

Extended abstract

*Urban Migrations to Rural Areas of
Castile and Leon during COVID-19*



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Highlights:

1. COVID-19 pandemic has provoked a sharp change in migration trends in rural municipalities.
2. Post-Covid migration is not sufficient for slowing or reverse the rural demographic decline.
3. Outflows to cities has curbed along 2020, with a predominance of oscillating trajectories in 2021.
4. The change in migration flows is transitory, with a rapid return to preCOVID-19 migration patterns.
5. Proximity to large cities is a key factor in explaining inter-provincial differences in Castilla y León.

Abstract: Mobility restrictions imposed by pandemic COVID-19 control had provoked a severe disruption in the migratory flows to rural areas.

For many city residents, lockdowns created a sense of confinement, which led to a severe disruption of the traditional rural-to-urban migration flows—a shift that garnered media attention. The primary objective of this contribution is to assess the extent of this reversion and to measure the sustainability of population flows to rural municipalities in Castilla y León from urban areas. These flows are quantified and treated as time series, with a SARIMA model applied to estimate changes during the 2020–2021 biennium. The abruptness of the migratory shift since the implementation of lockdowns can be appreciated, as well as the speed at which it returned to a similar path to the pre-pandemic period, although with notable differences among provinces, especially those neighbouring Madrid and Bilbao compared to the rest of the region.

Keywords: Castilla y León, rural-urban migrations, urban-rural migrations, Temporal series, SARIMA model.

Extended Abstract

1. Introduction and justification

The accelerated depopulation of rural areas, the so-called "Empty Spain" (*España vaciada*) was one of the main topics during the late 2010s, not only from an academic point of view but also in social debates. The mobility restrictions that accompanied the Covid-19 pandemic significantly temporarily altered the terms of the debate, suggesting a potential recovery of the rural population due to immigration from the cities.

Castilla y León, severely affected by a loss of residents in its rural areas and bordering some of the most thriving Spanish urban areas (Bilbao and Madrid), is an interesting case for analysis of the dynamics experienced by migratory movements between the countryside and the city.

2. Objective, methodology, and sources

The main objective of this work is to assess the effects of an unexpected and unpredictable event (or disturbance) such as Covid-19, on population variation in rural municipalities of the Spanish region of Castilla y León, especially from population flows arriving to these municipalities from the cities. The following are secondary objectives derived from this main aim:

To assess the differences in population variation of rural municipalities before and during the pandemic.

To measure the relevance of population flows to and from the cities.

To estimate the variation component experienced by the population that may be attributed to alterations caused by the pandemic, in terms of both persistence over time and intensity.

The Residential Variation Statistics (EVA) was used as the main source. It comes from the Spanish Municipal Register of Inhabitants and provides monthly summaries of registrations and removals recorded in the Register of each municipality. Microdata

files were used, examining each event based on the age of the population ((both those registering in rural areas and those leaving rural areas and registering in urban areas) and the size of the municipality of origin or destination of each person.

The time period covered by the data series constructed from the EVA extends over the 2014–2021 period, resulting in 96 observations for each of the nine provinces. Of these, 72 will be used as a basis for making the predictions. These time series are provincial (NUT 3) aggregates since, given statistical secrecy considerations, microdata do not individualize municipal data for areas with less than 10,000 inhabitants (only 23 of a total of 2,248 exceed this population threshold).

Time series analysis techniques were used, employing the MATLAB software package. Based on data from the months prior to the pandemic outbreak (January 2014 to March 2020), predictions were made for both the series of population inflows from cities with over 50,000 inhabitants and population outflows to that same location. A SARIMA (Seasonal Autoregressive Integrated Moving Average) model was used to make predictions, by internalizing both long-term dynamics and short-term changes, applied independently to each province. The trajectory of the predicted curves was subsequently compared with the real variation taking place in the population during the months between March 2020 and December 2021.

3. Results

The results obtained are presented in two sections. The first section attempts to measure the characteristics of population flows having origins and destinations in the rural municipalities of Castilla y León during the years prior to the pandemic, as compared to those acquired during the months of the implementation of restrictions to combat the spread of the disease. The second section offers a counterfactual analysis, comparing what would happen in the absence of Covid-19, the materialization of the predictions made with the SARIMA model, and what actually happened.

Between 1914 and 2019, most of the rural municipalities experienced a decline in population, especially those located in the Spanish provinces of Leon, Soria, and Zamora. This demographic decline is so widespread that only 336 municipalities have increased in population, approximately one-sixth of the total. During 2020–2021, the demographic situation experienced a substantial improvement that mitigated the catastrophic demographic legacy of the earlier years. However, there was considerable variability between the distinct regions analysed. The balance is ultimately positive,

with the number of municipalities experiencing positive variation reaching 1,004, approximately 45% of the rural territories of this region. The transformations observed express a substantial increase in not only positive population variation rates but also in the age structure of the protagonists of the population flows between the rural and urban areas. Population inflows aged between 40 and 64 are found to be increasingly numerous, as well as those aged between 65 and 79.

Although less marked, this aging is also visible among the population outflows. Finally, a relevant transformation is also recorded with regard to the main origins/destinations of the out and in population flows. The pandemic introduced a major imbalance as compared to what occurred between 2014 and 2020, especially in the vicinity of the metropolitan areas: the influx of population inflows from Madrid (provinces of Avila and Segovia) and the Basque Country (Burgos) is notable. This is the result of the proximity of Madrid and Bilbao and the proliferation of second homes in these provinces. In the other provinces of the region, a greater balance is observed, with an even greater intensity of population inflows.

The counterfactual analysis indicates that the pandemic months were ones of "excess" of population inflows, during which the rural territories of each province gained in overall population from the cities. There was a notable deviation of actual population inflows from expected ones, especially in Avila, Burgos, and Leon. The positive discrepancy is more nuanced in Salamanca and Segovia, and it is barely evident in the rest of the region. On the other hand, the estimated and actual outflow rates show no significant differences.

The estimated and real outflows rates do not present major differences, except during the months of confinement when, for obvious reasons, the observed figures fell as compared to the projected ones. The period in which the differences between actual and expected migration balances reach their highest levels is limited; autumn 2020 may be the time when the deviations are maximum, gradually mitigating until projection and observation converge in 2021.

4. Discussion

The results obtained indicate that the pandemic has temporarily altered the direction and intensity of population flows between rural municipalities and cities. The rural areas of Castilla y León have experienced a degree of relief in the intensification of inflows of people seeking to ease the limitations on their mobility caused by

the restrictions introduced during the declaration of the state of emergency. Using a SARIMA model, it has been possible to verify the intensity of the increase in the number of population that has arrived (or at least registered in rural areas), while also confirming hypotheses developed by other authors regarding the ephemeral nature of this increase new residents. The bulk of the positive balances recorded during the 2020-2021 biennium correspond to a few months of the second half of 2020, decreasing progressively throughout 2021.

5. Conclusions

Covid-19 has brought temporary relief to the populations of many municipalities of Castilla y León, which had been severely punished by decades of neglect. This relief did not result from a halt of outflows, which remains at the same level as in previous years, but in an increase of inflows. The former is consistent with theoretical analyses in which dual markets and the so-called *brain drain* explain the continuing exit of young adults. On the contrary, the emergence of robust inflows is a response to the negative effects associated with the pandemic, and therefore, it is not sustainable over time. Therefore, in a post-pandemic scenario a return to the previous situation of declining demographic numbers is anticipated.

6. Future directions

Research on the migratory dynamics of rural areas requires the investigation of relevant aspects, insufficiently addressed with the tools proposed in this work. It is necessary to detect the characteristics and circumstances of those individuals who came from the cities and stayed permanently in the host towns. It is also of interest to determine the impact on municipalities burdened by deficiencies in infrastructure and equipment and to identify which factors explain the differences between municipalities that have benefited from this demographic growth event as compared to those that have not.