

## Population decline: Towards a rational, scientific research agenda

Zuzanna Brzozowska<sup>1,2,\*</sup> , Ekaterina Zhelenkova<sup>3</sup>  and  
Stuart Gietel-Basten<sup>4,5</sup> 

### Abstract

While the global population continues to rise, many regions are experiencing population decline due to low fertility, outmigration or, most often, a combination of the two trends – and many more are forecast to do so in the future. Economic and demographic theories have so far been unable to offer an unambiguous prediction regarding the consequences of population decline. The 2023 volume of the Vienna Yearbook, “*The causes and consequences of depopulation*”, provides a wide variety of perspectives on population decline, illustrating that it is a highly multifaceted issue, and that there are no simple theoretical or empirical applications for understanding its causes and consequences, or the potential responses to it. The *Debate* contributions provide a broader view of and reflections on population decline, while also highlighting the benefits and opportunities associated with it, and ways to manage population changes globally. In contrast, the research articles tend to focus on the challenges of shrinking population that are experienced at a local level. This *Introduction* gives an overview of the contributions in this volume and the different perspectives they offer.

**Keywords:** population decline; depopulation; ageing; migration

---

<sup>1</sup> Austrian National Public Health Institute (GÖG), Vienna, Austria

<sup>2</sup> Vienna Institute of Demography (OeAW), Wittgenstein Centre for Demography and Global Human Capital (IIASA, OeAW, University of Vienna), Vienna, Austria

<sup>3</sup> University of Vienna, Wittgenstein Centre for Demography and Global Human Capital (IIASA, OeAW, University of Vienna), Vienna, Austria

<sup>4</sup> The Hong Kong University of Science and Technology, Kowloon, Hong Kong, China

<sup>5</sup> Khalifa University, Abu Dhabi, UAE

\*Correspondence to: Zuzanna Brzozowska, [zuzanna.brzozowska@goeg.at](mailto:zuzanna.brzozowska@goeg.at)

## 1 Introduction

The global population clock consistently shows that an ever-increasing number of people are living on the earth with each passing year. But beneath the frequent discussions about our planet's perceived "overpopulation" and the challenges that it poses in the form of environmental degradation and resource allocation problems lies the reality that many regions are experiencing population decline – and many more are forecast to do so in the future. While population decline has certainly occurred in the past, the current moment is likely the first time in human history that this trend is not being driven by violence, natural disasters or forced migration. Instead, in recent years, population decline has largely been the result of low and falling fertility levels as well as extensive, generally voluntary migration.

Much of the contemporary debate on population decline, however, is framed in rather stark, oversimplified terms. In much the same way as population growth was presented as a threat to human existence in the second half of the 20th century, population decline is often presented as an existential threat to populations, and even to "civilisations". Conversely, some observers have characterised population decline as an unmitigated good; i.e., as a panacea for the challenges associated with resource allocation constraints, climate change and inequality.

There have been extreme rhetorical expressions as well. According to the so-called "*great replacement*" theory, which has gained traction among the far-right, the relative decline of certain groups of the population is a tool to "defenestrate" white people while empowering a globalist elite. Some observers have expressed concern that such rhetoric could lead to conspiracies, violence and even mass shootings. At a more mundane level, populist-nationalist politicians are keen to stoke fears of a threat to "civilisation" posed by low fertility in their own countries coupled with the in-migration of "others". In this sense, population decline is presented as a threat to cultural and national ethnic identities (for more on this issue, see [Gietel-Basten](#), in this volume). Indeed, in such discussions, the switch from the macro to the micro level is seamless. The threat of "extinction" is a very real rhetorical tool used by politicians the world over – although especially by those in East Asia – as a crude way to encourage women to have more babies. For example, in Taiwan, single women are described as being a "threat to national security" – presumably because of their failure to contribute to national reproduction ([Gietel-Basten, 2019](#)). Again, this has clear echoes of the tendency to "blame" women in the Global South for "over-reproducing" and contributing to the "population bomb" of the 20th century.

When left unchecked, these nihilistic "demographic imaginaries" ([Armitage, 2021](#)) that regard population decline as an unmitigated threat to humanity – or, alternatively, the fantasies that population decline is an unambiguous good that will solve all of the world's problems – can be used (and abused) to misrepresent and obscure the real challenges that lie ahead of us (see also [Gietel-Basten's Debate](#) contribution in this volume). Of course, it goes without saying that economic and demographic theories still fall short of offering an unambiguous prediction regarding the consequences of population decline ([van Dalen and Henkens, 2011](#)).

As such, not only does our standing on the frontier of a new demographic paradigm represent an exciting time to consider the challenges and opportunities that might arise, there is also a strong need to reorient the “debate” on population decline towards a more rational, scientific perspective. This is not, of course, the first volume to attempt to systematically address this issue, as population decline has been a central focus of studies emanating from various disciplines over many years. Macroeconomists have pondered the implications of population decline for economic growth; regional and urban planners have considered its potential effects on how services are provided to human settlements; and rural sociologists have expressed concerns about whether communities in the countryside can adapt to having a sparser and older population (Bloom, 2020; Hollander et al., 2009; Johnson and Lichter, 2019). Worries about the effects of population decline on culture, language and intrinsic cultural heritage have been expressed by historians, linguists and anthropologists. Demographers have also considered the implications of population decline, and have debated the extent to which it should or should not be a cause for concern. Meanwhile, environmental researchers have tended to focus on the positive aspects of population decline, given that it *could* be associated with lower rates of natural resource consumption and greenhouse gas emissions (Casey and Galor, 2017; O’Neill et al., 2012).

Population decline is, therefore, a complex phenomenon, and it should be addressed in a holistic manner. However, the existing literature on this topic seems to demonstrate that economic and demographic theories fall short of offering an unambiguous prediction of the consequences of population decline. To explore this question further, “*The causes and consequences of depopulation*” was chosen as the theme of the 2023 volume of the Vienna Yearbook of Population Research. From the outset, the editors of this special issue emphasised that the authors should approach population decline not just in the context of demography, but in an interdisciplinary manner. We are, therefore, delighted to report that the papers in this volume cover a wide variety of perspectives: demographic, economic, environmental, urban/regional planning, sociological, historical and linguistic. The issue is also global in scope, but is sensitive to the different issues and challenges that arise at various spatial levels, including the regional, district, and even town and village level.

This volume features 18 articles that present research on population decline in a range of article categories: in addition to *Research Articles*, shorter and empirically focused *Data & Trends* and more broadly focused *Perspectives* and *Review Article* are represented in the journal. Seven invited *Debate* contributions discuss the topic of population decline from many different angles, including by exploring the fears and hopes associated with population decline, its drivers and consequences, and the possible adjustments to it – while often suggesting that worries about the consequences of depopulation might be overblown.

## 2 The global perspective

The principal criticism advanced by environmentalists with regard to population growth hinges on the over-exploitation and misuse of environmental resources, thereby creating a perception that population decline would be an apt solution to counter environmental degradation. A *Debate* article by [Rees](#) (in this volume), observes that the current size and growth rates of human civilisation are anomalies, and that the continued expansion of the population poses significant dangers to the integrity of the ecosphere, and to its life support functions that are critical to human survival. He proposes looking at the ecological overshoot as “a meta-problem that is the cause of most symptoms of eco-crisis, including climate change, landscape degradation and biodiversity loss”, and that is directly driven by “excessive energy and material ‘throughput’ to serve the global economy” (p. 21). Consequently, among the major obstacles to sustainability are rising incomes and the consumption levels that accompany them. The author presents relevant eco-footprint data, from which he concludes that the maintenance of the ecosphere’s integrity calls for a contraction of the human population.

The *Debate* contribution by [Lutz](#) (in this volume), pointedly specifies how this contraction could be achieved: namely, by prioritising universal education, especially female education. The author contends that greater resilience and the capacity to mitigate and adapt to climate change will emerge as a result of a smaller desired family size, better family health and poverty reduction – all of which are likely occur with improvements in education. The *Debate* article by [Skirbekk](#) (in this volume), convincingly summarises the benefits of low fertility, arguing that a declining population would reduce the pressure on resources, and could enhance the quality of life for those who remain. He observes that environmental degradation, increased competition for resources, and declining quality of life are exacerbated by population growth. [Skirbekk](#) also points out that the spread of low fertility has been accompanied by economic success, allaying fears that low fertility would lead to economic decline and collapse. As low fertility is unlikely to be reversed, societies need to invest in human capital, reform their labour markets and family policies and pursue many other adaptations to a new world with fewer children.

These commentaries attempt to highlight the more optimistic and positive sides of population decline, emphasising the benefits and opportunities associated with this trend, and potential strategies for managing the changes in the global population. From a global perspective, population decline is, according to [Rees](#), [Lutz](#) and [Skirbekk](#), an advantageous phenomenon that will have predominantly positive effects, although the transition period could be rife with challenges. At the same time, however, the local perspective on population decline might be far less optimistic.

### 3 The regional perspective

In the necessary juxtaposition of “the global” and “the local”, population decline can be seen as a double-edged sword, as despite its positive impact when framed globally, its effects may be far less beneficial when viewed from the local level. Several contributions look at the wide range of challenges associated with shrinking population at the municipal or the national level. The *Data & Trends* article by [Gagauz et al.](#) (in this volume), maps the demographic trends and explores the socio-economic downsides of population decline in Moldova. Using a comprehensive set of data on migration, fertility and mortality indicators, as well as demographic projection, the authors describe the detrimental effects that the sharp decline in the population driven by outmigration (or “brain drain”) is having on the country’s prospects. They also discuss some ways to mitigate the negative consequences and to prevent further human capital losses.

The hard realities and bleak perspectives are also the focus of a qualitative study conducted in 2021 in eastern Ukraine by [Perelli-Harris and Hilevych](#) (in this volume). Since the 1990s, Ukraine has been experiencing a triple burden of population decline: low fertility, high mortality and substantial emigration. In their contribution, the authors report the findings from online focus groups carried out in the conflict zone before February 2022 on both the territory occupied by Russia since 2014 (Donetsk) and the Ukrainian side (Mariupol and Kharkiv, and rural areas). The residents of the shrinking villages and Donetsk, as well as of Mariupol and Kharkiv, both of which had grown rapidly since 2014 due to the large number of internally displaced people they received after the Russian annexation of Crimea, were asked about their perspectives on depopulation. While the study participants were mostly occupied by their day-to-day problems and worries, they were also well aware of the negative consequences of population decline, including rapid ageing and a shrinking labour force.

The *Debate* piece by [Loichinger and Spiess](#) (in this volume), documents how migration has helped countries such as Germany to counteract population decline at the national level. The authors discuss the challenges associated with the proportion of older people in the population increasing while the working-age population decreases, and stress the importance of addressing these challenges by promoting ongoing human capital development across the life course and across socio-economic and migrant groups. [Loichinger and Spiess](#) argue that investments in early education are particularly important, as they have positive effects on fertility, female employment and the integration of parents with a migration background.

Many of the individual country studies highlight a common challenge fuelled by the changes in fertility and migration. Population ageing has proven to be an unavoidable outcome that countries in the post-transitional stage have been trying to manage. However, these countries have so far had little success in doing so for various reasons, including unfavourable labour market conditions, conflicts, limited infrastructure and emigration. Using the example of Italy, a *Research Article* by [Reynaud and Miccoli](#) (in this volume), shows that demographic changes can lead to

a vicious circle in which population decline and population ageing feed on each other. The authors explain how negative growth rates relate to subsequent population ageing, and show that higher population growth was associated with slower population ageing in different time periods and in different geographic locations.

A *Research Article* by [Benassi et al.](#) (in this volume), also looks at population decline in Italian municipalities, pointing to notable differences in the trends in population change across the country. Their analysis reveals the imprints of various socio-economic and demographic dimensions, such as the presence of school facilities and the proximity to these facilities; the presence of students and foreigners; and female labour force participation. The authors' investigation of the diffusion process and the determinants of average annual population growth confirms the need for and the relevance and applicability of analyses of the spatial dimension and local heterogeneities. Evidence from local municipalities in Spain is presented in a *Research Article* by [Gil-Alonso et al.](#) (in this volume). In examining urban/rural population change, the authors underscore the importance of factoring in not just geographic location, but also municipal population size in the "post-crisis" period of 2014–2020 (i.e., after the latest Great Recession) and the COVID-19 pandemic, as well as international and internal migration flows. Moreover, they argue that leveraging political impulses, such as creating supplemental governmental bodies or implementing special policies aimed at closing the urban-rural divide and improving rural inhabitants' access to the welfare state, could help to improve the quality of life and opportunities of rural inhabitants, which might, in turn, help to counteract population decline.

Academic scholarship has provided strong support for the claim that policies are the driving force moderating population shrinkage and influencing population distribution. In addition to the policy approaches formulated on global and regional platforms, local policy and planning arrangements are likely to set the tone for the dynamics of shrinking societies, and should not be overlooked. This important point is elucidated in a *Review Article* by [Huntington](#) (in this volume), in which he presents observations about the residential segregation of different population groups and the spatial concentration of vulnerable groups in European cities, which have been caused by population decline in urban areas. [Huntington's](#) review posits that the governance of shrinkage may be more complicated than the governance of growth. He also argues that greater attention to the complex interdependencies of population change, residential mobility and urban inequalities could help to mitigate those urban inequalities, which might, in turn, lead to more spatially just cities and greater social cohesion in general. Moreover, he observes that the struggle to protect populations from the negative consequences of population decline calls for, and requires, the exercise of good governance. Whether a challenge is turned into an opportunity will largely depend on the seamlessness and foresight of future political decisions, which should be based on socially equitable planning agendas and approaches to tackling urban shrinkage and residential segregation.

## 4 The importance of political decisions

The importance of identifying the problem correctly when weighing political action is stressed by [Sigle](#) in her succinct *Debate* contribution (in this volume), in which she urges population experts to be aware of their (potential) role in shaping “the way that policymakers and citizens subsequently think and behave” (p. 17), and, consequently, to be very careful when interpreting demographic indicators, especially the unfavourable ones. [Sigle](#) contends that these indicators should be taken for what they actually are – a symptom of a problem to be targeted, and not a problem per se. Thus, she argues, population decline should never be fought by restricting emigration and reproductive rights. Instead, efforts should be made to identify and address the reasons why people emigrate and/or do not have (more) children. In line with these observations, [Vanhuyse](#) (in this volume) demonstrates that in the post-state-socialist countries of Europe, the steady decline in population has been largely the result of policies that focus on the needs and interests of the elderly (i.e., pensioners), while neglecting the needs of young people, including children and their parents.

In his *Debate* piece, [Vanhuyse](#) argues that in the early phases of the transition to a market economy, most governments in East Central Europe (ECE) tried to buy social peace and avoid mass-scale unemployment by creating retirement and disability pension schemes for people of working age. “This politically ‘pushed’, rather than demographically ‘pulled’, boom in pensioner numbers set in motion powerful new electoral dynamics [...] leading to the emergence of pensioners’ democracies or gerontocracies”. This happened at a time when the ECE societies were still demographically much younger than the already ageing societies in other parts of Europe. But instead of using that “demographic window of opportunity” to prepare for their inevitable demographic ageing, the ECE countries irreversibly entered the path of “pro-elderly policy bias”. This resulted in the “young exit” from ECE to the “old” European Union (EU) countries in the 2000s, after the EU enlargement. Now that the large-scale outmigration of people in their twenties and thirties coupled with three-decade-long (very) low fertility levels have evolved into a dynamic of rapid population shrinkage, the ECE countries are entering the process of demographic ageing unprepared, as they lag behind other European regions in terms of their investments in health, education and technology.

The implementation of an alternative policy approach with a pro-youth bias, as well as the difficulties associated with measuring its effectiveness, are described by [Schorn](#) (in this volume) in her article in the *Perspectives* section, in which she analyses four rural regions, two in Germany and two in Austria, that have been affected by the outmigration of mostly young and educated people. Over the last two decades, the four regions introduced a series of measures with the aim of reversing the negative net migration trend by encouraging young people to stay, to come back or to resettle from another region. As promoting youth-oriented regional development cannot be regarded as a single measure, but as a diverse approach in which different measures are integrated, the policies embraced not only improving and advertising local labour



market opportunities and strengthening local social ties, but also, depending on the region, investing in transport, culture and leisure activities and affordable housing, or intensifying participation in local policy-making. Following the implementation of these measures, net migration did indeed increase mostly due to growth in in-migration levels, while out-migration levels remained stable. However, as the net migration trends in the four analysed regions mimicked the general trends observed in rural areas of both Austria and Germany, they could not be unambiguously attributed to the effects of the policies. Thus, [Schorn](#) concludes, “more research is needed to evaluate the actual impact of youth-oriented measures”. As with any demographic evaluation, adequate indicators and “what-if” projection scenarios are needed.

## 5 To make the right decisions you need to know your (potential) options

A perfect example of such an indicator is provided by [Parr](#) (in this volume) in his *Research Article*, in which he calculates the net migration replacement level for each of the 20 analysed European countries, and finds that net migration above and below this level leads in the long run to a population increase and a population decline, respectively, assuming constant fertility and mortality. Thus, he shows that despite the negative natural increase in many countries, only some of them, mostly in post-state-socialist Europe, are expected to experience a population decline, while the rest are likely to either grow or maintain their current population size thanks to net migration above the net migration replacement level. [Parr's](#) method has the advantage of conveying “the implications of the net migration level for long-run population growth, (...) [without the] need to refer to (or to run) projections” (p. 204). In addition, the method can be used to simulate the net migration replacement level under different assumptions about fertility and mortality.

The “what-if” scenarios of migration are also the main focus of [Tonnesen and Syse's](#) analysis (in this volume). In their *Research Article*, the authors examine the potential consequences of hypothetical changes in the level of emigration – a perspective that is rarely taken in population projections of countries with positive net migration. In Norway, out-migration levels are far below in-migration levels, and have remained lower than those in other European countries in recent decades. However, the effects of the hypothetical halving of out-migration on ageing – measured as the old-age dependency ratio – and on population size are larger than might be expected. The authors compare the effects of changes in various demographic indicators, and find, for example, that reducing the emigration rate by 50% would slow down population ageing to the same, rather modest extent as raising fertility by 0.25 children per woman, but would lead to a larger increase in the population size than in fertility. While the performed computations are purely hypothetical, “a comparison of different scenarios can be useful for demographers



and policymakers, and can, more generally, inform the public debate on the relationship among emigration, population size and population ageing” (p. 226). The analysis corroborates the conclusion of past studies that there are no demographic “solutions” to ageing.

The most likely developments in migration trends rather than in different migration scenarios are the focus of the *Research Article* by [Vanella et al.](#) (in this volume). The authors offer a novel approach to the regional forecasting of both international and within-country migration flows by age group and gender. Their model “addresses a significant shortcoming in the regional migration projection literature by comparing the performance of different modelling approaches and suggesting a stochastic strategy, thereby stimulating the improvement of the projection approaches commonly used by both researchers and statistical offices” (p. 392). Compared to the official population projections until 2040 published by the German Statistical Office Destatis, the proposed model assumes a higher level of in-migration, but predicts a similar overall pattern of population development: namely, that the migration trends observed in Germany in recent decades will continue and persist, at least until 2040.

## 6 Conclusion

Earlier in this commentary, we observed that economic and demographic theories have so far been unable to offer an unambiguous prediction regarding the consequences of population decline. We have certainly not been able to produce such an integrated theory in this issue. However, it is perhaps better to have done nearly the opposite: i.e., to have shown that population decline is, indeed, a highly multifaceted issue, and that there is no simple theoretical or empirical application for understanding its causes and consequences, or the potential responses to it. Population decline is an increasingly prominent demographic trend that will require the attention of researchers and policymakers alike, and that will inevitably pose new challenges and present new opportunities. Which of these become more salient very much depends on how we respond to future scenarios today.

We should concede that at the end of this exercise, we probably have more questions than we do answers. Nonetheless, the process of further investigation enhances our understanding of this critically important issue. Rigorous investigation combined with a new set of demographic indicators, methodological approaches and policies will be needed to inform the efforts of countries to anticipate and respond to demographic change, and to build societies and economies that are resilient to, and that are capable of thriving amidst, the demographic changes that are unfolding.

The eagle-eyed reader might have observed that while the call for papers of this special issue used the word “depopulation” in the title, in this commentary, we have mainly used the terms “population decline” and “population shrinkage”. This is because in the process of exploring this issue more systematically, we came to believe that the latter terms are more scientifically appropriate (see the discussion in the *Debate* piece by [Gietel-Basten](#)). It is precisely through more investigation and

in-depth discussion that we can hone our understanding of population decline, and question our assumptions about it.

We are proud to be able to offer this set of papers to you, and hope that it will make an important contribution to our understanding of population decline, while also informing the (often fractious) debate on its consequences, and how best to respond to it.

## ORCID iDs

Zuzanna Brzozowska  <https://orcid.org/0000-0002-0235-991X>

Ekaterina Zhelenkova  <https://orcid.org/0009-0001-0943-8848>

Stuart Gietel-Basten  <https://orcid.org/0000-0002-5818-8283>

## References

- Armitage, A. (2021). *From Demographic Security to Demographic Resilience: Towards an Anthropology of Multilateral Policymaking in Eastern Europe*. PhD thesis, Graduate Institute of International and Development Studies.
- Bloom, D. (2020). Population 2020. *Finance & Development*. March 2020. <https://www.imf.org/en/Publications/fandd/issues/2020/03/changing-demographics-and-economic-growth-bloom>
- Casey, G. and Galor, O. (2017). Is faster economic growth compatible with reductions in carbon emissions? The role of diminished population growth. *Environmental Research Letters*, 12, Article 014003. <https://doi.org/10.1088/1748-9326/12/1/014003>
- Gietel-Basten, S. (2019). *The “Population Problem” in Pacific Asia*. Oxford University Press.
- Hollander, J. B., Pallagst, K., Schwarz, T., and Popper, F. J. (2009). Planning shrinking cities. *Progress in Planning*, 72(4), 223–232.
- Johnson, K. and Lichter, D. (2019). Rural depopulation: Growth and decline processes over the past century: Rural depopulation. *Rural Sociology*, 84(1), 3–27. <https://doi.org/10.1111/ruso.12266>
- O’Neill, B. C., Liddle, B., Jiang, L., Smith, K. R., Pachauri, S., Dalton, M., and Fuchs, R. (2012). Demographic change and carbon dioxide emissions. *The Lancet*, 380(9837), 157–164. [https://doi.org/10.1016/S0140-6736\(12\)60958-1](https://doi.org/10.1016/S0140-6736(12)60958-1)
- van Dalen, H. P., and Henkens, K. (2011). Who fears and who welcomes population decline? *Demographic Research*, 25, 437–464. <https://doi.org/10.4054/DemRes.2011.25.13>

**Open Access** This article is published under the terms of the Creative Commons Attribution 4.0 International License (<https://creativecommons.org/licenses/by/4.0/>) that allows the sharing, use and adaptation in any medium, provided that the user gives appropriate credit, provides a link to the license, and indicates if changes were made.