

More People and Yet Fewer States

We live in a dynamic world – in many respects it changes quicker than we tend to realize. It has become a fundamental sign of progress that we replace our computer, cell phone, or car every couple of years. In fact, failure to do so would either signify technological stagnation or demonstrate our own resistance toward (mostly technological) progress. However, while we are breathlessly trying to catch up with the latest smaller inventions emerging every year, we often neglect much slower, yet still massive changes of the systems that envelop us. These changes may be slower in pace, but they are no less significant.

Consider the remarkable trajectory of the world population that has been accelerating and slowing down in a way that almost resembles a roller coaster ride. Just think about today's centenarians – those fortunate enough to reach the grand milestone of 100 years. Most of them probably do not even realize that they have been alive during an utterly unique episode in human history: The world population more than quadrupled during their lifetimes. When they were born in 1925, the world population stood at a modest 2 billion people. Yet, as they reach the venerable age of 100 in 2025, they will find themselves amidst a staggering 8 billion individuals of the same human species.

This experience is strikingly different from that of centenarians born 100 years earlier. They saw only a 1.7-fold increase in the world population, rising from 1.1 billion people in 1825 to 1.9 billion in 1925. However, it is unlikely that the experience of today's centenarians would apply to anyone else in the future. World population more than quadrupled within a century only after 1916 to 1927. If the average millennial patterns continue to hold, those born in 2025 will likely see only a 1.4-folding from 8 to 11 billion when they are lucky to reach the age of 100. If population change can surge and collapse within the lifetime of a single human being, this raises the question of what comes next: Will population stabilize, edge up, or crash?

If we further expand the scope to, say, 5,000 years – a period that is still considered short by some historians – the human population has grown 600-fold, and it is still growing at a breakneck pace. Yet, this pace is rapidly slowing down. The scarcity of fundamental resources, such as water, is a concerning factor, prompting us to reevaluate our approach to sustainable living. Furthermore, advancements in technology have lessened the imperative for families to enlarge rapidly in pursuit of material necessities and the assurance of survival.

Most of the readership will likely agree that there is little debate about what constitutes the world population: the number of people living on Earth at the same time. This intuitive operationalization provided an easy way to demonstrate the sizable change we have been witnessing during the relatively short history of humankind. However, the scope of this book extends well beyond mere population numbers. It delves into the intricate patterns of human cohabitation in the form of various cooperative entities, shaped largely by the prevailing technological capabilities for coordinating people and safeguarding land. Over the last 5,000 years, we have witnessed a remarkable trend whereby governing bodies have expanded their rule, resulting in a decline in the number of separate tribes and states. This claim may surprise some, as the past century has seen an increase in the number of states. Nevertheless, when viewed within the millennial context, this recent rise appears akin to random fluctuation – as will be fully documented.

Similar to the burgeoning world population, this trend in state formation prompts numerous questions about the future: Will international cooperation eventually lead to the emergence of a single worldwide state? If so, when would that be?

1.1 A NEW PERSPECTIVE ON THE HISTORY OF HUMANKIND: THE CONTRIBUTIONS OF THIS BOOK

The research presented in this book sheds new light on the aforementioned topics. By meticulously examining past trends, we gain valuable insights into potential future developments. If the average long-term patterns that we have identified continue to hold, the trajectory of the world population indicates that it would level off at around 11 billion by the year 2100 (and there is even the possibility of a subsequent decrease). However, the formation of a single worldwide state would not materialize until the year 4600.

How on earth can one reach such specific numbers? The main purpose of this book is to contribute to the historical, anthropological, and philosophical debates about the history of humankind by introducing more precise measurements. Our research examines historical developments in population growth, growth of empires, smaller states and cities, and various underlying trends and interactions. Once we are able to place consistent measurements on

a timeline, we apply mathematical tools to develop equations that effectively capture the historical trajectories. Since these trends hold for the past, they may give away something about future evolution too. Moreover, in many cases these findings uncover new relevant insights into the critical volume(s) of population, and the space needed, for empires to take off and gain dominance, as well as the limits of growth beyond which the lack of sufficient technology to control people and land led to inevitable collapse.

We show that world population and sizes of states connect in conflicting ways. As the number of people grows, one might expect them to divide into more numerous separate units (call them states, countries, or even empires). This has been our experience since 1900: The world population has grown from 1.6 to 8 billion, and the number of recognized states has gone from 54 to nearly 200. Over the last 5,000 years, however, the reverse has prevailed.

In -3200 (3200 BCE) a world population of about nine million was divided among tens of thousands of separate tribes, before the emergence of organized states. As time progressed, the consolidation of territories was gradual in terms of geographical area, yet it saw a swifter increase in population. About 2,000 years ago the Han, Roman, Parthian, and Saka empires, almost simultaneously at their peak sizes, jointly included almost one-half of the world population, accounting for about 94 million individuals out of a total of 214 million. Interestingly, these empires controlled only one-tenth of Earth's dry land area. The rest of the land harbored hundreds of smaller states and thousands of independent tribes.

In this book, we will measure the areas of the largest states and develop a method to express the number of states in a meaningful way. Going by populations and areas of states leads to slightly different results. But, either way, the overall trend has been toward fewer separate states. Why has this been so? We will argue that it is due to the ability of humans to feed ever-expanding technological progress, which has played a pivotal role in shaping the geopolitical landscape and contributing to the consolidation of states over time.

The tremendous increase in human population over 5,000 years, soaring from 12 million to a staggering 8 billion, has come about due to advances in technology (Boserup, 1981). The same advances that feed more people also enable them to move faster: from the humble pace of a few kilometers per hour on foot to the astonishing speed of many hundreds of kilometers per hour by airplane. The speed of messaging has increased even more, connecting people across the globe instantaneously. This is what enables states to organize ever-larger areas even while a growing population could potentially support more numerous states to sustain themselves.

Two innovations in particular increased messaging speed: from messengers on foot to those on horses, and from horses to steam engines and further engineering feats. Hence, "Runner Empires," "Rider Empires," and "Engineer Empires" supply convenient (albeit simplistic) labels for three empirically observed periods in empire sizes. Such categorization helps us

understand the evolution of communication and its vital role in shaping the rise and fall of empires throughout the course of human history.

The nature and functions of “the state” have changed tremendously over 5,000 years, and so have the ways states interact. Initially, state borders were fluid, gradually becoming rigid in the early 1900s, only to be relaxed again in more recent times. They may have lost much of their significance in the present era of worldwide cooperation (Colomer, 2014). Being member of a tribe, the subject of an absolute king, or a citizen of a modern democracy or dictatorship means utterly different relationships. We outline the origins of these diverse forms of governance, what they have in common, and how they differ. The differences are such that to compare the areas and populations of states past and present is a questionable task. We will undertake it anyway, while acknowledging the difficulties, particularly when dealing with feudal arrangements.

This understanding requires more awareness about the past, beyond measurement. We already had cause to mention the Han, Roman, Parthian, and Saka empires. Prior to doing this research we knew about Rome and vaguely about Han, but Parthia and Saka were just names one could look up in an encyclopedia – and forget again. By exploring their rise, their achievements, and their eventual decline, we hope to infuse these empires with renewed significance and appreciation. Through this endeavor, we seek to ignite curiosity and foster a deeper connection to the past, recognizing the invaluable insights it offers for our understanding of the present and the future.

1.2 A MULTIDISCIPLINARY EXPLORATION OF HUMAN HISTORY AND POLITICAL SYSTEMS

Why should we even think about the future in more specific terms? There hasn't been a moment in history when humankind did not face a challenge. Contemporary challenges include (among many others) climate change, economic sustainability, global inequality, and the feasibility of redistributive systems – issues influenced by population size and political cooperation within as well as between nation-states. It is not a coincidence that these trends are continuously monitored by, for example, the United Nations, the United States Census Bureau, and the World Bank, among many others. Even though the speed of human development varies, there are general underlying tendencies in the past that can help us to get ready for the time to come. Our approach sheds some light on the future of human development, and our findings could influence the response to the contemporary challenges.

The biggest achievement of this book is that it brings together several fields of human inquiry. This research would not be possible without findings in history, social anthropology, and political science that have provided bases for the thoughts and data utilized in this work. In addition, the implemented techniques are largely inspired by applied mathematics and practices in

physics. Thanks to its truly interdisciplinary synergy, this book measures various aspects of human population and its political division over millennia. It tries to make sense of how the different measured features interact and what they try to tell us about the deep undercurrents of our past, which may carry over to our future.

In its methodology, this book combines a heavy dose of qualitative historical analysis, such as is used by Samuel Finer in *The History of Government from the Earliest Times* (1997), with more quantitative analyses. The latter touch on what has been called cliometrics: the measurement of history (Williamson, 1991). The volume interlinks with the study of world systems, such as Wallerstein's *The Modern World-System* (1974), Chase-Dunn and Hall's *Rise and Demise: Comparing World Systems* (1997), and the volume edited by Denmark et al.: *World System History: The Social Science of Long-term Change* (2000). Compared to Peter Turchin's *Historical Dynamics: Why States Rise and Fall* (2003, follow-up in 2006), we go into greater historical detail on the "How" and ask naïve comparative questions on the "Why." More so than most of these works, we place world history in the context of population growth.

In contrast to Jonathan Holslag's *A Political History of the World* (2018), which summarizes the extensive history of human cohabitation and state formation, we also provide a theoretical framework which systematizes the role of technological constraints, administrative innovations, geographical borders, and past experiences of some nations in the growth and decline of their political systems. Moreover, we do not only perceive history as a battle between the state-related groups, but also dive into the power balance within political systems in order to study in a comparative perspective how relations between "talkers," "doers," "regulators," and "followers" predetermine the institutional stability of states.

This book is unique because it develops and implements general theoretical frameworks in the research of the history of political systems, which are often studied in a less structured way. It is reassuring that some of our main findings align well with recent works published in international relations. By looking at the political systems globally, we discover that political science has been preoccupied with Western countries and thus missed some processes of state formation with global implications. This is consistent with the recent call to reimagine the international relations that have largely omitted premodern India, China, and the Islamic world (see, e.g., Buzan and Acharya, 2021). Moreover, our major findings about the globally decreasing number of relevant state entities align with the arguments in international relations depicting only a few states powerful enough to shape the global order (Acharya, 2018). However, while scholars in international relations focus on the recent century following World War I to identify the relevant states and international actors, we begin our research much earlier – more than five millennia ago – when people were

grouped into tens of thousands of separate tribes. That constitutes the point from which we track how the growth and decline of states and empires brought us to the current world order.

1.3 DO WE NEED PROJECTIONS BASED ON HISTORY? A NOTE ON THE METHODOLOGY

A person living today may feel uneasy about trusting that our projections based on historical trajectories are worthwhile. The world has become so complex and there are so many ongoing issues that a single major event could change the direction of progress and put our temporal extrapolations off the real-world development. However, even though contemporary challenges feel more salient than any others of the past, humankind has always faced a crisis, or several of them at the same time. New inventions, violent wars, cultural turnovers, medical emergencies, and so forth are closely tied to human history. Nevertheless, the mathematical formulas we present fit the development of societies for millennia. These periods include the cataclysmic Toba volcanic eruption 70,000 years ago, when ashes blocked the sunshine and the freezing soil pushed humankind to the edge of extinction (Ambrose, 1998). In another major event around 1400, the Black Death resulted in the deaths of between 75 and 200 million people (Ziegler, 1969). Yet, these events still caused only a temporary deviation from the long-term trajectories we identify.

The past tends to fade the more we go back in time. We know less about ancient history and attach less importance to it. But how fast does it fade? Distant history either matters or it doesn't. Some argue that ancient history may have little relevance, merely consisting of random fluctuations that offer no guidance for the future. According to this perspective, we can only make short-term projections based on current data. But deep-set basic factors also exist, to propel human growth and political organization over the ages (Turchin, 2008). If so, then judicious inference from past trajectories might tell us something about the future.

While it is possible for new major factors to disrupt the balance among these underlying forces, we should not dismiss our findings solely on the basis of perceived unprecedented contemporary challenges. Of course, extrapolations are not predictions. We can only say: If – and *only if* – the average millennial patterns continue to hold, then the following would result. The future is not obliged to continue past trends; it just often does, which is the reason why extrapolations can provide valuable expectations about future development. It does so as long as the same deep-set factors and processes continue to act and no new ones appear to overrule them. Discontinuities can occur. Indeed, we will document a puzzling major kink in world population growth, some 2,000 years ago. This is a warning against mistaking even the best-founded projections for predictions. Nevertheless, as long as the longstanding basic factors and

processes persist and no new ones dominate the landscape, these projections can offer meaningful guidance in understanding potential future trajectories.

While we are confident enough to publish our projections, we certainly do not claim that this is how the future looks like. Our extrapolations offer valuable insights, but they are not a definitive representation of what lies ahead. Nevertheless, these extrapolations are slightly better grounds for preparing for the future than saying “We cannot know.” The phrase “We cannot know” often conceals an implicit assumption that the present will persist indefinitely. However, history has shown us time and again that this is not the case. The past is a testament to the dynamic and ever-changing nature of human society. By acknowledging this reality and utilizing historical trends as a reference point, we can gain a deeper understanding of possible future trajectories.

1.4 THE STRUCTURE OF THE BOOK

This book proceeds in three major parts: Part I: World Population Growth; Part II: Empire Growth; and Part III: Trends and Interactions.

World population (Chapters 2 and 3) is the framework within which states form. We can estimate the human population for much longer than 5,000 years. Surprisingly, two distinct phases emerge, both beginning with accelerating growth and ending with a sharp leveling off. The *ancient phase* may have picked up speed ever since a million years ago and reached its top percent growth rate around -400 , but by the year ± 1 world population leveled off for 500 years. The *present phase* started with almost no growth 1,600 years ago, reached its top percent growth rate around 1980, and is now slowing down fast. A logical interaction model among population, technology, and Earth’s carrying capacity, fitted to population data from year $+400$ on, projects to a ceiling or peak of 11.2 billion.

Chapters 4 to 13 deal with the growth of individual empires, starting with their relationship with population and technology (Chapter 4). Growth–decline curves of empire areas show at a glance how they rose and fell. Chapter 5 presents examples, explains how to measure empire areas, and points out which indicators might be used to characterize empire size and duration.

Inspired by Samuel Finer’s momentous *History of Government* (1997), Chapter 6 develops a scheme to describe the power relationship in any state among four population categories: “talkers,” “doers,” “regulators,” and “followers.” This Finer-inspired scheme comes in handy in trying to visualize, however imperfectly, how power and authority relationships may have developed, from fishes and chimpanzees to chiefdoms and early states (Chapter 7). After domestication of other species, the highly regimented early states looked like human self-domestication.

The next six chapters (13 to 18) outline the main events in historical development in various world regions to present the growth–decline curves of

major empires during three basic phases in empire sizes, labeled for short as Runner Empires (–3000 to –600; Chapter 8), Rider Empires (–600 to +1800; Chapters 9, 11 and 12), and Engineer Empires (from +1800 on; Chapter 13). The long central period is subdivided into Early Rider (–600 to +600; Chapter 9), Stirrup (+600 to +1200; Chapter 11) and Last Rider (+1200 to +1800; Chapter 12) Empires. Each of these five phases and subphases was ushered in by an empire of record-breaking size: Egyptian Old, Achaemenid, Caliphate, Mongol, and British.

Early republics interrupt this flow (Chapter 10). They did not achieve appreciable size (except for Rome, which in so doing lost its soul) and seemed a dead end in statecraft. They still command attention in view of the re-emergence of the republican format much later.

Chapters 14 to 17 undertake a comparative analysis of states, with world population a perennial background. The largest state has tended to become larger, following an exponential path (Chapter 14). This is the pattern that would lead to a single world state by the year 4600, if continued. The pattern for the most populous states points toward a similar date. A logically expected “square root law of people states” connects the patterns for areas and populations. Chapter 15 takes the notion of “effective number” of parties used in political science and applies it to the number of separate states when some are large and others are tiny. Whether based on areas or populations, the number of states has shrunk, the reverse trend of the last 100 years notwithstanding. This exponential downward trend points again toward a single world state around 4600.

Patterns in population densities and maximal expansion rates of top empires are studied in Chapter 16, along with a puzzling connection between world population and top sizes of empires. Chapter 17 returns to the level of individual empires: their duration and the shape of their growth–decline curves. It outlines a mathematical model of how proliferation of coordinators at the expense of primary producers can stop growth and lead to collapse. Chapter 18 adds a number of side issues: the shape of empires, and of Rome in particular; how languages and alphabets relate to empires; and durations of reigns and dynasties. Chapter 19 compares the populations of empires and their largest cities.

All this describes, measures, and analyzes an aspect of history: the way world population and state sizes have proceeded. Chapter 20 turns around and looks into why we pay greater attention to more recent history. Is it that old history is lost or discounted, or do the recent billions of people produce more memorable events than the few millions could do 5,000 years ago? We are in for surprises.

Finally, Chapter 21 sums up the major regularities observed and measured, offering alternate ways of periodization of world history. It then asks what the patterns and trends observed in the past might tell us about the future. The future is not predetermined, but some directions are more likely than others.