The population aspects of the COVID-19 pandemic in 20 papers: an introduction

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Abstract

The introduction to the 2022 Special Issue presents the 20 articles that discuss the demographic aspects and the consequences of the COVID-19 pandemic. It synthesises the main findings from the contributions, emphasising the demographic, social and economic characteristics that influenced the spread of infections and determined the number of deaths. We highlight the specific focus on measurement issues, often with a comparative framework across several countries, and at the regional level as well, both within and beyond Europe. We also summarise the impact of the measures imposed to contain the spread of the virus, such as lockdowns. Moreover, we explore the impact of the pandemic on the quality of relationships, the intention and the motivation to have children, and realised fertility. In addition, we present the authors' broader reflections on the risks faced by different communities of individuals, and the potential consequences for their life trajectories, including in relation to other current risks that overlap with the pandemic (recent armed conflicts), and for the achievability of the Sustainable Development Goals themselves.

Keywords: COVID-19; demographic impact; mortality, infections; fertility; economic impact; social impact

1 At the outbreak of the pandemic

In the first months of 2020, the world was hit by an epidemic emergency. The COVID-19 pandemic affected every aspect of our lives. The crisis also strongly

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impacted population trends, leading to upturns and fluctuations in deaths and mortality, short-term ups and downs in births and fertility, and a temporary freeze of migration due to government restrictions on mobility. Scientists, including demographers, sociologists, economists and medical scholars, soon started studying the impact of the pandemic shocks and the ensuing economic changes, as well as the effects of policy responses on population trends, producing a wide array of research (see Mayer, in this volume). The collection of the relevant data was accelerated, and new surveys were quickly designed to track life changes during the pandemic. New methods focused on estimating incomplete data, modelling and analysing the dynamics of the pandemic and its impact, and new approaches for designing appropriate policy responses, have evolved at breath-taking speed. With their strong background in data and methods, demographers and population researchers have made pivotal contributions to the rapid accumulation of knowledge on the coronavirus pandemic.

This volume of the Vienna Yearbook of Population Research, which is made up in part of presentations delivered at the Wittgenstein Centre Conference 2020,[1] is dedicated to the demographic aspects and the consequences of the COVID-19 pandemic, and showcases the breadth and the scope of the demographic research on this subject.

The Special Issue includes 20 contributions selected from more than 60 submissions. This is a remarkable number for a single issue of the VYPR, but it represents a tiny fraction of the research that has been published on this topic since the early months of 2020.[2]

We have organised the presentation of the contributions into four main directions. A large part of the issue is devoted to analysing the direct demographic impact of the crisis: i.e., describing the spread of the disease, estimating the number of infections, and analysing the COVID-19 mortality patterns and their impact on life expectancy. A second group of papers considers in more detail the indirect consequences of the pandemic, and the impact of the measures imposed to contain the spread of the virus, including prevention and mitigation policies, of which lockdowns (with varying degrees of strictness) were the most common component. A third group of papers looks at how the pandemic affected intentions and motivations to have children, and actual fertility. The volume also includes two contributions that reflect

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[1]   The Wittgenstein Centre Conference 2020 (see https://www.oeaw.ac.at/vid/events/calendar/conferences/demographic-aspects-of-the-covid-19-pandemic-and-its-consequences) was the first international scientific conference stretching over several days that was entirely dedicated to the demographic aspects of the COVID-19 pandemic. It was held exclusively online, and was attended by a total of 450 participants from 54 countries.

[2]   A quick search for the term "COVID-19 pandemic" on Google Scholar, limited to results published since 2020, yields a result of more than half a million entries (as of 23/09/2022). By comparison, a search using the term "depopulation", which has little overlap with research on the COVID-19 pandemic, yields a total of 50,000 hits over the last 20 years (16,000 of which are since 2020, indicating the increasing popularity of the topic that is the focus of the VYPR Special Issue for 2023).

more broadly on the risks that different communities of individuals faced during the pandemic, and the potential effects on their life courses; and that consider more generally the global impact of the pandemic on the Sustainable Development Goals agenda. We will start with the fourth group of papers.

2 Perspectives on the pandemic

Two compelling articles in the newly established *Perspectives* section open the Special Issue, offering a comprehensive overview of the pandemic's implications and consequences for the life course (by Mayer, in this volume), and for the Sustainable Development Goals (by MacKellar, in this volume).

As Mayer points out, the scientific field of demography, embedded in sociology, is well-positioned to study the consequences of the pandemic on the population. He opens the "toolbox of sociology" to unpack how social inequalities contributed to the spread of COVID-19 and its consequences, which in turn affected the life courses of populations, and may have fostered new inequalities over the longer term.

In his wide-ranging contribution, and with many interesting detours, MacKellar shows how the pandemic has affected the Sustainable Development Goals, and contrasts its impact with that of the on-going war on Ukraine by Russia – labelling them the "twin crises". He warns of a crisis in the global sustainable development project, also in relation to the current lack of adequate financial resources to effectively pursue its full scope. He calls for a shift in focus away from the micro narratives at the individual and the household level, and towards the larger question of "what demographic trends mean for global prosperity", while underlining the relevance of demography for dealing with the future global challenges.

3 This pandemic is about infections and deaths...

From a demographic perspective, one of the most obvious impacts of the pandemic is on mortality. To date, around 20 million people worldwide have died because of COVID-19.[3] As is the case for any infectious disease, the vulnerability of different populations to COVID-19 infection, morbidity and mortality was unequal,

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[3]   The officially reported number of COVID-19-related deaths globally was 6.5 million as of September 2022 (Source: Coronavirus (COVID-19) Deaths - Our World in Data, for details see Mathieu et al., 2020). However, this is an underestimation due to varying protocols and challenges in the attribution of the cause of death. Research based on excess death data suggests that the true global death toll from the pandemic is about 3–4 times higher: a Lancet study by Wang et al. (2022) estimated the total death toll at 18.2 million until 31 December 2021 (with a 95% uncertainty interval between 17.1 and 19.6 million), while a more recent estimate by The Economist (2022) puts the total death toll from the pandemic at 22.3 million as of 26 September 2022 (with a 95% uncertainty range between 16.1 and 26.7 million).

and depended largely on several factors. The demographic (Guilmoto, 2020), geographic (Goujon et al., 2021), socio-economic (Hawkins et al., 2020) and health (Guan et al., 2020) characteristics of populations were key components in their specific epidemiological risk levels, which were in turn influenced by their access to and the availability of medical resources. Several papers in this volume investigated how the virus affected the mortality trends of different regions of the world during different waves. It is clear from those papers that evidence of disruptions in mortality trends was found in all of the regions studied. In sum, the papers in the volume agree on the following points:

- COVID-19 outbreaks were correlated in time, in space and in intensity with excess deaths and mortality.
- Excess mortality was more concentrated among the elderly than among the younger population.
- Though the average age of the people who died from COVID-19 was high, the virus was severe enough to have caused a pronounced decline in life expectancy in the hardest hit regions.
- The decline in life expectancy was larger for men than for women.

The risk of dying from COVID-19 has been difficult to measure accurately because the ways that causes of deaths and cases of COVID-19 have been reported have varied over time and space. In this volume, this methodological issue is clearly highlighted by Vanella *et al.*, who found evidence of considerable variation in the COVID-19 case fatality risk over time and across countries, which the authors attributed to different sources of bias in the estimates, particularly from testing policies that targeted specific age groups, and thus overestimated the risk for other age groups. On the one hand, a lack of testing capacities might have resulted in some cases not being detected, which would have led to the underreporting of the number of deaths from the virus. On the other hand, depending on how the causes of deaths were registered, the much higher incidence of mortality for people with severe comorbidities might have resulted in the overestimation of the real impact of COVID-19 on the aggregate number of deaths over a given year.

For these reasons, most studies included in this volume looked at excess deaths, rather than at the number of registered COVID-19 deaths, to assess the impact of the pandemic on mortality trends. On this topic, Bauer *et al.* (in this volume) observed that in the Austrian provinces, there was a significant increase in the number of deaths in 2020 and 2021, and that excess mortality closely followed the waves of COVID-19 infections. Moreover, in the case of Austria, excess mortality matched the number of deaths caused by COVID-19.

Similarly, using all-cause daily death registrations data from the Italian Statistical Office, Ghislandi *et al.* (in this volume) were among the first researchers to measure the extent to which COVID-19 had affected life expectancy. They found that in the Italian provinces that were hit the hardest by the first wave in spring 2020, four-month life expectancy declined by 5.4 years to 8.1 years for men, and by 4.1 years to 5.8 years for women. These figures also reflected the differences between men

and women in the risk of dying from the virus. In their spatial analysis of COVID-19 mortality by age, Baptista *et al.* (in this volume) also observed that in all regions of Brazil, the risk of mortality from COVID-19 was higher for men than for women, particularly during the first wave.

Kolk *et al.* (in this volume) focused on excess deaths and trends in life expectancy for 2020 in Sweden, which attracted a lot of international attention due to its unique response to the pandemic, in particular its decision to impose fewer epidemiological control measures than other countries did. They estimated that life expectancy in Sweden fell back to 2017 levels for men and to 2018 levels for women, while in neighbouring Nordic countries, where the virus was spreading much less rapidly in 2020, there was no decline in life expectancy.

Rousson *et al.* (in this volume) further compared the loss of life expectancy during 2020 with that during the 1918 Spanish flu in six European countries (Switzerland, Spain, France, Italy, the Netherlands and Sweden). Although COVID-19 has significantly reduced life expectancy in all of these countries, its impact has been much less dramatic than the aftermath of the 1918 pandemic, mainly because the latter was much deadlier among the younger population, while COVID-19 affected the elderly population in particular.

4 . . . but there is more at stake than just mortality

While also dealing with COVID-19 infections and mortality, the focus of the articles summarised in this section is on the indirect consequences of the coronavirus and the effects of the prevention and mitigation policies that were put in place to control the pandemic. The paper by Sánchez-Romero (in this volume) used National Transfer Accounts (NTA) data to assess the economic impact of the pandemic across different cohorts and countries. The author found that given the transfers across generations, lifetime consumption declined more for the 0–24 age group than for the 65+ age group due to the reduction in private transfers from parents to children, but also argued that this negative impact could be reversed if governments fully compensate workers for their labour income losses.

While COVID-19 infections and deaths were clearly stratified by income level, Sánchez-Páez (in this volume) took a macro perspective and examined the possible link between the levels of income inequality in European countries and the impact of the virus in terms of infections and deaths. The evidence does not point to the existence of a strong association, which could be due to the relatively low levels of socioeconomic inequality in these countries prior to the pandemic. However, the author found a robust association between the proportion of the population working in essential activities – who often belonged to the lower-income group – and infections.

As the article by Bellani and Vignoli (in this volume), reminds us, the consequences of the pandemic were not only economic, as they also spread to the sphere of relationships. Unsurprisingly, in the countries examined (Italy, Spain and France) the relationship quality of couples decreased during the highly restrictive

lockdowns of the first pandemic wave. The authors presented evidence that the decline was mostly driven by emotional stressors triggered by an increased sense of loneliness and the inability of people to engage with their network, and was less related to paid work or organisational matters. They remarked on the absence of differentials within and across the three countries, noting that it might be attributable to the severity of the lockdown measures. These findings were partially confirmed by the study of psychological vulnerability (measured with self-reported stress, anxiety and depression scales) conducted by Xourafi *et al.* (in this volume) during the COVID-19 lockdown in Greece. However, their results were less homogenous across individuals, with women, young adults and the unemployed exhibiting higher levels of vulnerability during the lockdown.

Less intuitive are the results of the study on the link between crime prevalence before the pandemic and COVID-19-related mortality rates in the context of urban Mexico by Masferrer and Rodríguez Chávez (in this volume). They showed that the prevalence of homicides was negatively associated with mortality rates, while the prevalence of robberies was positively associated with mortality rates for both sexes. They end the article with a plea for more "research on the complex relationship between COVID-19 and its contextual determinants".

Two papers highlighted the role of living arrangements and mitigation policies in containing infections and deaths by COVID-19. Li *et al.* (in this volume) demonstrated how the policies that were put in place in Hong Kong were able to substantially limit the number of infections and fatalities between January 2020 and February 2021, despite the territory having several features that would be expected make mitigation efforts difficult, such as a relatively old age structure, a high population density, poor housing conditions and a large migrant population.

Living arrangements played an important role in the COVID-19 mortality of elderly people residing in care homes, who were more vulnerable to the virus, and experienced higher death rates during the first wave than older people living at home. Mun Sim Lai (in this volume) studied this issue in Belgium and England and Wales, and found that the two main determinants of the excess mortality among older people in care homes were their frailty and higher infection prevalence.

5 The uncertain effect of COVID-19 on childbearing

While the impact of the pandemic on mortality, health, migration and well-being was clearly pointing in one direction, there was initial speculation that its implications for family formation and childbearing could go either way. On the one hand, external shocks are often associated with a baby bust. On the other hand, the lockdowns and the enforced closeness might have encouraged couples to fulfil their fertility plans, or to develop new ones (Aassve et al., 2020). So far, there is no evidence of a significant and lasting reversal in the number of babies born during the pandemic. Instead, most countries experienced distinct fluctuations in birth trends

depending on the phase of the pandemic and on the context (Beaujouan, 2021; Sobotka et al., 2022). Among the papers in this issue that review the implications of the COVID-19 pandemic for fertility, the most common finding was that there is still uncertainty about the long-term effects of the pandemic on women's and men's reproductive experiences. The papers cover a broad spectrum of data, methods, topics and geographical areas. Using longitudinal and cross-sectional survey data as well as official register data, these studies explored short-term fertility motivations, fertility intentions, pregnancies and births, while focusing on different countries (Brazil, Italy, selected sub-Saharan African countries and the United States).

Regardless of the geographic context they were examining, all of the authors emphasised that it is difficult to draw a consistent picture of the impact of the pandemic on births (desired, expected or achieved). They noted that because the pandemic occurred in a context in which fertility rates were already trending downwards, determining what share of the most recent changes was attributable to the impact of the pandemic is difficult. However, they were able to establish that the prolonged proximity of partners enforced by the lockdowns did not result in a baby boom.

Based on the experiences of past crises, it is possible that there was a tendency during the pandemic to postpone births in response to the general sense of uncertainty, but that these postponed births might be "recovered" when the pandemic is over. All of these papers found that in the first year of the pandemic, when vaccinations were not yet broadly available, a tendency to postpone births to a later period was indeed prevalent. More surprising are the potential motivations behind this trend, which were explored in detail in the papers by Manning *et al.* for the US and by Guetto *et al.* for Italy, both in this volume. Analysing the reasons why people tended to avoid pregnancy (in the United States) or to revise their fertility intentions (in Italy) during the pandemic, the authors underlined that on their own, facing difficult economic conditions, experiencing or being afraid of experiencing health problems, or having labour market struggles due to the prolonged lockdowns could not explain people's decisions to have or to not have a (further) child. Instead, they found that people's perceptions of their relationship quality and their psychological well-being played a larger role in their fertility decisions. Thus, it appears that people's subjective perceptions, expectations, imaginaries and personal narratives of the future tend to influence their childbearing decisions in times of uncertainty.

Two further papers looked at how the pandemic affected pregnancies and births in sub-Saharan Africa and Brazil. Backhaus' article (in this volume) analysed longitudinal data on the pregnancy status of women of reproductive age in Burkina Faso, DR Congo, Kenya and Nigeria. Based on a comparison of data for 2019 and data collected at the turn of 2020/2021, he found no evidence of an increase in pregnancy rates, even though it had been anticipated that in low-income countries, limited access to modern contraception, combined with the persistence of early marriage and teenage pregnancy, and school closures, would lead to higher rates of unplanned pregnancies and births during the pandemic, particularly among the

youngest and the least educated women. Lima *et al.* (in this volume) analysed births in six Brazilian cities for which good quality data were available. They concluded that the decline in births that was occurring before the COVID-19 outbreak continued and accelerated during the pandemic in most, but not in all, of these cities.

In summary, determining the impact of the pandemic on the number of births will require longer observation periods. It appears that during the early stages of the pandemic, people exercised caution in their fertility behaviour, at least if they did not have a strong desire to have (another) child.

6 The contribution of social sciences

The pandemic has prompted social scientists to study the impact of the virus on society as part of a gigantic collaborative effort that began immediately after the outbreak. The initial activities focused on sharing medical data and research that helped to contain infections and minimise hospitalisations and deaths in China. By the time the virus reached Europe in early 2020, it had become clear that the older age structure of the European populations could explain, at least in part, why the pandemic had much more devastating effects on European countries than it did on countries in Africa and Asia with younger populations (Dowd et al., 2020). Since then, population scientists worldwide have been advocating for the collection of higher quality and more detailed data, having shown that demography could indeed play a crucial role in describing and explaining the consequences of the COVID-19 pandemic for the population. The contribution by Rosero-Bixby and Miller (in this volume), for example, provided a formal look at the reproduction number R used for monitoring the epidemiological situation of the pandemic, with the main goal being to open a "black box" that would enable researchers to understand it, and to estimate it, in demographic terms.

All of the contributions collected in this volume describe the overwhelming uncertainty that accompanied what rapidly became a worldwide crisis. Some of the papers highlight the importance of finding the necessary data, refining the measures and the indicators, and interpreting the causes and the consequences of the spread of the virus. The analyses carried out in Italy, Brazil and Sweden clearly show that, especially in a context of acute uncertainty, it is important to take into account that the virus may spread unevenly in different regions. Nevertheless, many countries have adopted containment measures and lockdowns at the national level that have had varying degrees of success in protecting individuals and the population as a whole (Talic et al., 2021; Wong et al., 2020). By now it seems apparent that there are no simple and straightforward solutions to a complex problem such as a global pandemic. The vaccination campaigns that were supposed to help people live with the virus by reducing its most severe outcomes have been met with scepticism and harsh criticism among some parts of the population (Sallam, 2021), and have failed to fully reach the Global South (Lawal et al., 2022). The long periods of restrictions

undoubtedly affected people's mental health and well-being in many ways. As well as causing incalculable losses of learning skills and knowledge for children and altering the pace of life for families, school closures also deprived children of the formative experiences associated with school life that are hard to make up (Engzell et al., 2021; Larsen et al., 2022; Pfefferbaum, 2021). Moreover, there is evidence of increasing inequalities in learning losses across different groups of students (Patrinos et al., 2022). Surprisingly, in most of the higher-income countries considered here, concerns about the economy and the loss of jobs and income seem to have played a smaller role in people's partnership and childbearing decisions than their subjective perceptions, feelings and expectations (Guetto *et al.*, Manning *et al.*, both in this volume). It is probably fair to say that the short-term and the long-term effects of the pandemic are not yet fully known, especially since its duration is still not foreseeable, and there is no end in sight. Moreover, other crises are overlapping with the pandemic, including the invasion of Ukraine by Russia and the accompanying displacement of millions of refugees, and climate change-induced disasters.

For all these reasons, we will welcome reflections and commentaries on the studies published in this volume in the online section "Letters and commentaries".

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