

University of Groningen

## Fertility trends and its determinants in Spain and Europe

Carioli, Alessandra

DOI:  
[10.33612/diss.237466569](https://doi.org/10.33612/diss.237466569)

**IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.**

*Document Version*  
Publisher's PDF, also known as Version of record

*Publication date:*  
2022

[Link to publication in University of Groningen/UMCG research database](#)

*Citation for published version (APA):*  
Carioli, A. (2022). *Fertility trends and its determinants in Spain and Europe*. University of Groningen.  
<https://doi.org/10.33612/diss.237466569>

### Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

### Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

# **CHAPTER 1**

## **Introduction**

## 1.1 European fertility diversity across space and time

European demography and fertility is a colorful mosaic that reflects a variety of cultures and institutions across different countries and regions (De Beer & van Wissen, 1999; Roussel, 1992). Indeed, there is considerable subnational variation in fertility levels, therefore the national average values often hide important local differences. Previous research has shown different factors to have an impact on the tempo and quantum of fertility, such as economic contraction (Matysiak, Sobotka

& Vignoli, 2020; Neels, Theunynck, & Wood, 2013; Sobotka, Skirbekk, & Philipov, 2011), with evidence that economic downturns not only translate into postponement of fertility but also there seem to be effects on its quantum in those regions worst affected by long term unemployment (Matysiak, Sobotka, & Vignoli, 2020). Social transformations also have accelerated fertility postponement such as women's access to university education (Lappegård & Rønsen, 2005; Ni Bhrolcháin & Beaujouan, 2012) and entry into the labor force (Adsera, 2011, Lappegård & Rønsen, 2005). In addition, societal transformations have progressively transformed not only women's paths to motherhood but also partnership formation shifted from the more traditional marriage to cohabitation (e.g., Beaujouan & Berghamer, 2019; Clarkberg, 2002; Clarkberg, Stoltzenberg & Waite, 1995; Martin-Garcia, 2008). Such changes have not spread homogeneously, but rather with a different pace and intensity across European countries and within each country. Indeed, while the analysis of childbearing patterns in Europe is important to understand what drives fertility apart across countries, a subnational approach can provide useful insights as to what factors influence fertility variation within countries and regions.

One common feature across European countries has been the steady decrease in fertility levels for the past four decades, which has reached under-replacement levels (below 2.1 children per woman) in the mid-1990s and never having jumped back to previous levels. Indeed, fertility rates have been low for long enough to alarm policy makers and fear a future of shrinking population numbers (Skakkebaek, et al. 2020). The average total fertility rate for European countries (EU27) was 1.55 with an average of 1.3 for Southern European countries in 2018 (source: EUROSTAT). A spatial approach can highlight regions that are leaders or laggards in fertility change, as well as how such attributes have changed throughout time.

Understanding the factors contributing to these changes in fertility is essential for researchers as well as for policy-makers seeking to appropriately address fertility decline. Analysing fertility trends at the European level can shed light on greater national

divergence and reflect how various economic and social regimes influence childbearing, a regional approach is also required to understand finer scale differences that are lost at national level.

In this context, Spain provides an ideal setting to study subnational fertility trends for various reasons. Its long history of regional identities (Leasure, 1963) has often translated into distinct demographic trends (Livi Bacci 1968a and 1968b). Spain has also witnessed rapid socio-economic transformations since the fall of the Francoist regime in 1975. For instance, women's access to university education (Martin-Garcia, 2008) and to the labor market shifted mean age at childbearing to later ages, couples childbearing was no longer confined within marriage and cohabitation became common practice among younger generations (Baizan, Aassve, Billari, 2003). The surge of immigration during the early 2000s transformed society and shifted Spain from an emigration into an immigration country, simultaneously with its economic expansion. Last but not least, Spain's rich datasets and their availability at fine area detail make it possible to apply spatial econometric models to study fertility evolution over the past forty years.

Most of the research corpus on Spanish fertility has investigated fertility determinants through national datasets (e.g., Fernandez-Cordon, 1986; Adsera, 2006), or they focused on regional and provincial fertility (e.g. Gil-Alonso et al. 2014; Gil-Alonso et al. 2017). There are few studies investigating temporal trends in fertility from a subnational perspective (Arpino, and Tavares, 2013; GilAlonso, 2000; Leasure, 1963, Livi Bacci 1968a and 1968b) and almost exclusively employ bigger areas of agglomerations such as regions or provinces. Furthermore, most research on subnational trends employs heuristic approaches that can fail to identify statistically significant trends of high or low fertility as well to properly address autocorrelation bias arising from spatial data. On the contrary, the spatial econometric techniques together with the detailed geographical information at municipal level employed by this thesis are able to detect significant underlying spatial structures, trends and processes that shape the fertility landscape of Spain during the past forty years. This approach has the benefit to detail which factors shaped fertility in each decade and which were the most important across the whole time frame that was considered.

In this thesis a number of key issues of European fertility patterns and trends are studied, with a particular attention to their variation across space and over time. Indeed, fertility differentials exist both over time and space at the national level across Europe, but also at the smaller regional and local geographical scale. At the national level of European countries, the thesis has a focus on a number of typically European fertility characteristics: below replacement fertility, postponement and the special cohabitation structure that has spread since the 1970s and 1980s. At the regional and municipal level we study changes

in fertility patterns in Spain as a case study of the regional variation that exists at the subnational level.

Desired family size has a direct influence on fertility behavior but suffers from the effect of factors negatively impacting the desired family size and disrupting fertility plans (Quesnel-Vallées & Morgan, 2003a; 2003b). Women's career aspirations have started to change and gender gaps in education and access to the labour market have been closing-in in many European countries. These changes, together with an increasingly difficult reconciliation with childbearing, have led researchers to hypothesise that a decrease in desired family size might be behind some of the observed fertility decrease to below replacement levels in Europe (Goldstein, Lutz, & Testa, 2003). On the other hand in Eastern Europe the fall of the Communist regime has produced unprecedented socio-economic changes following the reality of a new and developing market economy (Philipov & Kohler, 2001). However, there is strong evidence for European countries that the two children ideal is far from gone (i.e., Hagewen & Morgan, 2005; Smallwood & Jefferies, 2003; Sobotka and Beaujouan, 2014; Van Peer, 2000), whereas the difficult access to childcare and increasing mean age at birth are the main factors contributing to low fertility (Sobotka & Beaujouan, 2014). Although desired family size is an important tool to understand the gap between intentions and realization of fertility, its measurement is often complicated due to the lack of appropriate questions in surveys, resulting in underestimation of the desired family size (Goldstein, Lutz, & Testa, 2003). Low levels of observed fertility are not indicative of individual preferences, as desired family size is higher than current total fertility rates and has kept virtually constant over time (Bracher & Santow, 1991; Hagewen & Morgan, 2005). Recent studies highlight substantial proportions of foregone fertility (Adsera, 2006) and a desired number of children usually higher than observed fertility (Van Peer, 2000). To explain this intention-behavior inconsistency, Chapter 4 applies Bongaarts (2001) model to disentangle the proportion of foregone fertility due to factors such as change in preferences, postponement, and union dissolution.

A large body of literature has analysed the impact of desired family size on the variation of fertility across various European countries. Union formation can have a profound effect on the desired number of children, as well as depending on whether the couple is cohabiting or married and on the gender of the respondent. Indeed, although marriage is a good predictor for childbearing intentions and family formation, cohabitation's role in fertility intentions is not as straightforward.

The aim of this PhD thesis is to obtain more insight into the geographical variation in fertility changes in Europe, and to identify the role of a number of major factors behind this geographical variation, both at the macro level for European countries, and at the

micro level for Spanish regions. More specifically, the sub-objectives of this research are:

- 1) describe the regional pattern of variation in fertility change in Spain over the last 40 years;
- 2) to assess the role socio-economic determinants in explaining the fertility changes in Spain over the past 40 years;
- 3) to explore desired family size ideals across European countries and identify the factors involved in unrealised fertility ideals;
- 4) to explore how childbearing intentions change with union formation for men and women and the difference that union type has on childbearing intentions.

This study is original both in terms of data used and in the methods implemented. First, the data employed in this thesis comes from both individual and aggregated data sources: census, register data, and surveys. Second, original statistical methods are employed and aim at improving current understanding of fertility trends. Third, this thesis provides both a country specific focus as well as a much broader European perspective including both Western and Eastern countries. The results of these studies are expected to provide a more complete understanding of recent fertility changes.

## 1.2 Data and methods

Different types of data and therefore of statistical methods are used within this PhD thesis. Indeed, being the data sources both of aggregated and individual data nature, the methodologies applied in this thesis take into account different strategies to explore fertility considering women's childbearing trajectories (Chapter 4 and 5) as well as their larger scale impact (Chapters 2, 3).

Chapters 2 and 3 employ spatial econometric techniques. Both chapters make use of Spanish data time series coming from the Padrón Continuo and census data. Data on births consist of numbers of births by mothers' age group (5 years age groups from 15 to 49) by single calendar-year starting from 1979 up to 2015 and by birth order (1 to 3+). Data on female population exposures consist of population numbers by five-years age groups and come from different sources: the 1981 and 1991 censuses, the 1986 "Padrón", and the annual "Padrón Continuo" database between 1998-2015 from the Spanish Statistical Institute (INE). The inter-censal estimates for women of childbearing age were obtained through a cohort interpolation method, which allowed to get mid-year population numbers by 5-year age groups. All data were aggregated into 910 spatial areas or comarcas, which are agglomerations of the 8,114 Spanish municipalities as defined in the 1991 census. Each comarca contains at least 20,000 inhabitants in order to ensure rate stability, unlike municipalities.

Chapter 2 investigates the change in subnational fertility trends throughout the last 40 years of available data. Chapter 3 employs a spatial panel approach, allowing to investigate fertility determinants, using explanatory variables that come from the last four Spanish censuses: 1981, 1991, 2001, and 2011. They comprise of various socio-economic indicators and migrant's presence: proportion of married population, proportion of births outside of wedlock, proportion of the population by educational level (primary and university) and sex, proportion of foreign women by area of provenance, economic activity and unemployment rates, employment by sector and type of contract and population density.

Chapter 4 uses the Family and Fertility Surveys (FFS) data and consists of women's partnership and fertility trajectories through a microsimulation model. FFS data were used to compute estimates of desired and observed fertility levels, as well as of a set of parameters that serve as input for a microsimulation model of fertility. The microsimulation was conducted on a balanced set of five Western and five Eastern European countries. Data requirements dictated country selection, as we aimed to choose those with fertility rates close to estimates of the Human Fertility Database Project (HFD), restricting the difference between survey TFR and HFD to fewer than 5% difference.

Chapter 5 uses the Impact of Social Capital and Coping Strategies on Reproductive and Marital Behavior survey carried out in Bulgaria, sponsored by the Max Planck Institute for Demographic Research in Rostock, Germany. The survey explored the impact of economic, cultural, social and institutional changes on fertility decisions that affected Bulgarian society during the transition to an open market economy. The method employed in the study is a propensity score matching technique to identify the causal impact of co-residential union formation on individuals' attitudes towards childbearing to allow for comparison between cross sectional datasets.

### **1.3. Approach**

This PhD thesis utilises different statistical approaches to disentangle various aspects of fertility research. The main aim of this research is to investigate fertility trends and the role played by socio-economic factors in shaping those trends in Spain and in Europe. By examining the impact of fertility variation across countries and over time, this PhD thesis has a high degree of relevance for family policies. On the other hand, by considering fertility variation within the same country and using spatial econometric techniques, this thesis wants to highlight how within-country variations are as important as cross-country differences. More specifically, this PhD research uses both aggregated- and individual-level data when studying childbearing trends, assesses the impact of various life-course

events on fertility, and tries to explain the causes of such changes. The fertility differences between European countries are studied from a temporal point of view, and their long term effects are taken into account by evaluating forecasting methods. The fertility measures for Spain at sub-national level have been reconstructed obtaining a highly detailed forty-years long time series, with details for birth order and nationality of the mother as well as reconstructing intercensal population estimates. To obtain estimates of desired and observed fertility, this study evaluated and later employed new methods to compute unbiased measures. Thus, this PhD research carefully employs different methods for the estimation of fertility measures as well as econometric techniques to analyse the data. A number of advanced econometric techniques and statistical modelling techniques are used, including spatial panel analysis, microsimulation techniques, propensity score matching, and deterministic forecasting.

## 1.4 Outline of the thesis

This PhD thesis consists of six chapters. Chapter 1 introduces the reader to the key elements of this research, and to their importance based on the literature. The next four chapters present the results of the analyses conducted to explore the subobjectives of the PhD thesis as formulated above, in section 1.1. The focus of Chapter 2 is to describe sub-national trends of fertility in Spain, specifically to explore the spatial dimension of fertility (sub-objective 1). Chapter 3 presents a spatial regression model aimed at identifying the main determinants of fertility in Spain using sub-national data, and provides the results of an assessment of the impact of fertility determinants on overall fertility differences over time, and across municipalities in Spain (sub-objective 2). Chapter 4 and 5 analyse the individual dimension of fertility in 10 European countries and in Bulgaria, respectively. In Chapter 4, estimates of fertility loss due to involuntary factors are presented for 10 European countries (sub-objective 3). In Chapter 5, the impact of partnership formation on total fertility is examined for Bulgaria (sub-objective 4). Finally, Chapter 6 provides an overall discussion of the results. Chapter 6, provides a summary of the main results, a discussion of the methodological strengths and limitations of the approaches used, a discussion of the main results, and a summary of the implications of the results for further research.

## 1.5 References

1. Adsera, A. (2006). An Economic Analysis of the Gap Between Desired and Actual Fertility: The Case of Spain. *Review of Economics of the Household*, 4(1), 75–95.
2. Adsera, A. (2011). Where Are the Babies? Labor Market Conditions and Fertility in Europe. *European Journal of Population / Revue Européenne De Démographie*, 27(1), 1–32.
3. Arpino, B., & Tavares, L. P. (2013). Fertility and values in Italy and Spain: a look at regional differences within the European context. *Population Review*, 52(1), 62–86.
4. Baizán, P., Aassve, A., & Billari, F. C. (2003). Cohabitation, marriage, and first birth: The interrelationship of family formation events in Spain. *European Journal of Population/Revue Européenne de Démographie*, 19(2), 147–169.
5. Beaujouan, E., & Berghammer, C. (2019). The gap between lifetime fertility intentions and completed fertility in Europe and the United States: A cohort approach. *Population Research and Policy Review*, 38(4), 507–535.
6. Bracher, M., & Santow, G. (1991). Fertility desires and fertility outcomes. *Journal of the Australian Population Association*, 8(1), 33–49.
7. Eurostat. (2020). Data Explorer, Fertility Indicators: [https:// appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo\\_find&lang=en](https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=demo_find&lang=en) [7 December 2020 date last accessed].
8. Fernández Cordón, J. A. (1986). Análisis longitudinal de la fecundidad en España. Tendencias demográficas y planificación económica. Madrid: Ministerio de Economía y Hacienda, 49–75.
9. Gil-Alonso, F. G. (2000). El descenso de la fecundidad en el nordeste peninsular. *Documents d'Análisi Geogràfica*, 36, 111–132.
10. Gil-Alonso, F., Bayona, J., Pujadas, I., & López, C. (2014). Diferenciación espacial de la fecundidad en España: la creciente diversidad en el interior de las provincias. In Cairo, H. y Finkel, L.(coords.): *Actas del XI Congreso Español de Sociología «Crisis y cambio: propuestas desde la Sociología (Vol. 3, pp. 73–85).*
11. Gil-Alonso, F., Bayona, J., & Pujadas, I. (2016). From boom to crash: Spanish urban areas in a decade of change (2001–2011). *European Urban and Regional Studies*, 23(2), 198–216.
12. Gil-Alonso, F., Carrasco, J. B., Villanueva, C. L., & Rúbies, I. P. (2017). Diferencias geográficas de la fecundidad en España: una perspectiva provincial. *Papeles de Geografía*, (63), 21–38.
13. Goldstein, J., Lutz, W., & Testa, M. R. (2003). The emergence of subreplacement family size ideals in Europe. *Population Research and Policy Review*, 22, 479–496 (Special Issue on Very Low Fertility).
14. Hagewen, K. J., & Morgan, S. P. (2005). Intended and Ideal Family Size in the United States, 1970–2002. *Population and Development Review*, 31(3), 507–527.
15. Human Fertility Collection. Max Planck Institute for Demographic Research (Germany) and Vienna Institute of Demography (Austria). Available at [www.fertilitydata.org](http://www.fertilitydata.org) (data downloaded on 10 January 2020).
16. Jenkins, S. P., & García-Serrano, C. (2004). The relationship between unemployment benefits and re-employment probabilities: evidence from Spain. *Oxford Bulletin of Economics and Statistics*, 66(2), 239–260.
17. Kohler, H. P., Billari, F. C., & Ortega, J. A. (2002). The emergence of lowest-low fertility in Europe during the 1990s. *Population and Development Review*, 28(4), 641–680.
18. Lappegård, T., & Rønsen, M. (2005). The multifaceted impact of education on entry into motherhood. *European Journal of Population/Revue Européenne de Démographie*, 21(1), 31–49.

19. Leasure, J. W. (1963). Factors involved in the decline of fertility in Spain 1900-1950. *Population Studies*, 16(3), 271-285.
20. Livi-Bacci, M. (1968a). Fertility and nuptiality changes in Spain from the late 18th to the early 20th Century: Part I. *Population Studies*, 22(1), 83- 102.
21. Livi-Bacci, M. (1968b). Fertility and nuptiality changes in Spain from the late 18th to the early 20th century: Part 2. *Population Studies*, 22(2): 211- 234.
22. Martín-García, T. (2008). A reassessment of the role of women's education in existing fertility research. *Genus*, 64(1/2), 131-157.
23. Matysiak, A., Sobotka, T., & Vignoli, D. (2020). The Great Recession and fertility in Europe: A sub-national analysis. *European Journal of Population*, 37(1), 1-36.
24. Neels, K., Theunynck, Z., & Wood, J. (2013). Economic recession and first births in Europe: recession-induced postponement and recuperation of fertility in 14 European countries between 1970 and 2005. *International Journal of public health*, 58(1), 43-55.
25. Ní Bhrolcháin, M., & Beaujouan, É. (2012). Fertility postponement is largely due to rising educational enrolment. *Population Studies*, 66(3), 311-327.
26. Quesnel-Vallée, A., & Morgan, S. P. (2003a). Do Women and Men Realize Their Fertility Intentions?. *Annual Meeting of the American Sociological Association* (pp. 16-19).
27. Quesnel-Vallée, A. & Morgan, S.P. (2003b). Missing the Target? Correspondence of Fertility Intentions and Behavior in the U.S.. *Population Research and Policy Review*, 22, 497-525 (2003).
28. Skakkebaek, N. E., Jørgensen, N., Andersson, A. M., Juul, A., Main, K. M., Kold Jensen, T., and Toppari, J. (2019). Populations, decreasing fertility, and reproductive health. *The Lancet*, 393(10180), 1500 - 1501.
29. Smallwood, S., & Jefferies, J. (2003). Family building intentions in England and Wales: trends, outcomes and interpretations. *Population Trends*, 112, 15-28.
30. Sobotka, T., & Beaujouan, É. (2014). Two Is best? The persistence of a two-child family ideal in Europe. *Population and Development Review*, 40(3), 391-419.
31. Sobotka, T., Skirbekk, V., & Philipov, D. (2011). Economic recession and fertility in the developed world. *Population and Development Review*, 37(2), 267-306.
32. Thomson, E. (1997). Couple childbearing desires, intentions, and births. *Demography*, 34(3), 343-354.

