Extended abtract

EXTENDED ABSTRACT

Title: The local economy and the societal infrastructures as drivers of population dynamism

Authors and e-mails: Fernando Merino, fmerino@um.es and Maria A. Prats, mprats@um.es

Department: Applied Economics

University: Murcia

Subject area: *Strategies against the problem of depopulation*

Abstract:

1. Introduction and motivation

In Spain, as in many other countries, population is changing across the territory leading to new situations where population is concentrated in some areas, mostly large cities, while some smaller villages are being depopulated. The consequences are important, both from a purely geographical/demographical perspective (and their derivatives over the environmental perspective) as an economic one (public services or infrastructures demand, evolution of land prices, etc.).

The aim of this paper is to analyze at what extent purely economic factors and features linked to the life quality (that can be managed at the local level) are important to attract or keep population at a local level in the Comunidad Valenciana (CV, Spain).

Traditionally, the CV is an autonomous community that attracts population at national level. In 2016, the population was 4 959 968 inhabitants (10.7% of the national total), with INE data. The relative population growth of this community in 2016, with INE data, was 0.05%, slightly below the total (0.19%) but positive along with other communities such as Illes Balears, Canarias, Comunidad de Madrid, Cataluña, País Vasco, among others. However, if we descend to a municipal analysis there is a great disparity in the population behavior of the region coexisting large urban centers, with large agglomerations around, with small municipalities, most of them with severe problems of depopulation. These small municipalities are located, basically, within the CV and are mainly agricultural areas. In terms of surface, the CV covers an area of 23 255 km² (4.6% of the Spanish total area), of which 65% is rural (45% farmland and 54% forestry) being 2.4% the contribution of the primary sector to the total gross added value in Valencia[1].

There are 543 municipalities, and consistent with the processes observed in other regions and countries, the CV participates in certain trends concentrators of the

[1] http://www.agroambient.gva.es/documents/20551003/161972563/factsheet-comunidad-valenciana_en.pdf/fc135b4e-42b7-46b6-adc4-afe6d0f57184

population (Caravaca et al. 2007). The 30.6% of the Valencian population[2] lives in one of the four municipalities (Valencia, Alicante, Elche and Castellón) with more than 100 000 inhabitants; while the rest is shared among rural nuclei, that is, those with less than 10 000 inhabitants (445 localities) and those with more than 10 000 but less than 100 000 (94 localities). That is, the 82% of the municipalities concentrate the 17.8% of the population and the 18% of the municipalities the 82.2% of the population. The data are even more devastating if we take into account that the 41% of the municipalities (223) have less than 1 000 inhabitants that highlights the problem of the depopulation of rural areas in the CV, especially in inland districts. Undoubtedly, this territorial imbalance affects the quality of life of people and produces inequality.

The depopulation of rural areas is an important issue in the European Union (EU). Concretely, the EU's rural development policy is funded through the European Agricultural Fund for Rural Development (EAFRD) worth €100 billion from 2014-2020, with each EU country receiving a financial allocation for the 7-year period[3]. There are 118 different rural development programmes (RDP) in the 28 Member States for this period. "During the 2014-2020 programming period, efforts are being focused on encouraging the development of services and infrastructure leading to social inclusion and reversing trends of social and economic decline and depopulation of rural areas"[4].

In the case of the Spanish State, the development of EAFRD funds has been specified in the National Rural Development Program and in the 17 regional programs[5]. The European Commision accepted the RDP for the Comunidad Valenciana[6] in 2015 (with the last modification in 2017) with a budget of €450 million for the period 2014-2020 with the object to fund actions related with the six rural development priorities.

In order to combat depopulation the CV has created a specific action plan, named Agenda Valenciana Antidespoblament (Avant) in April 2017[7][8]. Its objective is to respond to the basic problems that affect the rural world: health, education, employment, mobility, financial services and taxation.

But in accordance with this important European, national and regional plan, we are interested in what kind of specific local policies can be implemented in order to increase and attract population, because traditionally depopulation has been tackled in Spain by the local administrations (Sáez et al., 2011, Sáez et al., 2016). The most recent economic literature on demographic change maintain that demographic behaviours

---

[2] Population data by municipalities INE, *Banco de Datos Territorial. Padrón Municipal Continuo: Explotación Estadística. Resultados para la Comunitat Valenciana*.

[3] See European Commission: https://ec.europa.eu/agriculture/rural-development-2014-2020_en

[4] Official Journal of European Journal, Opinion of the European Committee of the Regions —The EU response to the demographic challenge, (2017/C 017/08): https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016IR0040&from=EN

[5] See European Commission: https://ec.europa.eu/agriculture/rural-development-2014-2020/country-files/es_en

[6] See European Commission: https://ec.europa.eu/agriculture/sites/agriculture/files/rural-development-2014-2020/country-files/es/factsheet-comunidad-valenciana_en.pdf

[7] More specif actions: Comunitat Valenciana (2012); Generalitat Valenciana Diari Oficial Decree 58/2017, of April 28, of the Consell, by which the Interdepartmental Commission for the Fight against the Depopulation of the Valencian Municipalities is created (DOGV 05.11.2017). http://www.dogv.gva.es/datos/2017/05/11/pdf/2017_4057.pdf ; and the RDP of the Comunitat Valenciana 2014-2020 (Conselleria d'Agricultura, Medi Ambient, Canvi Climàtic i Desenvolupament Rural).

[8] See http://www.presidencia.gva.es/es/web/begv-gavina/despoblament

depend, among others, on aspects related to the quality of life of the place where the population reside (Sáez et al., 2001). Therefore, if a municipality has endowments that contribute to improving the quality of life this will mean that the municipality does not lose population and may even be a magnet for immigrants derived from the lower cost of land in these areas. In this context, the municipal budget is an important tool to regulate population behaviour.

Specifically, in this paper we select, for the period 2012-2016, a set of variables linked to life quality factors that can be affected by local policies (cultural centers, sport facilities, parks and green areas) or those linked to economic factors that go beyond the local scope of policies at least at short term (sectorial economic structure, income) in order to test if it is possible to determine a relationship between one or more of them and the increase of population in the municipality.

2. Methodology

The methodology consists of analyzing the evolution of the population in each of the 543 municipalities of the CV, both in total as well as in the number of newcomers (local immigrants) from elsewhere. To analyze the characteristics of those municipalities that increase their population, an econometric model was estimated where the dependent variable captures the increase of inhabitants in 2012-16 and the explanatory variables considered where variables linked to life quality factors that can be affected by local policies (cultural centers, sport facilities, parks and green areas) or those linked to economic factors that go beyond the local scope of policies at least at short term (sectorial economic structure, income). Since smaller municipalities may have different factors, as well as some kind of size effect may affect, the estimations are presented both for the total set of municipalities as for those ones with more/less than 10,000 inhabitants.

3. Econometric Procedure

3.1 The data

The used data are provided by the Statistical Office of *Generalitat Valenciana* (the regional government). It collects data from different sources and present them homogeneously for all the municipalities that comprise it (over 500 with a total population around five million persons).

The figure of population is generated in the *continuous census* that every local government obtains as the result of the compulsory registration of the population living in it. The automatic withdraw of people that register in another town when they move avoids any possibility of double accountancy or errors in this variable.

The public infrastructure related to cultural infrastructure for each municipality combines the number of cultural centers, libraries, social-civic centers, seniors' citizens social clubs and similar installations located in each municipality. The number of theaters is not included, since out of the largest cities, there are no specific venues for them and these activities (film exhibitions, theatrical performances..) are developed in cultural centers as well as in social-civic centers. In order to avoid any possibility of endogeneity if these venues increase as a result of a population increase, we have chosen the value for 2012 (the first year of the analyzed period). In the same vein, the number of urban parks (gardens) is reported by each local government to the Statistical Office which publishes it. However, for the largest cities this data is not available given that their municipalities do not report them, probably due to the difficulty to register all the green areas in a large city. In the statistical analysis these variables are presented per thousand inhabitants in each municipality.

The public infrastructure for sports makes references to the number of public sport centers (such as in-door & out-door sport fields, swimming pools, etc) not being

included the private ones (located in condominiums or private gyms, for instance). This variable is not reported yearly, and the latest one available (previous to the period) is for 2005. As it was done concerning the cultural infraestructure, this figure is normalized over the total population and presented per thousand inhabitants.

To proxy the closeness to a large city, the distance to the main town of each of the three provinces that comprise the region has been considered. This data is based on the distance by road and is calculated in the Statistical Office of Generalitat Valenciana.

The variables that capture the economic situation of each municipality make reference to the number of operating firms per thousand inhabitants that the Spanish Statistical Office collects in DIRCE and the Statistical Office of the regional government reports for each municipality. The sectoral specialization of each town is measured on the basis of the weight that jobs in agriculture, manufacturing, construction and services (this last category omitted in the regressions to avoid multicolinearity) as the Social Security reports. Using the number of actual jobs becomes a better reference of the work possibilities that each location may offer, since they will differ in size and, more importantly, towns may have jobs in some sectors although the firms are registered in another place.

Another measure of the economic activity is the investments that each local government carries on. The variable public investment per inhabitant measures the average investment per inhabitant that the local government has effectively done (data are not from the budgeted figures, but from the actual expended ones) in the previous five years (2007-2011) to the analyzed period. This data are reported by the Spanish Ministry of Economy which is in charge of monitoring the activities of local governments.

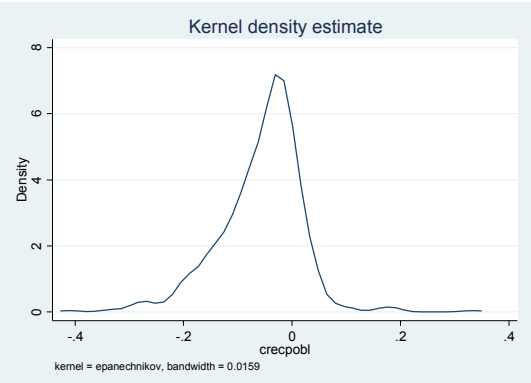
Finally, to proxy the income per inhabitant, we use the figure that the regional statistical office reports for each municipality that is computed according the established standard methodology for sub-regional entities. As it commonly happens, it is not available for smallest municipalities given the needed input data.

3.2 Descriptive analysis

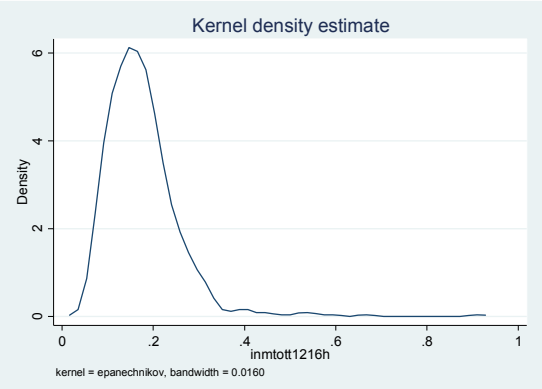
Figure 1 shows the kernel estimation of the population changes in 2012-16 across the 546 municipalities that for the Comunitat Valenciana. The first panel reports the total change in population while the second one makes reference to the number of people that were attracted to them, this is only the result of people that move to/from them.

Figure 1

Total growth of the population 2012-16



Total variation of immigrants 2012-16



The presented figures show that, on average, municipalities lost -5.7% of their population in 2012-16. This figure shows a non symmetrical distribution where more municipalities lost population that gained it. Meanwhile, the population change due to

immigration (in relation to the number of inhabitants) is clearly positive, with an average level of 17.6% in this period and quite more symmetrical in municipalities with a growth over/below the average.

Concerning the values of the explanatory variables, we can see in Table nº 1 that the differences supported by statistical tests between municipalities that increase and decrease their population is observed in the distance to the provincial capital town (on average municipalities that lose population are further away from the capital than those that increase it) and with an income per inhabitant significantly smaller and the sector structure. Other differences can be seen in terms of some of those infrastructures linked to leisure activities and green areas (sports, parks and, in economic terms in the number of firms, although they are not statistically significant.

Concerning the differences according the growth in the number of immigrants in each municipality (Table nº 2), we can see that municipalities that increase more their number of immigrants (relative to total population) have an economic structure more focused to agriculture and manufacturing vs. construction and services (that were the ones more affected by the crisis), as well as the average income. With the exception of parks, other elements as cultural or sport centers do not exhibit statistically significant differences. As it happens with the total population growth, distance seems to be an important factor, although de difference is not so large (on average 5 km vs. 19 for the total population change).

Table nº 1: Descriptive data

	All municipalities		Municipalities that reduce population		Municipalities that do not change population		Municipalities that increase population		Hypothesis test[2]
Variable	# obs	Average	# obs	Average	# obs	Average	# obs	Average	
Cultural inst. [1]	516	4.98	425	5.0	2	1.36	89	4.95	
Parks (gardens) [1]	512	1.64	419	1.5	2	1.90	91	2.34	
Sports inst. [1]	546	4.25	450	4.0	3	0.78	93	5.37	
Firms[1]	526	893.68	432	847.2	3	1181.39	91	1104.80	
Distance to capital town	540	56.37	446	59.4	3	75.67	91	40.93	Rejected
% of jobs in agriculture	546	11.69	450	12.1	3	5.5	93	9.7	
% of jobs in manufacturing	546	11.50	450	11.3	3	014.1	93	12.7	
% of jobs in construction	546	9.95	450	10.1	3	17.1	93	8.9	Rejected
Public investment per inhab.	543	559.35	446	545.2	3	1991.00	94	580.68	
Disposable income per inhab.	324	16,211.48	258	15820.3	2	15370.50	64	17814.86	Rejected

Notes: [1] per 1,000 inhabitants. [2] Hypothesis test H_0: Average of municipalities that decrease population = Average of municipalities that increase, at 95% confidence.

Source: Statistical Office of Generalitat Valenciana

Table nº 2: Descriptive data

	All municipalities		Municipalities that increase immigrants less than the average		Municipalities that increase immigrants more than the average		Hypothesis test[2]
Variable	# obs	Average	# obs	Average	# obs	Average	
Cultural inst. [1]	516	4.98	296	4.9	220	5.1	
Parks (gardens) [1]	512	1.64	288	1.3	224	2.1	Rejected
Sports inst. [1]	546	4.25	313	3.9	233	4.7	
Firms[1]	526	893.68	298	840.7	228	962.9	
Distance to capital town	540	56.37	309	58.5	231	53.5	Rejected
% of jobs in agriculture	546	11.69	313	13.5	233	9.3	Rejected
% of jobs in manufacturing	546	11.50	313	13.8	233	8.4	Rejected
% of jobs in construction	546	9.95	313	10.1	233	9.8	
Public investment per inhab.	543	559.35	310	509.6	233	625.5	
Disposable income per inhab.	324	16.211.48	187	15,638.0	137	16,994.2	Rejected

Notes: [1] per 1,000 inhabitants. [2] Hypothesis test H_0: Average of municipalities that increase immigrants below the average (17.6%) = Average of municipalities that increase over the average, at 95% confidence.
Source: Statistical Office of Generalitat Valenciana

3.3 Econometric model

To analyze with more detail the characteristics of those municipalities that increase their population, an econometric model was estimated where the dependent variable captures the increase of inhabitants in 2012-16 and the explanatory variables considered where the ones already discussed to capture both variables linked to life quality factors that can be affected by local policies (cultural centers, sport facilities, parks and green areas) or those linked to economic factors that go beyond the local scope of policies at least at short term (sectorial economic structure, income). Since smaller municipalities may have different factors, as well as some kind of size effect may affect, the estimations are presented both for the total set of municipalities as for those ones with more/less than 10,000 inhabitants.

4 Results

Results of regressions for the model, in Table 3, reveal interesting features of towns according their population increase in the analysed period. The first result we can see is that growth is not determined that by the previous size, and that factors related to the local infrastructure that affect to the life quality (cultural centres, sport centres, parks) is not statistically significant of the population change, the only exception being the number of parks, in smaller towns. Meanwhile, the economic situation as well as the distance to the province capital town are the two most relevant factors. Concerning the economic situation, we find that the more concentrated are the jobs in manufacturing and in agriculture the more has increased its population. As we know, the 2008 financial crisis hit most to the construction sector, as well as to the service sector; besides some authors have raised that the manufacturing sector has exhibited a stronger resilience to the crisis, which in this case would also be transferred to the population growth of the towns. In the same vein, those towns with a larger disposable income are the ones that

have increased most their population, being this effect specially import among the smallest ones. As we can see, this perspective of the economic situation reveals more important that the number of firms, which is not surprising since the number of firms is not directly linked to jobs as firms will be register in one town but may have working centres in different places. Finally, the distance to the capital town of the province exhibits a negative and significative sign both in large as in small municipalities. At a certain extent, this results may explain the lack of significance of those variables that capture life quality since proximity provides those services (cultural, sport, etc.).

The results of Table 4 make reference to the same model but related to the change of population that comes from another town (whether is from CV, other parts of Spain or abroad). This variable captures better the appeal of the town, since this part of the population is more moveable and is less linked to the municipality, so the inertia (due to familiar or personal linkages with other inhabitants, affection to the town, etc.) will be smaller. As we can see, the results for those indicators that proxy life quality (cultural and sport centres, parks) are not statistically significant). On its part, the economic situation of the town presents a different situation. While the total population growth is larger in towns more focused on manufacturing and agriculture, the immigrant population growth is smaller in those towns. This reveals that immigrants increase more in those places where construction (a sector that has given jobs to many foreign immigrants given their skills and abilities) and services are more important. As it happens for the total population growth, a larger income remain being an attractive reason for immigrants. It is also remarkable that distance to the provincial capital town is not significant, which will indicate that for this part of the population, this is not a relevant factor.

Summing up, we may say that quality of life infrastructure (such as cultural centres, parks, sport centres), that at a grand extent can be handled by local governments, is not a factor that promotes population growth. The most important reason is the economic situation, especially the income and the economic structure: while for the total population those municipalities more concentrated in agriculture and manufacturing are the ones that increase most their population, the result for immigrants is the converse probably due to the kind of jobs these people look for. Finally, the closer the town is to the capital town of the province the more its population grows (which could explain the lack of relevance of local cultural/sport/… infrastructure or may be a trend to concentrate around those cities), which does not happen with the migrant population.

Table 3: Estimation for the population growth

	All municipalities		Municipalities > 10.000 inhab.		Municipalities < 10.000 inhab.	
Population	-6.55E-08		0.00000471		0.000000517	
	-(0.05)		(1.16)		(0.06)	
Popul. Square	9.91E-12		-6.52E-11		5.97E-11	
	(0.31)		-(0.96)		(0.08)	
Cultural centers	0.0044108		0.0166165		0.0050783	
	(1.62)		(0.33)		(1.48)	
Parks	0.00575	*	-0.0048242		0.0062571	*
	(1.89)		-(0.55)		(1.96)	
Sport centers	-0.0007083		-0.0025625		-0.0011069	
	-(0.35)		-(0.34)		-(0.57)	
# firms	-4.12E-07		0.0002292	*	-1.96E-07	
	-(0.37)		(1.95)		-(0.18)	
Distance	-0.000631	***	-0.0012822	***	-0.0004976	***
	-(4.01)		-(3.37)		-(2.82)	
% jobs agri	0.0642434		0.2537052	***	0.0440693	*
	(0.06)		(2.63)		(1.70)	
% jobs manuf	0.1015057	***	0.1644906	***	0.0776679	***
	(4.21)		(2.84)		(3.36)	
% jobs constr	-0.0080156		-0.1663992		-0.0069438	
	-(0.18)		-(1.07)		-(0.14)	
Public invest	0.0000365	**	0.0000865		0.0000318	*
	(2.01)		(0.89)		(1.76)	
Disp. Income	0.0000081	***	0.00000768	*	0.00000878	***
	(3.47)		(1.81)		(3.06)	
Constant	-0.1840471	***	-0.2453634		-0.197396	***
	-(3.95)		-(1.61)		-(3.78)	
R^2	0.2549		0.3623		0.2578	
# Obs	295		84		211	

Notes: OLS estimation, heteroskedasticity robust; *t*-ratios in parenthesis; *,**, *** indicate statistical signficativity at 90, 95 and 99% respectively.

Table 4: Estimation for the immigrant growth

	All municipalities	Municipalities > 10,000 inhab.	Municipalities < 10,000 inhab.
Population	5.46E-07	0.00000322	-0.0000061
	(0.46)	(1.25)	-(0.59)
Popul. Square	-2.63E-11	-8.12E-11	7.82E-10
	-(0.91)	-(1.63)	(0.75)
Cultural centers	0.0027216	0.0028893	-0.0020771
	(0.75)	(0.08)	-(0.44)
Parks	0.0052029	-0.0116661	0.0045912
	(1.45)	-(1.27)	(1.30)
Sport centers	-0.0033497	-0.0104527 **	0.002378
	-(1.27)	-(1.97)	(0.81)
# firms	0.00000166	-0.0000909	0.00000127
	(1.36)	-(0.89)	(1.17)
Distance	-0.0002148	-0.000045	-0.0001274
	-(1.52)	-(0.24)	-(0.64)
% jobs agri	-0.0957217	-0.150693 ***	-0.0511472 **
	-(0.10)	-(3.23)	-(2.01)
% jobs manuf	-0.1173982 ***	-0.2063459 ***	-0.0867797 ***
	-(4.14)	-(4.53)	-(2.98)
% jobs constr	0.0380163	0.1556847	0.0313424
	(0.75)	(1.42)	(0.76)
Public invest	0.000034 *	0.00000624	0.0000125
	(1.86)	(0.08)	(0.62)
Disp. Income	0.00000704 ***	0.00000725 ***	0.00000437 **
	(3.74)	(3.66)	(2.10)
Constant	0.0771914 **	0.0647697	0.1337324 ***
	(2.15)	(1.15)	(2.84)
R-squared	0.2176	0.4869	0.1298
# Obs	295	84	211

Notes: OLS estimation, heteroskedasticity robust; *t*-ratios in parenthesis; *,**, *** indicate statistical signficativity at 90, 95 and 99% respectively.

Keywords: population dynamism, depopulation, local economy, societal infrastructures, Comunitat Valenciana
JEL codes: H75, H76, J11, Q56, R50