Doctoral School of
Economics, Business and Informatics

COLLECTION OF THESES

Áron István Drabancz

Population change in Hungary?

Analysis of fertility rates and factors determining fertility

for his Ph.D. thesis

Supervisor:

Éva Berde, CSc
Professor Emerita

Budapest, 2023

Institute of Economics

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Contents

1. Research history and justification of the topic

1.1. Research history

The interest in science was already an important part of my life during my primary and secondary school studies. My family motivation, as well as my personal interests, have led me to strengthen my commitment to scientific knowledge and research through various academic competitions. During my university years, the attitude of a researcher continued to strengthen in me, especially in the form of a commitment to writing studies. This was greatly facilitated by the welcoming and supportive atmosphere provided by Corvinus, which I experienced first as a university student and then as a demonstrator. I especially owe a lot to my specialist college, the Fiatal Autonóm Közgazdasági Társasága (FAKT), an organisation in which I and many open-minded students committed to scientific thinking supported each other in the early days of research. Thanks to this, I was able to write a total of 8 TDK studies during my undergraduate and master's studies, which paved the way for my later doctoral studies. At that time, my research interest was still relatively broad, as I wrote a TDK paper partly alone and partly together with others, on the main social and economic processes of the Gulf Cooperation Council countries, and some economic issues of the short-term housing rental market (Airbnb) or the EU quota system and about modern society's openness to the electric car industry.

During the scientific research work, I got to know my later doctoral supervisor, Dr. Éva Berde, with whom I primarily conducted research related to demographic issues. My undergraduate thesis reflected on the economic and social problems caused by China's one-child policy, while during my master's course I conducted research related to the first demographic dividend and aging in Hungary. In the first half of my doctoral studies, I continued to investigate research questions related to aging in Hungary, primarily within the framework of the EFOP research group coordinated by my supervisor. During the project, I primarily analyzed the labor market activity, needs and opportunities of older workers within the framework of a questionnaire survey. In the first half of my doctoral years, in parallel with the analysis of Hungarian aging processes, I also developed the need to examine Hungarian fertility issues, which eventually became the central analysis area of my doctoral dissertation. My supervisor and I wrote several joint papers on that issue, which greatly helped me in the preparation of my dissertation, for which I am extremely grateful to Eva. A detailed list of my publications related to my research can be found in chapter 5 of this thesis collection.

1.2. Justification of the research topic

A country's long-term economic prospects are strongly influenced by the size and composition of its population and how it is likely to change in the future. Today, many developed countries are also experiencing increasingly marked population decline. The underlying cause is clear: fertility in developed countries has fallen well below replacement level, and the resulting population decline has not been fully offset by increases in life expectancy or immigration in most countries. The declining population has significantly reduced labour-intensive growth opportunities, and the challenges of an ageing society have become more pronounced. At the same time, governments are trying to halt the decline in fertility through an increasingly extensive system of incentives, slowing down the economic challenges resulting from the transformation of the population structure.

In Hungary this problem has become a particularly important economic, political and social issue in the last decade. On the one hand, according to the forecasts of international organisations, our wider region, Eastern Europe, will decrease the fastest in the world, and within this region the Hungarian population could fall by around 2 million in the next 50 years. On the other hand, family support and immigration-related issues are also at the heart of the current Hungarian government's activities and communication with society. The strategic goal set for the government is to reverse population decline, primarily by promoting childbearing, but also by using other social policy instruments (housing subsidies, social assistance). Furthermore, the declining and ageing Hungarian population has a number of adverse economic consequences, partly due to the tight labour market, and the population decline has a significant impact on the long-term economic potential of Hungarian regions.

In my dissertation I analyse the chances of achieving a population turnaround in developed countries, focusing mainly on Hungary. The central question is how to get the population to grow again, or at least to maintain it. In my work, I describe the main economic and political dimensions of demographic processes (Chapter 1), and then review the main theories of population (Chapter 2). In the following chapters, I will discuss the characteristics of fertility rates needed to maintain the population (Chapter 3) and the historical trends in the total fertility rate and the factors affecting fertility (Chapter 4). My dissertation approaches the question from two main directions, but in each case it examines the possibility of a population turnaround based on the total fertility rate. In the first part of the analysis, I show the fertility level under different conditions at which the country's population would stabilise in the long run (Chapter 3). I point out that the fertility associated with a reproductive level of 2.1 may in some cases be

significantly lower than this value. In the second part of the thesis I will examine the factors behind the rise in the Hungarian total fertility rate in recent years, and where the value of the indicator may stabilise in the long term. My conclusion is that in order to achieve a population turnaround, fertility at the reproductive level adjusted for mortality and net migration must in any case decline (i.e. net migration must increase and/or Hungarian mortality rates must improve), while total fertility rates must continue to increase.

In my thesis, I basically formulate two main, complementary hypotheses:

I.) *Achieving the population turnaround in Hungary is only realistic if life expectancy growth exceeds the trend of previous years and the net migration balance not only remains positive but also increases significantly compared to recent years.*

II.) Without an increase in life expectancy and a positive migration balance, relying solely on fertility growth is not sufficient to reverse population dynamics given current trends.

2. The methodology used

My research includes theoretical-historical, descriptive-statistical and economic analyses based on economic models and approaches. The first and second main chapters of my dissertation are primarily a theoretical-historical overview and a literature review of the economic and socio-political aspects of the topic. In the first part, I will discuss the links between demographic processes and economic and political decisions, and the relationship between demography and sustainability. I will also point out what initiatives have been taken in the past to influence the intention to have children in developing and developed countries. In this chapter, I describe why influencing population numbers is often a priority policy goal, while institutional change is less important to political actors.

In the second main chapter, I review Malthus's population theory, optimal population theory and the theory of demographic transition. I also briefly discuss the new models (e.g. the new household economics or the theory of intergenerational wealth flows) used to analyse childbearing decisions in the second half of the 20th century. I point out that over time, in parallel with the empirical evidence, population theories of overpopulation have been increasingly pushed back and explanations of lower fertility have come to the fore.

In the third and fourth main chapters, I use a variety of economic tools and models to examine different aspects of demographic issues. The descriptive statistical analyses were often based on different international databases (e.g. UN and Eurostat population projections), while for supplementary analyses I use data from key economic and statistical organisations (World Bank, OECD, HCSO).

The analyzes of the third main chapter were carried out in Excel, using Excel Solver or Excel VBA. Here, under different forward-looking net migration and mortality conditions, I estimated where the total fertility rate would have to stabilize in the long term for a hypothetical country, or Hungary, in order for the population of the given country not to change.

The results of the model also pointed out how the country's population and population structure would develop under certain assumptions.

In the fourth main chapter, I used several methodological approaches. The main framework of the chapter was provided by a population forecast based on the cohort component method and various related scenarios, but from a theoretical approach, I also pointed out the factors influencing the optimal number of children in the framework of microeconomic models. During the population forecast, I started from the immediately preceding cohort-level population (2019), and with the help of the fertility of each scenario, I could give the number of children to be born in the following period. From the Eurostat (2019) population forecast data, I was able to estimate for each year at the cohort level how many times the population of a given cohort changes compared to the previous year: the population of the t-th cohort in the t-th year divided by the population of the (t-1)-th cohort in the (t-1)-th year gives this ratio. If there were no emigration and immigration from a given country at all, this ratio would correspond to a country's mortality table. Since Eurostat (2019) expects a significant positive migration balance towards Hungary, the value of the indicator for the younger cohorts usually exceeded 1. I have used the table to further calculate the number of children born in each scenario as they grow older and enter childbearing age, so the role of these age groups in the reproduction of the country's population will be enhanced. The gender breakdown of children to be born was the same in all scenarios, exactly the same as the male-female ratio predicted by Eurostat (2019) for newborns. Overall, therefore, the net migration in the model for cohort-non-cohort pairs is in line with the baseline projection of Eurostat (2019).

3. Scientific results of the thesis

The first and second main chapters of the dissertation are mainly a theoretical-historical overview and literature on the subject, providing the theoretical framework for the demographic analyses. In the first chapter, I briefly described the various economic (e.g. economic development, health planning) and socio-political (e.g. social cohesion, planning) implications of demographic processes. Furthermore, I will discuss the relationship between demography and sustainability, and describe the criteria of sustainability from a demographic and environmental perspective. In this chapter, I describe the antinatalist initiatives in developing

countries (e.g. China, India) in the 20th and 21st centuries aimed at influencing the intention to have children, while I present the pronatalist population policies of developed countries mainly from the perspective of the abortion issue. Finally, I discuss the ways in which public and private interests may conflict over childbearing decisions, and why influencing the population is often a priority policy goal, while institutional change is less so. In the second chapter, I review Malthus' population theory, the optimal population theory, the theory of demographic transition, and the new models (e.g. the new household economics or the theory of intergenerational wealth flows) that were used to analyse childbearing decisions in the second half of the 20th century.

In the third chapter I examine the potential for population maintenance in a low fertility environment in developed countries, including Hungary. First, the variability of the fertility rate associated with the level of reproduction and the substantive limit to its further reduction are discussed. This analysis builds heavily on the results of my previous articles (Drabancz, 2021a, 2021b). Here, using the UN cohort-level population projection, I point out that

1) Globally, both the fertility rate and its variance with respect to the level of reproduction have declined significantly in recent decades (see Table 1)
2) Furthermore, in developed countries and Hungary, there is no longer room for a substantial reduction in the fertility rate associated with the reproductive level, and this does not have a significant impact on the population conditions of these societies.

Table 1.: Change in the fertility rate associated with the reproduction level

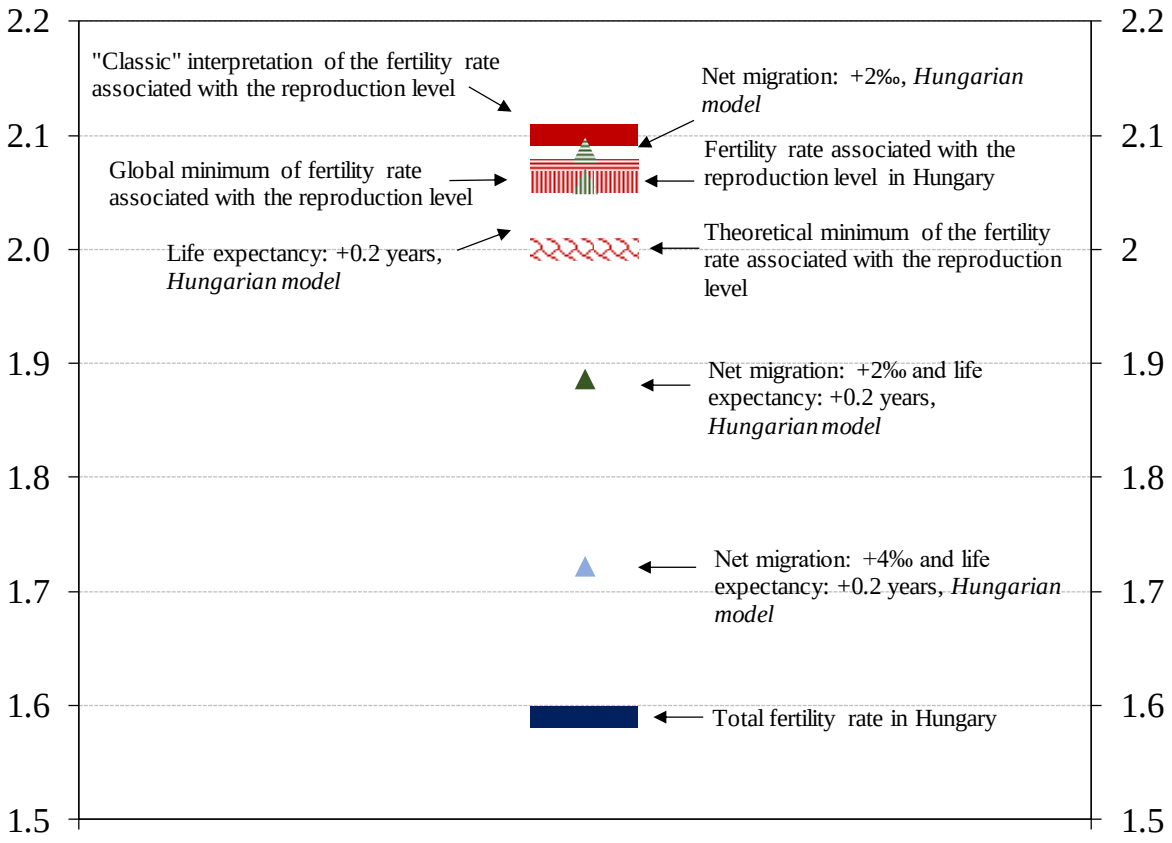
	1950	1980	2015	2040
Average*	2.99	2.38	2.19	2.14
Median	2.82	2.25	2.11	2.09
Minimum	2.12	2.08	2.06	2.05
Maximum	4.87	3.51	2.64	2.37
Lower quartile	2.43	2.13	2.08	2.07
Upper quartile	3.42	2.58	2.2	2.12
Dispersion	63.67%	35.29%	12%	5.8%

Note: * Weighted based on the share of each country's population in the global population. Source: Own calculation based on UN (2019) data, with data from 2015 and 2015–2020.

Then, in my own model framework, I investigate under different migration and mortality conditions what total fertility rate is needed in Hungary in the long run to keep the population

of the country constant. The model partially supplements domestic fertility research with new results from several aspects: on the one hand, it points out that, in addition to the fulfillment of the current migration and mortality trends, approximately what total fertility rate is required in order for the country's population to not change. Furthermore, I point out that a realistically achievable short-term fertility rate (1.8) is not sufficient to stop the decline of the Hungarian population, a positive migration balance and/or an increase in life expectancy is also needed (see Chart 1.). On the other hand, the overall results of the model show the channels through which changes in mortality rates and net migration affect the population size of a society in the long run.

Chart 1.: Different values of the fertility rate associated with the reproductive level, and the fertility rates and their boundary conditions needed to halt the population decline in Hungary in the long term



Note: Triangles show the results of the models with their associated annual migration and life expectancy change boundary conditions, while the rectangles indicate the different values of the fertility rate associated with the reproduction level, and the value of the total fertility rate in Hungary. Source: Own editing.

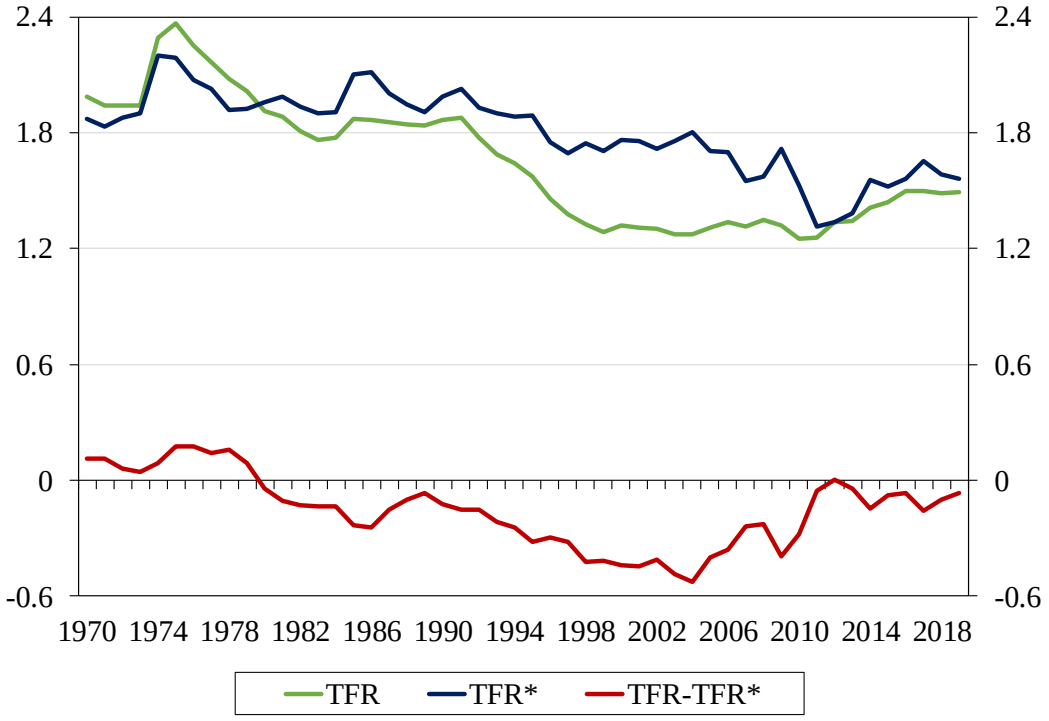
In the fourth chapter, focusing on the demographic situation in developed countries, I show the factors that have contributed to the fall in the total fertility rate below replacement level. This section builds heavily on our two earlier studies, co-written with Dr. Eva Berde (Berde –

Drabancz, 2022a; Drabancz – Berde, 2022b). In developed countries, the decline of religiosity and the former traditional social order, as well as the changing role of children in society, have also contributed to the decline in fertility. The analysis, through different approaches to Becker's (1960) economic model of childbearing, as well as through a classical microeconomic model framework, points to the limitations of economic policy attempts to reverse the declining propensity to have children in developed countries. This is supported by empirical evidence, as there is not a single developed country in the world where the declining trend in fertility has reversed sharply in the long term over the past half century, with total fertility rates returning to levels close to the classic reproductive fertility rate. Contrary to research at the beginning of the millennium (see e.g. Myrskylä et al., 2009), the increase in economic development and the reduction of gender inequality has not led to a significant "boom" in childbearing, with the one- and two-child family model becoming the dominant one in developed economies.

In the second half of the fourth chapter, I will review the transformation of Hungarian family support programmes in the decade 2010, and I will also conduct various population projections within the framework of a scenario analysis. These chapters also build to a large extent on our earlier publication with my supervisor (Berde - Drabancz, 2022b; Drabancz - Berde, 2022a). Hungarian family support has undergone a major restructuring over the past decade. After 2010, the support system was restructured, with the introduction of the family tax credit in 2011 and the introduction of the home purchase subsidy in 2012 as the most important elements (Lentner et al., 2017). As a result of the restructuring of the support structure, the focus has shifted towards employment and wage-related support, while the amount spent on unconditional transfers has decreased (Makay, 2018).

In Hungary, as in neighbouring countries, the total fertility rate has increased over the past decade. In Hungary, the indicator reached its absolute low in 2011 with 1.23. In the following years, it initially increased relatively rapidly, rising to 1.44 in 2014. Thereafter, a more moderate rise took place until 2019, when the indicator reached 1.55. However, when evaluating Hungarian trends, it is important to point out that the average maternal age in Hungary shifted largely in the early 2000s, which has greatly distorted the value of the total fertility rate, and the value of the correcting indicator is still lower than the value observed in the early 2000s (see Chart 2.), therefore, the long-term trend in Hungarian fertility rates remains on a downward trend.

Chart 2.: Development of total fertility rate, adjusted fertility rate and the difference between the two

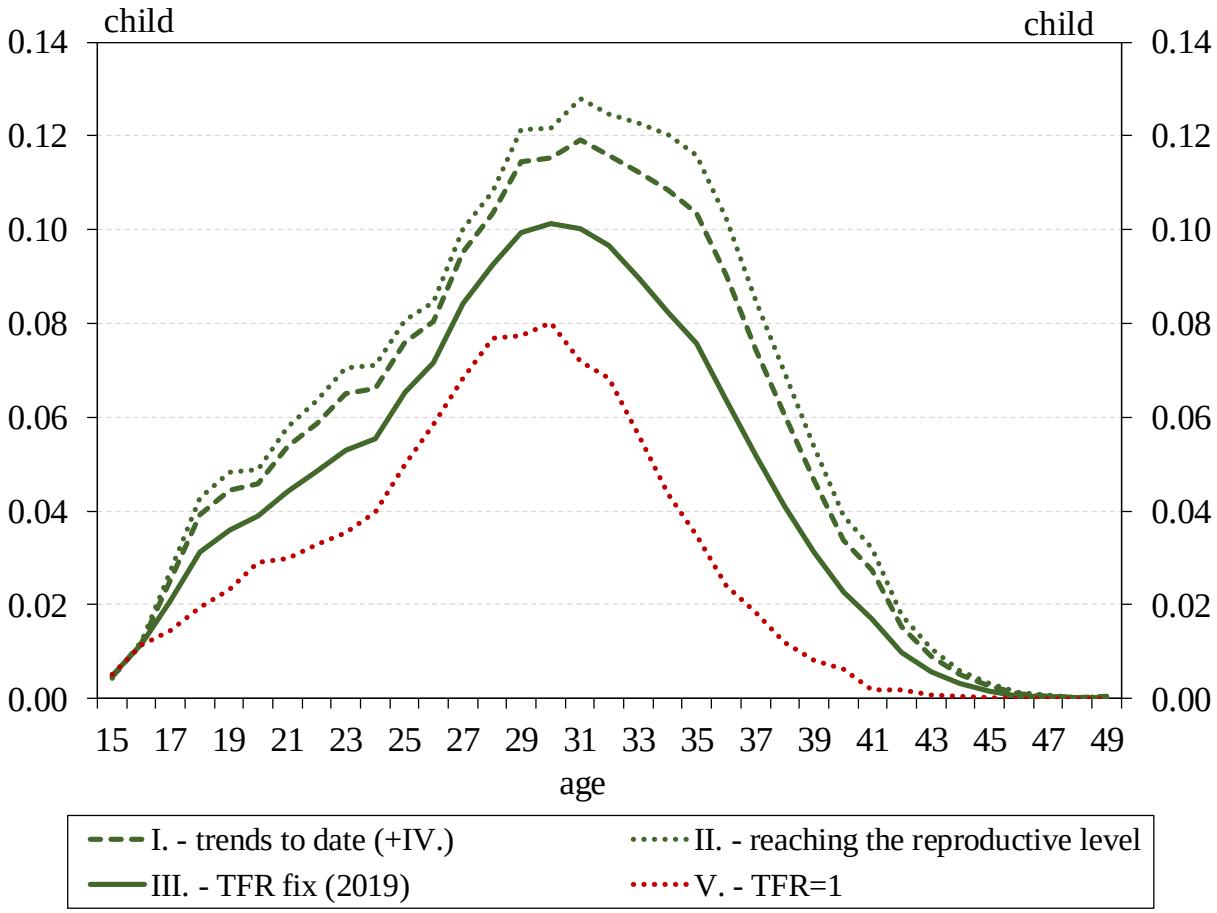


Note: TFR = total fertility rate; TFR* = tempo-adjusted, corrected total fertility rate. Source: Own editing based on HFD (2022).

Based on the Hungarian fertility trends, I have examined the future Hungarian population conditions under different scenarios (see Chart 3.:). In the first case, I have assumed that the fertility growth between 2010 and 2019 is maintained in the coming years, in which case the total fertility rate could exceed 1.9 in 2030. In the second case, I have assumed faster growth, and the government's fertility target (2.1) would be reached by 2030. And in the third scenario, I did not expect further fertility improvement and held the 2019 numbers constant. I consider the third scenario to be my baseline projection, which is the most consistent with international projection criteria. In addition, in a fourth scenario, I examine the extent to which the current decline in the number of women of childbearing age is affecting demographic trends. In this simulation, the total fertility rate in Hungary would remain unchanged for another 5 years, and then the fertility rate would increase in the same way as in the first scenario, up to 1.93. Thus, instead of 2030 in the original first scenario, Hungarian fertility would peak only in 2035, after which it would stabilise at that level. And in the last scenario, the fifth scenario, I foresee an extremely unfavourable scenario from a demographic point of view, with a gradual and rapid decline in the total fertility rate, leading to a fertility rate of 1 in 2030. We should note that there has not been a drastic turnaround in Hungarian fertility in recent decades, but looking ahead, the increase in the number of childless households and the spread of smaller family size may

put Hungarian fertility under pressure. In the event of a major crisis, we could even see a major drop in fertility as observed in 2008-2011, in which case a drastic fall in the fertility rate seems less unrealistic.

Chart 3.: The maximum average number of births per woman of reproductive age in Hungary in the five different scenarios



Source: Own editing based on Eurostat (2019).

The scenarios confirm the results of chapter 3. The first scenario, for example, shows that if the total fertility rate could gradually increase to 1.93 by 2030, the Hungarian population would virtually stop declining. By 2046, Hungary's population would decrease by only a few tens of thousands of people, and then increase by about 200,000 to reach 9.9 million in 2070. This is in line with the results of Chapter 3, i.e. a population turnaround is possible in Hungary even with a fertility rate below 2. Moreover, a common point in all scenarios is that even in the case of a positive demographic turnaround, it is not possible to slow down Hungary's ageing process in any meaningful way.

In my research, I accepted the hypotheses related to the population turnaround, as the analysis showed that fertility rates reaching reproductive levels are no longer typical of developed

countries, and that it is difficult to increase the long-term fertility rate. In Hungary, the positive trends of recent years are not sufficient to achieve a population turnaround, and the increase in fertility rates is partly due to specific effects. There is little prospect of a further significant increase in the total fertility rate, and in some respects stabilising the current relatively high fertility level would be a significant achievement. For this reason, current fertility trends are not sufficient to stabilise the Hungarian population, other factors are also needed. Of these, improving mortality rates and maintaining a positive net migration balance are of particular importance. Halting population decline would in any case require more significant shifts than in previous years (faster increases in life expectancy and a higher and sustained positive migration balance).

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5. List of own (or co-authored) publications related to the topic

5.1. My/Our main articles related to this topic

Berde, É., **Drabancz, Á.** (2022a): The propensity to have children in Hungary, with some examples from other European countries. Frontiers in Sociology 7:1009115. DOI: 10.3389/fsoc.2022.1009115

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Berde, É., **Drabancz, Á.** (2022b): Népesedési szcenáriók Magyarországon a családtámogatási program részeredményei és a globális termékenység változásának tükrében. Köz-gazdaság, 17(1), 259–275.

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5.2. Other, more important publications of mine/ours on other topics

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