Chapter 15
Shrinking Cities in Spain: Shrinking Medium-Sized Cities in the Twenty-First Century. Depopulation and Employment

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Abstract Many countries have experienced a phenomenon of hollowing out of their rural areas and small cities, which has led to a territorial imbalance in favour of large metropolitan areas. Meanwhile, in the first decade of the twenty-first century, medium-sized cities underwent intense expansion demographically and, above all, in terms of urbanisation. However, they were then affected by the Great Recession and are now in decline. The phenomenon of shrinking cities is common in North America and central and northern European countries, such as France and Germany. Indeed, urban shrinkage is a subject of academic interest but is still an incipient field of study in the literature. This research aims to encourage the analysis of shrinking cities by studying two critical aspects of urban decline: depopulation and the evolution of employment. The method analyses the evolution of the population of medium-sized cities and workers in the first two decades of the twenty-first century. Results show no direct correlation between depopulation and the evolution of employment in Spanish medium-sized cities as a general phenomenon, but certainly in some specific cases.

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15.1 Introduction

An increasing number of cities are today undergoing urban shrinkage processes. From a historical perspective, urban shrinkage is not new (Nelle et al. 2017) and was characteristic of many cities in the United States in the second half of the twentieth century (Bradbury et al. 1982). In Europe, however, it is a recent but significant phenomenon (Haase et al. 2016). The process started to develop in the early twenty-first century (Oswalt 2005) and has now spread, to differing degrees, across all of Europe (Nijman and Wei 2020).

Inequalities between cities are increasing in the form of growth versus shrinkage (Nijman and Wei 2020). Shrinking cities are vulnerable places (Raco and Street 2012). This is a severe problem as urban shrinkage involves socio-demographic decline, retreating anthropogenic presence, the degradation of fixed social capital and the neglect of built and infrastructure heritage (Vendemmia and Kërçuku 2020).

Consequently, academic publications have studied urban shrinkage drivers and impacts (Oswalt 2005; Martínez-Fernández et al. 2012) in a research agenda on growth (Großmann et al. 2013). Shrinking cities in Europe have been analysed (Döringer et al. 2020; Haase et al. 2016), concluding that the forms of degrowth vary greatly. The intensity of urban shrinkage differs from country to country (Eva et al. 2021), as evidenced in studies conducted at the national level in France (Chouraqui 2021), Germany (Nelle et al. 2017), Italy (Vendemmia and Kërçuku 2020), the Netherlands (Hoekveld 2012), Portugal (Alves et al. 2016), etc.

This chapter focuses on urban shrinkage in intermediate cities in Spain. "Medium-sized European cities have been playing an increasingly significant role in the economic development of countries in recent decades, establishing themselves as genuinely specialized local production systems with great potential for stimulating the economy and generating added value" (Parrilla-González 2021, p. 1). Nonetheless, they are experiencing depopulation phenomena. In Spain, this is a novel process in the country's spatial system, in which depopulation has always been associated with rural areas and not cities, with the decline of the rural world being the *first wave* of Spanish depopulation (Collantes and Pinilla 2019). However, a second wave has commenced in the present century, now affecting medium-sized cities. Indeed, in Spain, with the 2008 crisis, medium-sized cities went from boom to recession (Bellet-Sanfeliu and Andrés-López 2021), moving from implosive growth to a significant decline as a result of an intense financial, economic and, finally, social crisis. At the same time, the recession increased the spatial concentration of population and economic activity. The most populated cities have gained more weight at the population level and are where recovery has occurred sooner and stronger (Royuela et al. 2017). In contrast, medium-sized cities have witnessed their development slow down and/or reach a complete standstill.

In studies on medium-sized cities on a national scale, there is a growing interest in urban shrinkage (Vendemmia and Kërçuku 2020). In Spain, however, this process has not generated great interest among academics, although some works have identified the phenomenon (González-Leonardo et al. 2022). This research aims to help remedy this lack of studies.

Furthermore, the literature has identified correlations between urban shrinkage and a number of processes. Of these, the most noteworthy is the evolution of employment (Bernt et al. 2012; Hartt 2018). Low activity and employment rates, high unemployment rates and the dwindling young population's difficulties in finding work characterise the social devitalisation of shrinking cities.

The main aim of this research is to study shrinking medium-sized cities in Spain in the twenty-first century, drawing on two key elements: depopulation and the evolution of employment. Our study explores possible relationships between the two processes. The study's initial hypothesis is that Spanish medium-sized cities experiencing degrowth, in line with the suggestions of the literature on urban shrinkage (Bernt et al. 2012; Hartt 2018), present a clear correlation between population loss and the evolution of employment.

The interest of this research lies in its being one of the few available on the subject in urban studies and, to the best of our knowledge, the only one that links depopulation and employment in medium-sized Spanish cities in the twenty-first century.

After this introduction, the structure of the chapter continues with a theoretical study of urban shrinkage. This is followed by a description of the object of study, data sampling and the analytical method of analysis. Finally, we present the research results, the discussion and conclusions.

15.2   Urban Shrinkage

Urban shrinkage can be described as a crisis triggered and characterised by job and population losses (Martínez-Fernández et al. 2012). The concept of urban shrinkage describes a complex phenomenon in which demographic decline and economic downturn are the results of the structural characteristics of the city (Fol and Cunningham-Sabot 2010). There is a shrinkage of cities and their dissipation at the regional level (Brenner 2014).

Many researchers have recognised the multidimensionality of urban shrinkage (Pallagst et al 2009; Martínez-Fernández et al. 2016). Haase et al. (2014) proposed a heuristic model of urban shrinkage (Fig. 15.1). Hoekveld (2012) and Hartt (2018) highlight that the processes contributing to urban shrinkage are highly complex. Population decline impacts on almost all areas of urban life: business and employment, housing, social and technical infrastructure, municipal finances, social cohesion, segregation, etc. Urban shrinkage thus results in a mismatch between supply and demand for built structures, urban space and infrastructure (Bernt et al., 2012).
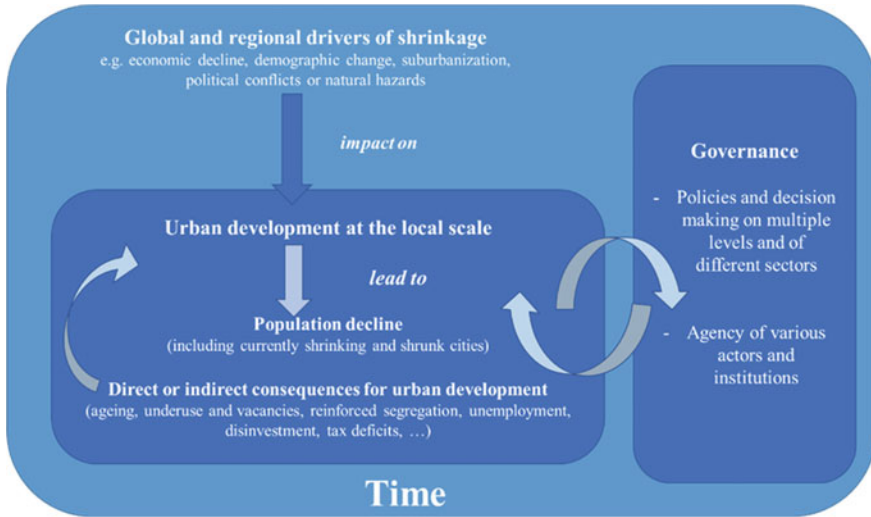
Fig. 15.1 Heuristic model of urban shrinkage (Haase et al. 2014; own preparation)

In the case of medium-sized cities, the crisis is typified, in the particular by impoverishment of the population and degradation of the built environment (Chouraqui 2021).

Planners have responded to population decline by initiating economic development strategies; a conventional approach that has failed in many places. Indeed, as Fol (2012) suggests, the proposed remedies have, on occasion, been worse than the disease, resulting in socio-spatial disparities. Additionally, in many cases, recovery and adaptation strategies have generated short-term impacts, with their long-term sustainability and ability to pave the way for a new course of events being called into question (Radzimski 2018).

The experience of cities affected by urban shrinkage shows there is no simple way to forestall the negative consequences of this process. At the same time, governance is an essential challenge for local authorities (Stryjakiewicz and Jaroszewska 2016). Going beyond growth strategies, Herrmann et al. (2016) propose sustainability policies for shrinking cities. Hospers (2014) calls for policy responses to urban shrinkage that shift from growth thinking to civic engagement.

Academia has responded to the urban shrinkage crisis by a reconceptualising decline as shrinkage, beginning to explore creative and innovative ways for cities to shrink successfully. This new approach to re-thinking decline provides a non-economic vision of the response to depopulation (Hollander et al. 2009). For example, Karp et al. (2022) suggest investing in green infrastructure for recreation and supporting ageing populations with retirement services as a response to urban shrinkage.

For the specific case of medium-sized cities, Chouraqui (2021) concludes that public policies must take account of their heterogeneity to adapt urban planning

strategies to various contexts. Medium-sized cities constitute both a window of opportunity and a challenge for spatial planning (Güneralp et al. 2020). In this context, the COVID-19 crisis may represent an opportunity for shrinking medium-sized cities by relocating workers to less crowded and more economical locations (Besana 2021).

15.3 Object of Study, Data Sampling and Method of Analysis

Our study focuses on shrinking medium-sized cities in Spain in the twenty-first century. To define a medium-sized city, we used the criteria developed in previous works by the authors (Martínez-Navarro et al. 2020). The first and most decisive is the range of population size. To be considered medium-sized, their population in 2002 had to be between 50,000 and 300,000. This yielded a total of 137 cities, to which we have added a further four. These are Zaragoza and Córdoba, both with a population above the range, and Soria and Teruel, with populations below. These latter two were chosen as they are capitals of provinces, the Spanish sub-regional administrative division, which has no other medium-sized city in the provincial territory.

In the evolution of population, a period of prosperity can be seen, during which 131 of the 141 cities analysed had positive growth between 2001 and 2010, while 51 lost population in the recessionary period from 2011 to 2020. The criterion for defining shrinking medium-sized cities was to select only those that lost population in the overall period analysed for the twenty-first century (2001–2020). In other words, their 2020 population was lower than in 2001. A total of 17 cities met this requirement, of which 11 are provincial capitals, with six being in the Castilla-León region. All of them, except Santa Cruz de Tenerife, are in peninsular Spain and are mostly located in the north-western quadrant (Fig. 15.2). Of this sample, 10 of the intermediate cities have lost population across all the years of the twenty-first century: Cádiz, Ferrol, Getxo, Granada, León, Ourense, Salamanca, Santander, Torrelavega and Valladolid. The other seven cities grew between 2001 and 2010, but subsequent depopulation in the decade from 2011 to 2020 meant they fell within the established criteria.

Our methodology draws on an analysis of quantitative demographic and socioeconomic data. The population has been selected from the beginning of the century (2001–2020). For the labour market data, the unemployed and those affiliated to the Social Security (SS) up to 2020 have been selected. These data can be linked to the target employment in each city. The starting date has been established according to official statistical availability: from 2006 for the unemployed and from 2003 for those affiliated to the SS. This minor date mismatch is considered acceptable, given that the dynamics will be analysed using an average growth rate. In fact, it is not uncommon in econometric analysis to include variables from different reference periods; for example, Kim et al. (2000) and Noonan et al. (2021).

Fig. 15.2 Object of study: Spanish shrinking medium-sized cities 2001–2020 (INE 2022; own preparation)

For the analysis, an average annual growth rate (AAGR) was calculated for the three diachronic variables. This was used to study the possible link between the demographic decline and the employment variables explained. A percentage index has been developed that relates the indicator under analysis (P) in its final value for the period studied (t_a) and in its initial value (t_o). These data have been weighted by the number of years analysed ($t_a - t_o$), and with the average value of the final (t_a) and initial (t_o) values in the denominator with the following formula:

$$\text{AAGR}(t_o, t_a) = \frac{(P(t_a) - P(t_o))/(t_a - t_o)}{(P(t_a) + P(t_o))/2} * 100$$

To calculate the AAGR, we included sub-periods related to the Spanish economic context and the complete analysis for 2001–2020. Thus, the AAGR was calculated for three intervals. These periods are marked by the clear turning point the real estate bubble bursting and the subsequent economic and social crisis, which reached its peak in 2010. This enabled us to divide the 2001–2020 period into two ten-year sub-periods: 2001–2010 and 2011–2020. For this purpose, we used the official data as of 1 January provided by the continuous population register (INE 2022), the mean monthly municipal unemployment statistics (SEPE 2022) and the total number of workers affiliated to the social security system on the last day of January (SS 2022). Finally, Pearson's correlation coefficient was used to measure the possible

links between the evolution of population and employment in Spanish shrinking medium-sized cities in the twenty-first century. Although this indicator is not valid to demonstrate cause and effect, it does determine whether there exists a relationship or association between various variables of interest (Schober et al. 2018).

15.4 Spanish Shrinking Medium-Sized Cities in the Twenty-First Century. Depopulation and Employment

The selection criterion used means that all the medium-sized cities in the sample lose population over the study period, but not at the same rate (Table 15.1), with the AAGR (2001–2020) of the population ranging from −0.04% in the case of Linares to −1.07% in that of Ferrol. The mean for the dataset is 0.37%.

The AAGR (2006–2020) of the unemployed presents positive values (Table 15.1), as is logical, since it is reasonable to expect that a greater population loss would

Table 15.1 AAGR (annual %) for population and unemployed (INE 2022; SEPE 2022; own preparation)

City	AAGR (2001–2020) population	AAGR (2006–2020) unemployed	AAGR (2001–2010) population	AAGR (2006–2010) unemployed	AAGR (2011–2020) population	AAGR (2011–2020) unemployed
Alcoy/Alcoi	−0.08	0.82	0.21	4.21	−0.32	−0.68
Avilés	−0.38	0.61	0.09	2.14	−0.80	−0.10
Cádiz	−0.94	0.32	−1.02	1.25	−0.87	−0.23
Ferrol	−1.07	−0.08	−0.97	1.23	−1.19	−0.75
Getxo	−0.40	0.43	−0.50	1.77	−0.33	−0.39
Granada	−0.21	1.01	−0.19	3.10	−0.30	0.11
León	−0.54	0.35	−0.28	2.04	−0.75	−0.47
Linares	−0.04	0.72	0.65	2.24	−0.70	−0.07
Ourense	−0.17	0.18	−0.04	1.58	−0.25	−0.59
Palencia	−0.18	0.40	0.18	2.38	−0.47	−0.50
Salamanca	−0.48	0.52	−0.29	2.68	−0.64	−0.46
Santander	−0.12	1.08	0.43	3.97	−0.67	−0.17
Segovia	−0.35	0.89	−0.22	3.43	−0.41	−0.30
Sta. C. de Tenerife	−0.20	1.10	0.35	4.74	−0.66	−0.69
Torrelavega	−0.42	0.98	0.00	3.75	−0.82	−0.39
Valladolid	−0.32	0.46	−0.10	2.82	−0.51	−0.59
Zamora	−0.39	0.50	0.06	2.61	−0.80	−0.53
Average	*−0.37*	*0.61*	*−0.10*	*2.70*	*−0.62*	*−0.40*

correspond to a more significant number of unemployed. There is only one exception, Ferrol, which has a negative value, albeit a very low one, 0.08%. For this series, the positive mean of the AAGR is higher, 0.61%, than the negative mean of the population, with 7 cities above that value. Santa Cruz de Tenerife has the highest AAGR with a 1.10% average annual increase in unemployed inhabitants. The Pearson correlation between the AAGR of population and unemployed for the twenty-first century analysed is 0.61.

Let's analyse the AAGR of the population in the first sub-period that of the first decade of the twenty-first century (Table 15.1). We find the 10 medium-sized cities undergoing population decline throughout the twenty-first century. The number of inhabitants in 6 of the others grew between 2001 and 2010, while the population stagnated in the last one, Torrelavega. The arithmetic mean is −0.10% AAGR (2001–2010) of the population.

As regards the unemployed, in this first sub-period, which, due to the previously mentioned data availability, corresponds to 2006–2010, there are positive and high AAGRs (Table 15.1), with an average of 2.70%. In addition, up to 7 cities are above the average, including Santa Cruz de Tenerife, with an AAGR of 4.74%. The effects of the Great Recession meant that the difference between 2006, still a year of economic expansion, and 2010, at the height of the crisis, led to a significant increase in the number of unemployed. In this sub-period, the correlation coefficient between depopulation and unemployment is identical to that of the century (0.61).

In the second sub-period, from 2011–2020 (Table 15.1), all the Spanish shrinking medium-sized cities show a negative AAGR of population, ranging from −0.25% for Ourense and −1.19% for Ferrol once more, the intermediate city with the highest depopulation rate in Spain. The arithmetic mean is −0.62%, albeit with ten cities showing degrowth rates above this. The population decline was more severe in the second decade of the present century than in the first. It is a phenomenon that has escalated recently.

However, the evolution of the number of unemployed exhibits an opposite trend in this second sub-period of analysis. Here, the average AAGR is negative, −0.40%. In other words, in the second decade of the twenty-first century, that of the crisis and subsequent incipient recovery thwarted by the COVID-19 pandemic of 2020, the number of unemployed falls in all the shrinking medium-sized cities, except in Granada (Table 15.1). A comparison of the AAGRs of the population and unemployed between 2011 and 2020 yields a non-significant correlation coefficient (0.10). The relationship or association between depopulation and unemployment disappears in this second sub-period.

Table 15.2 shows the AAGRs for the population and those for objective employment, that is, the individuals affiliated to the SS. The correlation of the AAGRs for the two decades of the century, 2001–2020 in the population and 2003–2020 in the SS affiliates, the difference in dates being due to the data availability, lacks significance (0.08). Only five cities—Alcoy, Avilés, Ferrol, Linares and Torrelavega—have a negative AAGR of SS affiliates. The other cities combine population decline with increased employment, which contradicts our initial hypothesis that the relationship

would be the opposite, lower population and lower employment. The mean AAGR (2003–2020) for SS affiliates is 0.34%.

The first decade of the twenty-first century in Spain was characterised by economic growth, and all the shrinking medium-sized cities have a positive AAGR (2003–2010) of persons affiliated to the SS (Table 15.2), except Alcoy and Avilés. The average for the sample is positive, 0.97%. In this sub-period, there is no significant correlation between population evolution and SS affiliation in the cities. Pearson's coefficient yields a negative value of −0.32.

The second sub-period of analysis (2011–2020) reveals six cities with an unfavourable evolution in the total number of SS affiliates (Table 15.2): Avilés, Ferrol, Linares, Salamanca, Torrelavega and Zamora. The other cities have positive values. The average AAGR of SS affiliates is also positive, but much more modest (0.22%) than between 2003 and 2010. There is now a higher correlation between the evolution of the population and that of individuals affiliated to the SS (0.60).

We analysed the Pearson correlation coefficient for the two datasets of socio-economic variables concerning the evolution of the population and in the periods

Table 15.2 AAGR (annual %) for population and persons affiliated to the social security system (SS) (INE 2022; SS 2022; own preparation)

| City	AAGR (2001–2020) population	AAGR (2003–2020) registered with SS	AAGR (2001–2010) population	AAGR (2003–2010) registered with SS	AAGR (2011–2020) population	AAGR (2011–2020) registered with SS
Alcoy/Alcoi	−0.08	−0.04	0.21	−1.41	−0.32	1.12
Avilés	−0.38	−0.54	0.09	−0.57	−0.80	−0.28
Cádiz	−0.94	1.07	−1.02	2.01	−0.87	0.93
Ferrol	−1.07	−0.58	−0.97	1.16	−1.19	−1.41
Getxo	−0.40	0.23	−0.50	0.44	−0.33	0.43
Granada	−0.21	1.19	−0.19	1.59	−0.30	1.17
León	−0.54	0.32	−0.28	0.93	−0.75	0.06
Linares	−0.04	−0.74	0.65	0.65	−0.70	−1.22
Ourense	−0.17	0.47	−0.04	1.24	−0.25	0.28
Palencia	−0.18	0.75	0.18	1.78	−0.47	0.23
Salamanca	−0.48	0.42	−0.29	1.52	−0.64	−0.03
Santander	−0.12	0.90	0.43	0.57	−0.67	1.74
Segovia	−0.35	0.91	−0.22	1.35	−0.41	0.89
Sta. C. de Tenerife	−0.20	0.50	0.35	1.39	−0.66	0.10
Torrelavega	−0.42	−0.04	0.00	1.26	−0.82	−0.61
Valladolid	−0.32	0.67	−0.10	0.91	−0.51	0.77
Zamora	−0.39	0.30	0.06	1.74	−0.80	−0.47
Average	*−0.37*	*0.34*	*−0.10*	*0.97*	*−0.62*	*0.22*
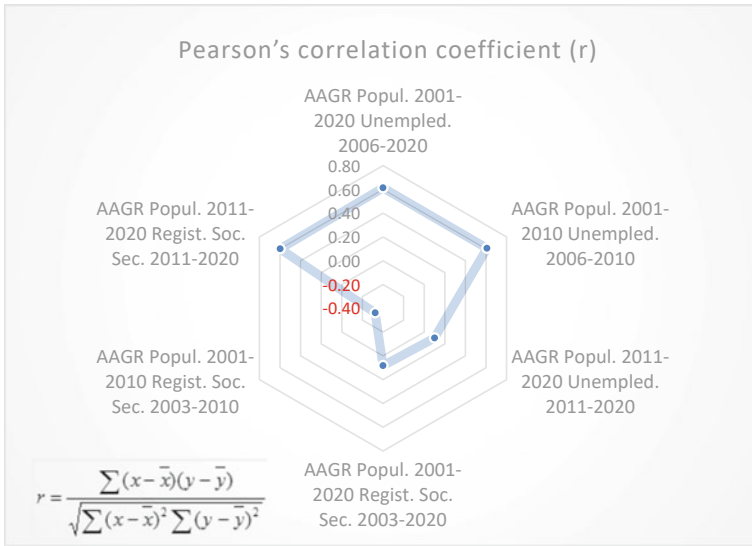
Fig. 15.3 Pearson's correlation coefficient between the AAGRs of population, unemployed and SS affiliates (INE 2022; SEPE 2022; SS 2022; own preparation)

studied (Fig. 15.3), which, to be significant, must be close to 1 or −1 (Schober et al. 2018). Kennedy (2008, p. 19) proposes that to be considered high; a correlation coefficient between two independent variables must be "0.8 or 0.9 in absolute value". None of the correlations obtained reaches these values. In the social sciences, however, values above 0.5 can be considered a large, statistically significant, correlational effect (Onwuegbuzie and Daniel 2002). With the latter criterion, a correlational effect can be seen between depopulation and unemployment in the twenty-first century and its first decade and between depopulation and SS affiliation in the second decade. The remaining correlations are non-significant in all cases.

We developed a representation in two scatter plots to better understand the possible groupings in the behaviour of the variables analysed. Both are drawn for the evolution across the complete first two decades of the twenty-first century, with the x-axis representing the AAGR (2001–2020) of the population. On the y-axis, the first graph l (Fig. 15.4) plots the AAGR (2006–2020) of the unemployed and the second (Fig. 15.5) the AAGR (2003–2020) of individuals affiliated to the SS.

Regarding the relationship between the AAGRs for population and unemployment (Fig. 15.4), the cases vary greatly between cities with no clear general correlation ($r^2 = 0.37$). However, the association is considerable in many examples, such as Alcoy, Avilés and Salamanca. On the other hand, in some cities, such as Ferrol, and especially Ourense, León and Cádiz, urban shrinkage has reached such a level of maturity that the growth in the unemployed has fallen or is even negative in the case of Ferrol. The jobless population is leaving these cities for other areas of employment; a factor that, in turn, also explains their depopulation. In Spain, an increase in internal
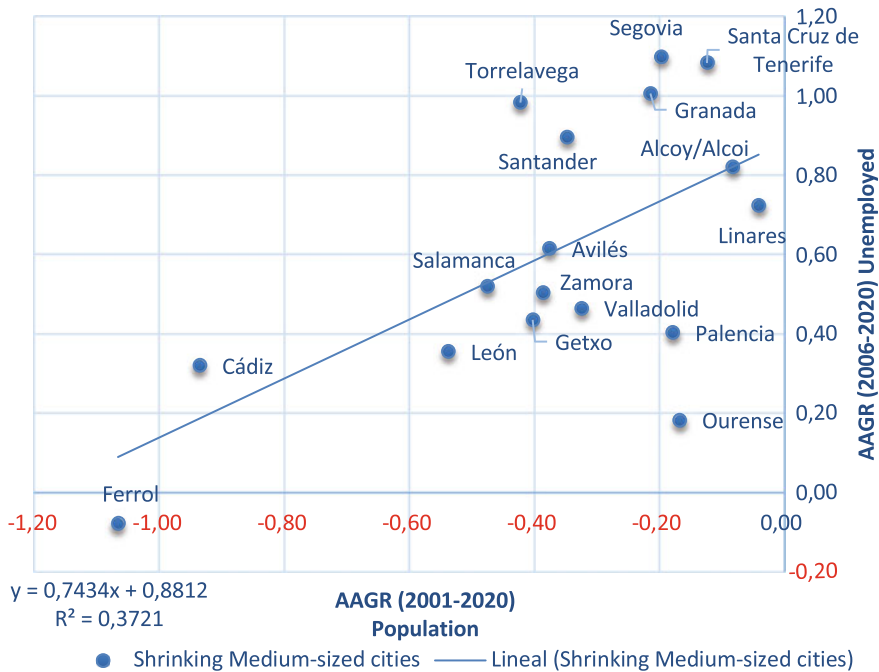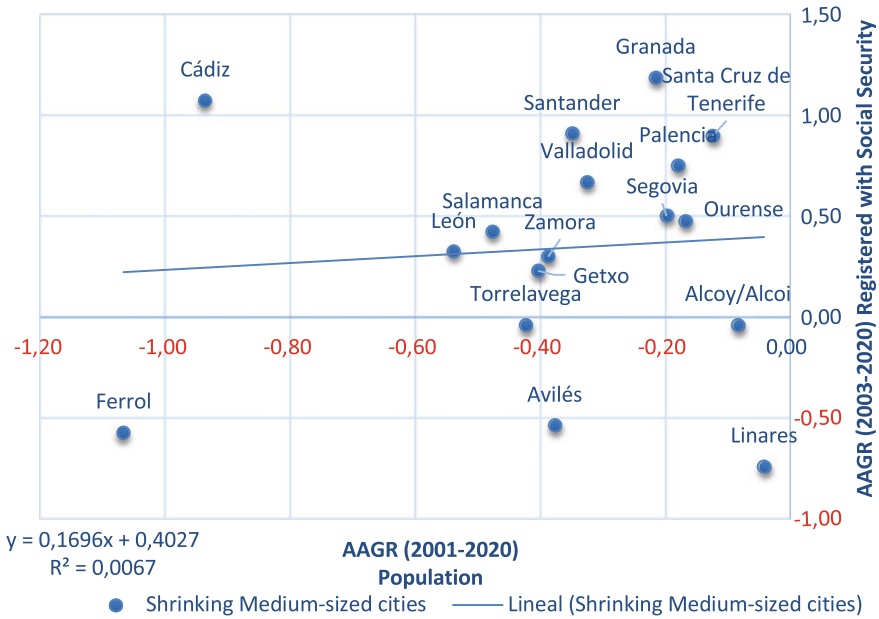
Fig. 15.4 Comparison of AAGRs of population growth, 2001–2020, and unemployed, 2006–2020 (INE 2022; SEPE 2022; own preparation)

migration of highly qualified young people from medium and small cities to large cities, mainly to the urban area of Madrid, has recently been detected (González-Leonardo et al. 2022). In other cities, urban shrinkage is in its infancy, with the associated phenomenon of an increase in the number of unemployed, for example, in Alcoy or Linares. However, it is difficult to generalise the conclusions due to the dispersion present in the graph.

A complex discussion also arises from the scatter plot between the AAGR of the population, 2001–2020 and SS affiliates, 2003–2020 (Fig. 15.5). There is no significant correlation between the two variables ($r^2 = 0.006$). Only five cities—Alcoy, Avilés, Ferrol, Linares and Torrelavega—follow the logic of lower population and fewer workers. For the rest, the point cloud suggests no clear conclusions.

15.5   Discussion and Conclusions

We have studied Spanish shrinking medium-sized cities in the twenty-first century using two key elements: depopulation and employment, the latter through the number of unemployed and objective employment, exploring the relationships between the two. The initial hypothesis of the research was that these urban centres would present

Fig. 15.5 Comparison of AAGRs of population growth, 2001–2010, and individuals affiliated to the SS, 2003–2020 (INE 2022; SS 2022; own preparation)

a correlation between population loss and falling employment. However, we conclude that this hypothesis is false for Spanish shrinking medium-sized cities as a whole, although it may explain the reality of some specific cases. Such cases are the cities where population declines, the number of unemployed increases and the number of SS affiliates falls, namely, Alcoy, Avilés, Linares and Torrelavega.

The Pearson correlation coefficients revealed no relationship or association between the AAGRs of population, unemployment and SS affiliation at a highly significant level. However, there is a correlational effect between population and unemployment.

Urban shrinkage is a complex and multi-causal phenomenon with many possibilities. A number of medium-sized Spanish cities have been losing population continuously across the twenty-first century. The depopulation-employment relationship is not sufficiently explicit to understand the complete process. Part of the population loss is likely related to centrifugal movements resulting from suburbanisation or demographic phenomena, such as ageing. More explanatory variables need to be explored.

Economic activity, studied in this research through the optics of the unemployed and individuals affiliated to the SS, is but one aspect of a process, urban shrinkage, with multiple facets and complex reality. Our research results reflect this circumstance. The evidence shows that the economic aspect has a greater impact in some cities than others but is neither exclusive nor decisive. Therefore, future research

should address the second wave of depopulation in Spain by including new demographic indicators, such as ageing, birth rates and migratory movements, relating them to the process of suburbanisation and to policy and governance questions.

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