

field of monetary integration. By drawing on various perspectives in international political economy and on a wealth of empirical data, all the chapters unearth new causal relationships among the multiple policy aspects of Eurozone integration. As such, the book sends out the strong message that above and beyond the core of static tenets derived from the Maastricht criteria, Eurozone integration can only be understood from the contingent perspective of political actors.

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**Partha Dasgupta: *Time and the Generations: Population Ethics for a Diminishing Planet***

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This book is part of a series that builds on the work and spirit of the late economist Kenneth J. Arrow. It contains some of Arrow's thoughts on the central piece of this publication, Dasgupta's essay 'Birth and Death', along with a foreword by Robert Solow and contributions by Scott Barrett, Eric Maskin, and Joseph Stiglitz. These three commentaries are followed by Dasgupta's response to their concerns. The book ends with an essay co-authored with Aisha Dasgupta on socially embedded preferences and the environmental externalities of fertility choices. The book pre-

sents an excellent example of ambitious and interdisciplinarity-informed scholarship on what may be the most pressing issue of our time: the sustainability of human society in a diminishing ecosystem.

The book's main essay, 'Birth and Death', starts with a short introduction on the different rationales behind people's reproductive choices, ranging from children as vehicles for self-transcendence to children as a source of old-age insurance. The first chapter of the book provides a very broad overview of the economic demography of the rich and poor countries of the world – their differences in fertility, infant mortality, income, and population – and introduces the concepts of environmental externalities and intergenerational transfers. Reproductive choices and the way people use the environment can have consequences for the environment and other people – consequences that might as yet be unaccounted for. As Dasgupta takes on the role of a population axiologist, the key philosophical question is: 'How should one value possible populations so as to decide which would be best?' (p. 6). Chapter 2 presents the reader with the utilitarian foundations of Dasgupta's approach and outlines the path from Sidgwick's Classical Utilitarianism to his own Generation-Relative Utilitarianism (GRU). The third chapter contains further explanations of his take on the concepts of capital and well-being, and the fourth chapter contains the synopsis of the theoretical and empirical work Dasgupta presents in the remainder of the essay. In chapters 5 to 9, Dasgupta focuses on building evaluation models of population numbers. He argues that other approaches have so far ignored the important socio-ecological constraints that are becoming more dire and more apparent every year, and it becomes the main task of this volume to take them into account. This warrants a closer look.

Dasgupta starts with Total Utilitarianism (TU), where the Decision-Maker (DM)

is an entity separate from the future population. This view, as the author abundantly clarifies, disregards the fact that the current generation shapes the world and the future as they live in it, but it is nevertheless deemed useful to study the Genesis problem of creating the optimal amount of people in a timeless world. The optimum population is the one that makes the best possible trade-off between the size of a population and its average individual well-being. As a simplification, all people are considered equal and social well-being is distributed equally. Thus, social well-being is an aggregate of individual well-beings, which are a function of consumption. Simultaneously, (personal) consumption is total output divided by population size. Here lies one of the crucial points of the book: total output does not just depend on population size, it also depends on the value of the biosphere in its current condition. In this way, Dasgupta manages to incorporate the importance of sustainability into his model, unlike in mainstream economics, where it has been mostly ignored. Returning to the TU model, it is assumed that personal well-being increases with consumption, albeit at diminishing rates, just as the total output does with respect to both population size and the biosphere. It's worth noting that these assumptions imply that the optimal model of wealth distribution is the very one that we chose for simplicity, the egalitarian one. Assumptions about the shapes of the functions used in Dasgupta's theory allow him to seek a local optimum, which exists and is unique with minimal assumptions. This yields what the author calls the Sidgwick-Meade rule, which is at the very centre of TU, as it leads to an easy way to calculate the optimum population as soon as the specific functions are chosen to model the variables. This is exactly what Dasgupta does, opting for specific simple functions which are standard choices that get the point across without making the math overwhelming.

Following this capstone of TU, Dasgupta critiques it in a discussion of death and several variations of the Sleeping Beauty problem, which then prompt discussion of what he calls Generation-Relative Utilitarianism (GRU). In this scenario, intuitively, the DM is the current generation (or more precisely, a representative of that generation). An important notion here is the one of discounting future generations – whether and how much the well-being of potential future people is valued by the current DM. Dasgupta lays out an array of reasons – invoking the work of Tjalling Koopmans – that make discounting a desirable trait of the model. Notably, high future returns on current investments would lead to the current generation making sacrifices far and wide, because the well-being of a potentially extremely large amount of people in the future would outweigh any current benefit. The author, however, chooses to discount on the grounds of a risk of planetary extinction. This guarantees that the series of the values of well-being of each future generation will converge by considering expected well-being values instead. Mathematically, the well-being values are multiplied with the probability that the world will not face extinction before that generation comes to be. Dasgupta also then chooses to additionally discount for potential people and uses the parameter  $\mu$  to set the scale of the discounting.

To model generations, the author again chooses a representative model that can be used to examine complex issues despite its simplicity. In short, generation-0 chooses the size of the next generation. For the first period, they are the parents, and the following generation is the children. Only the parents contribute to total output, but the children also reap the benefits from it. In the next period, the children become the parents and are the ones who choose the size of the following generation, while the previous parents die. With this model, the

author obtains a counterpart to the Sidgwick-Meade rule under GRU. This is the theoretical culmination of the book. He then looks at the model's applications, examines the ways in which politics has largely neglected the importance of the biosphere and population numbers, and provides some statistics to help estimate the model parameters in order to yield tangible numbers. The optimal population suggested by the model varies strongly even with small changes of parameters, so the author clarifies that the estimates are only to be seen as a small illustrative exercise to add some meaning to the model, rather than as a guide. In the closing chapter, Dasgupta offers a beautiful view of the human attitude towards mortality. It is written from a place of deep love for humanity, and yet it remains in synergy with the analytical approach evident in most of the book. It is a display of empathy that makes the book all the more appealing.

In the main essay, and later in the response to the commentaries, Dasgupta rejects the idea of Average Utilitarianism (AU). The main difference between AU and Dasgupta's TU is that the former maximises average instead of accumulated utility. Dasgupta mainly rejects AU based on his assumption of a completely concave production function, as AU would then lead to the peculiar optimum of a population of zero. In his commentary on the main essay, Maskin questions Dasgupta's choice of production function and argues that it should instead be seen as convex at the beginning and concave when reaching resource constraints. Dasgupta accepts this criticism and argues that there is an additional reason to reject AU, even when it does not recommend a population of zero. He argues that it seems implausible that a DM would not add another person simply because that person would have a slightly smaller - but still positive - utility. It must be noted, however, that this argument only works in a situation where we do not assume equality between all members of the

population, which is assumed in some of Dasgupta's early models. What then happens when the DM follows this logic? Most populations that are bigger than the previous one would still not give the DM a reason to reject adding another person, at least as long as the utility of doing so remains positive. This would eventually lead to a very large population at a living standard just above zero utility. A situation that Parfit fittingly called 'the Repugnant Conclusion' (Parfit cited on p. 46). In fact, Dasgupta also objects to this version of utilitarianism. In a first step, he considers a version of TU that establishes a critical value, above zero utility, that acts as a minimum for average utility (Critical-Level Utilitarianism). The propensity of TU to recommend a large population with a low standard of living would then be bounded by this new minimum ensuring a higher average living standard. Dasgupta argues that this approach is flawed, as there would not be a good reason for parents not to have a child if their living standard were slightly below the critical value, as long as the child's utility is still positive. He further argues that his approach to utilitarianism is also more practical and acts as a 'normative theory for potential parents' (p. 210). It remains unclear, however, how families can use his abstract theories to inform their reproductive choices, considering the impossible task of collecting enough data to calculate their potential child's utility. This is especially questionable, as this would also require them to predict future socio-ecological developments.

Finally, approaches such as AU and TU have another impracticality according to Dasgupta: They are applied to Genesis problems, as mentioned above, and this means that decisions about consumption levels and population size will be made in a context in which the DM is removed from actually inhabiting the world she is making decisions about. In GRU the DM does not approach the problem from Genesis, but represents a generation that cur-

rently exists. This distinction is key, as by giving the DM this perspective Dasgupta endows her and her generation with agent-centred prerogatives. In this approach, it is possible to justify valuing the utility of others less than one's own. Dasgupta applies a lighter version of this principle to the generational DM, arguing that she would only discount the lives of potential people. This discounting is represented in his models with the parameter  $\mu$  and it acts as the main changeable next to the minimum subsistence level of consumption in Dasgupta's back-of-the-envelope calculations in chapter 11. It is this approach, next to including the limits of the biosphere into population axiology, that can be seen as the main added value in Dasgupta's theory.

In the foreword to the book, Solow raises concerns about  $\mu$  and muses about his devotion to his own children and grandchildren. In the exercises in chapter 11, Dasgupta chose to set the parameter at 0.01, 0.05, or 0.1. Solow questions whether the values have been set too low and is sceptical about their intuitiveness. In the response to the commentaries, Dasgupta admits that he derived those values in a backwards fashion from population numbers, and that they are indeed not, as Solow doubted, 'intuitively natural' (p. xxiv). However, there is something reasonable about such low numbers. We might believe that we would not discount the lives of our grandchildren and children, but there could be a great distance between how we think we would discount and how we would act in reality. Research by Frederick [2003] on time discounting and different elicitation contexts shows that there are many different answers to the question of how much we discount future lives. The rate of substitution for a life ranges from around 45 to below 1 over a time horizon of 100 years. Frederick argued that some of the higher rates of substitution could be drastically overvalued as a result of biases in the elicitation context, as intertemporal comparisons are not always presented in a

neutral context. The lowest rate of substitution is found in an elicitation context called *equity*. Respondents have the choice of saving 300 lives now or of saving 100 lives now, 100 lives in their children's generation, and 100 lives in the grandchildren's generation. What Frederick fails to mention in the discussion of the results, however, is that this is the only elicitation context in the experiment that elicits a family connection over time. These results appear to match with Solow's intuition that he obviously cares a lot for his own children and grandchildren. However, there are several problems with this intuition. First, would we still care as much about our grandchildren's potential children, who are more likely to be included in the group of potential lives that are being addressed by  $\mu$ ? Second, do we only *say* we care about our descendants, or do we actually *do* something about it? A lot of people argue that they care about their children and grandchildren, and yet continue to vote for parties with an insufficient or even devastating performance on fighting climate change and protecting the environment. This is, of course, not to say that this failure to care for our children's and grandchildren's future is out of malicious intent. Many factors play a role in determining this myopia and the complexity of the political system, the economy and, even more so, the biosphere could be sufficient enough cognitive hurdles for people to be unable to act on their preferences. In conclusion, even though Dasgupta did not choose the different parameter values for  $\mu$  as 'intuitively natural', there is also no apparent reason as to why they should not be as low as they are here.

The final point that we want to highlight is Dasgupta's position on how to solve the problem of sustainability. In the beginning of the essay he co-wrote with Aisha Dasgupta, he applies the  $I = PAT$  metaphor to outline the three main dimensions that determine our impact on the biosphere (p. 226). Population, affluence, and

technology, however, are not equally covered in his theory. GRU uses the first two as variables and keeps the third one constant. Technology, which also includes institutions, is kept constant perhaps in part because of how difficult it is to reduce it to a single number. Dasgupta deals with this exclusion in several ways. First, he argues that techno-optimistic ideas are unfounded and that we should not make the mistake of believing that we can innovate ourselves out of the climate crisis. At the same time, however, he emphasises the pressing need to move to less resource-intensive patterns of consumption, especially in high-income countries, if we want to have any shot at reaching a sustainable level of impact. This would also imply a change in *T*, in the way we use our resources. As consumption levels in his models are measured in monetary terms and are simply derived from total world GDP, it is hard to understand how we could incorporate *T* into his theory. We can here refer to a comparison made by the World Bank. According to their 2010 *World Development Report*, 'switching from SUVs to fuel-efficient passenger cars in the U.S. alone would nearly offset the emissions generated in providing electricity to 1.6 billion more people' [World Bank 2010: 3]. While this does not invoke technological innovation per se, it could be addressed with an 'innovation' in US emissions policy.

There are several ways in which we could interpret this development with the tools Dasgupta provides. First, a switch to smaller cars, at lower prices, would be read as a reduction in consumption levels, leading to a smaller impact on the environment, but possibly also to lower utility levels. Second, and this is where Dasgupta offers some theoretical innovation, this fall in consumption does not have to have a negative impact on people's utility. In the second essay of the book, the authors elaborate on the idea of socially embedded preferences and argue that understanding this mechanism can help in addressing the problems

at hand. If a high fertility rate is partly due to socially embedded preferences, reforms that address social values or encourage lower fertility could succeed without people acting against their actual preferences. Similarly, when the societal norm for the size of passenger cars changes, it might not be read as a reduction in utility to 'only' own a smaller car. Examples like this show that it is not straightforward which recommendations can be read from Dasgupta's work. Family planning policies are presented as a key pathway. However, the book remains vague on both consumption patterns and levels, as well as on technological and institutional innovations.

In conclusion, *Time and the Generations* represents an innovative and relevant contribution. The main added value surely lies in Dasgupta's Generation-Relative Utilitarianism and in his introducing the socio-ecological constraints of a diminishing planet into population axiology. Dasgupta's modelling of GRU is well-founded with argumentation from both a philosophical and a mathematical perspective, and the model manages to be both elegant and representative at the same time. And while the choices Dasgupta makes in the book are not always immune to criticism, the book has great value for its interdisciplinary approach and Dasgupta's diligent scientific work. This intersectionality makes it relevant for scientists and policy makers alike.

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