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What effect has depopulation had on endogamy levels in the rural Spanish population? The case of the Huerva Valley, 1700–2010

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Abstract:

The impact of depopulation on endogamy levels in rural Spain remains an understudied phenomenon in demographic and historical research. This article examines the long-term effects of population decline on kinship structures and marriage patterns by analyzing the case of the Huerva Valley (Aragon) between 1750 and 2010. The study covers all individuals from 14 rural villages, none exceeding 2,000 inhabitants, constructing complete genealogical records from the 16th to the 21st century. By systematically tracing consanguineous ties up to the fourth-cousin level, we assess genetic kinship and endogamy levels across different time periods (approximately every 50 years). Furthermore, to capture longitudinal changes, we analyze all possible kinship connections among marrying couples in each decade, provided archival sources are available. This approach allows us to determine whether local demographic transformations had a measurable impact on marriage patterns, genetic diversity, and the persistence of kinship networks.

The theoretical framework of this study is grounded in historical demography, population genetics, and rural sociology. Classic models of endogamy, such as those developed by Hajnal (1965) and Goody (1983), provide a baseline for understanding traditional kinship structures in pre-industrial Europe. These models highlight the importance of socio-economic structures, inheritance patterns, and marriage strategies in shaping local demographic trends. In parallel, evolutionary biology perspectives on genetic drift (Wright, 1931) and small-population dynamics (Frankham, 1996) help interpret the potential genetic consequences of sustained marital closure in small

communities. The persistence of endogamy in isolated populations has been linked to increased homozygosity, with potential implications for genetic health and adaptability. Additionally, recent research on demographic transitions (Reher, 1998) and rural depopulation (Collantes & Pinilla, 2011) allows us to position our findings within broader socio-economic transformations in 20th-century Spain. These demographic shifts led to a contraction in population size, out-migration, and changes in economic structures, all of which likely influenced marriage patterns and kinship networks in significant ways.

Our methodological approach is innovative and complex, integrating historical microdata with advanced genealogical reconstruction techniques. By leveraging deep population pedigrees, we quantify changes in genetic endogamy using coefficients of kinship and inbreeding. This allows us to test the persistent stereotype that "everyone in small villages is related" while also exploring whether the shrinking marriage market in the smallest villages influenced genetic diversity. Genealogical databases provide an exceptional opportunity to analyze long-term changes in kinship networks, as they allow for the reconstruction of family linkages over centuries. Importantly, this study addresses whether the drastic depopulation of these rural communities in the 20th century is associated with unprecedented shifts in endogamy levels, particularly in contrast with prior demographic crises, such as plagues, famines, and economic downturns. The use of historical records, combined with computational techniques for pedigree analysis, enables a more accurate and comprehensive understanding of these processes than previously possible.

Preliminary findings suggest that while moderate endogamy was a stable characteristic of these rural populations for centuries, the demographic crisis of the 20th century triggered significant changes in marriage patterns. The increased out-migration of younger cohorts reduced the local pool of marriageable individuals, leading to a decline in close-kin marriages. At the same time, these demographic pressures may have encouraged greater exogamy, particularly as transportation and economic opportunities expanded beyond village borders. This decline in endogamy appears to have been especially pronounced in the second half of the 20th century, coinciding with Spain's broader rural exodus. However, our study also suggests that in earlier periods of demographic contraction, endogamy was often reinforced rather than diminished, likely as a mechanism of social cohesion and economic survival within small communities.

The implications of these findings extend beyond historical demography, shedding light on the genetic and social consequences of rural depopulation in Spain and comparable contexts. By examining the interplay between demographic pressures, economic transformations, and kinship structures, this research contributes to broader debates on population dynamics, social adaptation, and the evolution of family systems in rural environments. Furthermore, our findings have implications for contemporary rural development policies, as they highlight the long-term demographic and genetic consequences of sustained population decline in isolated areas.

By bridging historical demography with population genetics and rural sociology, this article provides a novel contribution to the study of marriage patterns in declining rural areas. The complex methodological approach adopted in this research allows us to explore an aspect of depopulation that has received little attention in literature: the transformation of kinship structures and genetic diversity as a response to demographic shifts. The study ultimately offers a refined perspective on how rural communities adapted to profound demographic and economic changes over time. Future research could expand on these findings by incorporating genetic data from living descendants, providing a deeper understanding of the long-term biological consequences of historical marriage patterns. Additionally, comparative studies with other depopulated regions could further illuminate the specific mechanisms through which demographic transitions reshape kinship networks and genetic diversity.

Keywords:

Endogamy, Rural Spain, Nuptiality, Kinship, Continuity and Change

Thematic Area:

- Demography
- Migration and new residents

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