index into two components: one that proxies labour income dispersion between persons filing income tax returns in each city (within) and another that captures dispersion between average labour income in different cities (between). The first component (within) explains 97% of the degree of dispersion. For more details, see Shorrocks and Wan (2005).

Chart 4.20

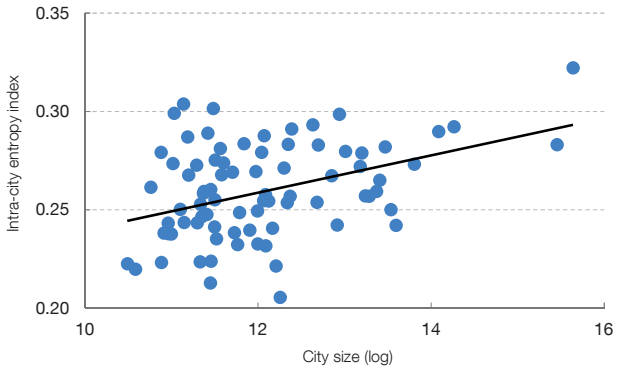
LABOUR INCOME DISPERSION HAS INCREASED SINCE 2005, BOTH WITHIN EACH CITY AND BETWEEN THE DIFFERENT CITIES

Labour income dispersion among workers in Spanish cities increased between 2005 and 2018, both within each city and between the different cities. There is also a high correlation between city size and the level of labour income dispersion.

1 DISPERSION (2005=100)



2 INTRA-CITY DISPERSION AND CITY SIZE



SOURCES: IEF-AEAT and Banco de España.

a Drawing on the data contained in the 2005-2018 Personal Income Tax Samples (Muestras IRPF 2005-2018 IEF-AEAT (Declarantes)) a Theil entropy index (mean log deviation) is constructed to break down the aggregated index into two components: one that proxies labour income dispersion between persons filing income tax returns in each city (within) and another that captures dispersion between average labour income in different cities (between). The first component (within) explains 97% of the degree of dispersion. For more details, see Shorrocks and Wan (2005).

DOWNLOAD

distributes its funding according to the relative wealth of the regions. Accordingly, 33% of the EU budget goes to economic, social and territorial cohesion policies. In the case of Spain, the main aim of the National Demographic Challenge Strategy, approved in 2017, is to design a joint response to mitigate the issues of population ageing and regional depopulation. Insofar as these policies seek to encourage development in more disadvantaged areas through public investment, subsidies, tax exemptions, etc., they may be considered redistributive policies as, by one means or another, they transfer public resources to households in more disadvantaged areas.

As in the case of all other public policies, the efficiency and efficacy of these policies must be assessed, to ensure their optimal design. The main argument for public measures in this area is their social benefit in terms of a more equitable distribution of resources.[34] But these policies may also entail costs in the form of efficiency losses. For example, if a specific geographical area receives public

34 Other arguments are based on the existence of market failures and/or externalities, insofar as firms and workers choose their locations on the basis of costs and private benefits, without taking into account the costs and benefits for society as a whole. For example, a worker and/or a firm may generate positive externalities towards other workers and/or firms in a small urban area that are not internalised when they decide to move to a larger one where the private benefits will be greater but the positive externality will, in relative terms, be smaller (see Fajgelbaum and Gaubert (2020)). However, in the Spanish case, the empirical evidence available on this type of market failures and/or externalities is very limited (see Cuberes and Moral-Benito (2021)).

support, workers and/or firms may move from other locations where marginal productivity is higher, with the consequent adverse impact on aggregate productivity (see Gaubert (2018)). In addition, it is also important to consider the opportunity cost of resources allocated to more disadvantaged areas, which could be allocated for redistributive purposes but according to other criteria, for example, income criteria (see Glaeser (2008)).[35]

A distinction must be drawn between policies that adapt to depopulation and those that aim to mitigate it. The former seek to maintain a minimum level of services to ensure people's welfare, while the latter seek to curb the demographic decline and encourage development in the medium term (see Copus et al. (2020)). This distinction is especially important in view of the two realities of the rural world documented in this chapter in the case of Spain.

In the case of the adaptation policies, the literature has identified two key factors that explain the difficulties, documented in this chapter, facing rural municipalities in the provision of certain services at the local level. First, with the existence of economies of scale in the provision of some services, the small size of many rural municipalities means that fixed costs per inhabitant are very high. Second, there are regulatory factors that could be limiting the provision of certain public services, as there is a lack of clarity in the distribution of some powers among the administrations concerned and, in addition, rural municipalities are highly reliant on transfers from other tiers of government, which may result in greater uncertainty as to the volume of resources available.[36]

In this setting, certain measures could be considered to more clearly define the distribution of powers among the different tiers of government and to boost collaboration between municipalities to exploit economies of scale. Associations of municipalities ("mancomunidades" in Spain) may play a key role in easing the difficulties that rural municipalities face to provide services. Such associations, formally established between a number of municipalities, mean that they can jointly provide services and execute works, allowing them to harness possible synergies and economies of scale. These associations would be especially beneficial were they to include larger municipalities with more drive, as they could act as hubs for the provision and distribution of services (see OECD (2013)).

The provision of digital and financial services could also be a significant catalyst for the rural world, beyond considerations of regional equality in access to services. The evidence available for Spain shows that the closure of bank branches in rural municipalities had an adverse impact on investment and on

35 According to the most recent literature, redistribution based on geographical criteria may be preferable to other forms of redistribution under certain circumstances. For instance, where population mobility is low or where there is a high concentration of highly skilled employment in certain regions (see Gaubert et al. (2021)).

36 Alloza et al. (2021) present a detailed analysis of the available literature on both these aspects.

the survival of small firms operating in those municipalities (see Martín-Oliver et al. (2020)). The development of new technologies and digital infrastructures provides an opportunity for communities to gain access to and use financial services. They may pose significant challenges for banks, but they could potentially play a very important part in mitigating the adverse effects of branch closures (see Barruetabeña (2020)).

Financial and digital education programmes are a necessary ingredient in the design of a joint strategy to defend vulnerable population groups in rural settings from financial exclusion and the digital gap. The complementarities between technological capital and the population's digital skills require that public policies address both aspects in a coordinated manner (see Cuadrado et al. (2020)). In this respect, collaboration between public authorities and financial institutions would appear to be essential to ensure that public education programmes enable rural populations to make optimal use of financial and digital services. Here, financial education programmes specifically geared to meet the demands of the rural world should play a fundamental role.[37]

The mitigation policies must be designed from an integral standpoint that takes into account, in particular, the interactions between rural and urban areas. In this respect, some regional, national and EU programmes are based on providing momentum to a single sector or group of activities, ignoring the complex and multifunctional nature of the rural world and its interactions with urban areas, without fully taking into account the institutional and economic setting, the situation of other geographical areas, interaction with other public policies or how social agents will respond. For example, as discussed earlier in this chapter, the development of the Spanish infrastructure network during the rural exodus contributed to the depopulation of rural areas as it cut transport costs and encouraged the concentration of economic activity and population in more industrialised regions. Indeed, investments in infrastructure that reduce transport costs may actually produce greater regional inequality if differences in productivity levels between the different regions persist (see Krugman (1991)). Moreover, the available evidence is inconclusive regarding the impact of policies such as tax incentives for firms (see Button (2019)) or relocation of public institutions (see Becker et al. (2021)). In other words, partial policies that ignore general equilibrium effects and/or the multi-faceted nature of the challenge may possibly not have the desired effects, and they may even trigger opposite effects to those sought, despite their potentially high opportunity cost.

Certain international experiences, conveniently adapted to Spain's particular circumstances, may be considered benchmarks. In this regard, the role and

37 See, for example, the cooperation agreement to develop the Financial Education Plan signed by the Banco de España, the National Securities Market Commission (CNMV) and the Ministry of Consumer Affairs.

trajectory of the Highlands and Islands Enterprise (HIE), which was created in 1965 with the aim of reversing rural depopulation trends in the Scottish Highlands, stands out. The population in the region fell by more than 15% between 1900 and 1965, and has risen by more than 20% since the HIE was launched in 1965, compared with growth of just 2% in the country overall. The main policies developed by the HIE include providing courses that are tailored to the needs of the local business community, in an endeavour to be able to identify and retain young talent in the region.[38] This is especially relevant to the case of Spain, in light of the evidence presented in this chapter. The close coordination between training and promoting local entrepreneurship, developed in part through social enterprises,[39] also stands out (see Southern Sparsely Populated Areas network (2017)). The Japanese experience may also be considered a benchmark for Spain since Japan is one of the highest risk countries in the world in terms of rural depopulation as a consequence of population ageing (see Matanle and Rausch (2011)). In this case, the "compact and connect" strategy, which consisted in combining municipalities and reducing their number, from 3,200 to 1,700 between 2000 and 2013, stands out (see Kato (2014)). This consolidation process was not merely a matter of combining administrations, but rather a result of integral planning, with a view to harnessing the opportunities of each group of municipalities around a hub which constitutes the driving force, and with special emphasis on retaining the younger population in line with the Scottish experience. Lastly, the Italian Agenzia per la Coesione Territoriale[40] also deserves a mention. This agency, created in 2013, is considered an example of good practice for its development of an integral strategy in the fight against rural depopulation. One essential element of this strategy is the design and coordination of various projects, to be funded through the European Structural and Investment Funds, to introduce local development and innovation policies in the provision of services in rural areas, with a holistic view at the national level (see European Network for Rural Development (2020)).

Digitalisation, population ageing and the energy transition not only pose new challenges, but also opportunities for developing the rural world. These trends pose some risks to rural areas, associated with the digital gap between generations

38 The University of the Highlands and Islands (UHI) plays a vital role in generating talent and developing innovative business projects. It is a public university with a mix of public/private funding. Its main aim is to provide courses tailored to the needs of the region and its business community. Also, given the region's low population density, the UHI is a leading advocate of online learning. In 2017 it was the European university with the highest proportion of classes delivered by videoconferencing.

39 These enterprises are part of the social economy, which encompasses all economic and business activities which, while operating in the private sphere, seek a collective interest that will benefit their members and/or society as a whole. Accordingly, while being economically viable, they focus on their social purpose rather than on profit-making.

40 Other countries outside Europe have also recently opted for this type of agency. For example, in 2019 Australia established the Centre for Population, whose main objective is to achieve more balanced population growth between the different regions. The system is organised around four main pillars: (i) establishing common metrics and objectives at the national level; (ii) encouraging greater collaboration between different jurisdictions; (iii) enhancing transparency and cost-benefit analysis of the different measures; and (iv) identifying success cases and facilitating common initiatives.

and between geographical areas. This gap could, for example, hinder the older rural population's access to services as headway is made in the provision of digital services on different fronts. However, as analysed below, at the same time the trends offer opportunities that should not be underestimated.

Digitalisation. The wide gap in the development of digital infrastructures between rural and urban areas could warrant investment in next generation broadband networks in municipalities that still lack access, to enable them to become more competitive in the digital world. Actions to provide the public with support and training in the new technologies would be an indispensable complement, to make optimal use of the digital infrastructures, as indicated earlier. These municipalities could thus achieve not only access to digital services and remote working for their inhabitants, but also access to e-commerce as a sales channel for their firms.

Demographic challenge. One of the most noteworthy peculiarities of the rural world is its ageing population, which increasingly demands products and services to meet its specific needs. Accordingly, initiatives for the "third age" would be desirable, linked at least partly to rural and smaller urban areas, which could offer certain comparative advantages for the provision of some of the services demanded by the older population (residential services, leisure, etc.).

Energy transition. Projects linked to the development of highly innovative alternative energy sources present an opportunity for rural and smaller urban communities. These initiatives could be developed in industries that currently have a low presence in these areas and that could flourish in new locations with low population density. According to data from the Ministry for the Ecological Transition and the Demographic Challenge, 77% of total installed renewable energy capacity in Spain corresponds to plants located in rural municipalities.

5 Conclusions

The secular depopulation of Spanish rural areas has taken centre stage in the public debate in recent years. With a view to understanding the causes and consequences of this process, this chapter provides an analysis of changes in the population in Spanish towns and cities from an international perspective. While Spain has been part of the global trend towards urbanisation, set against its European peers it is an outlier due to its high percentage of uninhabited territory, which results in a very high incidence of rural municipalities at risk of depopulation. In addition, the decline in young adult populations in smaller urban areas in favour of larger ones proves to be a key factor behind rural depopulation and, in turn, gives rise to a higher concentration of workers in high-skilled occupations in a few large urban areas.

The efficiency and efficacy of policies in this area must be assessed, to ensure their optimal design. In light of the evidence presented in this chapter, two types of policies to alleviate the effects of population concentration in big cities may be considered. First, adaptation policies to ensure that a certain level of services is available to inhabitants of rural municipalities. Second, mitigation policies that seek to reverse the population dynamics in those municipalities with growth potential given the circumstances and opportunities in their surroundings. In any event, any public policy should be assessed in depth, comparing the potential benefits in terms of greater regional equity with the costs it might incur for society as a whole, so as to minimise possible efficiency losses in the use of public resources.

To conclude, the analysis contained in this chapter is essentially intended to serve as a diagnosis. In this respect, the discussion on the possible role to be played by public policies should be viewed as an initial approach to the surface of what is a very complex and multi-faceted issue. Due to their importance to society and the Spanish economy, the matters broached in this chapter require a more detailed analysis, on which to base a consensus on a comprehensive and lasting strategy for the depopulation challenge ahead.

REFERENCES

Ahlfeldt, G. M. and E. Pietrostefani (2019). "The economic effects of density: A synthesis", *Journal of Urban Economics*.

Alloza, M., E. Moral-Benito and P. Tello (2021). "El acceso a servicios en la España rural", *Occasional Papers*, Banco de España, forthcoming.

Arroyo Pérez, A. (2003). "Tendencias demográficas durante el siglo XX en España", ISBN 84-260-3632-5, pp. 209-253.

Barruetabeña, E. (2020). "Impact of new technologies on financial inclusion", Analytical Articles, *Economic Bulletin* 1/2020, Banco de España.

Becker, S., S. Heblich and D. Sturm (2021). "The impact of public employment: Evidence from Bonn", *Journal of Urban Economics*, Vol. 122, pp. 1032-1091.

Beltrán Tapia, F., A. Díez-Minguela and J. Martínez-Galarraga (2017). "The shadow of cities: size, location and the spatial distribution of population in Spain", Cambridge Working Paper Economics, 1749.

Berry, C. R. and E. L. Glaeser (2005). "The divergence of human capital levels across cities", *Papers in regional science*, *84*(3), pp. 407-444.

Button, P. (2019). "Do tax incentives affect business location and economic development? Evidence from state film incentives", *Regional Science and Urban Economics*, Vol. 77, pp. 315-339.

Carozzi, F. and S. Roth (2020). "Dirty density: Air quality and the density of American cities", IZA Discussion Paper No 13191.

Chay, K. and M. Greenstone (2005). "Does Air Quality Matter? Evidence from the Housing Market", *Journal of Political Economy*, 113(2), pp. 376-424.

Combes, P., G. Duranton, L. Gobillon and S. Roux (2010). "Estimating agglomeration economies with history, geology, and worker effects", in Glaeser, E. L. (Ed.), *Agglomeration Economics,* Ch. 1. Chicago, IL: University of Chicago Press.

Copus, A., P. Kahila, M. Fritsch, T. Dax, K. Kovács, G. Tagai, R. Weber, J. Grunfelder, L. Löfving, J. Moodie, M. Ortega-Reig, A. Ferrandis, S. Piras and D. Meredith (2020). "ESCAPE. European Shrinking Rural Areas: Challenges, Actions and Perspectives for Territorial Governance: Applied Research", *ESPON EGTC*, Final Report, Version 21/12/2020.

Cuadrado, P., E. Moral-Benito and I. Solera (2020). "A sectoral anatomy of the Spanish productivity puzzle", *Occasional Paper* No 2006, Banco de España.

Cuberes, D., K. Desmet and J. Rappaport (2019). "Urban growth shadows", *Federal Reserve Bank of Kansas City Research Working Papers*.

Cuberes, D. and E. Moral-Benito (2021). "Analysing the Spanish Urban System: Are Madrid and Barcelona too Big?", *Working Paper*, Banco de España, forthcoming.

Duranton, G. and D. Puga (2020). "The economics of urban density", *Journal of Economic Perspectives*, 34(3), pp. 3-26.

Eckert, F. and M. Peters (2018). "Spatial structural change", *mimeo*.

European Network for Rural Development (2020). "Strategy for Inner Areas in Italy", European Network for Rural Development Working document.

Fajgelbaum, P. D. and C. Gaubert (2020). "Optimal spatial policies, geography and sorting", *The Quarterly Journal of Economics*, *135*(2), pp. 959-1036.

Forte-Campos, V., E. Moral-Benito and J. Quintana (2021). "Un índice de coste de la vida en las ciudades españolas", Analytical Articles, *Economic Bulletin* 2/2021, Banco de España, forthcoming.

Gaubert, C. (2018). "Firm sorting and agglomeration", *American Economic Review*, Vol. 108 (11), pp. 3117-53.

Gaubert, C., P. Kline and D. Yagan (2021). "Place-Based Redistribution", NBER Working Paper 28337.

Glaeser, E. L. (2008). *Cities, agglomeration, and spatial equilibrium,* Oxford University Press.

Glaeser, E. L. and M. E. Kahn (2010). "The greenness of cities: Carbon dioxide emissions and urban development", *Journal of Urban Economics*, *67*(3), pp. 404-418.

González-Díez, V. and E. Moral-Benito (2019). "The process of structural change in the Spanish economy from a historical standpoint", *Occasional Paper* No 1907, Banco de España.

Gupta, A., J. Peeters, V. Mittal and S. Van Nieuwerburgh (2021). "Flattening the Curve: Pandemic-Induced Revaluation of Urban Real Estate", *mimeo*.

Gutiérrez, E., E. Moral-Benito and R. Ramos (2020a). "Tendencias recientes de la población en las áreas rurales y urbanas de España", *Occasional Paper* No 2027, Banco de España.

Gutiérrez, E., E. Moral-Benito, D. Oto-Peralías and R. Ramos (2020b). "The spatial distribution of population in Spain: an anomaly in European perspective", *Working Paper* No 2028, Banco de España.

Handbury, J. and D. E. Weinstein (2015). "Goods prices and availability in cities", *The Review of Economic Studies*, Vol. 82(1), pp. 258-296.

Henderson, J. V., T. Squires, A. Storeygard and D. Weil (2018). "The Global Distribution of Economic Activity: Nature, History, and the Role of Trade", *The Quarterly Journal of Economics*, Vol. 133(1), pp. 357-406.

Jiménez, C. and H. Tejero (2018). "Bank branch closure and cash access in Spain", *Financial Stability Review*, Issue 34, Banco de España.

Kato, H. (2014). "Declining Population and the Revitalization of Local Regions in Japan", *Meiji Journal of Political Science and Economics*, 3, pp. 25-35.

Kompil, M., C. Jacobs-Crisioni, L. Dijkstra and C. Lavalle (2019). "Mapping accessibility to generic services in Europe: A market-potential based approach", *Sustainable Cities and Society*, 47, 101372.

Krugman, P. (1991). "Increasing Returns and Economic Geography", *Journal of Political Economy*, 99(3), pp. 483-499.

Lavalle, C. and J. P. Aurambout (2015). "UI - Population weighted density (LUISA Platform REF 2014)", *European Commission*, Joint Research Centre.

Martín-Oliver, A. (2019). "Financial exclusion and branch closures in Spain after the Great Recession", *Regional Studies*, 53(4), pp. 562-573.

Martín-Oliver, A., A. Toldrà-Simats and S. Vicente (2020). "The Real Effects of Bank Branch Closings and Restructurings", mimeo.

Matanle, P. and A. Rausch (2011). *Japan's Shrinking Regions in the 21st century: contemporary responses to depopulation and socioeconomic decline,* Cambria Press, Amherst.

Michaels, G., F. Rauch and S. Redding (2012). "Urbanization and Structural Transformation", *The Quarterly Journal of Economics*, 127(2), pp. 535-586.

Moral-Benito, E. and J. Quintana (2021). "Skill Sorting, Occupational Changes and Urban Wage Premium: Evidence from Spain", *Working Paper*, Banco de España, forthcoming.

OECD (2013). *Rural-Urban Partnerships: An Integrated Approach to Economic Development,* OECD Publishing.

Recaño, J. (2017). "La sostenibilidad demográfica de la España vacía", Centre d'Estudis Demogràfics, No 007.

Roca, J., de la and D. Puga (2017). "Learning by working in big cities", *Review of Economic Studies*, 84(1), pp. 106-142.

Rodríguez-Pose, A. (2018). "The revenge of the places that don't matter (and what to do about it)", *Cambridge Journal of Regions, Economy and Society*, 11(1), pp. 189-209.

Shorrocks, A. and G. Wan (2005). "Spatial decomposition of inequality", *Journal of Economic Geography*, 5(1), pp. 59-81.

Southern Sparsely Populated Areas (2017). *Successfully combatting rural depopulation through a new model of rural development: the Highlands and Islands Enterprise experience,* Southern Sparsely Populated Areas network.

Box 4.1

THE SPATIAL DISTRIBUTION OF POPULATION IN SPAIN

As discussed in the main text, Spain is markedly idiosyncratic, from a European perspective, as regards population concentration patterns and the prevalence of uninhabited areas, even after accounting for the country's geo-climatic particularities. This box explores this issue in detail.[1]

Eurostat provides data for 2011 on the spatial distribution of population based on 1-km^2 grid cells covering the whole of Europe. As this level of spatial resolution is not dependent on administrative boundaries, we can more accurately capture the relevant economic density in which individuals and firms interact. Conversely, traditional indicators, such as the ratio of the number of inhabitants resident in an administrative division to the surface area of that division, may convey a distorted picture of the level of population concentration if the division has a large natural or uninhabited surface area.[2]

Eurostat data (GEOSTAT 2011) reveal two differentiating patterns in the distribution of the Spanish population with respect to other European countries. First, Spain has a very large uninhabited surface area. Only 13% of the 1-km^2 grid cells in Spanish territory are populated, the lowest percentage in the European Union and some distance off countries such as France, Italy, Germany and Portugal, where 68%, 57%, 60% and 47% of the grid cells have a positive number of inhabitants (see Chart 1).

Second, the Spanish population is highly concentrated. Specifically, each populated grid cell hosts, on average, 737 inhabitants, the second highest value in the European Union and well above the levels of the above-mentioned countries, all of which are below 400 inhabitants per populated square kilometre. Significantly, the proportion of inhabitants to total surface area in Spain is 94 inhabitants per square kilometre, similar to the European average and close to the values for France and Portugal, with 114 and 119 inhabitants per square kilometre, respectively.

One aspect determining the spatial distribution of population and, therefore, a factor which might explain the high prevalence of uninhabited territory in Spain is the country's climatic and orographic features. In particular, Spain stands out in terms of its climatic diversity, the extreme temperatures reached in certain areas, its high average altitude and its extensive mountainous terrain.

To assess to what extent these climatic and geographic particularities may justify low settlement density in Spain and the high spatial concentration, we estimate a regression model to explain population density and concentration in the European regions (NUTS3, provinces in the case of Spain) as a function of their geo-climatic features and of a region fixed effect.

We measure the two dependent variables —density and concentration— at 250-km^2 grid cell level. We define settlement density as the percentage of 10-km^2 cells inhabited within each 250-km^2 grid cell. We calculate spatial concentration as the percentage of the population living in the most populated one percent of the surface area in each grid cell. The geographic and climatic factors included in the model (at cell level) are temperature, rainfall, altitude, ruggedness of terrain, soil quality and distance from the coast. The inclusion of these explanatory variables would allow the region fixed effect to be interpreted as the portion of population density and concentration in that region which cannot be accounted for by its geo-climatic features. This fixed effect can therefore be used as a proxy for certain anomalies in the distribution of population.

Chart 2.1 confirms Spain's unique characteristics in terms of settlement density. The vertical axis shows the value of the region fixed effect in the model without controlling for geo-climatic factors, i.e. the average settlement density in the grid cells within each region with respect to the omitted category (the Paris region). The chart shows that a large share of the Spanish provinces (marked with red dots) exhibit the lowest levels of settlement density, along with

1 This box summarises part of the analysis published in E. Gutiérrez, E. Moral-Benito, D. Oto-Peralías and R. Ramos (2020): "The spatial distribution of population in Spain: An anomaly in European perspective", *Working Paper* No 2028, Banco de España.

2 See G. Duranton and D. Puga (2020): "The economics of urban density". *Journal of Economic Perspectives,* 34 (3), pp. 3-26.

other regions in the Nordic countries, such as Iceland, Norway and Sweden.

When controlling for geo-climatic factors (horizontal axis), the value of the fixed effect stands above the omitted category in the case of these Nordic regions and, therefore, their low settlement density can be fully explained by their climatic and orographic features. Conversely, many Spanish provinces, after accounting for the effect of geo-climatic factors, continue to show an extraordinarily low settlement density. In particular, 16 of the 20 regions with the largest share of empty territory, after taking into account their geographic and climatic particularities, are located in Spain.

Chart 2.2 shows the same analysis using population concentration as a dependent variable. As can be seen, a large amount of Spanish provinces (highlighted in red) exhibit the highest concentration levels among European regions, even after accounting for the effect of the above-mentioned geo-climatic factors.

We may thus conclude that Spain shows a spatial distribution of population that is unique in Europe. On the one hand, a large proportion of its territory is uninhabited. On the other, inhabited surface areas are characterised by a high level of population concentration. Further, although Spain's geo-climatic features impact the territorial distribution of the population, they cannot alone explain

Chart 1
SPAIN HAS A SINGULARLY LOW SETTLEMENT DENSITY COMPARED WITH THE REST OF EUROPE

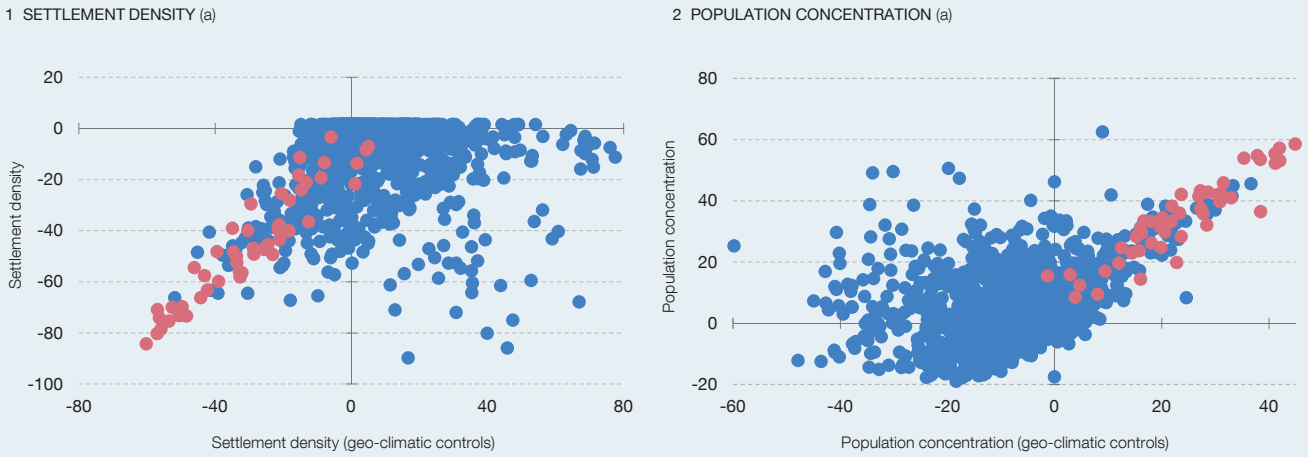
Only 13% of the 1-km^2 grid cells of Spanish territory are populated (depicted by the blue points on the map). This percentage is the lowest in the European Union and is some distance off other Member States such as France, Italy, Germany and Portugal.

SOURCE: Eurostat.

these idiosyncratic patterns. In this connection, the literature has highlighted some possible reasons. In particular, it has been documented that the scarcity of inhabited territory is not a recent phenomenon. For example, in the 17th century there were already accounts attesting to the scarcity of settlements in Spanish territory.[3]

Chart 2
GEO-CLIMATIC FACTORS CANNOT ALONE EXPLAIN THE LOW SETTLEMENT DENSITY AND HIGH POPULATION CONCENTRATION IN SPAIN

The Spanish provinces, highlighted in red, show a bigger proportion of unpopulated territory and a greater concentration of population compared with other regions in Europe, even after taking into account the influence of geo-climatic factors.



SOURCE: Gutiérrez et al. (2020).

a Each point refers to the difference in settlement density (or population concentration) of each European province relative to the Paris region, which is considered as the omitted category in this exercise. For example, a value of -20 indicates that settlement density or population concentration in a specific province stands 20 pp below Paris. See Gutiérrez et al. (2020) for more details on this methodology.

3 See G. Brenan (1950): "The Spanish labyrinth: An account of the social and political background of the Spanish Civil War". Cambridge. Cambridge University Press. In this respect, some studies have pointed out that the mediaeval conflict between the Christian kingdoms and Al-Andalus, characterised by frontier instability and the requirement to occupy large land masses with few people, is a historical event that might have shaped, at least in part, current settlement patterns. For more details on this hypothesis, see D. Oto-Peralías and D. Romero-Ávila (2016): "The economic consequences of the Spanish Reconquest: The long-term effects of medieval conquest and colonization." *Journal of Economic Growth,* 21, pp. 409-464 and D. Oto-Peralías (2020): "Frontiers, warfare, and economic geography. The case of Spain." *Journal of Development Economics,* 146, pp. 1-19.

Box 4.2

THE RURAL EXODUS AND THE CONCENTRATION OF ECONOMIC ACTIVITY IN SPAIN

The main body of the text linked the Spanish economy's belated process of deagriculturalisation to the greater spatial concentration of the population and of economic activity currently seen relative to other countries. This box aims to set out details of this evidence and to discuss some mechanisms that justify this hypothesis.[1]

The economic development of nations is characterised by a decline in the relative demand for agricultural products in favour of industrial products and services. This transformation in the economic structure of countries poses a challenge for those regions whose main activity in the initial stages of development is agriculture. In particular, the economic future of agricultural regions depends on their capacity to industrialise, since their inhabitants will otherwise migrate to those regions with a more dynamic industrial sector offering better job prospects. Traditionally, the industrialisation capacity of initially agricultural regions has been deemed to depend on their convergence in terms of productivity with those regions leading the way in industrialisation. However, changes in migration and inter-regional trade costs may also be determining factors. For example, a reduction in internal migration and trade costs enables more industrialised regions to attract a larger amount of workers and, in turn, to sell its products to the other regions, increasing the degree of spatial concentration of industry.

Indeed, although the relative productivity of Spain's provinces converged as from the mid-20th century, the predominantly agricultural provinces did not manage to industrialise and experienced negative migratory flows to the provinces with a greater weight of industry. In particular, drawing on information on average labour productivity in each sector and province since 1940, it is seen how the provinces with higher productivity growth in the industrial sector from 1940 were, precisely, those with a lower initial level of productivity. Moreover, this convergence pattern is also seen in agriculture, services and construction (see Chart 1).

Yet despite this convergence in relative productivities, the initially more agricultural provinces underwent the loss of major population swathes in favour of provinces with a greater weight of industry, especially between 1950 and 1970. For example, provinces such as Ávila, Jaén, Lugo and Teruel, more than two-thirds of whose employment was concentrated in agriculture in 1940, lost population, whereas more industrial provinces such as Barcelona, Madrid, Valencia and Vizcaya, where less than one-third of employment was in agriculture in 1940, attracted considerable population flows (see Chart 2). The outcome of this intense inter-provincial migratory process is visible today insofar as most of the provinces initially specialising in agriculture have not recovered their 1940 population levels despite the substantial growth of the population at the national level.

These developments pose something of a paradox in light of the traditional models of structural change. Unlike the case observed for Spain, these models predict, for fixed transport and migration costs, the industrialisation of those agricultural regions that are capable of converging in terms of their relative productivity. Thus, to analyse the Spanish development experience and its consequences for the spatial distribution of activity, it is essential to bear in mind additional mechanisms related to the decline in trade and migration costs in conjunction with the changes in cross-regional relative sectoral productivity.

To quantify the significance of the different mechanisms that influence the geographical dimension of development and structural change, we consider a macroeconomic model of structural change with migration and domestic trade.[2] Specifically, the model postulates an economy comprising four sectors of activity (agriculture, construction, manufacturing and services) and a set of provinces. In each province and sector there are many potential producers, but only the most productive survive the competition at the national level. Further, the goods and services produced by the sectors and consumed by households are subject to heterogeneous inter-provincial trade costs across sectors and provinces. In turn, workers may choose to migrate to provinces offering better opportunities, but always subject to migration costs and to their own heterogeneous preferences to live in specific areas. Against this background, the cross-provincial

1 This box summarises part of the analysis developed in Budí-Ors and J. Pijoan-Mas (2021): "Migration, Trade, and Structural Change", mimeo.

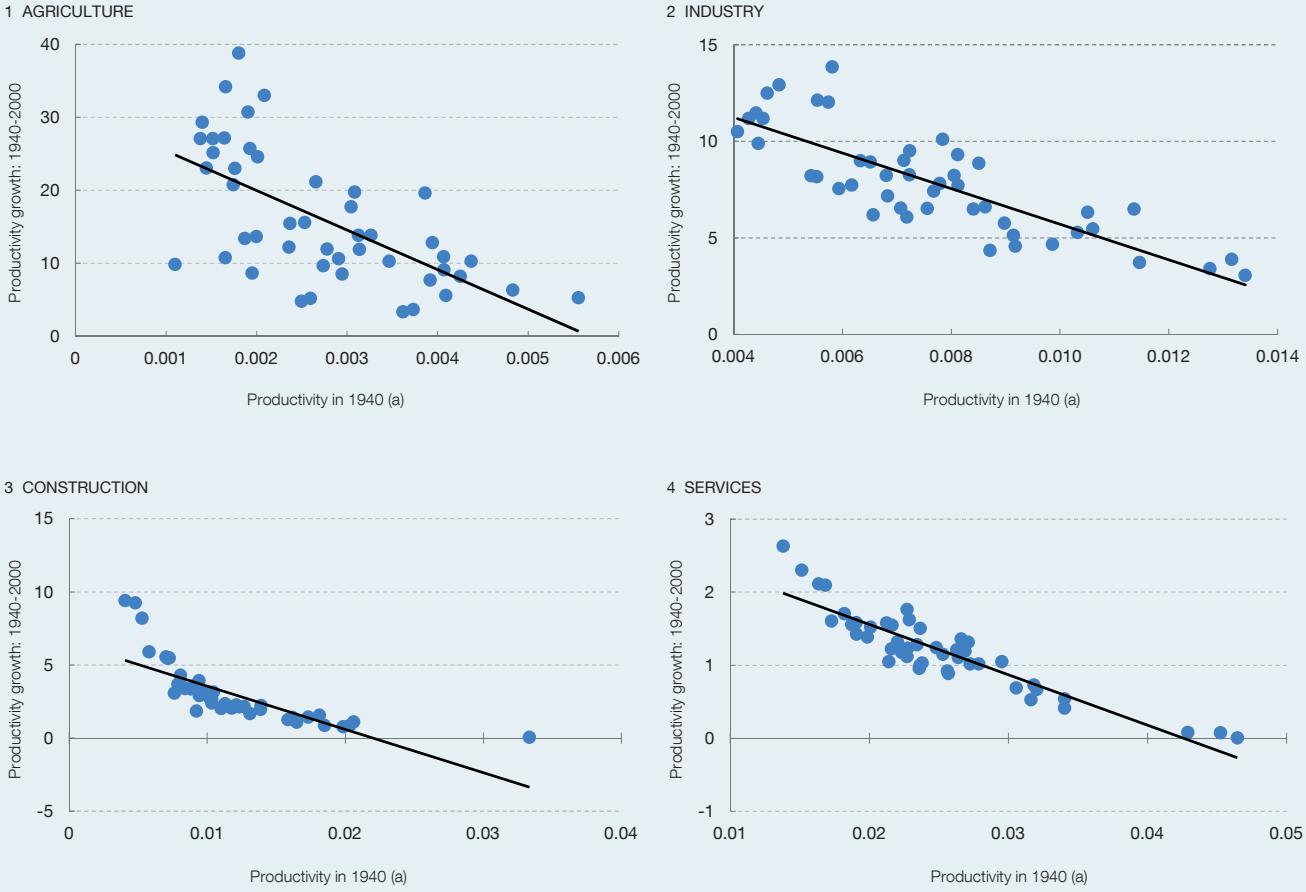
2 Interested readers can consult the essential features of these types of models in L. Caliendo, M. Dvorkin, and F. Parro (2019): "Trade and Labor Market Dynamics: General Equilibrium Analysis of the China Trade Shock". *Econometrica,* 87, pp 741-835; Morten, M. and J. Oliveira (2018): "The Effects of Roads on Trade and Migration: Evidence from a Planned Capital City". NBER Working Paper 22158.

distribution of competitive advantages is key to the development of different sectors. Thus, the most productive provinces in industry will tend to attract workers from the other provinces to produce manufactured goods and sell them to the rest of the country. Conversely, the provinces that import industrial goods will reduce their industrial production, concentrating it in a sub-set of goods in which they are more productive. As a result, industrial productivity growth in the provinces that do not industrialise stems partly from a composition effect. The significance of this mechanism will be greater the bigger the cross-regional differences in sectoral productivity and the lower the inter-provincial trade and migration costs.

Hence, the model's mechanisms allow us to rationalise the apparently paradoxical experience of Spanish development, characterised by the depopulation of initially agricultural regions associated with structural change despite convergence in productivities, via a decline in migration and transport costs. This would be so inasmuch as the decline in transport and migration costs were to come about at greater speed than convergence in productivities of the less developed provinces. While there is no information source that enables us to quantify accurately the reduction in transport costs in Spain, it is worth mentioning some specific figures that suggest a very significant decline in the rural exodus years. For instance,

Chart 1
THE PRODUCTIVITY OF SPANISH PROVINCES HAS CONVERGED IN ALL SECTORS OF ACTIVITY

Those provinces with lower productivity levels in 1940 experienced higher productivity growth in subsequent decades. This pattern of convergence is observable in all sectors of activity.



SOURCES: INE and Fundación BBVA.

a Productivity in 1940 in millions of pesetas per worker.

the emergence of the Seat 600 in the 1950s pioneered the widespread use of the motor vehicle, whereby from 1950 to 1960 the number of cars tripled, lorries doubled and buses grew by 50%. To tackle the unprecedented increase in journeys, projects were launched to modernise and extend the road network. These included the 1962 Road Modernisation Plan and the 1965 REDIA Plan. Based on information from the Ministry of Transport, Mobility and Urban Planning,[3] the national road network increased from 139,212 km in 1970 to 155,675 km in the late 1980s. Note that this 12% increase in two decades does not take into account the improvement in the quality and width of highways, and contrasts with the 1% increase in the past two decades.

Indeed, the fall in merchandise transport and migration costs allows for the concentration of industrial employment in a few leader regions, which export their products to the agricultural regions despite the relative growth of industrial productivity in the latter. By contrast, owing to their less tradable nature, the production of services or construction is not concentrated in specific areas of the national territory with the same intensity. As a result, the pattern of structural change in the initially agricultural regions exhibits a decline in agricultural employment, which is reassigned to services or construction production in the same province or to manufacturing production in other regions, but not to a local industry. The industrial regions, for their part, with little employment in agriculture in 1940, increase their employment in manufacturing and their population size thanks to the arrival of agricultural workers from other regions.

By way of illustration, this pattern can be seen most markedly in two provinces representative of each group: Jaén and Vizcaya (see Chart 3). Between 1940 and 1980, Jaén lost 100,000 jobs in agriculture. However, unlike the classic pattern of structural change, no growth was discernible in provincial employment in industry or construction, and there was only a slight increase in the services sector. The 100,000 workers ejected from the land did not find new jobs in Jaén, but migrated to other provinces. Vizcaya, in contrast, generated 80,000 industrial jobs and 100,000 services jobs during the same 1940-1980 period. A portion of these workers might have come from agriculture in Vizcaya, which lost 30,000 workers, but

Chart 2
TOTAL EMPLOYMENT FELL SIGNIFICANTLY IN THOSE PROVINCES WITH A GREATER WEIGHT OF AGRICULTURE IN 1940

The provinces with a greater weight of employment in agriculture in 1940 were those that lost employment in subsequent decades. Also the provinces with a lower weight of agricultural employment in 1940 experienced significant increases in their total employment thereafter. However, this pattern is not observable in the United States, whose structural change process began in 1880.

1 CHANGE IN TOTAL EMPLOYMENT AND INITIAL WEIGHT OF AGRICULTURAL EMPLOYMENT IN SPANISH PROVINCES (1940-2001)

2 CHANGE IN TOTAL EMPLOYMENT AND INITIAL WEIGHT OF AGRICULTURAL EMPLOYMENT IN US REGIONS (1880-1940)

SOURCES: INE, Fundación BBVA and US Census.

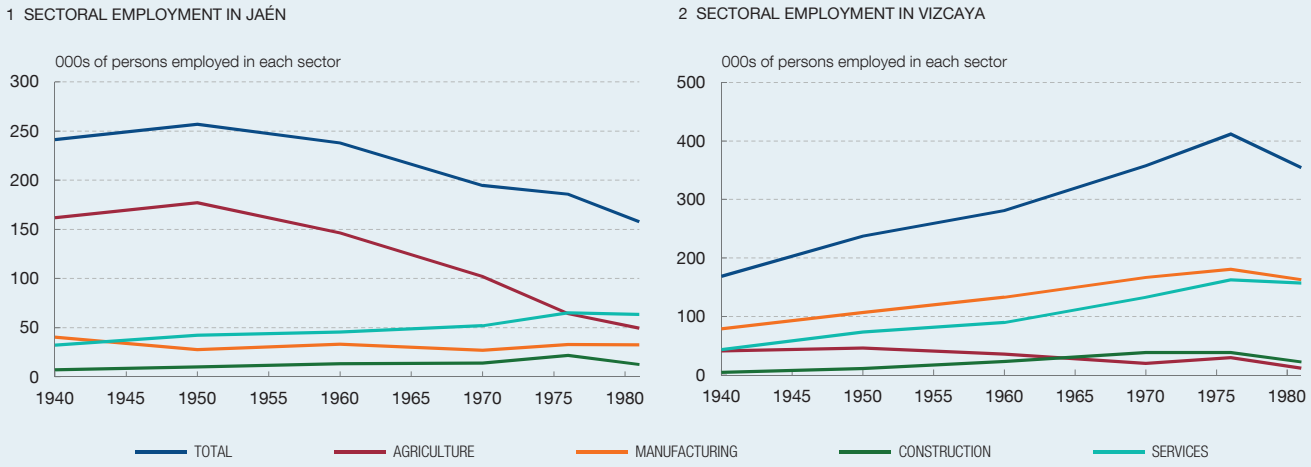
3 See Ministerio de Transportes, Movilidad y Agenda Urbana, Catálogo y evolución de la red de carreteras.

the rest came from other provinces. Consequently, Jaén lost 40% of its initial employment while in Vizcaya it more than doubled in an inter-provincial and inter-sectoral migration process.

Finally, these development patterns in the Spanish economy contrast with those in other countries. For example, the evidence available for the United States shows that initially agricultural regions did manage, generally, to industrialise and grow in terms of population.[4] Specifically, the relationship between the initial proportion of farm employment and regional employment growth was very weak in the case of the United States between 1880 and 1940, the period in which the US structural transformation took place (see Chart 2). A plausible explanation based on the theory described in this box is that transport/trade costs and internal migration costs at the end of the 19th century could not be assumed by most economic agents. That gave rise to each region, including the initially agricultural ones, having to develop their own industrial sector. Accordingly, we may conclude that the scale of the trade and internal migration barriers in the initial stages of industrialisation is a major determinant of the degree of spatial concentration of a country's economic activity.

Chart 3
THE CONSEQUENCES OF INTER-PROVINCIAL MIGRATIONS ON EMPLOYMENT IN DIFFERENT SECTORS IN THE CASES OF JAÉN AND VIZCAYA

An eminently agricultural province in 1940, such as Jaén, experienced a significant decline in total employment owing to the loss of agricultural employment, which was not accompanied by an increase in employment in other productive sectors. An eminently industrial province in 1940, such as Vizcaya, experienced a significant increase in its total employment owing to employment growth in industry and services, despite the diminished momentum of agricultural employment.



SOURCES: INE and Fundación BBVA.

4 See F. Eckert and M. Peters (2018): "Spatial structural change". mimeo.