# RESUMEN AMPLIADO

**Título:** Explaining Valencian Laponia. Quantitative and qualitative approaches to rural depopulation

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**Resumen:** *(mínimo 1500 palabras)*

**Introduction**

There is a growing consensus on the need to propose specific policies to face the on going depopulation processes in extensive rural areas of Southern Europe. But targeting policies needs assessment of the spatial, economic and structural conditions that explain why a local community experiences depopulation.

This paper sets out to explore the determinants of population growth in the Comunitat Valenciana (CV), an administrative and historical region located at the

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Eastern part of Spain. The study's results contribute to headline one of the most important territorial problems in rural Spain: the depopulation in inland municipalities in a relatively urbanised region. We focus the analysis on the whole territory of CV: 542 municipalities.

Taking into account that the increase of population in a municipality implies the declining in another one, we pay attention to the differences between territories according to their economic development and spatial factors. We started by specifying and estimating a population growth model that focuses on three factors mentioned by literature and also considered by the Valencia Government as the main topics to considering when a municipality has depopulation problems: accessibility, economic conditions and public equipment[1]. The spatial econometric methodology allows to explaining and quantifying the elements that cause de depopulation, and addresses the key question on how spatial dependence between municipalities can affect population change. We also applied fuzzy-set Qualitative Comparative Analysis, which organises criteria to define the presence or absence in each municipalities of the conditions leading to the presence or absence of depopulation processes, based on predetermined thresholds.

**Depopulation in the Comunitat Valenciana.**

One of the main problems faced by rural areas in Spain is depopulation, understood as a demographic and territorial phenomenon reflected in the decrease in the number of inhabitants of a territory or nucleus in relation to a previous period. This problem even exists in a relatively urbanized region, such as CV, a region with an average population density of 214 inhabitants per $Km^2$, but where 0.8% of the region's population lives in 27% of its total area, leading to a sparsely populated area that belongs to the so-called Spanish "Laponia". The massive and permanent reduction of population leads to desertification, with dramatic social and environmental implications. In the rural CV as in other Spanish regions the decline in absolute terms of rural population is a problem that affects to a significant part of its territory, and that may end

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[1] A study taken out by Valencian Public Administration (Generalitat Valenciana 2017) has classified a group of municipalities as "in danger of depopulation". The classification has been done considering three indicators that collect certain variables related with: accessibility, public equipment and economic conditions.

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up in the disappearance of villages, which represents a loss from the ethnological, economic and environmental perspectives.

In many cases, it is not just a matter of population loss, but also of de-structuring of the territory. Small villages are combined with dispersion, given the scarcity of municipalities of more than 5,000 inhabitants in the inland Valencian districts.

In the preparatory study of the AVANT anti-depopulation plan (Generalitat Valenciana, 2017) the Valencian Government estimates that the number of municipalities in risk of depopulation is 157, with a population loss of 14.5% between 1996 and 2016. The same study considers that depopulation of the territory is related to accessibility, economic dynamics and public services. We wonder if such approach can explain why some municipalities grow more than others.

**Conceptual framework**.

Depopulation is a complex phenomenon that can be approached from multiple perspectives. A standard explanation refers to the presence of very traditional employment structures in rural areas, with little economic dynamism against fast growing territories. Regional studies have considered the impact of large cities, rural-urban migration, economic development or quality of life. Glaeser, Scheinkman and Shleifer, (1995) examined the socioeconomic forces that explain the growth of US cities in different periods of time. Jedwab, Christiaensen and Gindelsky, (2016) focus on rural push factors and urban pull factors and they consider economic factors as income growth, differences in productivity, wages gaps and urban-biased policies to explain population movements from rural to urban areas. Graves, (1979, 1983), Graves and Linneman, (1979) Chi and Marcouiller, (2009), among others, underline that natural amenities (landscapes, open space, climate, forest etc.) are important resources that attract local population and have contributed to generate employment and economic activity. Cushing, (1987) and Shields et al., (2005) illustrate how both natural amenities and economic conditions affect population movements.

If we introduce spatial considerations, the explanation to depopulation could explore difficulties that some municipalities experience to integrate with other dynamic territories that benefit from social services and employment opportunities. Regional studies start to recognize the role of accessibility or the proximity to populated locations in explaining the current phenomena of territorial depopulation. The improvement of

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road infrastructures has allowed certain municipalities to increase their population and change their demographic characteristics because of a population integrated for reasons of leisure, work, studies or retirements.

The choice of territorial unit of analysis also conditions the factors explaining the population dynamics. The focus on local communities reflects specific impacts of territorial problems and allows to capturing spatial relations (Boarnet, 1994), while at a higher territorial level the spatial dependence could be less significant. On this line, recent studies introduce the spatial dependence as an additional determinant of population changes (Firmino, Silva, Elhorst and Mota, 2017, Lunberg, 2006, Delfmann, 2014).

Our approach does not necessarily focus on rurality as a major issue affecting depopulation. We, of course, consider a range of variables that can be inserted into a broad definition of rurality, such as the distance to the main cities. However, we don't categorise municipalities according to a rural-urban classification as other studies do (Franco, 2015; Reig et al., 2016) or according to population density (Burillo-Cuadrado et al., 2013). It is rather our intention to consider all municipalities in the Valencian community and to assess a set of specific factors that can explain depopulation, with independence of the eventual categorization of the municipality as a rural or as an urban municipality. The statistical approaches followed in the present research do not predefine categories although a territorial clustering could be deducted from the tested relationships between conditions and the problem of depopulation.

Our study pays attention to "material" conditions such as economic dynamics and public services. We recognise that some recent works in Spain (Camarero, 2009) argue that the feasibility of territories areas is not only the result of economic growth and material conditions but also of social interactions. We don't deny such interdependence. However, the existence of a "generation of support" as a social collective that takes charge of conditions for production, reproduction and support to community is extremely constrained by the lack of material conditions (Consejo Económico y Social, 2018).

Our approach aims at testing how material conditions coupled with spatial relations affect depopulation, with focus on accessibility and territorial dependence.

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**Spatial modelling**

As consequence of intermunicipality relations, at local level take place a transfer of population working, studying or using public infrastructures between municipalities, hence the territorial connexions generate spatial spillovers that should be considered in the analysis of territory and in political decisions. From a theoretical point of view, spatial econometric techniques allow to identify the spatial features of data for a given territory. Exploratory Data Analysis will help to identify the patterns of the distribution of population and further the spatial modelling provides two main effects, direct and indirect effects that allows to quantify the spatial spillovers according to the municipalities, (Anselin, 1988). Direct effect considers the relationship between dependent and independent variables in the models, limited to the spatial limits of each municipality, meanwhile, indirect effects show how covariates in a given municipality influence the population growth of its neighbouring. For instance, this last effects allows us to analyse how a change in public equipment in a municipality influence the population dynamics of surroundings, (Boarnet, Chalermpong and Gedo, 2005), Firmino, et. al., (2017).

**Recipes for depopulation**

The Qualitative Comparative Analysis considers that the study of complex causality of depopulation needs to combine three dimensions: (i) *conjunction*, which means that the outcome is the result of the interdependency amongst various conditions; (ii) *equifinality*, which means that there is more than one path to a specific outcome; and (iii) *asymmetry*, which implies that conditions found to be causally related in one configuration may be unrelated or even inversely related in another (Ragin, 2008). In the present research, we wonder about the recipes or pathways that include necessary or sufficient conditions leading to high risk of depopulation at the municipal level. To check this, we based on the criteria proposed by AVANT to define depopulation as an (undesirable) outcome and certain specific conditions that, alone or combined, lead to such outcome (or to the most favourable outcome which would be relatively high population growth).

AVANT does not classify municipalities by degree of rurality. So, as we argued in the conceptual section, rurality is not the issue by itself. AVANT provides a

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categorization of municipalities based on the degree of vulnerability from the view point of five scales. One is the undesirable problem: risk of depopulation. The other four scales refer to the main conditions leading to the problem: "dynamism", "public infrastructure and services", "accessibility", and "neighbourhood to a dynamic municipality". The AVANT database was used for a first identification of municipalities where alarms are activated.

Specifically, the analysed model contains three intrinsic characteristics of municipalities (accessibility, economic conditions, public equipment) and one spatial dimension. This spatial condition refers to the neighbourhood of municipalities to a dynamic municipality ("dynamic municipality" is considered here as a municipality that is accessible, shows favourable economic conditions and has public equipment).

Thus, the proposed model is as follows:

Depopulation = *f(*accessibility, economic, equipment, neighbour*)*

First of all, Table 1 shows the necessity analysis. It can be observed how the lack of accessibility is the only necessary condition for the depopulation phenomenon to occur (the consistency of necessity indicator is Cons.Nec > 0.9; Schneider et al, 2010).

Table 1. Analysis of necessary conditions.

| Outcome: Depopulation | | | |
|---|---|---|---|
| | Cons.Nec | Cov.Nec | RoN |
| accessibility | 0.076 | 0.027 | 0.277 |
| economic | 0.303 | 0.099 | 0.231 |
| equipment | 0.182 | 0.062 | 0.258 |
| neighbour | 0.653 | 0.187 | 0.122 |
| ~ accessibility | 0.941 | 0.895 | 0.962 |
| ~ economic | 0.755 | 0.916 | 0.978 |
| ~ equipment | 0.861 | 0.903 | 0.969 |
| ~ neighbour | 0.346 | 0.882 | 0.987 |

Note: the symbol (~) means absence of the condition

Table 2 complements the necessity analysis with the sufficiency analysis, with usual indicators. Of 16 possible configurations, three recipes were selected to reflect municipalities of the CV that are at high depopulation risk. Firstly, recipe 1 shows that

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the lack of accessibility (~ reflects "absence" of the condition) is a sufficient condition for high depopulation.

Second, the lack of economic dynamism in a municipality together with its neighbourhood to a dynamic municipality jointly lead to the depopulation of the first municipality (recipe 2).

Third, the causal configuration number 3 shows how the absence of public equipment in a municipality that it is neighbour of a dynamic municipality leads to depopulation.
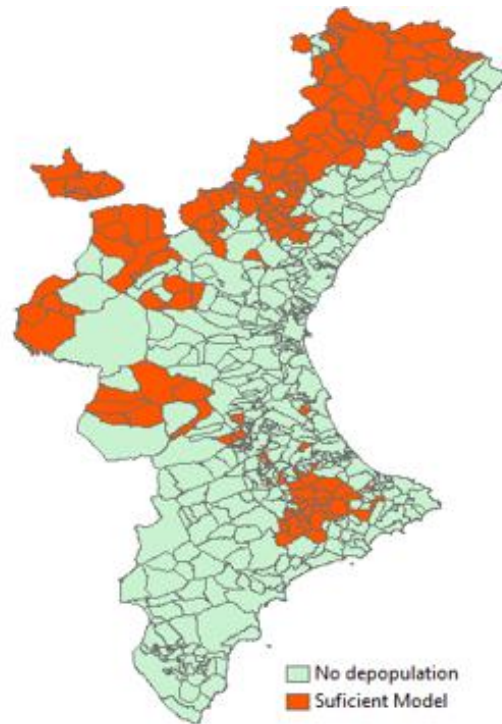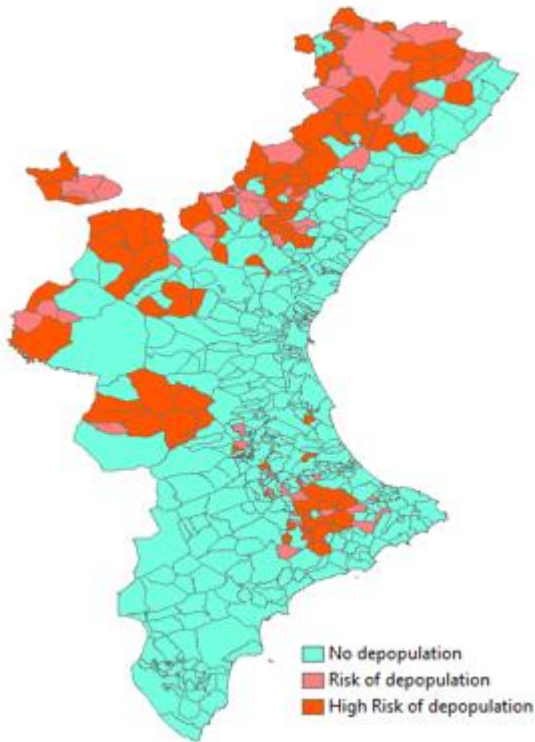
Table 2. Analysis of sufficient conditions.

|  |  |  | Sufficiency Inclusion Score | Proportional Reduction in Inconsistency Score | Raw Coverage Score | Unique Coverage Score |
|---|---|---|---|---|---|---|
| 1 | ~ Accessibility |  | 0.895 | 0.884 | 0.941 | 0.366 |
| 2 | ~Economic Neighbour | * | 0.907 | 0.894 | 0.487 | 0.018 |
| 3 | ~ Equipment Neighbour | * | 0.905 | 0.893 | 0.543 | 0.007 |
|  | **Model** |  | **0.887** | **0.876** | **0.971** |  |

Note: the symbol (~) indicates absence of the condition. The symbol (*) is the logical operator AND.

Finally, image 1 shows, on the left, where the municipalities with the greatest risk of depopulation are located (1a) and, on the other hand, the municipalities that are explained by the recipes selected in the sufficiency model (1b). The categorization of municipalities as mentioned is the proposed by the AVANT study.

Image 1. Depopulation level (1a) and Sufficiency analysis (1b).

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Note: (~ Accessibility + ~ Economic * Neighbor + ~ Equipment * Neighbor) where the symbol (+) is the logical operator OR.

## Concluding remarks

The evaluation of factors leading to depopulation is relevant to guide regional policies. In the case of Valencia region, a governmental effort is being carried out to support policies that correct the historical and increasingly serious problem of depopulation of inland rural areas. Accepting the exploratory nature of the present research, we find that any territorial strategy will be insufficient if it underestimates the territorial dependence between one municipality and its neighbouring areas. In conclusion, policies dealing with depopulation cannot be managed only from isolated local units' perspectives but they need to consider the relation between local communities and the rest of the broad territory. In this respect, accessibility aspects and the promotion of efficient labour systems with a supra-municipal approach will likely reach increasing relevance in the future.

## References

- Anselin, L. (1988). Spatial econometrics: Methods and Models, Dordrecht: Kluwer Academic Publishers.

- Boarnet, M. (1994). The monocentric model and employment location. Journal of urban economics, 36, pp. 79-97.

- Boarnet, M. G., Chalermpong, S. and Gedo, E. (2005). Specification issues in models of population and employment growth. Papers in Regional science, 84 (1) pp. 21-46.

- Burillo-Cuadrado, M. P., Mozota, F. B., & Budría, E. R. (2013). Serranía Celtibérica (España): un proyecto de desarrollo rural para la Laponia del Mediterráneo. Instituto Celtiberia de Investigación y Desarrollo Rural.

- Camarero, L. (coord.) (2009). La población rural de España. De los desequilibrios a la sostenibilidad social, Colección Estudios núm. 27, Fundación la Caixa.

- Chi, G. and Marcouiller, D. W. (2009). Isolating the effect of natural amenities on population change at the local level. Regional studies. 45 (4) pp. 491-505

- Consejo Económico y Social (2018). El medio rural y su vertebración social y territorial. Informe 01/2018. Sesión ordinaria del Pleno de 24 de enero de 2018.

- Cushing, B. (1987). A note on specification of climate variables in models of population migration. Journal of regional science, 27, pp. 641-649

- Delfmann, H. (2014). Population change and new firm formation in urban and rural regions. Regional studies, 48 (6) pp. 1034-1050.

- Firmino Costa da Silva, D., Elhorst, P. and Mota, R. (2017). Urban and rural population growth in a spatial panel of municipalities. Regional studies, 51 (6) pp. 894-908

- Franco, F. (2015). "Mundo, Medio y Territorio Rural". En Fundación Encuentro (2015). Informe España 2015.

- Generalitat Valenciana (2017). Agenda Valenciana Antidespoblament (AVANT). Propuesta de Sistema de Indicadores. Gabinet del President. 22 November 2017.

- Glaeser, L. E., Scheinkman, J. and Shleifer, A. (1995). Economic growth in a cross-section of cities. Journal of monetary economics, 36 (1) pp. 117-143.

- Graves, L. E. (1979). A life-cycle empirical analysis of migration and climate by race. Journal of urban economics, 6 (2) pp. 135-147

- Graves, P. E. (1983). Migration with a composite amenity: the role of rents. Journal of regional science. 23(4) pp. 541-546.

- Graves, P. E. and Linneman, P. (1979). Household migration: theoretical and empirical results. Journal of urban economics, 6 (3) pp. 383-404

- Jedwab, R. Christiaensen, L. and Gindelsky, M. (2016). Demography, urbanization and development: Rural push, urban pull and… urban push?. Journal of urban economics, 98, pp. 6-16

- Lunberg, J. (2009). Using spatial econometrics to analyze local growth in Sweden. Regional studies. 40 (3) pp. 303-316.

- Ragin, C. C. (2008). *Redesigning social inquiry: Fuzzy sets and beyond*. Chicago (IL): Chicago University Press

- Reig Martínez, E., Goerlich Gisbert, F. J., & Cantarino Martí, I. (2016). Delimitación de áreas rurales y urbanas a nivel local. Demografía, coberturas del suelo y accesibilidad. Informes Economía y Sociedad, Fundación BBVA.

- Schneider, M. R., Schulze-Bentrop, C., & Paunescu, M. (2010). Mapping the institutional capital of high-tech firms: A fuzzy-set analysis of capitalist variety and export performance. *Journal of International Business Studies*, *41*(2), 246-266

- Shields, M., Goetz, S. and Wang, Q. (2005). Out-migration from the Northeast US: the relative roles of economic and amenity differentials, in Green G., Deller S. and Marcouiller D. (Eds). Amenities and rural development: Theory, methods and public policy, pp. 78-94. Edward Elgar, Northampton, MA.

**Palabras Clave:** *(máximo 6 palabras)* Depopulation of peripheral areas, rural development, migration, spatial econometrics, Qualitative Comparative Analysis.


**Clasificación JEL:** J18, R11, C21,