

Spatial Inequality and Rural Decline: The Determinants of Internal Mobility in Spain

Extended Abstract

Introduction

Internal migration plays a central role in shaping regional disparities, labor market adjustment, and the spatial distribution of human capital (Greenwood, 1997; Moretti, 2012). By reallocating workers across space, mobility can foster regional convergence or reinforce territorial inequalities. Understanding its determinants is therefore crucial for policies aimed at reducing spatial imbalances.

Recent evidence documents a decline in internal migration across developed countries (Jia et al., 2023; Olney and Thompson, 2024). However, most studies rely on aggregated spatial units such as regions or provinces, potentially masking heterogeneity between urban and rural areas. A municipality-level perspective offers sharper insights into how local economic forces shape mobility decisions.

Spain provides a particularly relevant case. Despite overall population growth of 17.2% between 2000 and 2020, more than 60% of municipalities experienced population decline, especially in rural northwestern and central regions (Collantes and Pinilla, 2011; González-Lenardo et al., 2023). At the same time, Spain exhibits relatively low internal mobility rates compared to Western and Northern Europe (Bell et al., 2015; Alvarez et al., 2021), raising questions about spatial adjustment mechanisms.

This paper makes three contributions. First, we construct a municipality-level origin–destination panel covering internal migration flows from 1998 to 2021 using the *Estadística de Variaciones Residenciales* (EVR). Second, we adapt the structural framework of Ortega and Peri (2013) to model internal migration in a gravity setting estimated by Poisson Pseudo-Maximum Likelihood (PPML), accounting for zero flows and multilateral resistance. Third, we document substantial heterogeneity across urban–rural origins and between natives and immigrants.

Our findings show that income acts as a pull factor, while distance and housing rents reduce migration flows. Responsiveness differs across groups and territories, infrastructure and renewable energy matter in specific contexts, and the role of economic determinants weakened after COVID-19.

Data and Methodology

We combine granular microdata with a structural gravity framework to analyze internal migration in Spain at the municipal level. Using individual-level data from the *Estadística de Variaciones*

Residenciales (EVR), which records all registered changes of residency between municipalities from 1998 to 2021, we construct a municipality-level origin–destination panel covering over 8,000 municipalities.

We complement mobility data with municipal-level information on income per capita (INE), housing rents (SERPAVI), transport accessibility (IGN highway entry points), and renewable energy capacity (SOWISP; Jiménez-Garrote et al., 2023). Continuous variables are logarithmically transformed. We restrict the sample to municipalities with at least 100 inhabitants and corridors exceeding 120 km, yielding 361 million municipality–municipality–year observations for 2016–2021.

To model migration choices, we adapt the framework of Ortega and Peri (2013) to internal mobility. Each individual i residing in origin municipality o chooses whether to stay or move to a destination $d \in \mathcal{D}_o = \mathcal{D} \setminus \{o\}$. Utility is defined as

$$U_{odi} = V_{od} + \varepsilon_{odi}, \quad (1)$$

where V_{od} captures observable bilateral determinants (expected income, distance, housing, infrastructure, renewable energy) and ε_{odi} denotes unobserved idiosyncratic preferences. Following Ortega and Peri (2013), we allow for individual-specific random effects correlated across destinations, resulting in a nested-logit structure that accommodates correlation in unobserved determinants and yields closed-form choice probabilities.

Applying the law of large numbers, we approximate these probabilities with observed shares of movers across municipalities. To estimate the model, we transform the nested-logit into a Poisson Pseudo-Maximum Likelihood (PPML) gravity specification, which is robust to the prevalence of zero flows and heteroskedasticity (Blackburn, 2015). The estimating equation is:

$$\ln n_{odt} = \alpha_{ot} + \beta_1 \ln Y_{dt} + \beta_2 T_{dt} + \beta_3 \ln R_{dt} + \beta_4 \ln RE_{dt} + \beta_5 (\ln Y_{dt} \times \text{COVID}_t) + \gamma \ln D_{od} + \alpha_d + \epsilon_{odt}, \quad (2)$$

where n_{odt} denotes flows from origin o to destination d at time t ; α_{ot} and α_d are origin-year and destination fixed effects; Y_{dt} is income per capita; T_{dt} is transport accessibility; R_{dt} is housing rent; RE_{dt} is renewable energy capacity; D_{od} is geographical distance; and COVID_t captures post-pandemic periods.

This methodology allows us to isolate the partial correlations between mobility flows and destination characteristics while controlling for multilateral resistance, origin-specific time-varying factors, and zero-inflation in migration corridors. It also permits an analysis of heterogeneous responses by urban–rural origin and by nativity status (immigrant vs. native), providing detailed insight into the spatial dynamics of internal migration.

Results

The baseline estimation confirms that income per capita at destination acts as a strong pull factor: a 1% increase in income is associated with a 0.73% rise in mobility flows. Distance and housing rents act as push factors, reducing flows by 0.78% and 0.42%, respectively. Highway accessibility has a small negative effect (6.3%), while wind and solar capacity are not significant in the baseline specification.

Heterogeneity analysis reveals distinct patterns between natives and immigrants, as well as across the urban-rural spectrum. Immigrants from urban origins are highly responsive to economic factors: income and housing costs at the destination strongly influence their mobility. Conversely, immigrants from rural origins are largely insensitive to these economic determinants. Natives, however, consistently respond to income and housing rent across all levels of urbanization, with the strongest sensitivity observed in rural origins.

Infrastructure and amenities also play a role in specific contexts. Highway accessibility significantly affects immigrant mobility from rural origins, reducing inflows by approximately 43% where access improves. Photovoltaic capacity acts as a pull factor for natives from rural municipalities, with a 1% increase in PV capacity associated with a 0.29% increase in mobility flows.

Finally, the COVID-19 pandemic altered mobility behavior. The influence of purely economic factors, such as income and housing rent, declined notably after 2020, particularly for natives. This finding aligns with evidence suggesting a post-pandemic shift in preferences toward non-pecuniary factors and amenities, reducing the relative importance of economic differentials in migration decisions.

Overall, these results highlight substantial heterogeneity in internal mobility determinants in Spain, showing that both demographic characteristics and local context shape the migration response to economic, infrastructural, and amenity factors.

Conclusions

This study examined the determinants of internal mobility in Spain, emphasizing urban–rural disparities and heterogeneity between natives and immigrants. Using EVR microdata, we constructed a municipality-level origin–destination panel and estimated a gravity model incorporating economic conditions, housing markets, infrastructure, and renewable energy.

Economic factors remain central: income at destination attracts movers, while distance and housing rents discourage migration. However, responsiveness differs markedly across groups. Immigrants are more sensitive to economic conditions when originating from urban areas, whereas natives respond more strongly in rural contexts. These patterns imply that internal mobility can either mitigate or reinforce spatial inequalities depending on origin and population group.

The findings are policy-relevant for addressing regional disparities and rural decline. Expanding economic opportunities in lagging regions, improving amenities, or easing housing constraints in urban areas may have heterogeneous effects across populations.

Several limitations apply. The estimates capture partial correlations rather than causal effects, and the analysis abstracts from additional individual characteristics. The relatively short time horizon also limits conclusions about long-term persistence. Future research could extend the period analyzed and implement causal identification strategies to better uncover underlying mechanisms.

Overall, internal mobility is shaped not only by economic fundamentals but by their interaction with territorial and demographic characteristics. Recognizing this heterogeneity is essential for designing policies that promote balanced regional development.

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