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Fertility trends and its determinants in Spain and Europe

Carioli, Alessandra

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CHAPTER 6

Conclusions

6.1 Objectives

The aim of this PhD thesis is to investigate fertility trends in Spain and in Europe and explore fertility differences across countries. More specifically, the subobjectives of this research were: 1) to employ small aggregations of geographical areas to describe and analyse through a robust econometric method how fertility has changed within Spain across the past 40 years; 2) to assess and analyse the role of socio-economic determinants in fertility changes at subnational level 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; and 4) to explore how childbearing intentions change with union formation for men and for women and the difference that union type has on childbearing intentions. This PhD research is innovative because it investigates fertility using both survey and aggregated data, and employs a temporal approach. In this study, data from countries in Western and Eastern Europe were employed, and the subnational dimension was included to investigate past fertility trends over a longterm time frame. This PhD thesis employed a mix of methods to underline the complexities of a low fertility environment, the various angles that can contribute to understanding its dynamics. Demographic and socio-economic data were analysed using advanced demographic techniques and modelling.

6.2 Central findings

This thesis has explored various facets of low fertility in the European setting through the application of different econometric techniques.

Chapter 2 utilized various spatial descriptive and econometric techniques to delineate the changing geographies of fertility in Spain over the course of four decades, its spatial clusters, and the changing influence of various socio-economic factors. Spain is a country with outstanding diversity, with linguistic and cultural identities, which often translate demographically into heterogeneous fertility trends, substantially varying from region to region and province to province. Our main contribution has been in reopening the dialogue concerning smaller geographical scales for an extended time frame that covers the most recent decades. We have highlighted important divergences in childbearing trends across the country that could not be evinced from national, regional or even provincial data. Employing spatial analysis tools such as Moran's I, correlogram analysis, LISA maps, and spatial regression have proven the existence of positive and significant clustering of areas with similar values. Indeed, our main hypothesis that there is spatial autocorrelation in fertility behavior for all variables throughout the considered time frame is supported by the results, both at a global and local scale. Moran's I results for all the considered variables

indicate that spatial autocorrelation is present throughout the considered time frame and does not decrease over time, but rather fluctuates, seemingly decreasing during times of fertility decline, such as in the mid 1990s, and increasing at times of fertility expansion, as in the 2000s. This variation, however, does not see spatial autocorrelation disappear, but remains positive and high throughout the decades considered. This finding is of particular importance as between 1981 and 2011, the difference in childbearing indices among the various areas seems to decrease, hinting at a reduction of the spatial divergence and at a likely reduction in spatial autocorrelation as well due to convergence in trends. Even though graphic or cartographic representation of fertility trends may be helpful, the sole heuristic approach is not enough to identify and assess the non-randomness of fertility trends. Indeed, further analysis using spatial techniques proves the possibility of a decrease in spatial autocorrelation wrong, as spatial variation is present throughout the considered timeframe and does not decrease over time. The comparison between contiguity and distance-based weights matrices suggests that the choice of a specific neighborhood definition is not a trivial process. In this study, first rook contiguity proves to be the specification capturing the highest spatial autocorrelation, thus ignoring distances in a map where areas surface and distances between centroids can vary substantially. The employment of correlogram analysis also helps in providing a scale to spatial autocorrelation: highest at very small distances, positive and significant at large distances, thus spatial clustering of fertility can be expected to be a small area phenomenon (first order neighbors) with the ability to encompass large areas. Moreover, the application of correlogram analysis to single macro-regions highlights significant and positive spatial autocorrelation and autocorrelation patterns that persist in time (as for the regions Galicia and Catalonia). This finding is particularly important as it stresses the role of autonomous regions not only with own governments who are required to structure and deliver key services such as education, health and social services (Navarro and Velasco 2016), but also with a documented history of distinct childbearing patterns (Cabr , 1999; Cabr  Pla and Pujadas R bies 1989; Leasure, 1963; LiviBacci, 1968a, 1968b). The advantage of employing spatial analysis is not only to globally assess the presence of spatial autocorrelation, that is to say that similar values tend to cluster together, but also to identify such clusters. Indeed, LISA cluster analysis helps to depict the shift in the geographical distribution of fertility over the country. The last three decades have seen a profound transformation in fertility trends across the Iberian country with a sharp decrease in overall fertility and delay of childbearing, but with substantial differences in space that do not match provincial boundaries. Cluster analysis shows not only that spatial autocorrelation does not disappear, but also that over time clusters change. The classic North-South division ceases to exist leaving room for high fertility clusters located in big cities (Madrid, Barcelona, Bilbao, Murcia, Sevilla) and the North-West to emerge as the focal point for low fertility. Moreover, spatial regression is the appropriate method to explain changes in fertility as it provides results unbiased

by spatial correlation. It also gives insights on which factors had a substantial role in shaping fertility. Indeed, the biggest changes throughout time that impacted Spain can be identified in the variables considered in our model: family formation, labor market and migration. Marriage has become an indicator for family-oriented values (Adsera, 2006) and is the strongest predictor of higher fertility after African migrants' presence, as presented in the results section of Chapters 2 and 3. Persistent shocks to the economy still negatively impact fertility, although female participation to the labor force has shifted sign and has become a positive influence on overall fertility, signifying that areas with higher female activity rate also show higher fertility rates. The spatial approach stems from the idea that there is an underlying influence at work between neighboring areas, which causes nearby places to display similar values with respect to a certain phenomenon, in this case fertility behavior. The presence of spatial autocorrelation among observations in statistical studies is particularly important as the lack of independence between observations could potentially bias the results and therefore the whole study.

Chapter 3 explored the presence of spatial autocorrelation in childbearing behavior across 910 geographical units in Spain over a 40 years period (1981-2015). As I established in the previous Chapter, Spain is a country with heterogeneous fertility trends, substantially varying from region to region and province to province. Even though cartographic representation of fertility trends were helpful, the sole heuristic approach was not enough to identify and assess statistically significant trends to exclude non-randomness. Chapter 3's main contribution is to highlight how Spanish fertility has changed across decades, shifting long standing regional trends of fertility and first birth timing across the country. In this study, spatial econometrics is an ally for aggregated data analysis. Indeed, the lack of individual data that can be representative at a subnational scale should not be a deterrent to explore demographic phenomena. Employing a spatial panel approach enabled the identification of the main drivers of fertility and first birth timing over the considered time period without the bias arising from spatial autocorrelation. The spatial panel Durbin model evidenced that most of the influence defined by the covariates set worked at a local scale (direct effect) rather than through spillover effects (indirect effects), although they were both statistically significant, thus improving the robustness. Both models had a substantially lower spatial autocorrelation after controlling for the considered covariates, and the residual spatial bias was substantially lower for both models and negligible in the first model.

Chapter 4 sought to measure desired fertility and to investigate the factors explaining the gap between desired and observed fertility in 10 European countries. Rodriguez & Trussell's (1981) approach for computing desired fertility at the parity level was employed, a method which offered better estimates of Desired Family Size (DFS), with respect to the method

employed by the Family and Fertility Survey (FFS). This method gave higher estimates of DFS, which contradict warnings of decreasing ideal family size in some European countries (Goldstein, Lutz, & Testa, 2003). These results rather supported the two children family size ideals (Sobotka & Beaujouan, 2014) for all the considered countries, but with important variations between Western and Eastern European countries. Chapter 4 underlined the difference that Western and Eastern European countries retain with regards to unrealized fertility desires. Western European countries' involuntary factors were the main drivers of the gap, while in Eastern Europe competing preferences were more important. This difference was especially true when considering total fertility or the transition to first parity, possibly due to women's high age at first birth and to union dissolution, which could have played an important role in childlessness patterns in Western Europe as suggested by te Velde et al. (2012). Involuntary factors played little role for women who have at least one child, as the gap was much smaller and mainly explained by competing preferences. For Eastern European countries, Chapter 4 observed that competing preferences and changes in fertility desires just prior to a survey explained a greater part of the gap than involuntary factors. At the parity level, involuntary factors predominated in the explanation of the gap for childless women, while voluntary factors related to preferences described most of the gap for women with at least one child. Chapter 4, as also suggested by other studies (Philipov 2009; Lutz 2007), highlighted how the dynamics behind women's unrealized fertility desires could vary across parities and also across countries, which would be an important point to consider in order to formulate successful family policies. Indeed, women at first parity in all countries seemed to experience the adverse effect of competing preferences.

Chapter 5 studied childbearing attitudes before and after union formation among couples in Bulgaria. Results show that the effect of union formation is positive and significant on positive attitudes toward childbearing, but only for men (see Chapter 5, Table 5.4). However, the type of union formation and gender display different impacts not only between men and women, but also between cohabiting and married couples. In particular, men who enter a union not only increase the positive attitudes toward childbearing, but also decrease the negative ones, although this effect is statistically significant only if the union is a marriage. Chapter 5 also highlights some important gender differences. Gender distinctions in the estimates are not explained by an *ex ante* difference between men and women on family formation desires. Indeed, the attitude levels at the beginning of the time window are taken into account and are not different if we compare men and women. If women would be more family oriented than men independently of the relevant life course events, then data would show that men and women start with unequal levels of family orientation, but this is not the case. Several studies show that women continue to carry the primary burden of childcare (Bielby & Bielby, 1989; Biernat & Wortman, 1991; Hochschild,

1989). Loughran and Zissimopoulos (2009), for example, show that a first birth reduces female wages by 2–3 percent while male wages are unaffected by childbearing. Furthermore, others demonstrate how the work/family conflict is greater in working women than in men (Del Rey et al., 2021; Cleary & Mechanic, 1983; Duxbury & Higgins, 1994); this aspect is of particular interest in a post-communist country such as Bulgaria, where the gap between female and male workers is lower than in Western countries (European Commission, 2013). As mentioned in the theoretical section, marriage seems to exacerbate, in some cases, this reduction in female wages even before the birth of the first child. On the contrary, men seem to experience some benefits on wealth and health that also have an impact on attitudes toward childbearing. The results could be, then, explained by the fact that after marriage men may benefit more from the role division within the couple and are more confident to concentrate themselves in pursuing success in their career development, thus they feel more inclined toward having children and less worried about the costs of rearing them. These benefits do not involve women, when they start a new union, especially if they foresee their commitment in the early stages of the life of a baby, that is perceived as higher than what happens to men: this may justify why they do not change their attitudes toward children after marrying. Since cohabitation does not require the same level of commitment, it could be that men are less confident to invest in having a child. In addition, cohabitation can be regarded as a trial period anticipating marriage and children; this set of reasons may justify why we have not found the same effect among cohabitants. This result is also coherent with previous literature that describes how married people exhibit stronger attitudes towards childbearing. The given explanations are that, on one hand, marriage furnishes greater guarantees of parents' collaboration in future childbearing expenditures (Cherlin, 2004; England & Farkas, 1986). On the other hand, the literature has shown that married couples have better life conditions than cohabiting individuals, in terms of health, life expectancy (Lillard & Waite, 1995) and higher average wealth (Lupton & Smith, 2003; Manning & Brown, 2006). Therefore, even if marriage is progressively weakening its central role in Bulgaria, as confirmed by the prevalence of children born from cohabitating parents, it still holds a positive and fully significant effect in augmenting positive attitudes towards parenthood. In this Chapter, the first part of the analysis involved the effect of union formation on changes in attitudes towards childbearing. However, including individuals who experienced childbearing between the two surveys may spuriously and negatively influence the effect of union formation on attitudes towards parenthood: indeed, individuals who had a child exhibited a decline in positive attitudes towards parenthood immediately after childbirth. This could denote that the choice of having a second child differs substantially from having the first one. Bühler (2008) stated that a first child plays a key role in strengthening the feeling of closeness

between partners in Bulgaria. Once the couple have their first child, we observe less incentives in the decision of having a second child, especially in the short run. In addition, higher educated individuals, especially women, perceived increased opportunity costs of childbearing in terms of loss of working opportunities and the risk of worsening economic family conditions, which are a result of the low public support and the decline of the pronatalist policy in the country after the fall of the Iron Curtain. This is reflected in the strong preference for one child in Bulgaria (Billari et al., 2009; Koytcheva, 2006; Koytcheva & Philipov, 2008; Philipov & Kohler, 2001; Philipov et al., 2006). Chapter 5 devoted one part of the analysis to only those respondents without children. The results are in line with expectations enunciated above: marriage substantially increases positive attitudes and decreases the negative ones for men, while it has no impact on women's attitudes. When couples with children are removed from the analysis, cohabitation becomes significant. The reason for this result can be found in the discussed difference between cohabitation and marriage. Cohabitants are less likely than married couples to pool financial resources, to support the partner financially, to spend free time together and to agree with the future of the relationship (Waite, 1995). Hence, it is not surprising that this uncertain situation increases the belief that a child would give them certainty, security and closeness with the partner, and thus positive attitudes toward childbearing increase, for both men and women. Many analyses do not distinguish the effect of attitudes on behaviour from the effect of behaviour on attitude orientations due to a general presumption that causality runs mainly from attitudes to behaviour. Nevertheless, the theoretical literature notes that causality also runs in the reverse direction, proceeding from behaviour to attitudes (see a brief literature review in Axinn, Emens & Mitchell, 2008).

In sum, this PhD thesis presented how different socio-economic factors concur to shape low-fertility in various European countries. The results indicate that low fertility is very heterogeneous, and has distinctive features that vary not only across countries, but also within countries. In this context, Spain can help appreciate how sufficiently detailed data can provide insights on local variation of fertility indicators, as well as shape and direct fertility changes in a low-fertility regime.

Thus, this PhD research highlights the substantial variation in fertility in Spain, across European countries, between the sexes, and over time; the impact of involuntary factors and competing preferences on fertility ideals; and the impact of union formation on women and men's childbearing intentions.

6.2.1 Limitations of the studies

The present thesis conducted analysis following robust econometric techniques; however, each chapter presents limitations due to the nature of the data employed for the analysis.

Overall, spatial demography and its econometric methods can provide useful insights to understand and improve population modeling, however there are some limitations as underlined by Vitali et al. (2015). The data employed is aggregated rather than at individual level, so the model is not robust with regards to ecological fallacy and does not allow for exploring social networks of diffusion (Entwisle et al. 1997). In addition, spatial regression does suffer from the modifiable area unit problem, MAUP (Openshaw, 1984), and in this paper we chose to employ comarcas (similar to UK counties) as a way to overcome both the high variability accompanied by small municipalities, and the masking of local trends by large geographical areas (e.g. provinces). In the absence of geolocated and representative surveys at individual level and network data, aggregated data at a small and representative scale can shed light on the mechanism behind fertility behavior.

Chapter 4 contained some limitations related to the factors not included in the simulation, since enhancing factors played little role in fertility decisions in posttransitional societies. In addition, some aspects of the model should be further addressed in the future, such as the interactions between union formation and union dissolution, the effects union dissolution had on plans for having children, and the role of unwanted pregnancies, which could not be properly addressed because of its absence from the FFS survey.

The relevance of Chapter 5 is given by the in-depth analysis of the complex and under-investigated subject regarding the impact of union formation on changes in attitudes towards childbearing in Bulgaria. This relationship is potentially affected by endogeneity problems due to reverse causality and selection bias distorting the results. Nevertheless, given the presence of a unique longitudinal dataset and the combination of different statistical techniques, we overcome these issues and compute the unbiased magnitude of the causal effect of union formation on attitudes towards childbearing.

6.3 Methods for analysing fertility

The approaches applied in this PhD thesis were directed at exploring different facets of childbearing and provided new knowledge that is comparable across different European countries.

6.3.1. Aggregated data

Aggregated data have the advantage of being representative for portions of the population over time making it comparable across multiple time frames. In this thesis, aggregated data were used in the sub-national analysis of fertility patterns in Chapters 2 and 3. Census and Padrón Continuo data provide detailed information at low resolution (municipality) that was used to compute fertility measures and obtain socio-economic variables for a period of over 40 years. The municipality level was then re-aggregated into larger areas to ensure rate stability, reducing the number of areas from 8100 municipalities to 910 comarcas.

This PhD thesis implements a smaller geographical resolution employed to investigate subnational fertility in Spain, unlike in the rest of the literature, and made it possible to appreciate fertility trends that substantially differed from the regional and provincial values. The richness and length of the time series also allowed us to explore the evolution of childbearing across multiple decades. Thus, I was able to describe how childbearing patterns of (relative) low and high fertility variations over time adapt to economic downturns as well as to societal changes such as women's entrance into the labor force, women's higher educational attainments, and immigration flows (sub-objectives 1 and 2).

6.3.2. Survey data

Survey data were employed in Chapter 4 and 5 to investigate fertility decisions across multiple European countries. Survey data allowed for investigation of fertility choices and behaviours across a wide range of countries located both in Western and Eastern Europe. Indeed, I was able to explore in detail the factors involved in unrealised fertility ideals across countries (sub-objective 3).

This PhD thesis employed Rodriguez & Trussell's (1981) formula for desired family size to the Family and Fertility Survey. This method has the benefit of better estimating the DFS with respect to the method employed by other literature and provides higher estimates of DFS, contradicting recent warnings of decreasing ideal family size in some European countries (Goldstein, Lutz, & Testa, 2003).

The surveys *The Impact of Social Capital and Coping Strategies on Reproductive and Marital Behavior*, carried out in 2002 and 2005/06, allowed me to evaluate the consequences, either positive or negative, of having a child between the two surveys. Thanks to this unique longitudinal dataset and the combination of different statistical techniques, Chapter 5 presents the unbiased magnitude of the causal effect of union formation on attitudes towards childbearing, their impact on couples and the specific effect union formation has for men and women in the case of Bulgaria (sub-objective 4).

6.4 Policy recommendations

In the light of the findings presented in this thesis in Chapters 2 to 5, there are promising suggestions for strategies to improve family policies to better address low fertility in European countries and allow individuals to fulfill their fertility ideals. These findings can be crucial to policy makers, in particular for those countries, such as Spain and Bulgaria, with very low fertility and rapidly ageing society.

First, the findings explored in Chapter 2 show important divergences of fertility trends between regions within Spain. Fertility analysis at sub-national level has been shown to lead to robust results that can inform policies on the processes behind areas with diverging trends, and the factors that impact total fertility the most in each time period. Chapters 2 and 3 suggest that job stability is essential for fertility to increase whereas periods of economic insecurity can lead individuals to postpone childbearing until better times arise (Matysiak, Vignoli, & Alderotti, 2021). Indeed, periods of economic expansion coupled with higher employment rates lead to higher birth rates, even in a country with a very high mean age at first birth such as Spain. Cities are the areas where fertility is highest, a new development of the last two decades, whereas before higher fertility was characteristic of the South of the country. On the other hand, periods of economic recession can undo previous gains in total fertility. In this context it is crucial for policy makers to address youth unemployment, especially for women of reproductive age.

Second, another factor to consider when formulating effective family policies, and with a strong spatial dimension is women's difficult access to childcare, especially in a welfare system that does not reconcile full time employment and childrearing. This recommendation is in line with Chapter 3 findings, where Spanish women's participation into the labor force has an overall negative impact on total fertility, leading to speculation that a greater availability of childcare is a key point for successful family policies aimed at allowing couples to fulfill their childbearing preferences as well as avoid postponing family formation. This finding is also in line with Chapter 5 results; indeed, Bulgarians who had a child exhibited a decline in positive attitudes towards parenthood immediately after childbirth. Couples with higher education, especially women, perceived higher costs of childbearing in terms of loss of working opportunities and the risk of worsening economic family conditions, which are the result of low public support and the collapse of the pronatalist policy in Bulgaria after the fall of the Communist regime.

6.5 Recommendations for future research

This thesis has proved the value of analysing fertility trends by employing aggregated and individual data through robust econometric methods. The variety of approaches and datasets can bring added value to the understanding of childbearing differentials within and across countries. Chapters 4 and 5 have allowed for a deeper understanding of the factors involved in couples and individuals' fertility decision making and choices. However, the lack of data regarding unwanted pregnancies did not allow for a clearer quantification of its impact on the observed total fertility. The analysis in Chapter 4 was of a quantitative nature, which does not allow to explore more in detail the processes that lead women and couples to unfulfill their desired family size. Fertility research can greatly benefit from including more qualitative data to better understand and inform quantitative analyses on the causes behind foregone childbearing for men and women. Also, datasets should include same sex couples as well as single individuals to explore their fertility desires and impediments to achieving their ideal family size.

Chapters 2 and 3 employed individual data that has been aggregated to be representative at small geographical aggregations. The micro-data approach offered a great variety of explanatory variables, whereas the macro-data subnational approach allows to highlight areas with diverging trends. The subnational approach should be applied also to countries where understanding the factors at play in shaping fertility and childbearing have a serious impact on women's and children's wellbeing, especially where adolescent fertility is high and family planning or access to health care is not universally available and accessible (see Balk & Grace, 2019). The increased availability of geolocated survey data as well as subnational aggregated data is increasingly opening new chances for robust spatial techniques investigating the determinants of relevant demographic phenomena such as under five mortality and teenage fertility (for instance: Balk et al. 2004; Ouma et al. 2018). These observations are relevant also in light of the recent COVID-19 pandemic that has called for new ways to approach the study of hot spots diffusion (Cordes & Castro, 2020; Golinelli et al. 2021; Raymundo et al. 2021). Indeed, the study of disease spread is spatial in nature from its very start and including spatial variables (e.g. travel time) as well as demographic profiles (e.g. women's age and fertility) has proven to provide substantial insights not only in predicting contagion spread but also in moderating it (Gianquintieri, L. et al. 2020; Ruktanontchai et al., 2020; Wang, et al., 2021).

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