

CORVINUS UNIVERSITY OF BUDAPEST

INTERNATIONAL RELATIONS AND POLITICAL SCIENCE

URBAN AND ENVIRONMENTAL POLICY STUDIES

REGIONAL AND SOCIAL INEQUALITIES IN FERTILITY BEHAVIOR

—

ANALYSIS OF FERTILITY PROCESSES IN THE EUROPEAN UNION, 2010–2020

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THESIS BOOKLET

BUDAPEST, 2026

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1) Research history and justification of the topic

Changes in the size and composition of the population fundamentally affect the functioning of economic, social and political systems. While population growth continues to be the dominant process in developing countries, developed countries are faced with the problem of population ageing and population decline. These processes may, for example, threaten the balance of the labour market or the sustainability of pension systems, with negative consequences such as a decline in the global economic weight of the European Union.

The demographic crisis characterizing our continent is due to low fertility, i.e. a persistent decline in the willingness to have children. The fundamental reason for this is that due to low birth rates, fewer and fewer people are entering the economically active cohort. This reduces not only the absolute number of people aged 15–64, but also increases the ageing index, resulting in an overall disadvantageous age structure and age population pyramid. Although so-called replacement migration can be used as a symptomatic intervention (for the short-term replacement of shrinking active cohorts), this strategy can only temporarily outweigh the ageing of society (for example, WEBER [2015] or TSIMBOS [2008]).

Although the average number of children is influenced by many factors – economic situation, social environment, political measures – and the long-term trend in the second half of the 20th century indicates an unfavorable process, the change in the total fertility rate is by no means linear (e.g. LUCI-GREULICH and THÉVENON [2014]) and geographically differentiated (e.g. LESTHAEGHE and WILLEMS [1999]).

The aim of this doctoral research is to explore the spatial, temporal and social inequalities of fertility behavior in the European Union. The two main directions of this: on the one hand, the geographical localization of fertility problems, and, on the other hand, demonstrating how inappropriate family and population policies can exacerbate social and territorial polarization. The results of the research may contribute to the development of policy strategies that can mitigate the fertility crisis and help balance the age structure of the population.

The thesis endeavors to answer the following main research question: can a significant territorial and social rearrangement be observed in the spatial structure of the European Union between 2010 and 2020 based on the total fertility rate (TFR) and the average maternal age at childbirth? To answer it, I formulated nine research sub-questions presented in *Table 1*.

Can a significant territorial and social rearrangement be observed in the spatial structure of the European Union between 2010 and 2020 based on the total fertility rate (TFR) and the average maternal age at childbirth?	
Q1	What structural rearrangement can be observed in the spatial structure of total fertility rate?
Q2	How do age-specific rates in the seven five-year reproductive cohorts of women aged between 15–49 differ regionally and temporally?
Q3	What structural rearrangement can be observed in the spatial structure of average maternal ages at birth?
Q4	What is the relationship between the total fertility rate and changing trends in timing?
Q5	Does the dimension of polarization within society, i.e. extreme postponement processes and pregnancies timed to an exceptionally young age, appear in the spatial structure of the European Union?
Q6	Does parity matter in terms of exposure to polarization, and if so, at which parity of live births does society become most divided?
Q7	What factors explain the early parenthood and the resulting social division?
Q8	What factors explain the postponement or shortening of the active or actual reproductive life span, and the resulting social division?
Q9	What are the policy proposals that could help improve fertility indicators and reduce the two polarization phenomena?

Table 1: The main research question and the sub-questions of the dissertation

Based on the main and sub-questions of the thesis, I have also formulated a hypothesis, which consists of two parts. On the one hand, I assume that between 2010 and 2020, a significant rearrangement took place in the spatial structure of fertility in the European Union, especially in terms of the total fertility rate and the average age of mothers at childbearing. As for the second statement: the Hajnal line concept established by János Hajnal in 1965 is still valid, according to which societies in the western part of Europe time having-children in general, and the first child to a significantly later lifestage than in the eastern part of the continent.

It is certain that answering the outlined main research question, the nine research sub-questions, and the hypothesis, i.e. the examination of fertility attitudes, requires a complex, interdisciplinary approach. Therefore, the research builds not only on the knowledge of demography and social geography, but also uses the empirical results of sociology, psychology, family science, and medicine. In line with this, I examined the aspects of a balanced population structure, fertility indicators, the second demographic transition, the nexus of migration and fertility, the territoriality of childbearing behavior, the intertwining of policies affecting fertility,

and the social polarization effect of parenthood from multiple perspectives, with an interdisciplinary approach, and, incidentally, with a critical aim.

2) **Applied methods**

Methodologically, the research is entirely quantitative, relying on secondary statistical data sources (Eurostat, UN, Human Fertility Database, World Bank, Fertility Europe, national statistical offices); therefore, the explanation of the statistical results is based on thorough literature support. It is important to emphasize that the available data primarily focuses on women, therefore the role of men in childbearing is less evident in the analysis; this is also the methodological limitation of the dissertation, which sets the framework for interpreting the results. At the same time, it must be emphasized that the causes of the demographic crisis should not be sought exclusively in the individual decisions of women: the attitude and behavior of having children is also the competence of men and the couples, and – taken as a whole – is an issue to be interpreted on a social scale.

The primary geographical unit of the analysis is the NUTS 2 region level, which is a geographical scale suitable for revealing differences between Member States and any meso-level differences within countries (for example, the contrast between Northern and Southern Italy). However, for the analysis of social polarization, I used national (NUTS 0) level data due to the availability of parity data.

I chose the period 2010–2020 for a time frame. One of the main reasons for this is that this period falls between the 2008–2009 global economic crisis and the COVID–19 pandemic, thus providing a relatively stable, cyclical environment for examining fertility processes. (The birth data for 2020 were only slightly affected by the pandemic, mostly starting with November.)

The applied methodology combines several different analytical tools, which can be classified into four main groups. On the one hand, certain indicators are generally widespread in demographic research (e.g. total fertility rate, age-specific fertility rates, average maternal age at birth). On the other hand, I used tools that, although they also appear in the literature, are not considered widespread: this includes the method of modal curves. Thirdly, my aim was to demonstrate the possibility of adapting methods used by other disciplines, primarily regional science and economics. An example of this multidisciplinary approach is the use of the Hoover index. Fourthly, general, non-discipline-specific procedures such as the Pearson or Spearman correlation also appear.

Overall, the most important and prominent analytical tool of the dissertation is the method of modal curves. The essence of this is that it depicts the age of mothers and the number of births

for a given age on a distribution curve (*Figure 1*). A curve approaching a normal distribution indicates a harmonious pattern of childbearing, while the shouldering or bimodality of the curve suggests that some kind of negative or neutral division is emerging between the majority and the sub-societies. In addition, I identified another phenomenon, namely the over-peaking of modal curves. In this case, polarization manifests itself in the fact that many of the women who are directly affected by the problem of biological limitations have presumably reached this vulnerable life situation through a life course strongly determined by the socio-economic-cultural environment. Consequently, childless women who desire children may rightly feel excluded or deprived from the social group of women with children.

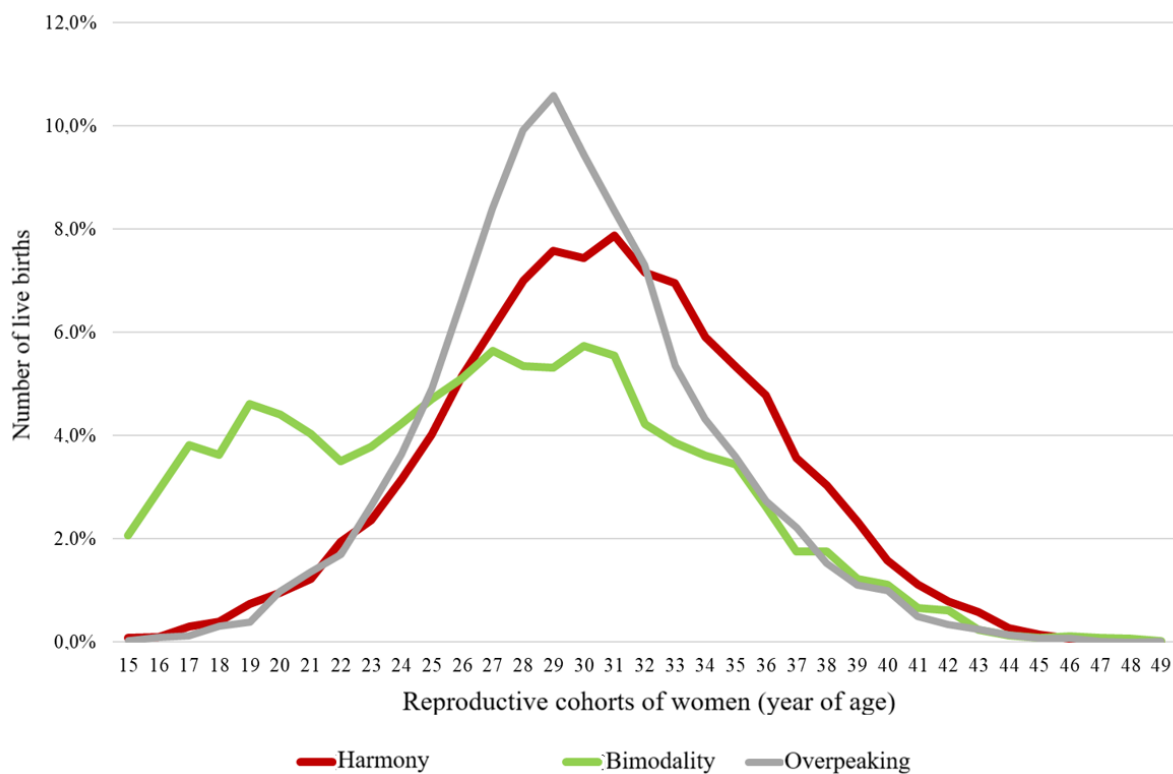


Figure 1: Example of the three main types of modal curves

3) Scientific results of the dissertation

Quantitative research on fertility works with a relatively constant set of variables (e.g. TFR) or approaches (e.g. the dimension of postponement). That is why, during the preparation of my dissertation, my main motivation was to come up with an approach that sheds new light on fertility processes. I also considered it important to focus on social polarization. The basis for this is that there are phenomena related to childbearing that, from the perspective of developed countries, we tend to associate with underdeveloped regions of the world. In addition, it was particularly important – among other things, due to the policy adaptation of scientific results – to clearly reveal the factors affecting the problems related to TFR and age-specific fertility rates. Furthermore, I considered it a scientific challenge to provide practical support for a concept (Hajnal line) that has been questioned and considered obsolete by many, which can be interpreted as an important milestone in the interweaving of demography and geography.

I summarize the new or novel results of the dissertation in the following four theses:

- Thesis I: in the field of methodology, beyond the adapted (for example, the Hoover index measuring the difference in the territorial distribution of two quantitative indices) and the less significant indicators developed by me (for example, the effect of first-born children on the average maternal age not weighted by parity), the clear innovation of the thesis is related to the classification of modal curves. It can be observed that in the available publications, without exception, the aforementioned distributions were used to support bimodality or shouldering (for example, BURKIMSHER [2017], KAPITÁNY [2019], LIMA et al. [2018] or SULLIVAN [2005]). This supported the fact that society may be divided through the dimension of fertility, which duality results either from the cultural trajectory consciously practiced by sub-societies or from the exclusion shown by the majority of society. At the same time, I noticed another extremity: there are curves where the distribution is over-peaked, i.e. the period of childbearing is shortened in individual life trajectories; this is based on a duality that can be traced back to the two reasons already mentioned in connection with bimodality (consciousness from the side of minorities, or exclusion from the side of the majority). Logically, in this case, it is not the method that is new, but I have supported another possibility of using modal curves, in connection with a critical phenomenon today, which is the dimension of relative or absolute childlessness. Another important and innovative addition is that the problem is not necessarily with postponement, but with the shortened reproductive life span; for there are processes that are

welcome, but on the contrary delay childbearing, and at the same time increase the risk of relative or absolute childlessness; such as the emancipation experienced in higher education. I would note here that as long as policy focuses on postponement, rather than on the shortened reproductive life span, there will be no progress in responding to the declining TFR, and in fact, recuperation – i.e. the “replacement” of births in later life – will also encounter serious obstacles.

- Thesis II: one of the main results of the dissertation is the demonstration that in addition to the shortened reproductive life span and childlessness, a significant problem in the European Union is the high rate of teenage pregnancies, which can be interpreted as a health, economic and social threat. Although, according to the literature (for example, SCHOUMAKER and SÁNCHEZ-PÁEZ [2022]), the global core area of teenage motherhood extends to Latin America and Sub-Saharan Africa, I have noticed that – at least on a European scale – a core area is also emerging in Eastern and Central Europe, encompassing Slovakia, Hungary, Romania and Bulgaria. Moreover, no progress has been made in the 11 years; and Hungary is a typical example within the core area: all four parities of the 11 years examined (children with the parity number 1, 2, 3, or 4 or higher) indicated extreme bimodality and a significant number of teenage pregnancies. Consequently, it is not enough to support, but it is also advisable to prevent childbearing in certain age groups (the TFR weight of relatively young mothers is negligible compared to the age group of 25–34, i.e. this policy step will not prevent the approach to the reproduction rate). Related to this – partly overlapping with thesis I – postponing childbearing in itself is not a problem. Consequently – I emphasize once again – if policy does not change this approach, social exclusion and the reproductive deprivation closely related to it will become even more severe.
- Thesis III: in the dissertation, I identified not only the fertility phenomena mentioned previously, but also their influencing factors, and at the same time developed a model explaining the two forms of polarization, which I supported with example countries, further calculations, and the results of the literature. These factors were already known separately in different contexts, but their model-like description adapted to European countries is not mentioned in the already published publications. Therefore, I came to the conclusion that the probability of bimodality is increased by nationality status (allochthon, autochthon, temporarily emigrated), adherence to tradition (religion, ethnic background, marriage), and pronatalist politics (middle-class focus, nationalist aspirations). The causes of the shortened reproductive life span may be biological constraints, assisted reproductive technology

(misunderstandings, developmental potential), and the limiting effect of the socio-economic-cultural environment (career and education, emotional maturity, consumer society). Overall, this scientific result provides an opportunity to conceptualize a subsequent empirical research that focuses on lower geographical levels (e.g. within a country or at the LAU scale) using qualitative analysis (e.g. focus group interviews). On the other hand, the eight factors highlighted in adolescent pregnancies and the six factors related to childlessness resulting from a short reproductive life span can be a reference point in the scientific preparation of policy decisions.

- Thesis IV: from a geographical point of view, it has been confirmed that the imprint of the Hajnal line concept published in 1965 still has its impact on European fertility processes. Not only the northwest-southeast contrast, but also the listed inclusions were identified using the method of modal curves (Ireland, Finland, etc.). However, there is a significant difference in the measurement tool and the explanation of the results: Hajnal examined the average maternal age at first childbearing, and further, he determined the timing of marriage within the individual life course, which is significantly determined by religiosity, as a direct factor affecting the differences. In contrast, in the dissertation, I classified the societies based on all four parities, and not by means of average ages, and by means of a visual analysis of modal curves (although the greatest sensitivity to polarization was shown by the first childbearing). Furthermore, as far as influencing factors are concerned, it has become clear that since the beginning of the second demographic transition, i.e. the 1960s, a large-scale social transformation has taken place in European societies, which has also caused turbulent changes in the latent motivations beyond fertility behavior. The influencing factor highlighted by Hajnal, namely the institution of marriage, has lost its significance in extreme timing processes – at least in general – despite the fact that this kind of traditional family model is still relevant in some countries and sub-societies.

4) Summary

Overall, the research results show that between 2010 and 2020, a significant rearrangement took place in the spatial structure of fertility in the European Union, which, however, did not occur as a uniform process. The change in the total fertility rate outlined regional differences, while the postponement of childbearing proved to be a trend affecting European societies as a whole. In parallel, the social and territorial polarization of the timing of childbearing persisted and in some respects strengthened. The results therefore also point out that European fertility processes cannot be described with a single indicator or as a uniform demographic crisis. The different fertility trajectories and different social problems of different regions require differentiated interpretation and regionally targeted policy responses. The most important overall conclusion of the dissertation is therefore that the issue of European fertility is simultaneously a demographic, social and territorial problem.

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