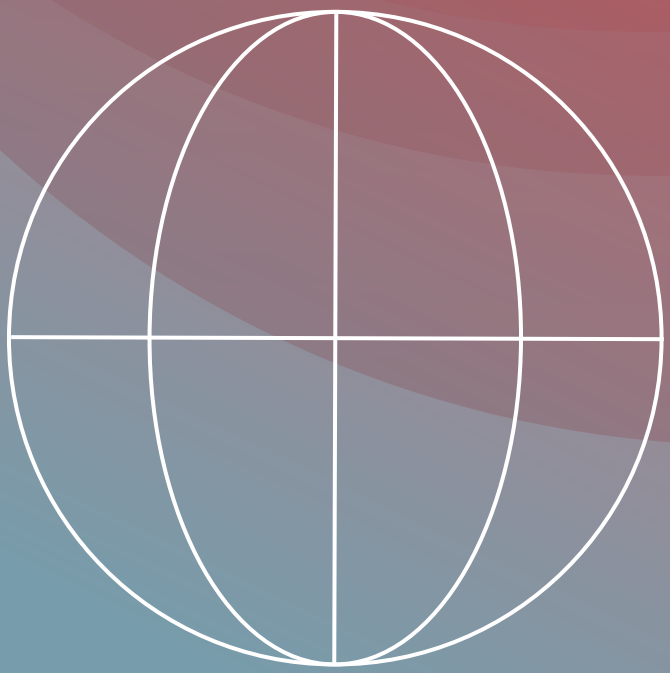
A Novel History of Societal Progress and its Key Drivers

A global historical analysis of sustainable and inclusive wellbeing and its key drivers, with deep dives for Africa, China, the EU and US



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Summary

If you could choose any year to be born, which year would it be? Some argue that there is no better time to be alive than today. Many long-term trends related to material wellbeing, health, and education show that the average person on the planet enjoys a quality of life far superior to that of previous generations. However, not everyone shares this optimistic assessment. Geopolitical conflicts, polarisation, and environmental breakdown are just a few examples of threats that society faces today. This raises a pivotal question: Is humanity on a path of true progress, or is there a risk of undermining the very foundations of our wellbeing?

To answer this, we must first assess past developments and subsequently explore their implications for the future. This report focuses primarily on the historical perspective. Drawing from a wide range of datasets, supplemented by qualitative sources, we examine how wellbeing has evolved over time and explore the key drivers of these developments. Through a global overview covering the period 1820 to the present, alongside deep dives focussing on 1960 to the present for Africa, China, and a comparative analysis of the EU and US, we provide insights into the historical trajectories of wellbeing and the factors shaping these trends.

This human-centred perspective on historical development sets our work apart from traditional approaches focused on economic developments. Specifically, we apply a novel conceptual framework that evaluates developments across three dimensions of wellbeing: average wellbeing, the distribution of wellbeing within and between countries (inclusion), and conditions affecting future wellbeing (sustainability). In addition, we link wellbeing outcomes to six key drivers: economy, technology, globalisation, demography, nature, and institutions. The main insights from this analysis are summarized below.

Average wellbeing has improved in all global regions. Looking at a wide range of wellbeing indicators, the world has made significant progress since 1820. Life expectancy has more than doubled, literacy rates increased 7-fold, and global GDP per capita – indicating material wellbeing – is 15 times as large as 200 years ago. The world is also much more safe and human rights are respected on a much grander scale, with the human rights index increasing from 0.18 in 1820 to 0.53 in 2023 and improvements occurring in all global regions. While these are positive trends, it is important to keep in mind that average developments mask inequalities.

Wellbeing is unequally distributed and trends are mixed. The current difference in average life expectancy per country is as large as 30 life years, and while some countries have doubled or tripled the size of their economy every few decades, others saw no sustained increase in GDP per capita during the same period. A positive development in this regard is the decline in between-country inequality in life expectancy, education, and GDP per capita since the 1990s. Additionally, the position of women has seen improvements over the long-run. Despite these encouraging trends, the world is still far from equitable and it is unlikely that true inclusion will be achieved with current systems that are still heavily influenced by

post-colonial and patriarchal power structures. Moreover, income and wealth inequalities within countries remain high.

Environmental pressures are becoming existential. Economic development and population growth have put increasing strain on the natural environment, now up to an extent that it threatens a safe living space for humanity. While many governments are undertaking serious steps to limit negative impacts on the environment, six out of nine planetary boundaries are being transgressed and no sufficient decoupling of economic production and environmental impact is in sight.

True progress towards sustainable and inclusive wellbeing is illusive. The global narrative on progress is a narrative about improved wellbeing in every region of the world. But it's also a narrative about disparities and environmental harm, highlighting the limitations of the current development model.

Key drivers can impact wellbeing positively or negatively, with outcomes ultimately shaped by institutions. This report has analysed six key drivers influencing wellbeing. We find that changes in the economy, technology, globalisation, demography, and nature can have positive or negative impacts on inter- and intragenerational wellbeing. However, institutions stand out as the "principal driver", determining how developments in other key drivers affect wellbeing outcomes. This includes formal and informal institutions at the local, national, and international level.

Given the central role of institutions, the future is not predetermined. It will depend on whether institutions can be (re)formed to deliver sustainable wellbeing for all.

Global conflicts, democratic decline, and polarisation are alarming developments. This report concludes that there are troubling trends in (inter)national institutions as well as in social relationships. Since 2011, the number of conflicts and the number of deaths by conflicts continues to rise, and the number of refugees has tripled in the last decade amounting to more than 120 million people in May 2024. Globally, democratic governance is in decline. In the early 21st century, over half of the world's population lived in a democracy. By 2023, this has dropped to just 29%, with freedoms of expression, clean elections, and freedom of association being under pressure in an increasing number of countries.

The institutional challenge. The historical analysis leads to a critical paradox: while the current era needs global cooperation and local action to guide us through profound transitions to address challenges such as climate change, biodiversity loss, growing wealth inequality, and rising migration, the very institutions designed to provide these solutions are struggling. While the focus of this report was primarily on historical analysis, we suggest three key areas for future action that have the potential to help solve this paradox:

1. **Develop a clear and relatable vision of progress** that resonates with citizens and can be adopted by citizens, businesses, governments, and international institutions. A focus on sustainable and inclusive wellbeing can provide a basis for such a vision. Citizen participation is essential to further specify societal goals, defining sustainable and inclusive wellbeing in ways that are

attuned to local contexts but with consideration for universal basic needs and planetary boundaries.

2. **Reform formal and informal institutional structures** to establish the necessary conditions to deliver on sustainable and inclusive wellbeing. Multi-level governance systems are crucial for addressing global challenges while simultaneously responding to local needs, thereby bridging the divide between global priorities and local realities. Existing international structures should be improved, making them more collaborative, representative, and inclusive. On the level of businesses, corporate governance structures should be redesigned, creating room to focus on long-term value creation for all stakeholders involved. For individuals, relevant "reforms" in informal institutional structures are highly context dependent. These could include greater local democracy and deliberative bodies for local communities.

3. **Address societal lock-ins** to enable the translation of humanity's goals through reformed institutions into concrete actions that people, businesses, and governments can take. Societal lock-ins harm adaptive capacities, decreasing society's resilience. On the level of governments and businesses, an exemplary lock-in is growth-dependency. For individuals lock-ins might exist in consumption patterns, for example in relation to diet and transport. Addressing these lock-ins is crucial to make room for the profound changes that are required at all levels of society.

Coming back to the question posed in the first paragraph of this summary, this report might not leave readers particularly optimistic about the future of society. The foundations of humanity's wellbeing are indeed at risk, with rising environmental and social pressures, compounded by the weakening of the very institutions designed to address these challenges. However, the future is not predetermined and the stakes are high. People around the world have the agency to influence institutional change at all levels, to enable sustainable wellbeing for all.

List of Abbreviations

AAF-SAP	African Alternative Framework to Structural Adjustment Programmes for Socio-economic Recovery and Transformation
AfCFTA	African Continental Free Trade Area
AFF	Agriculture, forestry and fisheries sector
AHDI	Augmented Human Development Index
AI	Artificial Intelligence
APRM	African Peer Review Mechanism
ARV	Anti Retro Viral
AU	African Union
CAR	Central African Republic
CBNRM	Community Based Natural Resources Management
COMESA	Common Market for Eastern and Southern Africa
CWON	Changing Wealth of Nations
DRC	Democratic Republic of Congo
EAC	East African Community
ECOWAS	Economic Commission for West African States
EU	European Union
FAO	Food and Agricultural Organisation
GDP	Gross Domestic Product
GNI	Gross national Income
GNP	Gross national product
Ha	Hectare
ICT	Information and communication technology
IDP	Internally Displaced Person
IEA	International Energy Agency
IMF	International Monetary Fund
LDC	Least Development Countries
LIC	Low-Income Countries
LLDC	Land-Locked Development Countries
LMIC	Lower Middle-Income Countries
UMIC	Upper Middle-Income Countries
FDI	Foreign Direct Investment
GHG	Green House Gasses
GII	Gender Inequality Index
HD(I)	Human Development (Index)
HIC	High Income Countries
HIV- AIDS	Human immunodeficiency virus & acquired immunodeficiency syndrome
IIAG	Ibrahim Index of African Governance
ILO	International Labour Organization
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
IWRM	Integrated Water Resource Management
LDI	Liberal Democracy Index
LP	Living Planet Index
MENA	Middle East and North Africa
MMT	Modern Monetary Theory
MTCT	Mother to Child Transmission
NATO	North Atlantic Treaty Organization
NBC	National Bureau of Statistics of China
NDC	Nationally Determined Contributions
NRM	Natural Resources Management
NEPAD	New Partnership for Africa's Development
OAU	Organisation of African Union
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
OPHI	Oxford Poverty and Human Development Initiative
P.a.	Per Annum
P.c.	Per Capita
PES	Payment for Ecosystem Services
PPP	Purchasing Power Parity
RBO	River Basin Organisation
R&D	Research & Development
REC	Regional Economic Community

SACU	Southern African Customs Union
SADC	Southern African Development Community
SAP	Structural Adjustment Programme
SDG	Sustainable Development Goal
SIDS	Small Island Developing States
SOE	State-owned enterprise
SSA	Sub-Saharan Africa
TFP	Total Factor productivity
TOE	Tons Oil Equivalent
TWRM	Transboundary Water Resources Management
UK	United Kingdom
UN	United Nations
UNCTAD	United Nations Conference on Trade & Development
UNECA	United Nations Commission for Africa
US	Unites States of America
WDI	World Development Indicators
WEO	World Economic Outlook data base
WEC	World Energy Consumption data base
WHO – GHO	World Health Organisation Global Health Observatory
WID	World Inequality Data base
WISE	Wellbeing, Inclusion, Sustainability & the Economy
WMO	World Meteorological Organization
WTO	World Trade Organization
WW	World War

Chapter 1. Introduction

1.1 What is This Report About?

The world is currently being confronted by many social and ecological crises. Geopolitical tensions, poverty, living costs, housing, inflation, rising inequalities, climate change, biodiversity loss, AI, polarisation, populism, migration and an ageing society are causing uncertainty for many people. Yet on the other hand, others argue that there is no better time to be alive. Many long-term trends in terms of material wellbeing, health and education show that the average person on the planet enjoys a quality of life that would be unthinkable for all the generations that came before. The ability of man people today to communicate, educated themselves and live a comfortable life is unique in history.

These "pessimistic" and "optimistic" narratives also frame societal attitudes about the future. The former narrative inevitably provides a bleak vision, since the crises that society faces will prove to be overwhelming. The latter narrative relies heavily on the notion that humanity will be able to overcome these crises, especially through innovation and technology. The reasoning goes: if humanity has been able to resolve major problems in the past, why be pessimistic about the future?

What narrative is correct? To answer this question requires a deeper understanding of historical developments. Has "societal progress" been achieved and, if so, what were the key drivers of that progress? What role did technology play? How did population develop? What were the political and cultural systems which were conducive to progress? With a deeper understanding of the past, a more informed opinion about the future can be formed.

This report will use an array of quantitative and qualitative analysis for the globe (from 1820 onwards), Africa (from 1960 onwards), China (from 1978 onwards) and Europe & the United States (from 1960 onwards) in order to gain insights about societal progress and its key drivers.

1.2 The Economic Narrative

When asking question about societal progress, an economic lens is often used. Whether it is describing the past centuries or the decades to come, the narrative is often expressed in terms of economic development. As such, Gross Domestic Product (GDP), which provides a measure of a country's economic activity, is often taken as a proxy for societal success. Economic *growth*, the increase in *real* (price adjusted) GDP, is often interpreted as "societal progress".

These measures of national income are capable of looking at the economic success or collapse of empires, countries as well as the livings standards of the citizens. What is more, it is a lens which can be used to compare peoples and communities throughout history and across the world in a way that is understandable to academics, journalists and politicians. It also appeals to citizens because it can be related to one important dimension of their lives, income. This makes it a powerful frame to talk about humanity's history and its future.

Using the economic lens, the past 2 centuries have been truly remarkable. There has been a 200-year economic growth spurt, with the average GDP per capita increasing from $ 1,128 to $ 15,461 (real GDP per capita in 2011$, Purchasing Power Parity (PPP) converted) from 1820 to 2020. At the same time, global population grew from 1 to 8 billion people, so "the economy" in 2020 is more than 100 times bigger than it was in 1820.

The economic narrative also looks at the key drivers of economic expansion focusing on the role of technology, labour (human capital) and physical capital (machines, infrastructure and buildings) to explain this remarkable period. Some heterodox economists, stress the importance of institutions, culture and narratives.

Quite often these publications will also make pronouncement about the future. It is reputed that Mark Twain said "*history does not repeat itself, but it rhymes*". If that is true, some patterns from the past could be used to deduce whether it is possible to be optimistic or pessimistic about the future. On the other hand, authors like Thomas Piketty stress the serendipitous nature of history which sometimes hinges on a small decisions, people or events (Piketty, 2020). From this perspective, the future is not deterministically defined and can be influenced to decisions and interventions. This perspective gives more agency to people to change the course of history.

1.3 An Alternative Narrative

When trying to understand humanity's past and future, many authors have argued that economic lens provides too narrow a focus of societal progress. These criticisms often focus on the use of GDP as a measure of progress. Three core criticisms stand out:

1. GDP only measure the material dimension, while wellbeing is also dependent on health, education, social relations and many other factors.
2. GDP (and even broader wellbeing indicators such as life expectancy) only focusses on country averages which masks important inequalities in income, health and other wellbeing factors. There is sometimes important development in within-country disparities according to gender, background and education. There are also large between-country inequalities in many of these indicators.
3. GDP provides a quantification of present economic activity, but the number provides no insights about the future. Ecological and social crises that might affect future economic and wellbeing are therefore not covered.

This report aims to change the lens through with which to look at humanity's past. The conceptual framework that is used has two dimensions.

First, rather than looking at GDP, it uses a wellbeing-lens of progress is used which is based on the Brundtland and Stiglitz reports (explained later in this chapter). This framework has an intertemporal dimension, contrasting current average wellbeing (*wellbeing*) vs future wellbeing (*sustainability*). It also highlights the distribution of wellbeing (*inclusion*) within countries and between countries. Rather than looking at

economic growth this report will therefore look at *sustainable and inclusive wellbeing* as the benchmark for societal progress

Second, the framework also includes a broader analysis of the key drivers of progress. Rather than looking solely at the determinants of economic growth, a broader conceptual framework is used to link key drivers to sustainable and inclusive wellbeing. Six key drivers are identified and assessed: *Technology, Economy, Globalisation, Population, Nature and Institutions*.

While this report does link a broader notion of progress to a broader range of key drivers, it does not provide a "formal" model with equations to provide a comprehensive quantitative assessment. Yet, by analysing the developments in the six key drivers and their positive and negative pressures on sustainable and inclusive wellbeing, it aims to suggest a novel conceptual framework for cliometrics and a novel way of framing societal progress.

The **first question** this report is trying to answer is: "**What is the novel narrative of progress (sustainable and inclusive wellbeing) and how does it differ from a traditional economic narrative?"** This report aims to enhance understanding of historical development through a wellbeing lens.

The **second question** that is being asked is **"What are the key drivers of progress (sustainable and inclusive wellbeing)"**. Based on historical analysis, this report aims to enhance the understanding of the key drivers that affect sustainable and inclusive wellbeing positively or negatively.

These are two difficult, not to say impossible, questions to fully answer. No study can provide a comprehensive assessment which tell a full story of progress and analyse its determinants. Nevertheless, this report will present a novel quantitative and qualitative study which is supposed to lay a foundation under a broader research agenda which moves beyond the economic narrative towards a more complete coherent analysis of societal development. To maximise the insights, we therefore answer these questions for four regional and historical periods (see Table 1.1).

The **third question**, which will only be answered in chapter 6, is **"Given the insights from the historical analysis, what are the implications for future?"** Using the insights from the past, and knowledge about potential future trajectories, what can be said about the future of sustainable and inclusive wellbeing? On what grounds can people be optimistic or pessimistic about the future? What are the key problems that need to be solved?

Table 1.1 Topic, temporal, and spatial scales of chapters

Chapter	Topic	Temporal scale	Spatial Scale
2	Global Trends	1820-now	8 world regions: Western Europe (WE), Eastern Europe (EE), Western Offshoots (WO), Latin America and Caribbean (LA), Sub-Saharan Africa (SSA), Middle East and North Africa (MENA), East Asia (EA), South and South-East Asia (SSEA) (exact regions might deviate depending on data source).
3	Africa	1960-now	All African countries, including analysis for five distinct regions: North, East, South, West, and Central Africa.
4	China	1978-now	China, including data for 4 Chinese regions
5	European Union- United States	1960-now	United States and European Union aggregate (consisting of 27 countries- this is excluding the United Kingdom)

The report is set up as follows. Chapter 2 provides a historical overview of the last two centuries (data since 1820), followed by 2 chapters that look specifically at China and Africa (for the post WW2 period). Finally, we look at comparative study of the US and EU27 where we delve deeper than the other chapters on one domain: the role of taxation systems on pre- and post-tax redistribution on income inequalities in the US and Europe. Finally, Chapter 6 conclude with a discussion of the first two questions (on progress and the key drivers of progress). This last chapter also looks at the third question about the future: what does this analysis mean for global, African, Chinese, US and EU prospects?

1.4 Conceptual framework: What is Progress?

A core feature of the economic narrative is assessing progress from the perspective of GDP and income. A country that has a large GDP powerful and important, a country with a high GDP growth rate is seen as successful. There are many reasons to think that this is a fairly accurate assessment. Especially when looking at historical data there is a large correlation between GDP and quality of life indicators. This is because GDP growth leads to higher incomes which enables people to meet basic needs (housing and food) and to finance public goods such as education, health services.

Yet, despite this simple logic, the literature has shown that GDP is a flawed measure of societal progress (Costanza et al., 2009; Fioramonti, 2013, 2016; Hoekstra, 2019; Jansen et al., 2024; van den Bergh, 2009). Some of the criticisms are that while GDP and wellbeing are strongly correlated at lower income levels, this relationship is much weaker at higher incomes. There are inflections points where more income no longer translates into greater wellbeing (Frey & Stutzer, 2002; Killingsworth et al., 2023). Another criticism is that GDP only provides an average economic picture,

which masks the underlying inequalities. Especially in longer historical analysis, long time periods of GDP growth have coincided with growing inequality (Piketty, 2014). Finally, GDP provides an average assessment of the present, but it does not provide information about the future. In fact, economic growth has let to many environmental pressures pushing the natural systems to their tipping points (Rockstrom et al., 2009; Steffen et al., 2015).

In other words, while GDP may provide a measure of economic activity it was never meant to serve as a measure of societal progress. This theoretical foundation of this framework is the Brundtland report (WCED, 1987) with Stiglitz-Sen-Fitoussi report (Stiglitz et al., 2009). Both reports stress the intergenerational distribution of wellbeing (think of the Brundtland definition of sustainable development as "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs.*"

The Stiglitz report does stress that "*the assessment of sustainability is complementary to the question of current wellbeing….. and must be examined separately*". In addition to the intertemporal perspectives, both reports also stress inequalities in wellbeing, both within countries (e.g., according to gender, background, age, educational attainment) and between countries (e.g., the disparities between global north and global south).

The Brundtland-Stiglitz framework is increasingly being used by international organisations and initiatives (Hoekstra, 2024). The conceptual framework basically distinguishes three dimensions:

- *Wellbeing* reflects the average wellbeing of the current generation, encompassing both experienced wellbeing and factors such as social relations, mental health, air pollution, and material living standards.
- *Inclusion* relates to the distribution of wellbeing, comprising the distribution of wellbeing determinants and opportunities across spatial scales (within countries, between countries, and globally) and social groups (gender, ethnicity, socioeconomic background, etc.).
- *Sustainability* refers to the wellbeing of future generations, encompassing social and socioeconomic conditions for future wellbeing, such as education and infrastructure, as well as environmental aspects, emphasising the necessity of operating within Earth's planetary boundaries.

This terminology is increasingly being adopted although the acronyms differ according to the order in which the terms are used: wellbeing, inclusion and sustainability (WISE), sustainable and inclusive wellbeing (SIW) or inclusive and sustainable wellbeing (ISW).

In the above framework, the economy is still important but its role in the narrative is different. The economy is a means to an end rather than an end in itself. An economy is an important foundation which is important in understanding how intergenerational and intergenerational wellbeing is developing, but it is not the policy goal or objective which society should base its direction on.

A core feature of a new definition of progress is what "Beyond-GDP" metrics there are. In a recent publication, (Jansen et al., 2024) categorised dozens of metrics according to whether they measured wellbeing, inclusion or sustainability (or a combination of two or three of these dimensions). It also identified many of the "themes" which are important for each of these dimensions. For example, underlying people's wellbeing are their health, education and social relationships. This report is largely based on that measurement synthesis (Jansen et al., 2024).

1.5 Conceptual framework: What are the Key Drivers of Progress?

The second layer to the conceptual framework is to understand the key drivers of societal progress (subsequently defined as sustainable and inclusive wellbeing). What aspects of societal and natural developments are pivotal in explaining increasing or decreasing sustainable and inclusive wellbeing? Why are some countries successful and why do some stagnate or collapse? What are the key determinants of progress?

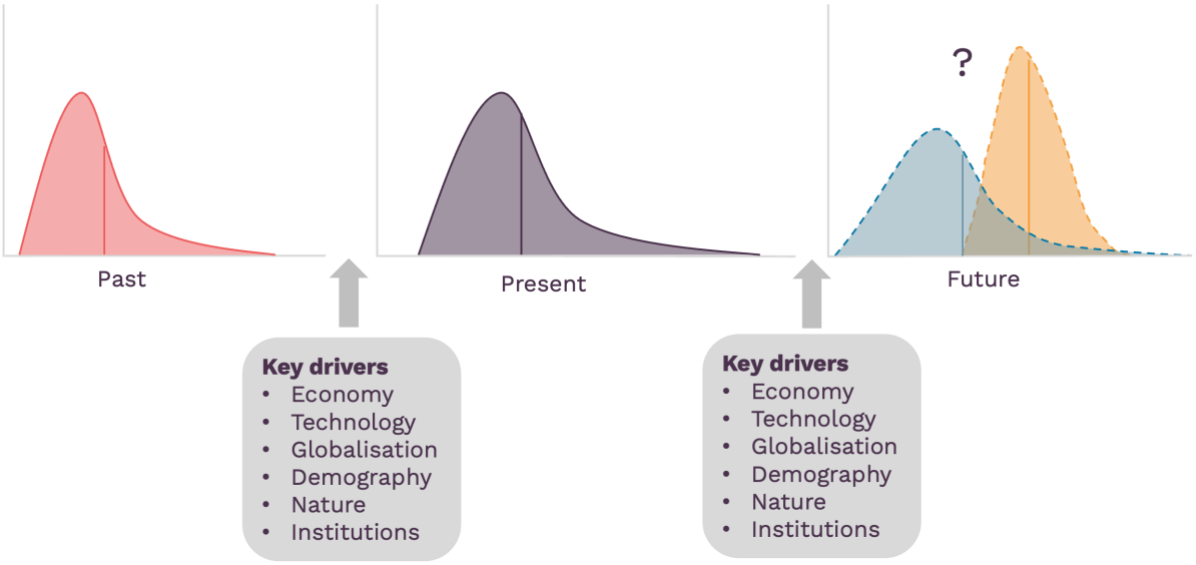
While a comprehensive model of the drivers of progress is beyond the scope of this report, this section provides an overview of empirical literature which present theories about progress, stagnation and collapse. Based on this literature, we distinguish for six key drivers: Technology, Economy, Globalisation, Demography, Nature, and Institutions.

The publications covered in this section are from historians, economists, sociologists, anthropologists and scientists from many other disciplines. This section will focus on the most important literature, concentrating on the research that includes empirical analysis. These studies use data to argue that one or more of these key drivers is the crux to the understanding progress. In some cases, this historical analysis is then used to make pronouncements about the future. Some of the studies concentrate on identifying on successful developments, while others focus on the root causes for stagnation or collapse.

A core feature is that these key drivers can have a positive or negative effect on wellbeing and/or inclusion and/or sustainability. For example, a country can be endowed with many natural resources and his can have positive effects on progress, but it can also lead to conflicts and, in some cases, civil war.

Figure 1.1 illustrates the synopsis of a lot of these publications. The bell-shaped curves are the distribution of wellbeing (with the vertical line showing the average). They usually analyse the past to make their claim that one or more of the six key factors are crucial in understanding success or collapse. Their analysis of the key driver(s) is then extrapolated to hypothesise about whether the future is bright or bleak. The analysis in the subsequent chapters will be similar, but rather than choosing one of the conceptual frameworks, look at all these six factors to understand their roles in global, regional and country level developments.

Figure 1.1 Distribution of Wellbeing in the Past, Present and Future



The next sections will cover some of the literature related to the six key drivers. It will include and eclectic array of publications from mainstream and heterodox economics, anthropology, historical and other social and natural sciences.

Economy

When economists create models for economic growth there is an implicit assumption that higher average incomes will translate into higher wellbeing. The empirical literature which focusses on the positive case of economic growth will point to the correlation between long-term GDP developments and many dimensions of the quality of life (health, education etc). Having a strong economy is seen as essential to raise individual living standards, provide public services, building infrastructure and support a military that is capable of exerting power over others or defending itself (Pinker, 2018; Susskind, 2024).

The rationale in these kinds of books is usually as follows: an economy provides people with income (from labour or capital) with which they can buy housing, food and other basic needs, and beyond a certain income level, luxury goods. At the same time a large economy also provides a foundation for taxation which enable governments to provide public services which enhances citizens' wellbeing such as health care, education, roads and utilities. The core idea is that the income and taxation will be used to enhance average wellbeing.

The relationship between GDP and wellbeing is not automatic or linear, as implied by the Easterlin Paradox (Easterlin, 1974). Empirical data shows that at low-income levels the relationship between the two is fairly robust, but there seems to be thresholds at which further increases in income lead to little or no additional wellbeing. This implies that many high-income countries, the growing GDP is not translating into significant improvements in average wellbeing. The reason for this

threshold could be because the wellbeing impact of basic needs are much more significant than luxury goods. Social comparison is also sometimes mentioned.

Sometimes there is also an implicit assumption about the relationship between GDP and inequality. The Kuznets Curve hypothesis, for example, implies an inverted U-shape between income and inequality. In other words, in the initial stages of growth, inequality rises. But beyond a certain threshold, income inequality will start to decline as income increases. This is known as the Kuznets Curve Hypothesis after the person who empirical work showed this relationship in the 1950s. However, later authors such as Thomas Piketty, have shown that the empirical relationship was only representative for that specific time period and the relationship was by no means automatic. The message of the Kuznets Curve was a welcome message Cold War, as it implied that the communist criticisms of capitalism, that is was inequality enhancing, was not true (Piketty, 2014).

A similar hypothesis between income and sustainability was proposed in the 1990s (the *Environmental Kuznets Curve Hypothesis*). A similar U-shaped relationship was assumed between income and environmental emissions, which was first positive and beyond a certain threshold, negative. The idea was that environment is a luxury good that people will only spend money on beyond a certain income level. The EKC hypothesis had also been criticised heavily (Stern, 2004). Some recent degrowth literature have also shown that evidence of “decoupling” of GDP and environmental pressures is not happening on the global scale or not fast enough to overcome transgressing planetary boundaries (Vogel & Hickel, 2023).

Discussion about the two Kuznets Hypotheses show that there is nothing automatic about income being used for good. It does not guarantee that wellbeing will be distributed evenly as average wellbeing increases. There is also no automatic mechanism that once people become better off, that they will shift towards environmentally friendly behaviours that is sufficient to meet environmental needs.

Apart from theories of overall economic growth in relation there are also studies that look into the structure of economic growth. For example, there are, now discredited, deterministic views of economic phases such as Rostow's five Stages of Economic Growth and Development (Rostow, 1959), countries all need to go through the same stages of development: Traditional Society, Preconditions to Take-off, Take-off, Drive to Maturity, Age of High Mass Consumption. Again, there is an implicit assumption that as an economy goes to the next phase, this will automatically improve wellbeing, mass consumption being the ultimate aim.

A modern, more critical view of the structure of the economy is from (Varoufakis, 2023). He argues that wealth creation has started to decouple from profits as central bank money was pumped into the economy in large amounts during the financial crisis. A big share of this capital ended up as “cloud capital”, belonging to companies like Amazon, Google, Alibaba, Facebook, TikTok, Tencent, and X. Traditionally, profits were largely invested in capital goods to maintain a capital owner’s ability to generate profits. But rent, essentially the returns on investments in cloud capital, typically captured by society’s wealthiest, is usually stored in property values (real estate, yachts, cryptocurrencies). As a consequence, economic growth slows down.

The rise of cloud companies also has profound societal implications. As these companies increasingly compete for individuals' attention, people spend more time online, indirectly boosting the profits of a few dominant Big Tech firms. Varoufakis argues that personal freedoms are diminished as individuals are nudged into using these services without any meaningful exchange—unlike labour, which comes with a wage. This not only happens at the personal level, but also on the level of businesses and government services.

An important feature of an economy is the level of debt. Households, governments and businesses can take on debt. This can be a good thing if it used to mortgage a house, provide financing for an investment of a small business or to fund certain public expenditures. At the same time, debt can lead to an unhealthy situation and power imbalances. Some authors such as David Graeber (Graeber, 2011) provides a long-term assessment, 5000 years in fact, of the role of assets/liabilities and their impacts on social institutions.

Debt can lead to a lot of instability, because the debt of one is the asset of the other. Many financial crises, including the Great Depression are based on this vulnerability of the financial system. For example, in the case of the financial crisis of 2008/2009 low-income households defaulted on mortgage debts which led to the collapse of various banks and an economic recession. As we will see in chapter 3, debt also played a role in in Africa as many countries needed to borrow from the World Bank IMF, which then imposed policies that were very detrimental to Africa's economic development (Rodrik, 2011).

Technology

This section will analyse the literature which talks about the relationship between technology and the economy but will also the broader wellbeing impact of technology. For this section, note that technology is being very broadly defined as applied science, but also science in general.

Economists have long thought about what makes an economy grow. What are the main drivers of growth? This question was far more important to 20th century economists because this was the century in which economy growth increased significantly. In contrast many 19th century classical economists, such as John Stuart Mill, believed economies would grow towards a steady state.

Macro-economic theories after the second world war created formal empirical models that linked economic growth to productivity gains through technological advances. The most influential were the Solow-Swan models which stressed that if economies made more productive use of their capital and labour, the economy would expand (Solow, 1956). However, the technological progress was an exogenous variable often described as "manna from heaven". While most of these models looked an economic growth, models like the Harrod-Domar model were also linked to employment- an important driver of wellbeing and social stability,

The first generation of models did not explain where technology comes from. Later, "endogenous growth models" started to emerge. There were models, which

identified expenditures on research and development as the main driver of innovation (Romer, 1990). On the other hand, models by Robert Lucas (Lucas, 1988) stressed the importance of education in creating productive workers (often using the term “human capital” to reflect the role they have in the production process).

What these models have in common is that technological change leads to production factors being used more productively which leads to fewer inputs being needed per unit of output. This leads to rising income i.e., economic growth. Note that it is not a given whether labourers or capital-owners will benefit from this economics growth. Whether real wages increases at the same rate, or faster than economic growth varies over time (Piketty, 2014).

What influence does technology have on wellbeing, inclusion and sustainability? Improvements in labour productivity in certain sectors might lead to job losses in declining sectors and job gains in growing sectors. While this might balance each other out for the total economy, losing one’s job or unemployment is a major source of instability and unhappiness. This is why technological changes have often faced fierce public opposition in history. An often-cited episode is the Luddite rebellion which was a series of protests and violent actions carried out by English workers between 1811 and 1816 during the early stages of the Industrial Revolution. The Luddites were skilled textile workers who opposed the introduction of new machinery that they believed threatened their jobs and livelihoods. These fears of new technology destroying jobs is prevalent in history but often decreases in one sector were (more than) compensated by increases in another.

However, some authors have argued that the rapid pace of technological advancement might now lead to an overall reduction in demand for labour and that income support such as a universal basic income would be needed to prevent major social instability (Brynjolfsson & Mcafee, 2014).

The type of jobs is clearly also important for wellbeing. David Graber has argued that there are many “bullshit jobs” for which people do not see any purpose (Graeber, 2019). Dani Rodrik has also warned about a shortage of “good jobs” (Rodrik & Sabel, 2020). These references show that employment does not just provide an income but also has worker wellbeing in a broader sense.

The above impacts of technology focus on making the production process more efficient, which affects incomes, employment and worker satisfaction. But technologies also have direct impacts on wellbeing. New medicines can save lives or alleviate symptoms. New ICT technologies radically change the possibilities to communicate. New movies and music add to enjoyment and leisure. This does not mean that all new products are necessarily good for wellbeing. Designer drugs, fast food, social media and smart phones have also been linked to health problems and addiction. Beyond wellbeing impacts for the current generation, technology is also a crucial part of exploiting natural resources (e.g. through mining techniques) or resolving sustainability issues such as the energy renewable energy technologies and electrical vehicles that will be needed to alleviate climate change.

The above discussions also make clear that technology can affect different people very differently. It has enormous consequences for the distribution of wellbeing.

Workers that are laid off due to increasing labour productivity, will experience technological change differently to people that are employed in growing sectors. For people that have access to education or the most advanced medicines and medical treatments it might also be different in comparison to people who are lacking this access. There are many ways in which technological disruptions alleviate or exacerbate inequalities.

Globalisation

Globalisation is often discussed in the context of economic growth. In this section, this literature will be reviewed but literature which looks at the broader socials and political impacts well also be covered.

Classical economists in particular David Ricardo's were already thinking of the benefits of trade. His idea of “comparative advantage” states that countries should specialize in producing goods and services they can produce more efficiently than other countries. Even if one country is less efficient in producing all goods compared to another, both can benefit from trade by focusing on what they do best. This allows for more efficient global resource allocation and mutual gains from trade.

Later, the Heckscher-Ohlin model explains that countries export goods that use their abundant resources (like labour or capital) and import goods which use scarce resources which they have less of. It emphasizes that trade is driven by differences in factor endowments between countries. Paul Krugman's New Trade Theory explains that international trade is driven not just by differences in resources (as in traditional theories), but also by economies of scale and consumer preference for variety.

There are also empirical studies, such as the work of Richard Baldwin (Baldwin, 2016), which looks at long-term economic data. His work has shown in the late 1900s, technological advancement led to lower transportation costs (steam ships and trains) and institutional arrangements yielded lower trade tariffs. This led to “1st unbundling” of global trade (1870-1914). The “2nd unbundling” (1990-2009) was due to lowering of communication costs (through telephone and internet). This allowed for production processes to be spread out geographically because they could still be coordinated. Baldwin even predicts a 3rd unbundling where “travel” costs of people will start to drop because of virtual technologies lead to “tele-migration” where people can work virtually in any economy they want. The covid pandemic has already have accelerated this trend, with location or work and residence becoming more and more detached for some jobs.

The 2nd unbundling also meant that rather than production taking place in a single country, it is now characterised by global value chains (Timmer et al., 2014). This has also led to a revisiting of theories such as Rostow’s stages of economic growth. It has become extremely hard for small countries to set up an entire sector (e.g. car production) and Baldwin suggests it is better to only focus on a portion of a global value chain where a country can insert itself rather than trying to build up an entire new sector. Of course, large countries like China and the US, with vast populations and economies have shifted into new sectors, but smaller countries do not have these opportunities given the complex supply chains involved.

International financial integration, a form of globalisation, can also lead to instability with debt defaults from one country proving to be contagious and destabilizing other economies. Example, include the South-East Asia crises of the late 1990s, the international effects of the collapse of Lehman Brothers and the Euro-crisis which was the result of Greek debt defaults (Rodrik, 2011).

The level of globalisation (in terms of goods, services and finance) therefore affects economic development and stability and therefore has an impact through income generation. However, the 2nd unbundling has also had a huge impact on losses in manufacturing jobs in the developed world and large swaths of the population in China gaining employment and being raised out of poverty. The global relocation in employment is sometimes also linked to disenchantment of the working class in developed countries.

Dani Rodrik provides a framework to think the broader wellbeing impacts of globalisation. He proposes that there is a "trilemma" which states that a country can only achieve two of these three goals at once: deep economic integration (globalisation), national sovereignty, and democratic governance. It's impossible to fully attain all three simultaneously (Rodrik, 2011).

Demography

Population is often taken as an exogenous context variable. However, some publications do look at the characteristics of populations (education, gender, age, rural/urban) as an endogenous factor in development. This also has major wellbeing and inequality impacts. Additionally, it is clear that humanity's impact on the planet is greatly dependent on the number of people (Mora et al., 2011). The world would have been very different had population stagnated at 1 billion people in 1820.

Economists have thought about the relationship between population and the economy for a long time. First, a big population could yield to economies of scale – it is easier to get productivity gains if you have a bigger market. The second aspect is the quality of the employment with higher educated employees being more productive (see the earlier discussion about Lucas's human capital models). Third, some economists also argue that as the population increases the number of innovators increases, leading to more ideas (technologies). And finally, there is the issue of participation rates which indicate how many of the population are taking part in the economic process.

The last point is related to the gender and age structure of an economy. An economy which can mobilise more workers will enhance it productive capacity. A core feature for many countries in the last decade has been the fact that women have joined the labour force at much higher rates as before. Robert Gordon (Gordon, 2016) attributes the US situation to technological factors (houses that gained electricity, communication etc) and the fact that many men went to war leaving a big shortage on the labour market. Clearly, enhanced employment of women did not just affect the economy but also has profound impacts on women's wellbeing and gender disparities.

The participation rate is also driven by the age structure of a population. If there are many people in the working age bracket, there is great potential. This is why this is sometimes called the youth dividend. If there is a relatively large cohort of older people, this is referred to as “aging society”.

There is also a lot of literature that that stresses the problematic nature of populations. This is especially due to the scale effect. Warning of the limits of human populations is not new. Probably the best-known publication came from Thomas Malthus who warned that food production would not be able sustain the population (Malthus, 1798). *The Population Bomb* and the *Limits to Growth* report made similar arguments (Ehrlich, 1968; Meadows et al., 1972).

Finally, one dimension which also related to the economies of scale is urbanisation where population tends to congregate towards big cities. It is easier to find jobs and provide amenities and public services because these places are often densely populated.

Institutions

Institutions include the norms and agreements in society both in the formal and informal interactions between people, governments and businesses. Under this definition we also include culture, narratives and ideologies which help to provide a rationale for these institutions. These institutions are the “principal driver” because they actually influence the trajectory of technology, globalisation, economy, demography and thereby humanity’s relationship with nature (see next section).

From the discussions above it is clear that the institutions in communities, countries and globally have a profound influence on history. Many authors have looked at importance of institutions in economic growth, but many also look at these issues from a broader perspective on progress. As we will see, a lot of the literature focused on the role of institutions and narratives in exacerbating or reducing inequalities.

Before focusing on the relationship between institutions and inequalities, we will first look at publications that deal with the average improvements for citizens. Some focus on the cultural or religious dimensions to economic growth. Max Weber accredited the rise of the West as being part of the protestant ethic (Weber, 1905). Joel Mokyr also stresses that in explaining the British industrial revolution, it is not sufficient to point to the steam technologies, but also an entrepreneurial culture which conducive to applying these technologies (Mokyr, 1999). Brad de Long adds that businesses also started to create labs for R&D starting from around the 1870s onwards (DeLong, 2022a).

As mentioned, a lot of publications on institutions focus on the whether they affect inequality. But the mechanisms differ per author. For example, Karl Marx argued that capitalist systems inherently will exploit the workers to the point of revolution (Marx, 1867). In *Why nations fail* the argument is made that the most successful countries/civilisations are those that are capable of power sharing, will avoid creating “extractive institutions” that enrich a small elite (Acemoglu & Robinson, 2012).

Van Bavel stresses that once markets were created for production factors like labour are crucial in understanding the enormous concentration of wealth (van Bavel, 2016). Historically, the expansion of these markets interacted with increased personal freedoms and economic growth, creating a positive feedback loop that benefitted society. However, Bavel argues that this is accompanied by the emergence of an elite class that accumulates financial assets, natural resources, and services. The concentration of economic power fosters growing political inequality, as market elites convert their wealth into political influence, allowing them to shape policies in their favour. Over time, this dynamic leads to a slowdown of economic growth, increasing social polarisation and a decline in welfare for the broader population. You might argue that this is indeed what is happening in recent years.

There is also literature that looks at the ideologies and narratives that are used to justify the inequality regimes. Piketty, in *Capital and Ideology*, argues that the ideologies are crucially important in how inequality narratives are framed in order to convince citizens (Piketty, 2020). This is similar to the book *Narrative economics* by Robert Shiller which also argues that narratives can have profound effects on social structures and economic development (Shiller, 2019).

Steven Pinker (2018) sees a central role for rationality as a driver of development. He describes the importance of reason, science, and humanism as driving forces of progress. The application of the standard of reason to understand the world, as opposed to dogma, mysticism, or faith, is described as the most important condition. He argues that the reason has led to the rise of scientific methods like of scepticism, fallibilism, open debate, and empirical testing, which paved the way for many scientific innovations which influenced lives profoundly. Humanism, which is defined as prioritizing the wellbeing of men, women, and children over the glory of the tribe, race, nation, or religion, provides a secular foundation for morality, and therefore moral progress. Pinker describes that people's circle of sympathy will expand from the family and tribe to embrace all of humankind, especially as reason goads us into realizing that there can be nothing uniquely deserving about ourselves or any of the groups to which we belong. Pinker also discusses the important role of institutions. Governments, laws, schools, markets, and international bodies are seen as important social contracts designed to enhance the welfare of citizens by coordination their behaviour and discouraging selfish acts. According to Pinker, these dynamics have inevitably led to great human progress in the past two centuries.

Hannah Ritchie (2024a) shares Pinker's positive outlook on the great achievements of the past two centuries and humanity's potential for a brighter future. She is however more critical of the environmental harm that humans have inflicted on the Earth along the way and stresses the large challenge that comes with this. Ritchie describes how actions in the sphere of (informal) institutions and technology can help to address the current sustainability challenges and how we can become the first generation to generate inclusive and sustainable wellbeing.

In the field of institutions, a special role is taken up by organisations that create transboundary collaborations between nations. The vast majority of history has been dominated by exploitation and colonisation of civilisations by others. When looking at history many of the empires or civilisations that are deemed "successful" usually

had a great expansive tendency in terms of subjugating and colonizing other peoples. Slavery, exploitation, conflicts and wars were the result. After the second world war a historically unique global governance framework emerged, the United Nations, and the Bretton Woods institutes (World Bank and IMF). While these institutes have contributed to the peace and economic development, some argue that these international institutes entrench old power structures. In some cases, policies by the World Bank and IMF have also hampered progress (see Chapter for Africa).

Nature

The above drivers are all within the realm of socio-economic developments. Yet, a society and economic can only exist in the context of the natural system. The role of the environment in the analysis of societal progress has many dimensions. The natural system provides inputs for the economy such as raw materials, fossils fuels and land. But nature is also air to breathe, the climate system and the embeddedness in a global ecosystem with 8.3 million species (Mora et al., 2011).

The resource perspective stresses that nature provides many inputs which have driven economic development. While in traditional economic models only capital and labour are defined as inputs, a lot of literature looks at the specific endowment of land and natural resources that a country has. In fact, some authors such as Jared Diamond, Montesquieu and Jeffrey Sachs see a special role for geography. For example, Sachs argued that the geographic characteristics of Africa are the reason for African countries lagging behind. There are also examples of societies being heavily impacted by diseases (The Black Death or the introduction of disease by the Spanish in South America) (Diamond, 1997).

Special attention in paid in the literature to the role of fossil fuels and other metals and minerals. Authors like Warr and Ayres make the argument that fundamentally the past 200 years should be explained by the adoption of cheap fossil fuels (Warr et al., 2010; Warr & Ayres, 2012). Similar to Smil, they argue that society was just infused with a whole trove of energy, where in the past only human and horsepower were available (Smil, 2017). Because of the importance of fossil fuels, metals and minerals in the global economic system, attention also started to shift towards these finite quantities running out. Probably the best known is the 1972 Limits to Growth report expanded this depletion argument to a broader swath of resources (Meadows et al., 1972). Jared Diamond's books on collapse make similar arguments (Diamond, 2005).

These arguments pit demographic developments against natural limits and point to the environmental collapse and subsequent demise of civilisations. This is not a new argument, Thomas Malthus, way back in 1798 already argued that it would be impossible to feed an exponentially growing population if agricultural production only increased linearly (Malthus, 1798). Some of these predictions, such as those of Malthus, have been debunked because they didn't take on improvements in agricultural productivity. The outcomes of the *Limits to Growth* report were also immediately debated are the report was published.

Note that having natural resources does not automatically lead to progress. There is ample literature which argues that countries can suffer from a so-called “resource curse”. That is that the right governance structures are not in place to manage the resources and societies devolve into conflicts and extractive institutions where only the elites profit. Many countries that fall under the resource curse are examples of “failed states”. The countries that escape the resource curse, Norway and Botswana have institutions that manage these resources well (Acemoglu & Robinson, 2012).

In the last 2-3 decades the focus on nature has shifted from a resource-focus to the planetary boundaries perspective (Rockström et al., 2009). These are natural systems which humanity is disrupting and would have a profound effect on the future. Some impacts of climate change are already being felt, but the majority of this threat lies in the future (Calvin et al., 2023; Kotz et al., 2024). Similar, the long-terms effects of biodiversity loss threaten humanity’s wellbeing in the future (IPBES, 2019b).

Note that the shift to planetary boundaries does not mean that resources are unimportant. For example, the shift away from fossil fuels, will require electrification which his based on very different resources. Also, the shift to renewables might actually lead to a speed up of fossil fuel extraction-a phenomenon knowns as the Green paradox (van der Ploeg & Cees Withagen, 2012).

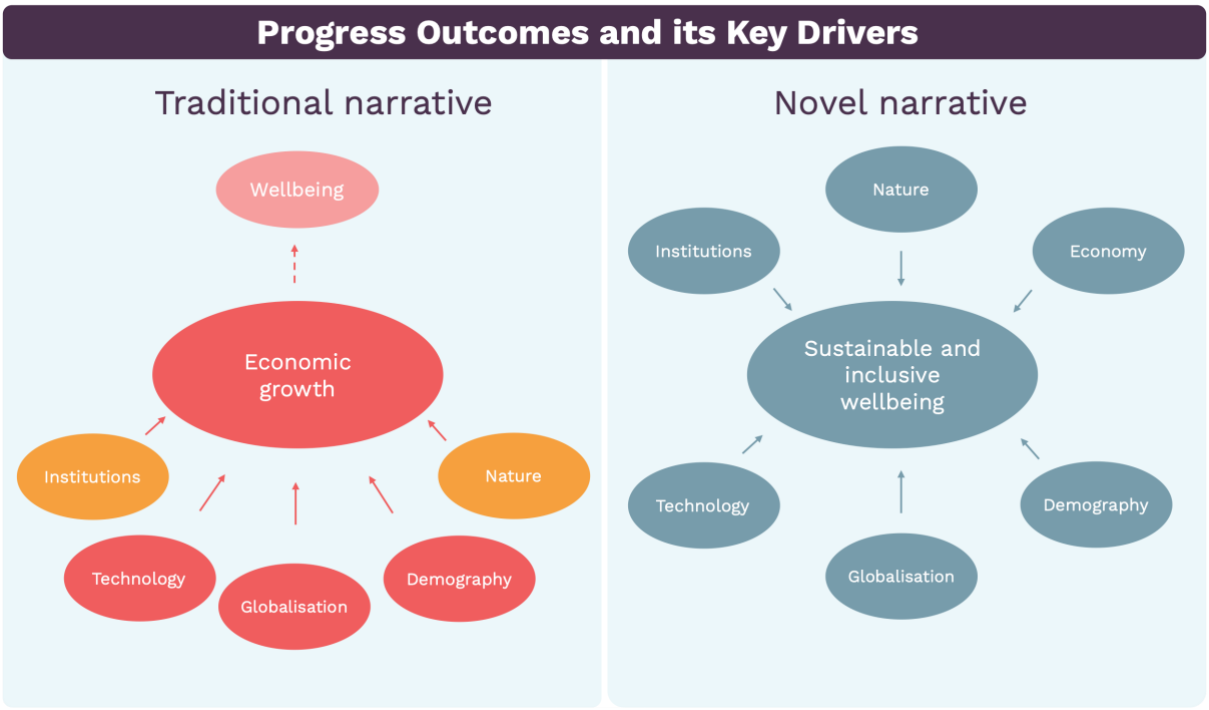
A summary of the framework to examine progress and its key drivers

Our conceptual framework, outlined on the right-hand side of *Figure 1.2* below, integrates the key drivers of wellbeing discussed throughout this section.

Traditional literature on progress typically focusses on economic growth, often assuming—either implicitly or explicitly—that such growth will automatically enhance people's wellbeing (and even inclusion and sustainability), as displayed on the left-hand side of the figure. Most studies emphasize technology, globalization, the primary drivers of economic growth. Most studies look at demography as a context variable or only important in so far as it increases the quantity or quality of labour. Only heterodox economists highlight the role of institutions or the environment as key drivers.

In this report, we take a more comprehensive approach by considering all six drivers and examining their direct contributions to wellbeing. Importantly, we also focus on how wellbeing is distributed across both space and time, as elaborated upon in section 1.2.

Figure 1.2 The traditional and novel narrative on progress and its key drivers



Interactions and direction of key drivers

While the six drivers were discussed as separate factors, they are highly interconnected, influencing and reinforcing each other. For example, the "resource curse" can be explained by the existence of a resource stock (nature) which poorly managed (institutions).

Similarly, if we look at demography it is affected by affluence (economy) and contraception and medicines and treatments, (technology), cultural norms (institutions), economic migration (economy) or droughts and climate impacts (nature). In other words, for a society to make progress, it is not sufficient to do well on one domain. Drivers need to work in synch to lead to higher sustainable and inclusive wellbeing.

The ultimate implication is that none of the drivers have a definite positive of negative impact on sustainable and inclusive wellbeing. The direction of the impacts depends on the interaction of the key drivers, and crucially on the "principal driver", institutions.

1.6 Methodology and Data

Quantitative and Qualitative Assessment

This report uses descriptive quantitative and qualitative analysis. Where possible, quantitative data is used to describe long-term developments. This is supplemented

with qualitative sources that provide historical and regional context, enriching our understanding of societal progress. This approach sets itself apart from much of the existing literature on progress by the following characteristics:

- We adopt an integrated approach to progress, discussing trends in various dimensions of wellbeing in close relation to one another, their historical context, and their key drivers. We do this based on trend analysis, we do not engage in statistical methods to test the relationships between outcomes and drivers formally.
- Our analysis is guided by a theory of progress, defined as sustainable and inclusive wellbeing, and its relationship to six key drivers.
- We consider deep dives into specific regions and time periods, capturing regional and temporal nuances.
- We use the drivers framework to explore potential development paths for sustainable and inclusive wellbeing in the future.

Our work is inspired by the influential *How Was Life?* publications (OECD, 2014a, 2021a). These OECD reports explore a broad array of wellbeing dimensions, tracking them across long time horizons for the entire globe. It also presents a composite index of wellbeing. While our report shares common ground with the OECD's work, particularly in its long-term historical focus and the inclusion of diverse wellbeing dimensions, our report has formalised the definition of progress and emphasize the interactions between different wellbeing dimensions and their key drivers.

Indicators of Wellbeing, Inclusion and Sustainability and Key Drivers

As described in the conceptual framework above, this report is based on 6 key drivers (Economy, Technology, Globalisation, Demography, Nature and Institutions) for three progress outcomes (Wellbeing, Inclusion and Sustainability).

Table 1.2 shows some examples of themes that are covered under each of these 9 categories. These themes give guidance on the indicators which are covered. Indeed, there are many indicators that are covered. Some indicators, such as life expectancy, are used in all chapters because they are relevant for a global perspective, but also in the African, Chinese, European and America contexts. Readers will however notice that there are also differences in the indicators used per chapter. This is because the interpretation and relevance of certain wellbeing, inclusion and sustainability issues is different per region or time period. This indicates that the conceptual framework is flexible and can accommodate regional and temporal nuances.

The indicators for sustainability, which are supposed to provide insights about future wellbeing, all provide data for the present. More formally, these are therefore indicators of the present which affect future wellbeing. As an example, think of current CO_2 emissions which accelerate climate change in the future. Or the extraction of metals, minerals or fossil fuels contribute to depletion of these stocks. But future wellbeing is dependent on more than environmental issues. Phenomena such as aging society (economy), institutional decay (institutions) will also affect future wellbeing.

In the discussions there could therefore be significant overlap. For example, climate change is formally part of the discussion of the key driver "nature". Data on CO_2 emissions is however also important for future wellbeing (sustainability). To avoid unnecessary repetition, we have therefore reduced the scope of the discussions of the "nature" and "sustainability". For nature the discussion concentrates on the resources side (land, metals, minerals, fossil fuels) because they have the most direct (positive) impact on current wellbeing. For the sustainability section, the discussion focuses on those aspects of nature which are the foundation of longer-term problems (climate change, biodiversity loss etc.).

Data Sources

For this report we used and sometimes adapted the WISE database.[1] This is repository for Beyond-GDP indexes and indicators for wellbeing, inclusion and sustainability. It uses many different underlying sources, including:

- World Development Indicators (WDI),
- United Nations (UN),
- Changing Wealth of Nations (CWON)
- World Inequality Database (WID).
- CLIO-infra
- Maddison Database
- Penn World Tables
- World Health Organization
- Global Health Observatory (WHO-GHO),
- World Economic Outlook (WEO)
- World Energy Consumption data base (WEC).

In some cases, regional dataset was used. For example, the Ibrahim Index for African Governance (IIAG) was used for this continent.

It is well known in historical datasets that, as we look back into history there can be a lack of data, or the data becomes unreliable (although there are a few exceptions where older time periods have better data for certain topics). It is also the case that different regions of the world have different statistical maturity (Jerven, 2013). Therefore, data quality differs throughout the analysis. For a more in-depth discussion on data-quality, refer to the original data sources.

[1] www.beyond-gdp.world

Table 1.2 Example of Metrics for Progress Outcomes and Key Drivers

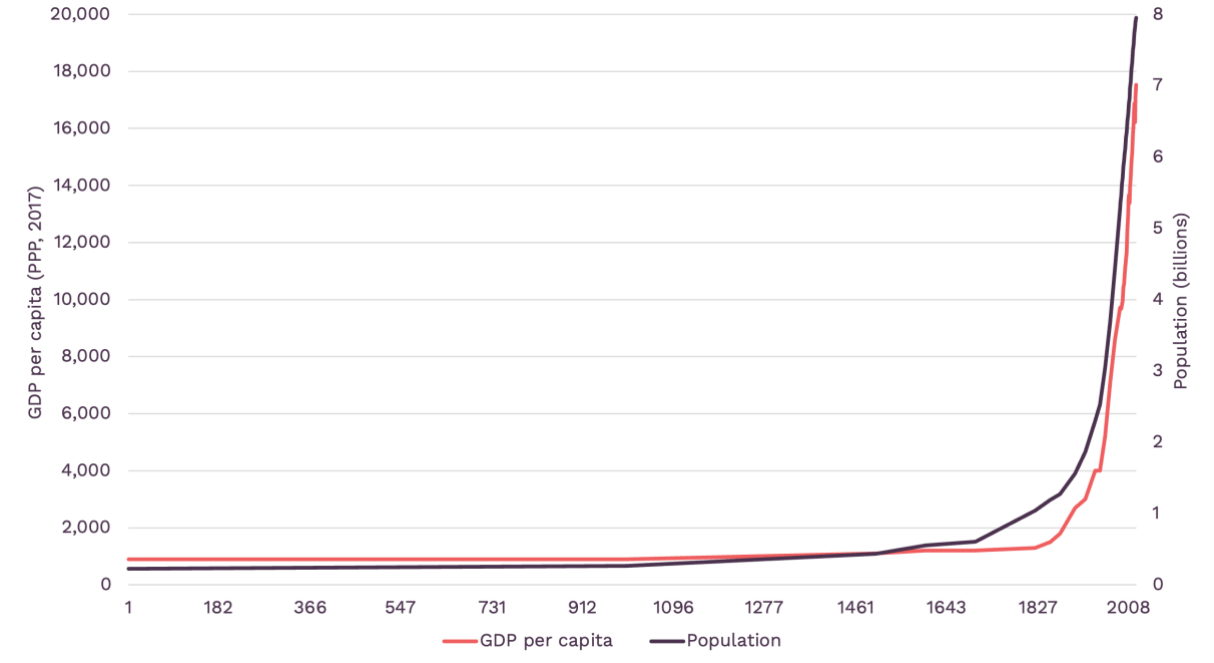
	Category	Themes covered
Key drivers	Economy	Economic growth, labour market, productivity, financial sector
	Technology	Energy transitions, agricultural technologies, digitalisation
	Institutions	Ideologies, narratives, national and international governance, geopolitics
	Globalisation	Transport, trade, communication
	Demography	Population growth, ageing society, youth dividend, urbanisation
	Nature	Ecosystems, resources, land-use
Outcomes	Wellbeing	Human development, subjective wellbeing, material wellbeing, life expectancy, education, living conditions and services, safety, work, subjective wellbeing
	Inclusion	Poverty, income inequality, wealth inequality, gender inequality, inequality in life expectancy, inequality in education
	Sustainability	GHG emissions, use of electricity, renewable energy, freshwater resources, deforestation, biodiversity/ threatened species, government debts, total wealth, human capital, natural capital

CHAPTER 2. A GLOBAL ANALYSIS OF WELLBEING SINCE 1820

2.1 Introduction

For hundreds and hundreds of years, living standards haven't changed very much over generations. Children would generally have the same type of shelter, food, and daily activities as their parents and grandparents. This stands in stark contrast to the fast-changing world today, where children generally live in a world that wasn't even imaginable 30 years before. The accelerated rate of change that society experiences is reflected in technological change and the exponential growth of the economic system. The world's economy – commonly measured by GDP – didn't grow much for centuries (see Figure 2.1). Then suddenly, the economy expanded almost hundredfold in the period from 1820 until now. The "steady 2-3%" economic growth that many inhabitants of high-income nations grew accustomed too, is incredibly extraordinary from a historical perspective.

Figure 2.1 Global GDP per capita (PPP 2017) and population (billions), 1-2008



Source: (1) GDP per capita: World Bank (2024); Bolt and van Zanden - Maddison Project Database 2023; Maddison Database 2010 – with major processing by Our World in Data (2) Population: Data for the year 1 – 1990 is based on Maddison Database 2010, data from 1990-2009 is based on an average of Maddison (2010) and World Bank (2024), data after 2010 is based on World Bank (2024).

With a 3% growth rate, the size of the economy doubles every 24 years. That means double the amount of goods and services provided in an economy. Especially when basic goods and services are lacking, economic growth can make a real difference to people's lives by improving the availability of food, decent housing, and healthcare. Therefore, economic growth is seen as a driving force to leave poverty behind. However, economic development isn't a magic recipe to create sustainable wellbeing for all. Benefits of economic growth are very unequally distributed, with

the global bottom 50% earning just 8.5% of global income, while the top 10% earned 52% of the total income during the period 1995-2020 (Chancel et al., 2022a). And while the number of multimillionaires is increasing steadily, 1.1 billion people are still living in poverty today (Chancel et al., 2022a; UNDP (United Nations Development Programme)) & OPHI (Oxford Poverty and Human Development Initiative), 2022).

Furthermore, it's increasingly clear that the current economic system has severe negative impacts on the planet, threatening the livelihood of millions of people and species every year already (IDMC, 2022; IPBES, 2019b). As humanity is approaching multiple environmental tipping points, the resilience of the environmental, economic, and social systems are at risk, potentially affecting the safety of billions of people (IPCC, 2023; Richardson et al., 2023). While the youth is increasingly worried that humanity has reached the end of progress (Hickman et al., 2021), voices are rising to redefine economic priorities and change the way societies are governed.

To inform this debate, it is imperative to assess the historical development of human progress and its key drivers inside and outside the economic domain. As described in Chapter 1, theories of societal progress and stagnation point towards the importance of demography, economy, technology, globalisation, nature and institutions. This chapter will provide a historical overview of historical developments in these key drivers and how they influenced wellbeing globally. We will first present a high-level overview for the period 1820-now, and then go more into depth on developments in four sub-periods, being 1820-1913, 1914-1949, 1950-1989, 1990-now. After that, we will reflect on the main conclusions of this chapter.

2.2 Methodology

This chapter presents a descriptive quantitative and qualitative analysis on the global development of wellbeing, inclusion, and sustainability in the world for the period 1820-now. The aim is to provide a comprehensive overview of how sustainable and inclusive wellbeing has evolved over time, highlighting key trends.

Geographical scope

This chapter's ambition is to provide a global analysis. However, some regions are discussed more than others. This is influenced by data and literature availability, whether global regions stand out (positively or negatively), and a link to the deep dives in this report.

The report presents both global averages and developments in global regions. The aggregation of global regions is dependent on the data source used. For example, the OECD reports on "Western Offshoots", referring to Canada, USA, Australia, and New Zealand, while the World Bank reports on "North America" and "East Asia & Pacific". While the variety in regional groupings demand some active attention from our readers, we preferred to use the regions of the original datasets. Some of the time series go back as far as 1820 and the original authors spent great effort in handling missing data and creating regional aggregates. One exception is the regional

data of the Augmented Human Development Index (AHDI) by Prados de la Escosura in which aggregates were recalculated to ensure consistency to other regional groupings.

This chapter focusses on global regions based on geographical scope. However, it is quite common in literature to base regions on the level of income or economic development. Recent research often focusses on two specific groups: countries with a relatively higher level of economic development and countries with a relatively lower level of economic development. A term commonly used to emphasize the dichotomy between these two global regions is 'Global North' and 'Global South'. A footnote listing the countries of these specific groups is inserted when these terms are used. In a few instances, there is not enough data available to discuss results for global regions. In that case, developments of a small selection of countries are presented.

Historical scope

The report focusses on the period 1820-now. The 19th century is often seen as the first century in which large-scale societal changes start to occur. The year 1820 was chosen specifically because of data availability. The pre-1820 period is only considered to a limited extent, for example to explain the long-run history of colonisation and to consider the impact of the Enlightenment. A combination of trend analysis and qualitative analysis has been used to define distinct time periods to structure this historical overview. The four time periods are:

- 1820-1913
- 1914-1949
- 1950-1989
- 1990-now

Data

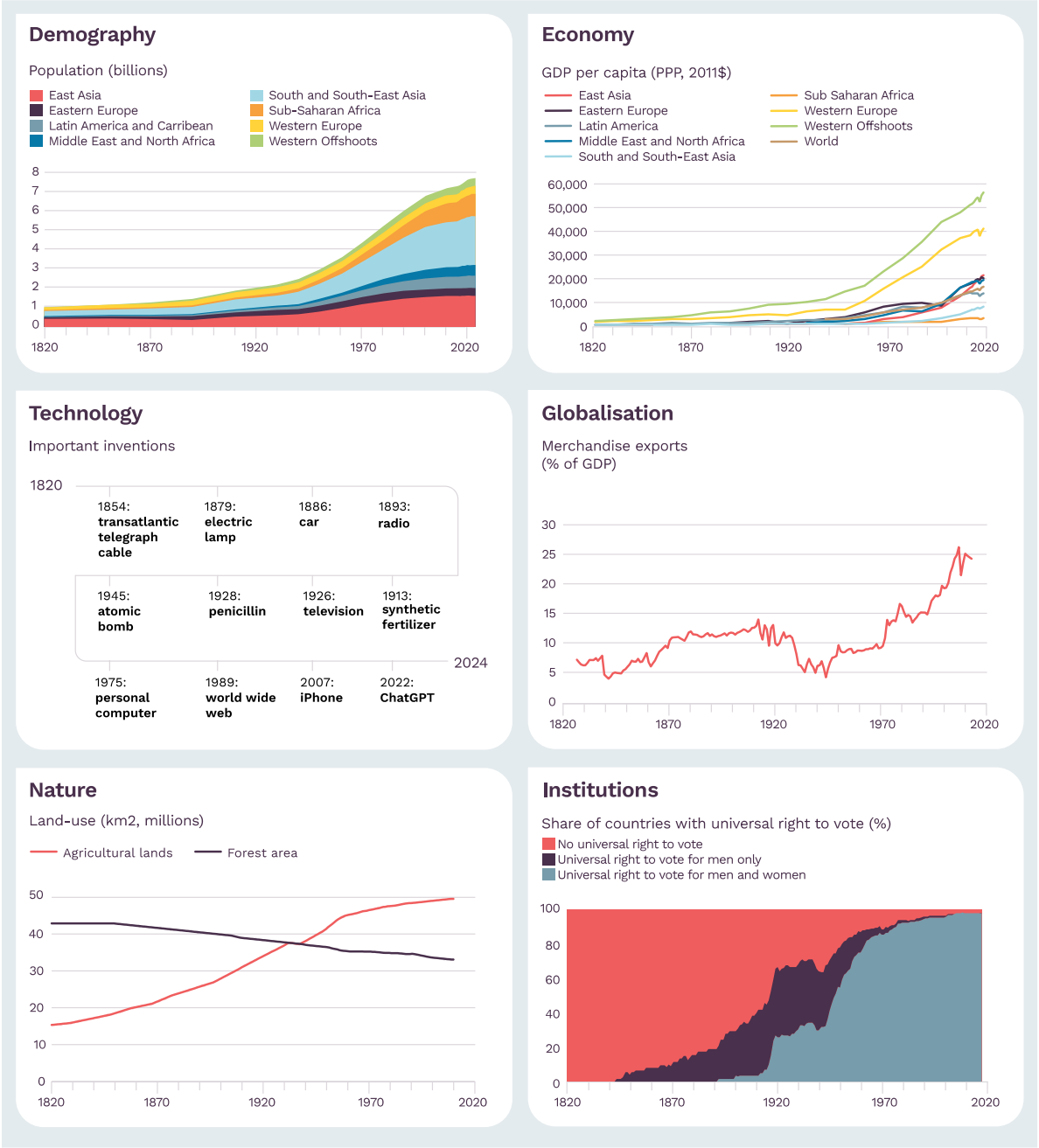
To measure the progress outcomes (wellbeing, inclusion and sustainability) and the key drivers (economy, technology, globalisation, demography, nature and institutions) a wide variety of data sources has been used that are referenced in-text. Some of the most referenced quantitative data sources include the OECD (Organisation for Economic Co-operation and Development) How was Life? reports, which are based on the CLIO-Infra database, and a selection of data from various sources that have been processed by Our World in Data. For more recent data, the World Development Indicators (WDI) from the World Bank and data from the United Nations Development Programme (UNDP) have been used extensively. Qualitative data is based on several sources including books, reports, and academic literature. Data quality differs throughout our analysis and is often lower for periods further back in time and for regions in which statistical agencies developed later in time or limited in general. For a more in-depth discussion on data-quality, refer to the original data sources.

2.3 Brief overview of developments from 1820 until now

This section provides a high-level snapshot of key drivers and its impacts on wellbeing, inclusion, and sustainability from 1820 until now on a global level. Subsequently, these developments (and others) will be elaborated for the 4 time periods in sections 2.4-2.7.

Key drivers

Figure 2.2 Key drivers in summary figures



Source: 1. Population (Bolt & Van Zanden, 2024), 2. GDP per capita (Bolt & Van Zanden, 2024), 3. Technology various resources, Exports (Fouquin and Hugot CEPII 2016) – processed by Our World in Data, 4. Land-use (Pongratz et al., 2008), 5. Right to vote (Skaaning et al. (2024) – processed by Our World in Data

The period of 1820 until now is a period with an unprecedented rate of change. The global population grew from less than 1 billion in 1820 to 8 billion in 2024 (Figure 2.2). That is 8 times as many people that need water, food, shelter, and other critical consumption goods to live a decent life. This population boom was largely enabled by technological innovation, including energy transitions, the agricultural revolution, and medical advances, which broke the “Malthusian spell”—the idea that population growth would outgrow its means of subsistence, leading to widespread poverty (Malthus, 1798).

Technological advancements profoundly transformed food production, making it possible to feed billions more people. By the mid-19th century, 25 men were needed to harvest and thresh a ton of grain in a day, but today, a single person using a combine harvester can do it in just six minutes (Norberg, 2017). The invention of synthetic fertilizers in the 20th century further boosted yields, doubling or tripling them in some regions since 1960. Today, nearly half of the global population depends on synthetic fertilizers for food (Erisman et al., 2008). Medical innovations such as the discovery of blood groups, penicillin, vaccines, and improved sanitation have also significantly increased life expectancy. The discovery of the existence of different blood groups in 1901 which enabled blood transfusion, is said to have saved more than 1 billion lives (ScienceHeroes.com, 2022).

Technological innovation also fuelled globalisation, beginning with railways and coal-fired steamships that expanded global trade. In combination with innovations in communication technologies such as the development of an intercontinental telegraph network and the fax, and a lowering of trade tariffs this allowed the geographical separation of production and consumption, sometimes referred to as the First Unbundling (Baldwin, 2016). With the rise of Information and Communication Technology (ICT) in the late 20th century globalisation accelerated even further, enabling the international separation of companies. Globalisation stimulated economic growth in a number of ways including the facilitation of efficiency gains following specialization, increased competition, and economies of scale. Technological developments also influenced economic growth directly, for example by enabling the mechanisation of production processes and the automation of administrative tasks, boosting productivity.

As countries specialized and production processes advanced, global GDP per capita skyrocketed from $1,128 in 1820 to $15,461 in 2020—a 1370% increase, even as population grew eightfold (real GDP per capita in 2011$, PPP converted) (Bolt & Van Zanden, 2024). However, the benefits of this economic growth have been unequally distributed. GDP per capita was already unequally distributed across global regions in the 19th century, which for a large part can be traced back to the heritage of imperialism. However, inequality between regions would increase much more during the 20th century. Colonisation played a huge role in this. At its peak in the 1920s, Europeans colonised more than 90 countries (Becker, 2019). Since the 1980s, inequality between countries declined and inequality within countries became the main force of global inequalities. Deregulation of the financial sector and changes in taxation policies stimulated increasing inequalities within countries.

Developments related to demographics, the economy, technological innovation, and globalisation, were fundamentally reliant on developments in the natural environment. Nature has played, and continues to play, a critical role in the provisioning of food, energy, medicines, greatly impacting people's wellbeing (IPBES, 2019b). For centuries, people relied on wood, dried manure, muscle power, wind, and water mills for basic needs like heating, cooking, and grinding grains, with animals aiding in transportation. The Industrial Revolution marked a shift to more energy-dense fuels like coal, and later oil and gas (Smil, 2017), driving major societal changes and boosting economic development.

However, through the extraction of natural resources, ecosystems might be degraded. During the 20th century alone, a forest area the size of the United States lost, impacting ecosystems and climate (Ritchie, 2021). Human-induced environmental degradation also affects human health directly. Modifiable environmental risks such as air pollution, unsafe use of chemicals, and climate change, now contribute to nearly one-quarter of global deaths annually (World Health Organization (WHO), 2024). Throughout this report, when considering nature as a key driver of wellbeing, we focus on the environmental factors that impact wellbeing positively. This often relates to the perspective of the provisioning of resources. In the sustainability section on the other hand, we look at environmental developments that might negatively affect the wellbeing of current or future generations.

In the end, the impact of changes in population, economy, technology, globalisation, and the environment, largely depends on institutional structures. The shift from ternary societies to ownership societies with individual property rights for example, has been very influential in determining how the key drivers impact different groups in society. While individual property rights increased, actual property ownership was still centralized among a small elite, keeping inequalities intact (Piketty, 2020).

The rise of democratic governance on the other hand, which limits the executive power through mechanisms such as rule of law, an independent judiciary, and constitutionally protected civil liberties, is believed to improve the protection and effective realisation of human rights. Suffrage rights have seen a tremendous increase from 1820 until now, initially for men and later on for women too (Skaaning et al., 2024), positively affecting human agency (Figure 2.2).

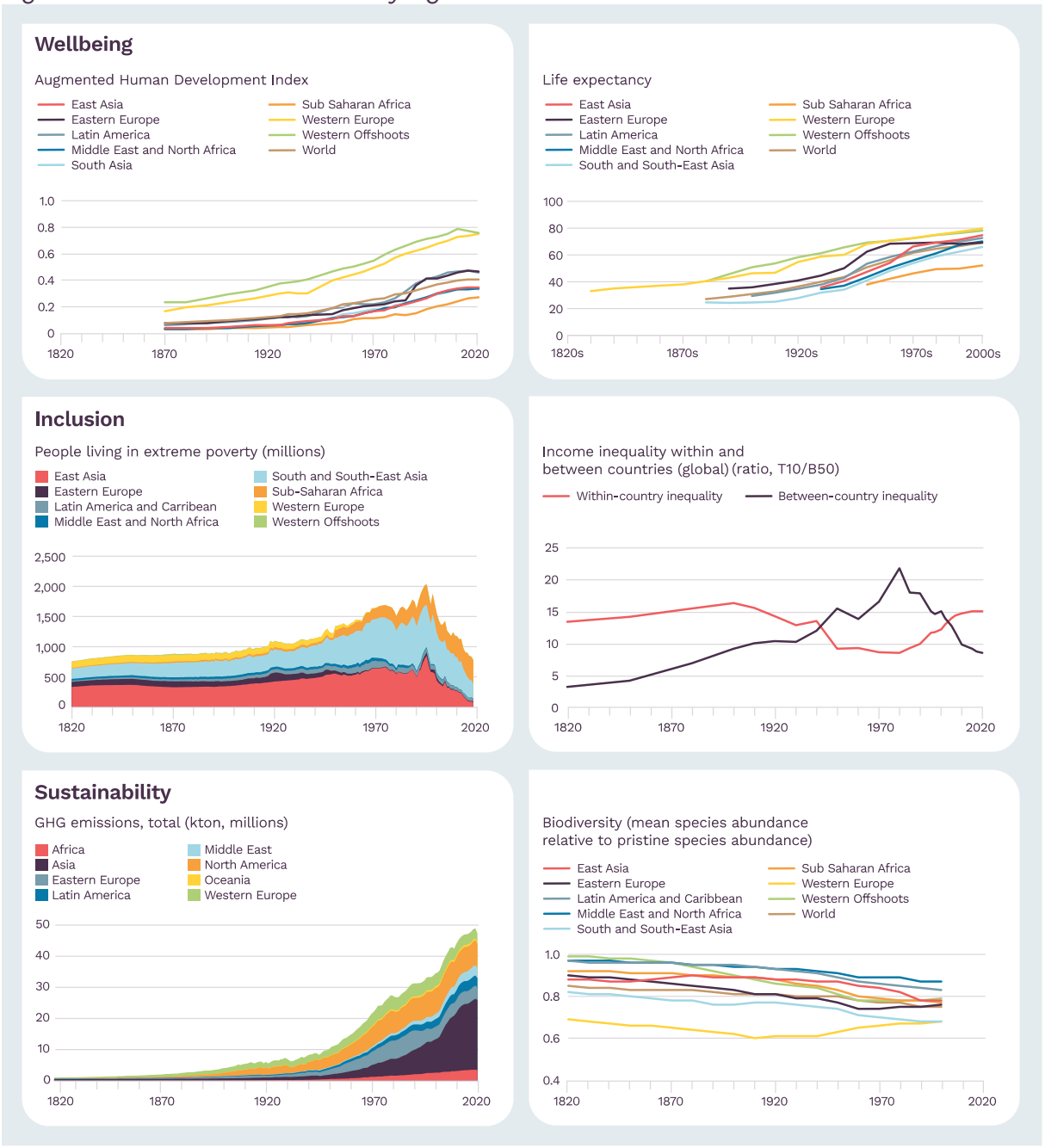
Another influential institutional structure is the welfare state. Social security legislation started to occur in Northwestern Europe and the US after the formation of a working class demanding better working conditions. In 1900, merely 7,5% of countries had social protection measures for employment injury, in 2020 its 96.8% (International Labour Organization, 2020), greatly enhancing life satisfaction, especially for those at risk of income loss (Anderson & Hecht, 2015).

Other examples of highly influential institutional structure are international governance and geopolitical relations. The Kyoto Protocol from 1997 for example, proved impactful in reducing GHG (Green House Gas) emissions (Kim et al., 2020). Geopolitical tensions on the other hand, generally have more negative impacts. Trade wars, for instance, typically damage the economies of all parties involved, while the impacts of armed conflict are even more severe and far-reaching.

Outcomes

We have seen how important key drivers of progress developed in the past two centuries. This section discusses how these key drivers have influenced wellbeing, the distribution of wellbeing (inclusion), and environmental sustainability, defined as the environmental factors affecting the potential wellbeing of future generations.

Figure 2.3 Outcomes in summary figures



Source: 1. Augmented Human Development Index (Prados de la Escosura, 2021), 2. Life expectancy (OECD, 2014a), 3. People living in extreme poverty (OECD, 2021a), 4. Income inequality within and between countries (Chancel et al., 2022b), 5. GHG emissions per region (Malanima, 2022), 6. Biodiversity (OECD, 2014a)

Wellbeing

When it comes to average wellbeing, we can conclude that lives today are in general much better than two centuries ago, no region excluded. This is for example well-illustrated by the AHDI, which combines achievements in health, education, material living standards, and political freedom (Figure 2.3). Let's look at these wellbeing developments a bit more closely.

To start with one very fundamental fact indicative of overall health: Average life expectancy has risen dramatically, from 28.5 years in 1820 to 72 years in 2022 – an increase of over 40 years (OECD, 2014a; UNDP (United Nations Development Programme), 2024). Even in regions with low life expectancy, life expectancy has more than doubled to around 60 years (Dattani et al., 2023). Education levels have also improved, with average years of schooling rising from 1 year in 1850 to 8 years in 2010. Historical data on the quality of education is not available, but it can be assumed that educational quality has been improved as well. The increase in education enhances wellbeing by providing individuals with more control over their lives (OECD, 2014a). Material living standards have surged, with GDP per capita growing over 10-fold from $1,128 in 1820 to $15,461 in 2020 (real GDP per capita in 2011$, PPP converted) (Bolt & Van Zanden, 2024). If we correct for the fact that GDP includes both consumption and investment expenditure and we focus on consumption alone[2], we can conclude that for the average person today, there is roughly 7-14 times as much money to spend on food, shelter, clothes, medicine, and education. Additionally, the quality and variety of available products have improved, meaning material living standards have increased even more than GDP per capita suggests (Brynjolfsson & Mcafee, 2014).

In industrialised countries, the amount of time people spend working in a year declined dramatically since the start of the industrial revolution. Amongst OECD countries, workers in manufacturing worked 60 to 90 hours per week in the 19th century, as compared to roughly 40 hours today (OECD, 2021a). The reduction in hours worked and the increase in leisure time have substantial positive implications for wellbeing.

Inclusion

While these developments are indicative of broader trends in society, it's important to not just look at average global numbers. For life expectancy we see substantial differences between global regions. For example, the average life expectancy of someone living in the Western Offshoots (United States, Canada, Australia, New Zealand, regions of immigration from Western Europe that shared a common developmental path) in the 1910s was higher than for Sub-Sahara Africa in the 2000s

[2] GDP includes both consumption and investment expenditure, so this doesn't fully translate into people's consumption expenditure, which is the most interesting indicator from a wellbeing perspective. Unfortunately, there's limited data availability on consumption this far back in time, so we can only estimate what this means for consumption. Generally, between 50% and 100% of GDP is consumption expenditure, with the number being higher in poorer countries and lower in richer countries (OECD, 2014a).

(OECD, 2014). Where you're born can mean a difference of up to 32 years in life expectancy; for example, it's 52 years in Chad or Nigeria compared to 84 years in Japan or Australia in 2020 (UNDP (United Nations Development Programme), 2024). Data shows a convergence in life expectancy since 1950, with rapid increases in East Asia, South and Southeast Asia, and MENA regions, while Sub-Saharan Africa has been catching up since the 2000s (OECD, 2014a).

Education has increased across all regions, but disparities remain. In 2010, the Western Offshoots had over 13 years of schooling on average, while Sub-Saharan Africa had only 4.2 years. Though the gap between these regions started narrowing after 1990, it still stood at 9.3 years in 2010, and 3.5 years compared to the global average. In addition, there are differences in the quality of education, which widens this gap even further.

While GDP per capita has risen everywhere since 1820, the income gap has widened significantly. In 1820, the richest countries had a GDP per capita 5 times that of the poorest; by 2022, the richest had 250 times more, with Monaco's GDP per capita being 930 times higher than Burundi's (Bolt & Van Zanden, 2024; World Bank, 2024). Between-country inequality, as measured by the ratio of the top 10% to bottom 50%, grew rapidly from 1820 to 1950, continued at a slower pace until 1980, and has declined since then, largely due to China's rise. Despite this decline, between-country inequality remains double that of 1820. Global income inequality has also worsened: in 1820, the top 10% earned 18 times more than the bottom 50%; by 2020, they earned 38 times more (Chancel et al., 2022a).

Within-country income inequality illustrates a different development trajectory, where the current level of inequality is similar to 1820. However, within-country inequality did experience a decrease from 1900 until 1980. The World Wars and Great Depression hit people in the top of the wealth distribution the most (Collier, 1998; Piketty, 2014). Rising social spending and progressive taxation also played a role. With the rise of neoliberalism in the 80s, we see within-country income inequality start to rise again (Chancel et al., 2022a).

Another important aspect to inclusion is deprivation, or poverty more specifically. In 1820, roughly 75% of the world population, about 756 million people, could not afford a tiny space to live, food that would not induce malnutrition, and some minimum heating capacity. The total number of persons living in extreme poverty in 1820 is almost identical to the estimate for 2018, which stands at 764 million people (OECD, 2021b).[3] But this does not mean that no progress has been made. When looking at relative poverty (the share of population living in poverty), it has decreased tremendously.

When looking at the distribution of different extremes of poverty, we see that the share of people not experiencing extreme or less extreme poverty is declining, while the share of people living on more than $30 a day is increasing. By 2018, global

[3] Poverty can be measured using different methods, like the percentage of people living below a certain level of income – usually USD 1.90 per day -, or by using the cost of basic needs (CBN) method, which calculates poverty lines for every year and country separately. These are two types of examples of measuring *extreme* poverty. Both metrics illustrate a similar development of extreme poverty.

extreme poverty dropped to 10%. The fastest drop in the entire period took place between 1995 and 2018. While this is great improvement, there is still much progress to be made.

It is also important to look at wellbeing distributions beyond population groups that are defined by income. Aspects such as gender, age, or ethnicity may play a role. Generally speaking, we can say that inclusion of different population groups has improved over time. While there is not one indicator that is able to capture this for the period of 1820 until now, and data availability is limited on this topic, there are some convincing indications such as the expansion of voting rights, decreasing gender inequality, and more recently, increasing rights for LGBTQIA+. For gender, data is available starting in 1900. On a global level, the ratio of female-to-male average years of schooling has increased from 51% in 1900 to 80% in 2010. The ratio of female-to-male labour force participation increased much less, from 48% to 63% globally. While progress has been made, there is still an incredible potential for further inclusion, especially as human rights is declining since 2014 according to the Civil Liberties Index (V-Dem (2024a) – processed by Our World in Data).[4]

Sustainability

Developments related to population, economy, technology, globalisation, nature, and institutions affect both the wellbeing of generations living in a specific time, but also the potential wellbeing of future generations. When considering nature as a key driver of wellbeing as discussed above, we focus on the factors that impact wellbeing positively. In this subsection, we will look at environmental developments that might negatively affect the wellbeing of current or future generations.

A common way to look at environmental pressures affecting wellbeing is by consideration of "planetary boundaries". Planetary boundaries refer to the physical and biological limits of the global Earth system that should be respected to maintain planet's human-friendly living conditions. The planetary boundaries concern: Novel entities, Stratospheric ozone depletion, Atmospheric aerosol loading, Ocean acidification, Biogeochemical flows, Freshwater use, Land-system change, Biosphere integrity, and Climate change. Currently, six out of nine planetary boundaries are being transgressed, suggesting that Earth is now well outside of the safe operating space for humanity (Richardson et al., 2023). There is political and technological developments that provide some hope for the future – for example, the increasing speed at which renewable energy is adopted (IAE, 2023) – but it is very clear that over the past two centuries, the socioeconomic system has been doing more environmental harm than good. Currently, there's no signs of sufficient global decoupling of environmental impacts from economic growth (Freire-González et al., 2024; Parrique et al., 2019).

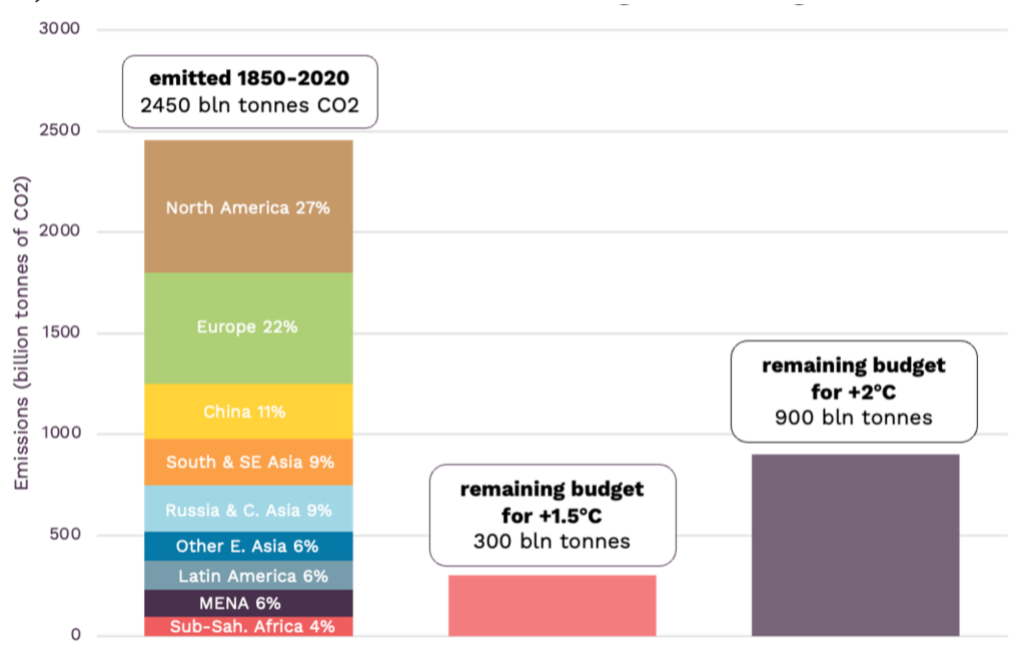
Let's consider climate change more closely. Climate change is caused by the emission of greenhouse gasses (GHG), for example by burning fossil fuels to extract

[4] The civil liberties index gives a best estimate of the extent to which people are free from government torture, political killings, and forced labour, they have property rights, and enjoy the freedoms of movement, religion, expression, and association.

energy, or in the production processes of food and materials such as steel and cement, among other factors. Total GHG emissions have increased tremendously since 1820, from around 1,000 MTon in 1820 to almost 50,000 MTon in 2020. The growth rate was especially large between 1950-1980 and the early 2000s. North America is the biggest contributor to total emissions in all periods, but the rise of Asia since the 1980s also stands out (Figure 2.3). Per capita emissions have been and are largest in the North America, followed by Oceania (Australia and New Zealand), and Eastern Europe (especially in times of the Soviet Union)[5].

While the most vulnerable people suffer the greatest losses, they contributed to climate change the least (Althor et al., 2016). As shown in Figure 2.4, of the total 2,450 billion tonnes of carbon released since 1850, North America is responsible for 27%, Europe 22%, China 11%, South and South-East Asia 9%, Russia and Central Asia 9%, East Asia (including Japan) 6%, Latin America 6%, MENA 6%, and Sub-Saharan Africa 4% (Chancel et al., 2022a).

Figure 2.4 Historical emission vs. remaining carbon budget, 1850-2020 (billion tonnes CO_2)



The graph shows historical emissions by region (left bar) and the remaining global carbon budget (centre and right bars) to have 83% chances to stay under 1.5°C and 2°C, according to IPCC AR6 (2021). Source: (Chancel et al., 2022a)

More recently, energy has become less GHG intensive, and society is more efficient at using energy in production (Malanima, 2022). However, due to continuous increases in population and GDP, the total amount of emissions is still increasing. The accumulation of GHG emissions in the air is already impacting global temperature, approaching the 1.5-degree threshold. Extreme weather events are on the rise, affecting especially the most vulnerable people already tremendously (IPCC, 2023).

[5] Global regions of Malanima (2022) and Chancel et al. (2022a) differ slightly.

Biosphere integrity, in which biodiversity plays a major role, is another planetary boundary that receives more and more attention. Mean species abundance is estimated to have decreased from 85% in 1820 to 75% in 2000, meaning in 1820 there was already an average decline of 15% in the presence of original species relative to a state of the world which is not disturbed by human activities (OECD, 2014a). More recently, biodiversity loss is increasingly endangering global food security by reduced pollination and weakened resilience of agricultural systems against threats like pests, pathogens, and climate change. Additionally, the degradation of land and coastal habitats increases the risks from floods and hurricanes (IPBES, 2019b). Hence, the loss of biodiversity poses a severe threat for the wellbeing of both current and future generations.

Emission of air pollutants such as nitrogen oxide, black carbon, sulphur dioxide, ammonia, carbon monoxide, is another factor impacting wellbeing. Air pollutants started to rise around 1800, with an accelerated speed from the 1950s onwards. The combined effects of ambient air pollution and household air pollution are associated with 6.7 million premature deaths annually (WHO, 2024). More recently, the total number of deaths from air pollution is still rising globally in the period after 1990, although the rate of people dying from air pollution is falling in all global regions (Institute for Health Metrics and Evaluation, 2024).

The next sections will look more closely at different time periods to enhance our understanding of the relationship between the key drivers and wellbeing outcomes over time.

2.4 Progress for Some (1820-1914)

Key drivers

The period 1820-1914 is highly characterised by the Industrial Revolution. Foundations of an economic and social order were created that influenced the newly globalized world for decades. Improvements in living standards in this period are mostly limited to industrializing countries in Western Europe and Westerns Offshoots. Impacts outside this region are generally neutral key drivers related to changes in population, economy, technology, nature, and institutions interchangeably as these processes are highly interrelated.

In 1820, the Industrial Revolution was very influential in the United Kingdom. The invention of mechanised cotton spinning, the steam engine, and coke smelting for iron production had a big impact on the way people lived. It was not long before the railroad and steamship appeared on the scene and neighbouring countries got on the bandwagon too. Urbanisation ratios from that time show a clear increase in Western-European countries, Western offshoots (US, Canada, Australia, and New Zealand), and some countries in Latin-America and Northern Africa (Fink-Jensen, 2015).

The coal-fired steamship, railroad networks, and a global telegraph network boosted globalisation. As production and consumption of primary materials such as sugar and cotton no longer had to be in the same place, markets expanded globally. A

phenomenon that Richard Baldwin calls the "First Unbundling" (Baldwin, 2016). Figure 2.2 shows an increasing rise of global exports starting around 1870. Production however, clustered in a selection of early-industrializing countries. The Industrial Revolution had happened to start in the United Kingdom, with neighbouring countries and their offshoots benefitting first (Goldstone, 2002).[6] Industrial clusters were a breeding place for technological and scientific innovation, leading to the production of more, better and new goods that would change the way people lived. Even quite simple machines increased human productivity by a factor of hundreds (Ayres, 2021). From around 1870, productivity growth was able to outpace population growth, effectively escaping the Malthusian trap (DeLong, 2022a).

Inventions during this period included the telephone, the gramophone, light bulbs, automobiles, and cameras (Lewis, 1978). However, only a small elite had access to all these new goods. For most people in the industrialised world, living standards in the 1870s were still dismal. John Stuart Mill described that the mechanical inventions created deep social inequalities: for some they generated "a life of drudgery and imprisonment" while for others it allowed them "to make fortunes" (Mill, 1865).

While the number of rural farmers started to decline and more people started to work in manufacturing, an urban working class emerged. And with it, a united demand for better working hours. People were working 11-14 hours a day in strenuous conditions (Hopkins, 1982; Pred, 1981). In 1886, hundreds of thousands of American workers joined trade unions and on May 1st, the American Federation of Labour declared a general strike to fight for an eight-hour workday (which they worked six days a week). Throughout the month May, protests occurred in cities throughout the US (Biggs, 2003). Similar albeit smaller labour movements occurred in Europe from 1850 onwards (Geary, 1999).

The rapid social transformation, growing political mobilisation of workers, and demands for democratization caused a break in the previous-dominant liberal political principles. In Germany, social insurance schemes were developed related to diverse issues. Programmes for sickness (1883), accident (1884), and old age and invalidity insurance (1889) were implemented over the course of six years. Governments also increasingly began to take an interest in other social issues including public education and public health. Governments expanded their focus from the traditional task of protecting its citizens from foreign intrusion and violence to social protection (Kuhnle & Sander, 2021).

The increasing rate of industrialisation, and the underlying technologies and applied sciences that drove it, changed the way people looked at the world. Karl Marx and Friedrich Engels describe the "subjection of Nature's force to man" in 1848 (Marx et al., 2012). The advancement of science and technology led to new beliefs about human's place in the universe, strengthening changes in world vision that had already

[6] Literature illustrates that the United Kingdom was not superior to other countries. Both China and Japan were headed in the same direction as England in 1600-1800: toward a society embodying the bourgeois values of hard work, patience, honesty, rationality, curiosity, and learning. They too enjoyed long periods of institutional stability and private property rights. However, China and Japan are thought to have evolved at a slower pace than the UK due to cultural differences. For example, the share of educated children was smaller as the bourgeoisie got relatively little children in China and Japan compared to the UK (G. Clark, 2010).

appeared since the Enlightenment. Historical estimates of land-use illustrate clear changes from 1700 onwards, as nature was indeed subjected to man's force in an unprecedented way. Livestock grazing land and croplands started to increase, while forestlands were decreasing rapidly, especially after 1800 (Figure 2.2). On the other hand, worries about nature conservation started to arise, leading to the development of the first National Park in the US in 1872, Yellowstone National Park.

So far, this is mostly a story about the industrialised core – where 10-20% of the global population lived. While Western Europe and its offshoots experienced rapid change, other parts of the world saw minimal technological development, nor significant changes in any of the other key drivers. Colonial rulers made it very hard for others to try to industrialize. Moreover, early movers had cost advantages that created significant barriers to competition. Once established, these comparative advantages often persisted for extended periods. Additionally, adopting steam-driven technology required engineering expertise, a literate workforce, and financial resources—elements that were lacking in many countries (DeLong, 2022a, p. 56).

Around the turn to the 20th century, a distinct global division of labour had occurred. Tropical regions became the primary sources of rubber, coffee, sugar, vegetable oils, cotton, and other lower-value agricultural commodities for Europe. Temperate regions, where European settlement was expanding, such as the United States, Canada, Australia, New Zealand, Argentina, Chile, Uruguay, and Ukraine, focused on the production and exportation of staple grains, meats, and wool to Europe. Western Europe paid for its imports by exporting manufactured goods (DeLong, 2022a, p. 45).

Alternatively, one might say that the division of labour among nations was that some specialized in winning, while others specialized in losing", as denoted by the Uruguayan activist Galeano (Galeano & Belfrage, 1973). The division of labour is often presented as a positive development from an economic point of view, but it's important to realize that this division of labour was by no means the result of equal powers negotiating agreements that would make them benefit more or less equally. Instead, it should be considered in the light of colonisation. To understand this, we have to go back to the pre-1820 period. Driven by religious, political, administrative, and commercial incentives, Europeans embarked on imperial conquest from the fifteenth century onwards (DeLong, 2022a, p. 116). As Europeans expanded their exploration and exploitation of the Americas, Africa, and Asia, indigenous people were threatened by war, disease, maltreatment, and the trauma produced by the efforts of the intruders to force it into ways of life and behaviour totally unrelated to its previous experience (Elliott, 1984; Scammell, 1992). Moreover, in the period between 1700 and 1800, the guns-slaves-sugar trade triangle in the North Atlantic had become a pivotal force (DeLong, 2022a). This brought profound and enduring devastation upon Africa. It has been associated with hindering state formation, exacerbating ethnic and social divisions, and unleashing a reign of terror (Rhode et al., 2011), providing even more impediments to the ability of countries outside the industrialised core to participate in the industrialisation wave of the 19th century.

The rise of mass production and mass transportation in the industrialised core made it possible to mobilise and equip huge military bodies, boosting overseas expansion. To avoid the outbreak of armed conflict between rival colonial powers, the Berlin

Conference was organized in 1884-1885 to "manage" the ongoing process of colonisation in Africa. This is sometimes referred to as the "Scramble for Africa" (Craven, 2015). Between 1878 and 1914, European powers divided up the entire African continent except for the independent countries of Ethiopia and Liberia. As part of this process of "empire-building", the number of Christian missions grew exponentially and European-style education spread increasingly in this period (Becker, 2022). While the spread of Western education systems is found to have positive impacts on long-term economic growth in Africa (Bolt & Bezemer, 2009), the overall consequences of colonisation are negative.

Within Europe, justification of colonisation came from several sources. Christianity played a role, with Europeans generally being convinced that their Christian views were intrinsically superior to African religion, hence it would be morally right to bestow Christianity on African societies. 'Social Darwinism' was another source of supposed justification. Social Darwinists believed in the inevitability of the struggle for existence. Progress, understood as the evolution to a higher social type, was to be achieved through social competition between "fit and "unfit" groups and individuals. Convinced that they themselves belonged to the fit group of individuals, Social Darwinists claimed that inherent racial traits explained and justified economic inequalities and brutal competition (Claeys, 2000). This type of thinking wasn't just used to justify inequalities between a colonial power and its colonies, it was increasingly applied to explain the "superiority" of a nation or race in comparison to neighbouring countries and citizens. This type of thinking gained prominence, especially in more liberal and academic communities, first in Continental Europe, and later in other parts of the world as well, including South Korea and Japan (Chung, 2019; Tikhonov, 2010; Weikart, 1993). This is one of the various factors leading up to two global wars, as will be discussed in Section 2.5.

Outcomes

The period 1820-1913 is characterised by rapid changes in technology, globalisation, and institutions. The next section considers how this influenced wellbeing, the distribution of wellbeing (inclusion) and environmental sustainability. We consider average wellbeing and the distribution of wellbeing interchangeably, as there's little to learn from just considering global averages.

Wellbeing and inclusion

In the early 19th century, living conditions in Western Europe and the US were characterised by heavy household labour for women and hazardous working environments for men. Life was short, with large families cramped together in small living spaces. Much food and clothing were home-produced, and market purchases were limited to basic raw foods and dry goods like textiles for homemade garments (Gordon, 2016). Some argue that life in the richest society of the world was worse during this period than way back in the time of hunter gatherers, where people enjoyed a heterogeneous diet and had a lot of free time (G. Clark, 2010, p. 51).

However, towards the end of the century things started to improve. Middle-class households experienced improved living standards, including a larger variety in diets, better working conditions, and better housing (Gordon, 2016).

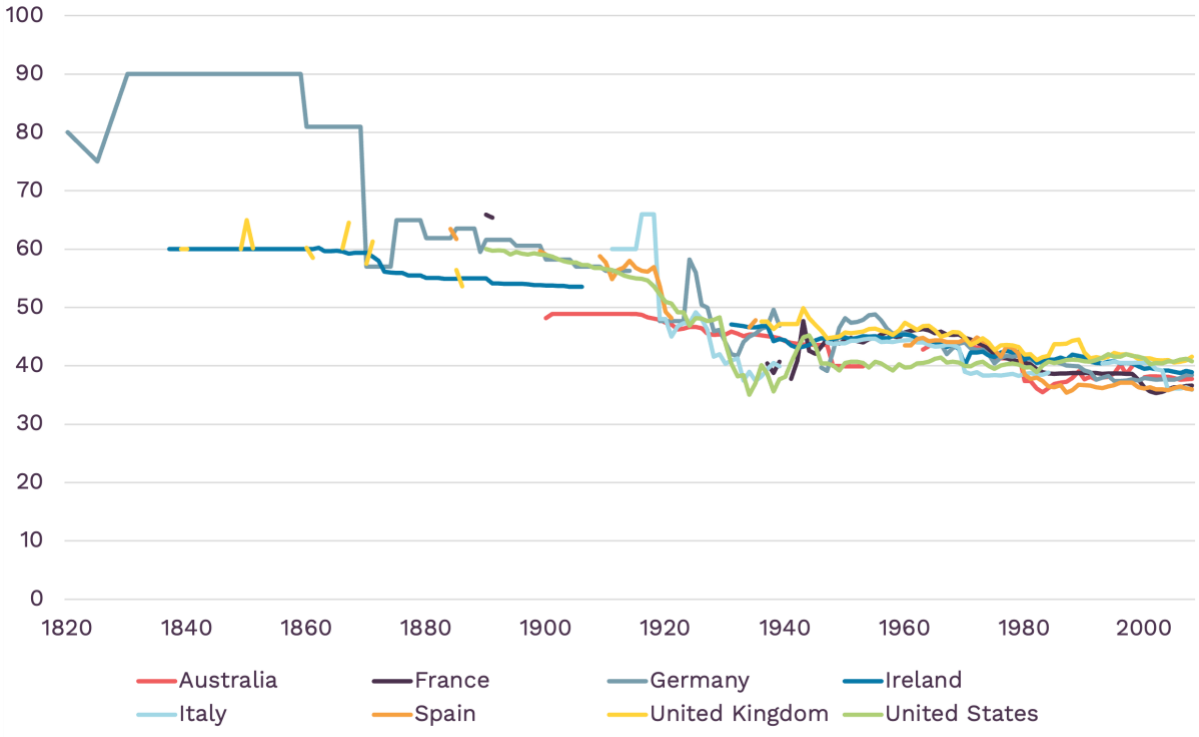
Despite the challenging living standards described, estimates of life expectancy for Western Europe show increases from 33.4 to 40.4 years for the period 1830-1880s. After that, life expectancy increases a bit faster, to 46.3 years in the 1900s.

Data on life expectancy doesn't go back as far in time for other global regions, but we do see that life expectancy was on the rise in the Western Offshoots from 1880s until 1900s, whereas it remained stagnant in South and South-East Asia. In Australia for example, life expectancy rose from 49 to 57 between 1880s-1900s, while in India, life expectancy decreased from 25.4 to 23.7 years in the same period. There were large discrepancies between regions.

Human height, which is another indicator used to assess health and nutritional quality, shows that human height was falling in Western Europe during the 1840s and 1850s, in the Western Offshoots from 1840s – 1900s, and in East Asia from 1880s-1900s. The fall for the Western Offshoots might be explained by urbanisation, which could lead to the spread of diseases. In North America specifically, immigration and rapid population growth also reduced the available protein per capita. In Asia a wave of cattle plague was probably the most important factor leading to lower average height, although other factors also contributed (OECD, 2014b).

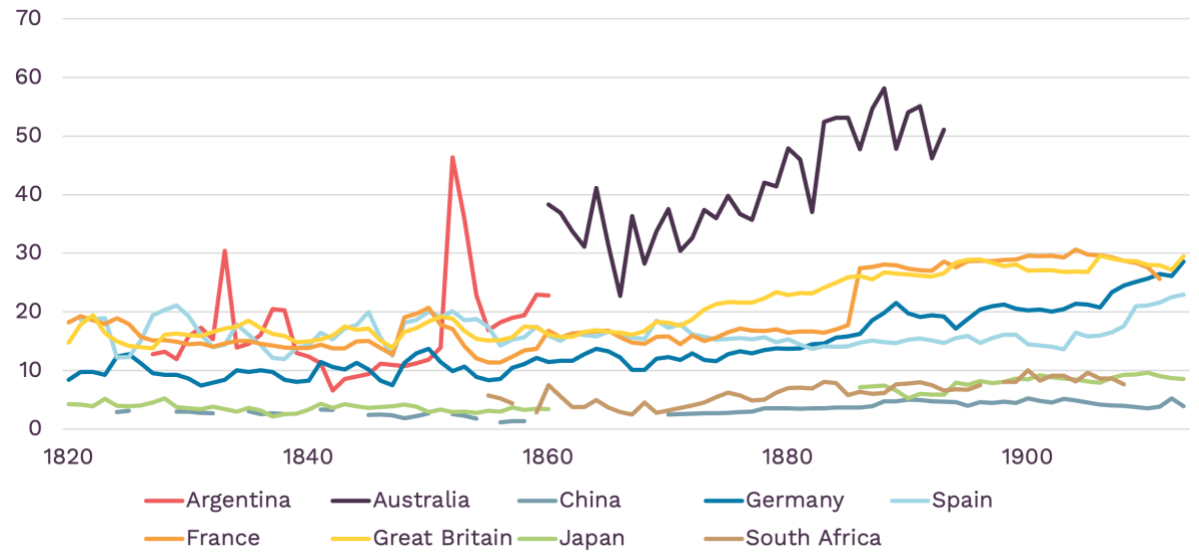
At the end of the 19th century, when life expectancy and human height start to increase in most global regions, we see that hours worked in manufacturing starts to decline, dropping from about 60 hours per week in 1875 to a little below 50 hours in 1925 (Figure 2.5). Real wages on the other hand, started to increase. However, less industrialised countries such as China, Japan, and Ghana, experienced only a small increase in real wages in the second half of the 19th century, and at a substantial lower wage level (Figure 2.6). For countries outside the industrialised core, globalisation also meant a global competition for labour. It created an incentive to keep wage rates low, to prevent production to move elsewhere.

Figure 2.5 Hours worked in manufacturing, 1820-2002 (hours per week)



Source: (Gilmore, 2021)

Figure 2.6 Real wages between countries, 1820-1910 (Daily building labourers' wage divided by a daily subsistence basket)



Source: (de Zwart et al., 2015)

Average years of education was increasing for every global region. Globally, average years of education increased from 0.9 in 1850 (the first year that data is available) to 2 years in 1910. The percentual increase in years of education was largest for South and South-East Asia (4.6% on average per year) and Sub-Sahara Africa (2.5% on

average per year) and smallest in the Western offshoots (0.8% on average per year). The increase in education might have been stimulated by the colonial rulers, as discussed in the key drivers section. Total years of education was highest in the Western Offshoots, with 7.5 years in 1910 and lowest in Sub-Sahara Africa, with 0.2 years in 1910.

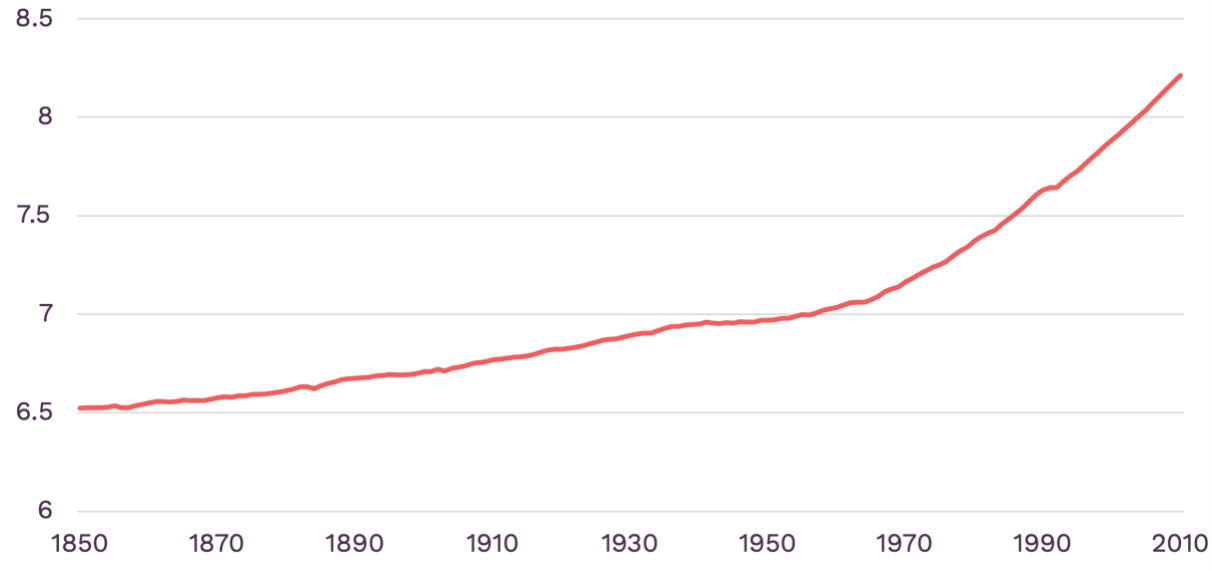
Western Europe and its offshoots saw a remarkable increase in average GDP per capita, while other regions experienced little change or, in the case of China, even a decline of GDP during the 19th century. Colonised nations often illustrate decreases in wellbeing. In colonised Africa, people are on average 1.1 centimetres shorter between 1810 and 1970 in comparison to non-colonised African countries. This is said to be caused by land dispossession (reducing access to food), coercive labour regimes, infectious disease proliferation from additional trade contacts, low public health expenditures, and colonial conflicts (Baten & Maravall, 2021). Another example is the Indian subcontinent. India saw no sustained increase in per capita income between 1750 and the 1950s, falling behind in relative and absolute terms (Gupta, 2019; Habib, 1985). Colonisation – like imperialism before – also pressured much of the indigenous practices and knowledge. In Canada for example, it was illegal by The Indian Act of 1876 to practice First Nations culture. This negatively affected the wellbeing of many populations, both in the short and long run.

Sustainability

The rise of industrial production in the industrialised core was heavily dependent on the use of fossil fuels. Global energy use increased with an average rate of 1.5% per year, while GHG emissions grew on average by 1.9% per year. As the total amount of GHG emissions in the air is still relatively low during this period, there's no noticeable impact on global temperature yet. However, ocean acidification already starts to occur during this period. The ocean absorbs an estimated 30% of the anthropogenic emissions, leading to ocean acidification (as measured from the beginning of the industrial revolution until 1990) (Gruber et al., 2019). Over time, ocean acidification causes marine ecosystems and biodiversity to change. During the 20th and 21st century, we will see that this negatively affects coral reef ecosystems, many of which support coastal human populations with food, income, coastal protection, and the development of novel pharmaceuticals (Hoegh-Guldberg et al., 2017).

The rise of industrial production was also largely enabled by deforestation. As land use changed rapidly, biodiversity declined globally. This was not just the case in the industrialised nations: biodiversity deteriorated in each global region (OECD, 2014a). As we will discuss later on, declining biodiversity can pose a severe threat for global food security over time.

Figure 2.7 Ocean acidification by hydrogen ion concentration, 1850-2001 (nmol/kg)



Source: (Bopp et al., 2013; Ciais et al., 2013)

Air pollution affects wellbeing more directly during this period. This was mostly a local phenomenon in industrialised cities. London for example, suffered frequent and severe fogs in the 19th century. Such fogs were often so dense that they interrupted railway journeys and general economic activities, and even contributed to rising crime rates. It also resulted in significant health costs. Air pollution deaths throughout this period rose steeply. In London, mortality from bronchitis increased from 25 deaths per 100,000 inhabitants in 1840 to 300 deaths per 100,000 in 1890 (Fouquet, 2011).

After its peak in 1891, air pollution started to decline again. Ritchie (2024b) lists three possible explanations for this: improved connectivity and commuter links allowed London's population to spread further into surrounding suburban areas, which probably leads to a reduction in total emissions of pollutants in the city centre, and also lessens the population that is exposed to the worst air pollution. Second, the Public Health Act was launched in 1891. Businesses in London run the risk to receive a financial penalty for excessive smoke. Last, there was a notable shift in heating and cooking from coal towards gas, which is much cleaner in terms of air pollution.

2.5 Global Turmoil (1914-1949)

Key drivers

The period of 1914-1949 is commonly associated with two World Wars (WWs), which were partially enabled by technological innovation, globalisation, and influenced by developments in the institutional sphere. The Great Depression is another event that influenced livelihoods inside and outside the industrialised core during this period. However, technological advancements continued to be made and applied, with the invention of penicillin (1928) and the uptake of synthetic fertilizer (enabled by the Haber-Bosch process which was invented in 1913) being two impactful examples. We

see improvements in wellbeing indicators occurring in all global regions, allowing average global indicators to improve slightly faster than in the period before.

The year 1914 marks the start of World War I. The Great War was mostly fought on European territory and in the Middle East, but it's impact would spread much further. For example, about a million African soldiers served in the First World War, causing the largest movement of Africans since the Trans-Atlantic slave trade (Crowder, 1984; Laband, 2007, p. 130). In addition, tens of thousands Chinese labourers were hired to fight in the war. China also experienced fighting on its own territory, in the German-controlled land in Shandong Province (Xu, 2011). In the end, an estimated 7.1-8.9 million people died fighting in the war, and another estimated 13 million civilians died due to starvation, exposure, disease, military encounters, and massacres (Lyall, 2020; Royde-Smith, 2024). The war also had a profound impact on the economy and labour force. Between 1913 and 1918, government shares of gross domestic product (GDP) rose from about 10 per cent to between 50 and 53 per cent in France and Germany, from 8 to 35 per cent in the United Kingdom, and from just under 2 per cent to just under 17 per cent in the case of the United States (Harrison, 1998, p. 15). The massive military mobilisation necessitated large shifts in the skill and gender composition of labour forces. Women were pulling ploughs and driving trams to compensate for the loss of manpower and animal power (Winter, 2014b). The female labour force increased from 20,6% in 1913 to 35,6% in 1918 in Germany. Similar increases occurred in other combating nations (Bessel, 1993; Prost, 2014). Changes in traditional gender roles would prove to be temporary, being reversed in most cases after the war (Winter, 2014a).

The end of World War I brought a new international order. The great British Empire was weakened, Russia was in the midst of an even more deadly civil war, and Germany was heavily indebted, as laid down in the Treaty of Versailles (Cabanes, 2014). The US turned inward at this point in time. While US President Wilson had advocated for the League of Nations, a forum in which international agreements could be reached, the US did not become a member in the end. The US added new restrictions on immigrants and raised tariffs (DeLong, 2022a, p. 171). The increase in economic globalisation came to a halt, as also clearly illustrated by the falling share of merchandise exports as share of GDP in Figure 2.2. Throughout the post-First World War period, many economies struggled to get back on their path to prosperity. Energy consumption in Eastern and Western Europe dropped substantially (Malanima, 2022). In many other industrialised nations, governments overpromised on what they could deliver based on the taxes that they could raise, meaning they needed to finance their expenditures with money borrowed on capital markets or by creating new money, a phenomenon that already started during the war (Fisk, 1924). This eventually led to hyperinflation in multiple countries throughout the early 1920s. Germany was hit hardest, with an inflation rate of almost 10 billion percent per year. In Russia prices rose four billionfold and in Austria, prices rose two thousandfold (DeLong, 2022a, p. 183).

For the US, the economy seemed to get back on track around 1922. Inflation stabilized, unemployment decreased, and GDP started to rise again. The great inventions of the 19th century had become more and more widespread. Almost all

urban households were connected to electricity, gas, telephone, running water, and sewer lines. By 1929, the ratio of motor vehicle registrations to the number of US households reached 90% (Gordon, 2016, p. 536). A general sphere of optimism arose. Optimism also spread to financial markets, where stock prices rose – partially enabled by the lack of banking regulation at the time. However, in 1929, a tremendous crash in the US stock market occurred. The crash caused a recession in the US, with unemployment rising from 3.1% in 1929 to 22.3% in 1932. During the same period, many western European economies saw a doubling of their unemployment rates (Middleton, 2014). Germany was hit especially hard by US banks calling in their foreign loans, which had helped Germany to invest in its industries and pay the reparations for World War I. The Great Depression had started.

During the Great Depression, economies of Africa and Asia were hit by falling prices, reduction of international lending, and rising protectionism. The interwar depression saw agricultural prices fall from an index of 100 in 1923 to 24.4 by December 1932, which mostly hit primary producing regions (Kindleberger, 1973). In the Philippines for example, which relied heavily on the export of crops, incomes fell, taxes went unpaid, weddings were postponed, and people reverted to subsistence agriculture. Egypt experienced losses in income from raw cotton exports, although it benefited from tariff autonomy that was achieved in 1930, raising tariffs and promoting domestic manufacture of textiles, sugar, shoes, spirits, and cottonseed oil. Other countries, like China, were relatively unaffected. In some regions there were also positive impacts. In Kenya, there were instances where farmers were able to gain market share at the expense of white settlers (Brown, 1989).

The economic turmoil and heritage of World War I are widely believed to have contributed to the outbreak of World War II in 1939. Again, the war dominated the lives of entire populations. Arming for total war required the mobilisation of all national resources, state control of industry, and regimented societies (Bosworth & Maiolo, 2015). The war effort imposed severe deprivations in affected territories, varying from the rationing of consumer goods essential to normal standards of living to outright starvation. Moreover, entire populations participated in violent action, and suffered the effects of violence (Geyer & Tooze, 2015). At the end of World War II, about 45-50 million people in Europe and Asia were dead due to violence or starvation. More than half of that number were inhabitants of the Soviet Union (DeLong, 2022a).

As with World War I, the impact of the war reached beyond the territories that were heavily in combat. Again, African troops were shipped to Europe to fight against the Germans and international trade was reduced and redirected. Millions of people were involved in military labour and the production of crops needed to feed the troops and civilians in Europe, which was aggravated by the Japanese annexation of the British and Dutch colonies in Southeast Asia. (Byfield et al., 2015).

On a more positive note, World War II brought a new level of industrialisation to Africa. For the first time, a substantial number of factories was established in the major African cities to process locally produced materials, instead of exporting it as raw material to Europe. This led to the formation of a wage-labour class which was to provide an important recruiting ground for the rising nationalist parties (Crowder,

1984). Data on energy consumption in Africa illustrate a 33% growth rate between 1940 and 1950, a decennial growth rate that would never be as high again (Malanima, 2022). More generally, wars can accelerate technological development to adapt tools for the purpose of solving specific military needs. Later, these military tools may evolve into non-military applications, as has been the case for many advancements in information and communication technology (Abbate, 2000).

While World War II was still ongoing, the groundworks were laid to prepare for a post-war international economic order. In July 1944, delegates from 44 countries joined for the United Nations Monetary and Financial Conference in Bretton Woods, New Hampshire. Led by US Treasury official Harry Dexter White and UK economist John Maynard Keynes, the structure for a new international financial system was laid out (Judt, 2010). An International Monetary Fund (IMF) was set up to facilitate the expansion and balanced growth of international trade. It would also overlook a novel regime of fixed exchange rates, in which the US dollar was pegged to gold, and other currencies were pegged to the dollar. In addition, the International Bank for Reconstruction and Development (IBRD, which was renamed the World Bank later) was founded, to finance the reconstruction of those parts of the world that had been ruined by war, and to increase the economic prospects of developing countries. Last, an International Trade Organization (ITO) was proposed, which should facilitate special tariffs for partners, codes for trade practices, and procedures to handle breaches and disputes. This would eventually take shape not as an organization, but as the General Agreement on Tax and Tariffs (GATT) (DeLong, 2022a, p. 465; Judt, 2010). Earlier onwards, in 1919, the International Labour Organisation (ILO) had been established as part of the Treaty of Versailles. The foundation of the ILO recognized the importance of social justice in securing peace, against a background of the exploitation of workers in the industrializing nations of that time (International Labour Organization, 2024).

The US bet heavily on international trade as a catalyst for both global peace and domestic prosperity (DeLong, 2022a, p. 323), in combination with policies to 'contain' the rise of communism in the Soviet Union (Judt, 2010). The US funded the Marshall plan to provide financial aid to Europe, accompanied with the North Atlantic Treaty Organization (NATO) for Europe's defence. From 1948 through 1951, the United States transferred $ 13 billion to European recovery. The recipients, verging on the brink of economic collapse, experienced a strong recovery. Industrial production in the recipient European countries rose by 55% in just four years, from 1947 to 1951 (De Long & Eichengreen, 1991).

The United Nations was founded in 1945 as an international organization to maintain peace and security. One of its early achievements was the establishment of the Universal Declaration of Human Rights in 1948. Drafting this shared declaration was a formidable challenge, especially given geopolitical tensions between Eastern and Western blocks at the time. Nevertheless, the declaration was ultimately adopted with no country voting against it.

The Universal Declaration of Human Rights aligned with the broader trend towards expanding social security, and moving beyond the early social security initiatives of the late 19th and early 20th centuries that primarily focused on specific groups in

society, mainly workers. The declaration underscored the right to social security for all, as exemplified by its proclamation:

> "*Everyone, as a member of society, has the right to social security and is entitled to realization, through national effort and international co-operation and in accordance with the organization and resources of each State, of the economic, social and cultural rights indispensable for his dignity and the free development of his personality.*"

Universal rights were at odds with many of the practices of colonisation, and pressure towards greater social and economic equity increased in the colonies, the colonial powers, and two new world powers: Russia and the United States. Within the colonies, views on the colonial relationship were heavily influenced by experiences in the war. African people saw how the "peaceful and orderly white people mercilessly butchered one another" (Sithole, 1968). A similar dynamic occurred in Indonesia, where Japanese overruled the Dutch, illustrating that a non-European country could overrule Europeans (Emmer, 2020). What also played a role within the colonies is that the number of people that were able to have the beginning of an education started to increase. Educated people are purportedly more aware of government actions, more actively participating in society, and better able to organise themselves politically (Glaeser et al., 2007).

Labour members of the wartime British government, French socialists, and the United States also advocated for the reform of the colonial system. The Unites States was eager to see the colonial markets opened to her trade goods. Where before the war empires had still been a matter for pride, now it was increasingly seen as an embarrassment, something which needed constantly to be justified.

Outcomes

Wellbeing and inclusion

Despite two world wars, average global life expectancy rose more rapidly during 1914-1950 than in the period before. Average life expectancy went up from 33 to 50,8 years. In the 1940s, life expectancy is highest in the Western Offshoots with 66 years and lowest in Sub Sahara Africa with 38 years. When looking at the limited country data that is available, we see that people living in Sweden in the 1940s were expected to grow 68.8 years old, while people in Indonesia had a life expectancy of 27.5 years (OECD, 2014a). Human height increased continuously in most global regions. However, South and South-East Asia experienced a decrease from the 1910s to 1920s and from 1940s to 1950s, while Sub Sahara Africa experienced a decrease in average human height in the 1920s and 1930s.

Years of education also increased globally, from 2.1 years in 1914 to 3.2 years in 1950 (OECD, 2014a). The percentage increase was largest in Sub-Sahara Africa, followed by South and South-East Asia, the same two regions as we saw in the period before. Despite the largest percentual increases occurring in the regions where average education is lowest, the absolute gap between years in education is widening. In 1914,

the gap between Western Offshoots and Sub-Sahara Africa was 7.4 years, while in 1950, the gap has widened to 8.8 years. Given that education is an important condition for industrial development, this amplified global differences in economic development.

GDP per capita increased, especially in Western Europe and the Western offshoots. Part of this increase was caused by warfare expenditure, which boosts GDP but does not directly translate into material wellbeing for households. Already existing differences between global regions exacerbated. Financial inequalities within countries on the other hand, generally improved in the period 1914-1945. Inflationary pressures, destruction of property, and bankruptcy hit people in the top of the wealth distribution the most (Collier, 1998; Piketty, 2014).

Gender equality is improving slightly in this period too, although quantitative data is limited available. The ratio of female-to-male average years of schooling and the ratio of female-to-male labour force participation illustrate improvements on the global level (OECD, 2021b). The development of new household technologies played a major role in this. Appliances such as the washing machine, vacuum cleaner, and iron, saved women much time in household chores, creating opportunities for paid labour (Greenwood, 2018). The two world wars played a role as well, forcing women to enter the labour force to replace the men that had gone off to war. Even if it was temporary as in the case of World War I, it challenged wide held beliefs about the role of women in the family.

When looking at differences of gender inequality in global regions, we see that gender inequality in education is lowest for Western offshoots and highest in South and South-East Asia. Gender equality in the labour force is highest in Eastern Europe and lowest in Latin America in the Caribbean. The latter is quite striking, as Latin America and the Caribbean is performing quite well in terms of gender equality in education, with highest level of educational gender equality after the Western Offshoots and Western Europe (OECD, 2021b).

Sustainability

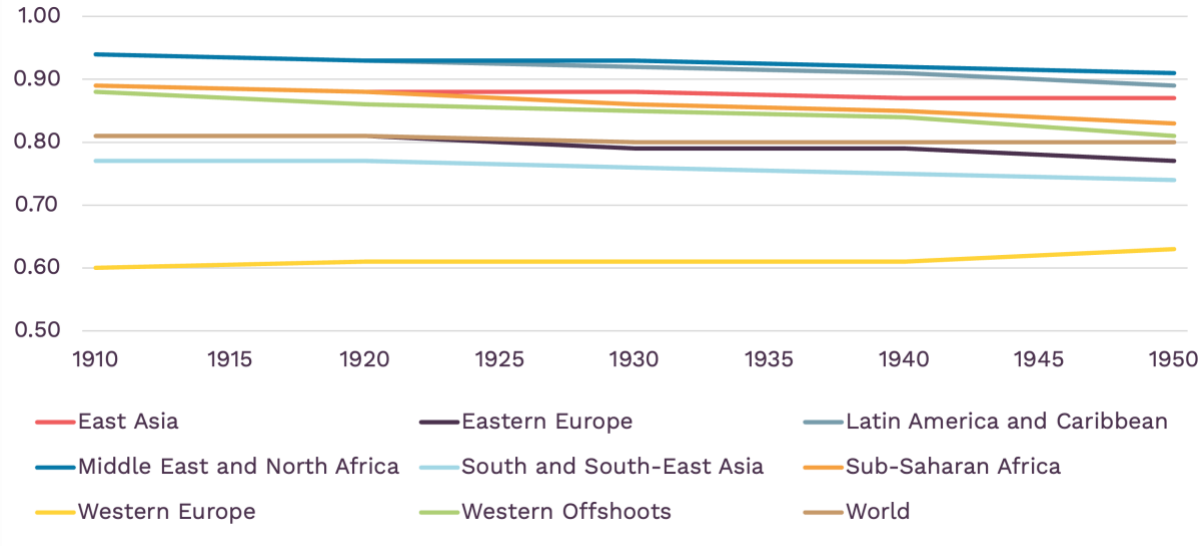
The World Wars caused widespread environmental effects, including soil compaction and vegetation changes and contamination of marine life (Martins et al., 2006). GHG emissions also increased during war times, as production was boosted by military demands, stimulating increases in global temperature. The Great Depression on the other hand, let to a temporary decrease in production in North America and Western Europe, which also translates into lower annual GHG emissions.

After WW II, an increasing amount of GHG emissions is observable in almost all global regions. Emissions per capita are by far the largest in North America, with 20.84 kilotons per capita in 1950, and smallest in the Afrika and Asia, with emissions of 1.05 and 2.33 per capita respectively (not displayed). GHG emissions already affect global temperatures in this period, with average temperatures being 0.16 degree higher from 1914-1950 compared to 1820-1913.

Biodiversity continues to be pressured. While production increased and agricultural land expanded, deforestation increased in speed, especially in the years right after World War II. Food production rose, but biodiversity was increasingly threatened.

Mean species abundance is decreasing in almost all global regions (Figure 2.8). This trend indicates that, on average, more species are in decline—or even facing extinction—than are increasing in number. The one exception is Western Europe, which also has an absolute level of mean species abundance that stands out. A potential explanation is that Western Europe had lost lots of its forests already in the 18th and 19th century, leading to a decline in mean species abundance relatively early onwards. However, as we will see throughout this chapter, the global decline during this period is only the starting point.

Figure 2.8 Mean species abundance between regions, 1910-1950 (index, relative to pristine species abundance)



Source: (Klein Goldewijk, 2015; OECD, 2014a)

2.6 The Great Acceleration (1950-1990)

Key drivers

After two world wars, global policy making illustrated a growing circle of moral ambition and international cooperation, though the threat of the Cold War loomed large. Nevertheless, post-war reconstruction efforts and technological innovations helped to enable the start of the "Great Acceleration" in 1950. Indicators such as GDP per capita, life expectancy, energy use, material use, and GHG emissions experienced increasing growth rates during this period, just as the size of the world population. These developments brought a dramatic change in magnitude and rate of the human impact on the environment, marking the year 1950 as the start of the "Anthropocene" (Steffen et al., 2015).

From 1950 to 1990, global population grew from 3 billion to 5.3 billion, with most growth coming from regions outside the countries that belonged to the industrial core. In Europe and the Western Offshoots, a rapid fertility decline had taken place from the late 19th century onwards, as child mortality decreased and the burden of having children increased, as schooling had become compulsory and child labour was limited (OECD, 2014a). In the 1950s and 60s, child mortality rates were still high in other global regions, but declining rapidly (United Nations, Department of Economic and Social Affairs, Population Division, 2024). However, in many global regions, this decrease in child mortality did not automatically result in lower fertility rates. Unlike Western societies, it was more common in Asia, Africa, and Latin America for extended households to share the responsibilities of raising children. Additionally, in Southern and Eastern Asia, there were long-standing traditions of post-natal birth control, such as adjusting family size through practices like infanticide or adoption. In much of Africa, "excess" children were often taken in by kin families. Furthermore, in many cultures, a strong preference for sons reduced the motivation for birth control (Mason, 2001) (OECD, 2014a).

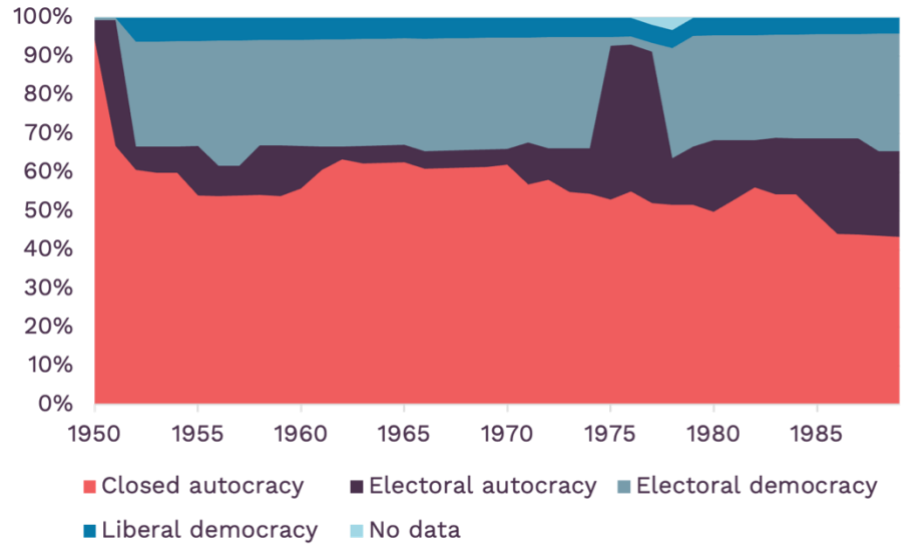
Global population increasingly lived in cities. The global average urbanisation ratio went from 29% in 1950 to 43% in 1990. The share of people living in cities increased most in Latin America and the Middle East and Central Africa. Latin America surpassed Europe & Central Asia in terms of urbanisation ratio in the 1980s. North America is the most urbanised region in 1990, South Asia the least.[7]

In Africa and Asia, the post-war period was highly characterised by decolonisation. Between 1945 and 1970, numerous countries in Southeast Asia and Africa gained independence. The trajectories that followed in individual countries are extremely varied – as also discussed in the deep dive on Africa - and we can't possibly do it justice in this high-level overview. Instead, we will focus on some common developments. Many former colonies had the initial intention to set up representative parliamentary institutions, independent judiciaries, and laws establishing freedom of speech.

Figure 2.9 and Figure 2.10 on the next page illustrate that the share of people living in closed autocracies decreased in favour of people living in electoral autocracies right after decolonisation (most Asian countries decolonised earlier than African countries). However, in both cases, we see this was followed by a period in which the percentage of people living in closed autocracies grew again.

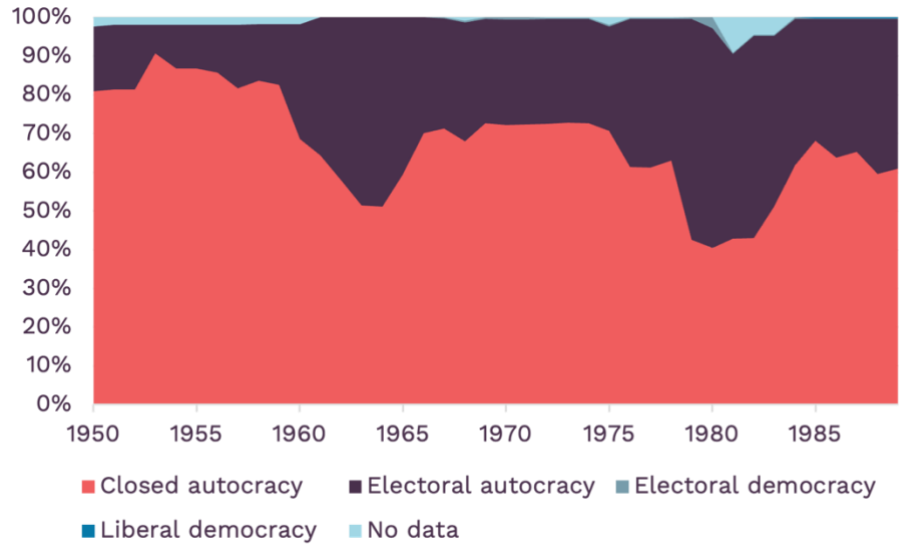
[7] Global regions presented here differ slightly from the aggregate regions that were most common up until now and based on work by the OECD and CLIO Infra. For data from the 1960 onwards, this report increasingly uses the regional groupings from the World Bank as they provide more recent data for a large variety of indicators.

Figure 2.9 Share of people living in autocracies and democracies in Asia, 1950-1990 (%)



The large spike between 1974-1978 captures changes in India. "No data" is based on the number of people for which regime data is unknown. Source: V-Dem (2024b), Population based on various sources (2023) – processed by Our World in Data

Figure 2.10 Number of people living in autocracies and democracies in Africa, 1950-1990 (%)



"No data" is based on the number of people for which regime data is unknown. Source: V-Dem (2024b), Population based on various sources (2023) – processed by Our World in Data

During this period, there were great expectations for economic development, especially in Africa (DeLong, 2022a, p. 342). The optimism that greeted independence turned into disillusion during the 1970s, as Africa's agricultural exports fell and the number of authoritarian regimes increased (Bates, 2014). There are many possible explanations for why the economic and political development of Africa was different than expected, as also discussed on the deep dive on Africa. Literature points

towards the role of extractive regimes, the general distrust that followed the slave trades, and demography – where a growing labour force might disincentivise the transition to high-quality production processes which provide less jobs (Acemoglu & Robinson, 2012; DeLong, 2022a, p. 348; Nunn & Wantchekon, 2011).

In Asia, post-colonial development was also heterogeneous. Hong Kong, Japan, South Korea, Singapore, and Taiwan experienced average annual growth rates over 5% in the period 1950-1989. In contrast, countries like Bangladesh, India, and Cambodia saw more modest growth, with average rates of below 2% (Bolt & Van Zanden, 2024). The success of East Asian nations is often attributed to rapid industrialisation, supported by a well-educated workforce, and the protection of domestic industries until they were competitive on a global level, after which exports were stimulated. The role of state-led industrial policy is debated, and also varying dependent on country and period (Juhász et al., 2024).

Western economies experienced rapid growth in the 1950s and 1960s, supported by the Marshall Plan funding. Up until this point, economic growth was seen as a means to finance a war or to combat unemployment. Now, it became a goal in itself. In 1961, an international growth target was set by the OECD, the organization that succeeded the Committee of European Economic Co-operation (CEEO) which monitored the Marshall Plan. The OECD pledged to increase the combined Gross Domestic Product (GNP) of the OECD economies by 50% in the period 1961 to 1970 (Schmelzer, 2012). The focus on GDP appeared successful from an economic point of view. In 40 years' time, the world managed to produce 5 times as many goods and services as in 1950 (Bolt & Van Zanden, 2024). An acceleration so substantial, it is hard to grasp fully.

Western European economies were characterised as 'mixed economies', where systems for redistribution and social protection, in combination with active public demand management, were built upon systems of market allocations of consumer and producer goods and the factors of production (DeLong, 2022a, pp. 319, 324). This stood in contrast with the laissez-faire principles that were dominant before the 1930s – often associated with capitalism and later neoliberalism - and the temporary wartime controls on production during WWII – associated with communism. During this period, we see a clear increase in the percentage of countries that provide social protection measures for citizens, including measures for disability, employment injury, and old age, illustrating a broader global trend for countries to provide social security to its citizens.

While Western Europe experienced a period of rapid economic growth, low unemployment, and low inflation, geopolitical tensions were rising. The US' Marshall Plan had not just been an economic strategy. It was also part of a policy of containment of the Soviet Union, or more specifically of the Soviet Union's ideology of communism. This ideology goes back to works of Karl Marx and Friedrich Engels. In *The Communist Manifesto*, Marx and Engels describe that the mechanization of production during the Industrial Revolution had exacerbated social inequality, dividing society into two classes: the bourgeoisie, who owned the means of production and accumulated wealth, and the proletariat, the working class that did not have significant ownership of the means of production. To address this problem, Marx and Engels prescribed a system in which the workers themselves "take the

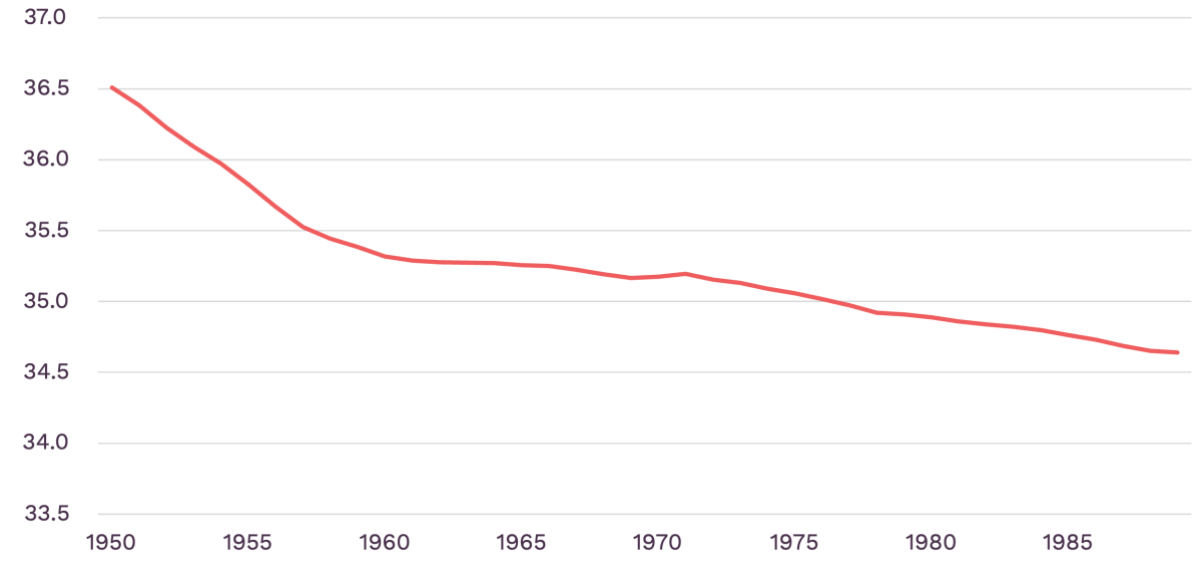
control of industry and of all branches of production," along with the abolition of private property and "the communal ownership of goods" (Engels, 1847; Marx et al., 2012). This stood in stark contrast to the market economies of the US and Western Europe, where the market determined allocation and exchange of land, capital, and labour since the end of ternary societies.

The US and the Soviet Union became entangled in the Cold War, which was characterised by the threat of war and intense competition in economic growth, space exploration, and the development of nuclear weapons. While there was no direct fighting between the US and the Soviet Union on their territories, both nations were involved in wars in countries such as Korea, Vietnam, Ethiopia, and Angola that linked to the containment of either communism or capitalism - costing millions of lives. The Cold War also brought the reality of a nuclear war very close, prompting millions and millions of people worldwide to demonstrate against nuclear weapons.

The end of the 1960s and early 1970s was a time of significant social unrest in Western Europe and the US, marked by protests and social movements that sought to challenge established power structures and bring about social change. This also included environmental movements, as it became increasingly clear that the economic system harmed the environment.

The rate of forest loss (both general forests and tropical forests) was falling slightly compared to the period before, yet a lot of additional forest was lost (Figure 2.11). The total land area covered in forest decreases from 36.5 million km^2 to 34.5 million km^2 from 1950-1990. This is an area larger than the size of Mexico.

Figure 2.11 Land area covered with forest, 1950-1990 (millions km^2)

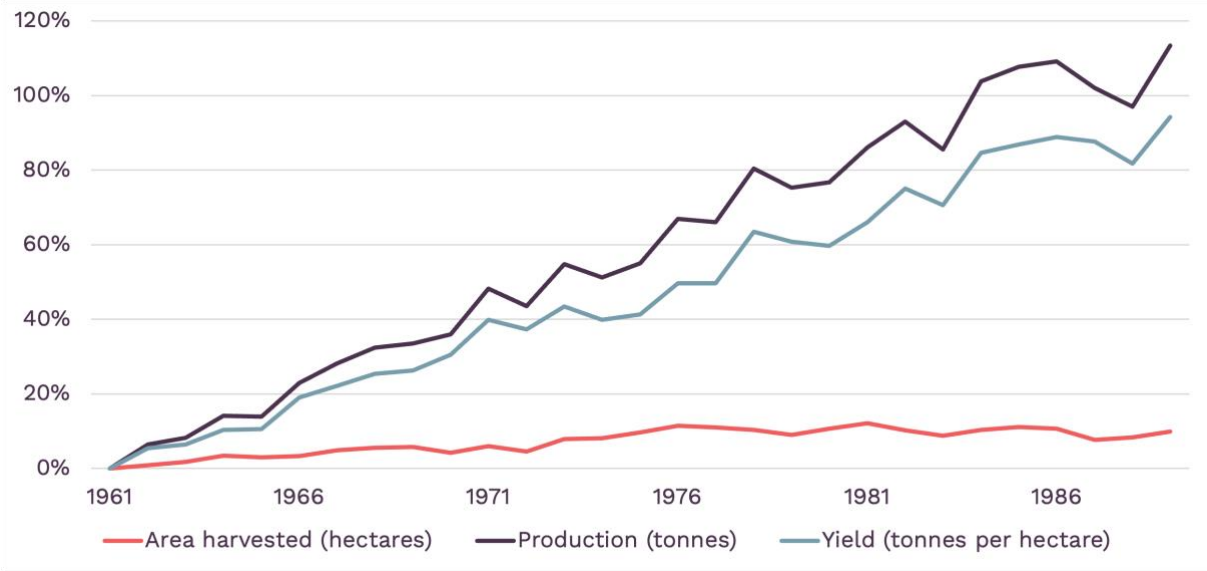


Source: (Pongratz et al., 2008)

The modest slowdown in the speed of deforestation in the 1950s and 1960s might be a consequence of agricultural innovations. Data on global cereal production,

illustrates a clear efficiency gain in cereal production (Figure 2.12), 1961 is the first year that data is available).

Figure 2.12 Change in cereal production, its yield, and land-use, 1961-1990 (indexed, 1961=0)



Source: Food and Agriculture Organization of the United Nations (2023) – with major processing by Our World in Data

For a large part, this was driven by the introduction of new, high-yielding crop varieties in economically less developed regions, also called the "Green Revolution". Especially in Asia, this was a large success. The adoption rates of modern crop varieties were lower in Africa, where the application of new crop varieties would rise later, in the 90s and 2000s (Pingali, 2012).

Fertilizer consumption also played an important role in increasing food supply, which shows a clear acceleration from 1950 onwards (Figure 2.13). Estimates suggest that nearly half of the people alive today rely on synthetic fertilizers for food consumption (Erisman et al., 2008).

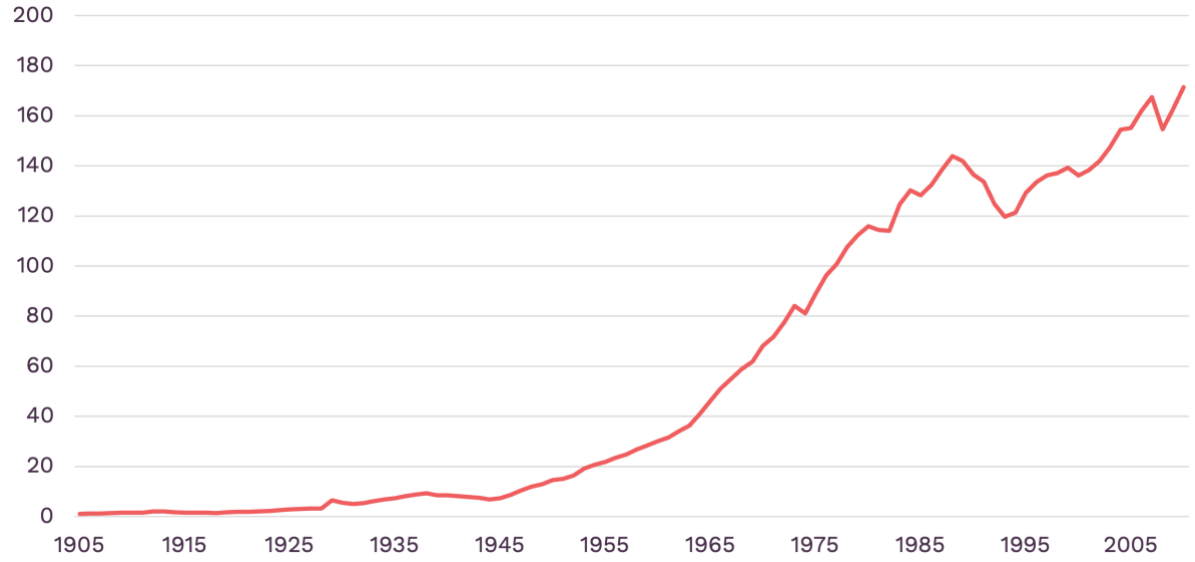
Meanwhile, pharmaceutical innovations led to efficiency gains in the production of meat, dairy, and eggs. Antibiotics for example, were introduced in the US to swine, poultry, and cattle feed after a series of experiments in the 1940s and 1950s found that feeding the drugs to animals caused them to gain weight faster and on less feed (Gustafson & Bowen, 1997). This came on top of earlier innovations in slaughter processing, that is said to have inspired Henry Ford for his automobile manufacturing plants (Rifkin, 1992). Factory farming was born, and with it a great acceleration in the maltreatment of animals.

The total available supply of calories per person increased from 2,250 calories per person in 1960 (start of data availability) to 2,570 in 1990 (2590 in 1989)[8] (Food and

[8] We could not find literature illustrating which innovations played the biggest role in this increase. This is likely to differ between regions. Our impression is that the use of synthetic fertilizer and modern crop varieties are likely to be the biggest contributors, especially in less economic developed regions. Factory farming is likely to have also played a role, although you can question whether this was the most

Agriculture Organization of the United Nations (FAO) (2023) and other sources (2024) – with major processing by Our World in Data). This is quite an accomplishment, especially considering there were more than 2 billion additional mouths to feed.

Figure 2.13 Fertilizer consumption, 1905-2010 (million tonnes)



Source: International Fertilizer Industry Association (2011)

The call for more sustainable and inclusive development in the 60s and 70s was to be overshadowed by the rise of neoliberalism in the 1980s. The 1970s were a period of economic turmoil. The Bretton Woods system broke down[9], there were two impactful oil shocks, and a public debt crisis in Latin America and parts of Africa, Asia, and Eastern Europe presented itself. The economic setbacks put pressure on politicians to boost economic growth, and to break with the previously dominant active demand policies related to "Keynesianism". Politicians such as Ronald Reagan (US) and Margaret Thatcher (UK) pledged for a smaller government, increasing deregulation, and privatisation. Economists and politicians believed that policies favouring wealthy individuals and large corporations, would "trickle down" to the less fortunate in society, making everyone benefit from economic growth. In practice, it created conditions for financial inequality within countries to surge and it decreased government's capacity to protect the most vulnerable in society and the environment. Neoliberalist thinking also dominated foreign policies. It translated into free-market policies promoting trade liberalization and privatization[10] Through

efficient way of increasing food supply, as animal-based products have a much larger environmental footprint (needing more land and water) than plant-based foods.

9 The dollar was no longer fixed to gold, and major currencies were no longer fixed to the dollar, leading to more currency fluctuations.

[10] This is sometimes referred to as the "Washington Consensus". This term was first used by John Williamson, an economist working for a think-tank in Washington. In 1989, he presented a list of 10 principles for policy reforms that he believed had a reasonable degree of consensus. The 10 principles included fiscal discipline, reordering of public expenditure policies (towards basic health, education, and infrastructure), tax reforms (to broaden the tax base), trade liberalization (with a notion that there's less consensus on the desired pace of trade liberalization), privatization, deregulation (of entry and exit barriers – not of regulations for safety and environmental reasons), and more. Williamson himself

international institutions such as the IMF, the “Global North” used its power to force regions that were less economically developed and dependent on funding of the IMF to open up through what is called “Structural Adjustment Programmes", as briefly mentioned before (see also deep dive Africa).

Outcomes

Wellbeing and inclusion

The Great Acceleration is very much visible in wellbeing indicators, although there are many differences between regions. The gap between the best performing and least performing regions grow bigger during this period, and inequalities between countries reach an all-time high in the 1980s.

Global life expectancy increased from around 46 years in 1950 to 65 years in 1990 (World Bank, 2024). In 40 years, people almost gained 20 additional years. Especially in the 1940s and 1950s, growth rates in life expectancy were surging in almost all regions. The exception is the Western Offshoots, which experienced its growth peak in the 1890s and 1900s. Regarding regional differences, some convergence in life expectancy starts to occur from the 1960s onwards. Nevertheless, it is the usual suspects that are at the top and bottom of the list. In Sub-Sahara Africa, the average life expectancy is 50 years in the 1990s, coming from 38 in the 1950s. This is a gap of 12 years to the region with the second lowest life expectancy, South and South-East Asia, and a gap of 27 years to life expectancy in Western Europe.

Average human height increased from 168.7 cm in the 1950s to 170.2 cm in the 1980s (the last year of data availability). The increase was relatively rapid between the 1930s-1960s. In Africa, on the other hand, human height in the 1980s is 0.1 cm lower than in the 1950s. The 1970s and especially the 1980s show a clear decrease, reflecting the hardships during this period in Africa (OECD, 2014a).

The growth rate in years of education also accelerates, especially from 1960-1980. In 1950, the global average years of education is 3.2, while it is almost double in 1990, with an average of 6.1. There’s no clear convergence or divergence occurring between regions. In Western Offshoots, the average years of education are highest in 1990 with 12.7 years, in Sub-Sahara Africa it is lowest, with 3.0 years. Educational quality is likely to differ between the regions as well, exacerbating the educational differences between these regions.

This period is also the period with the largest annual average increase in GDP/capita, which provides an indication of household consumption and material wellbeing. Global GDP per capita grew from $3,360 in 1950 to $8,211 in 1990, an average annual growth rate of 2.4% per year (real GDP per capita in 2011$, PPP converted, Maddison

explains that his list should not be equated to neoliberalism, as the list of policy reforms does not support monetarism, supply-side economics, and the minimal government that Reagan and Thatcher advocated for (Williamson, 2009). Despite Williamson’s intentions, the term “Washington Consensus” is often used to refer to neoliberalist foreign policies.

2023). Income inequality between countries reached an all-time high in 1980 and then declined as East Asia (mainly China) moves up along the global distribution.

Income inequality within countries declined slightly from the 1960s-1980s, largely due to rising social spending and progressive taxation. From around 1980, this trend reverses. The rise of neoliberalism has likely been influential in this regard. Data for the UK for example, illustrates a clear increase of the top 10% income share after 70 years of decline, as neoliberalist policies gained popularity (Chancel et al., 2022a).

People's worlds expanded, especially with the introduction of television and telephones. In 1966 (start of data availability), about 5% of people had a fixed telephone subscription. In 1990, this grew to a global average of 10%. But again, regional disparities are large. National estimates for 1990 vary from below 1% in China and Angola to 55% in the US.

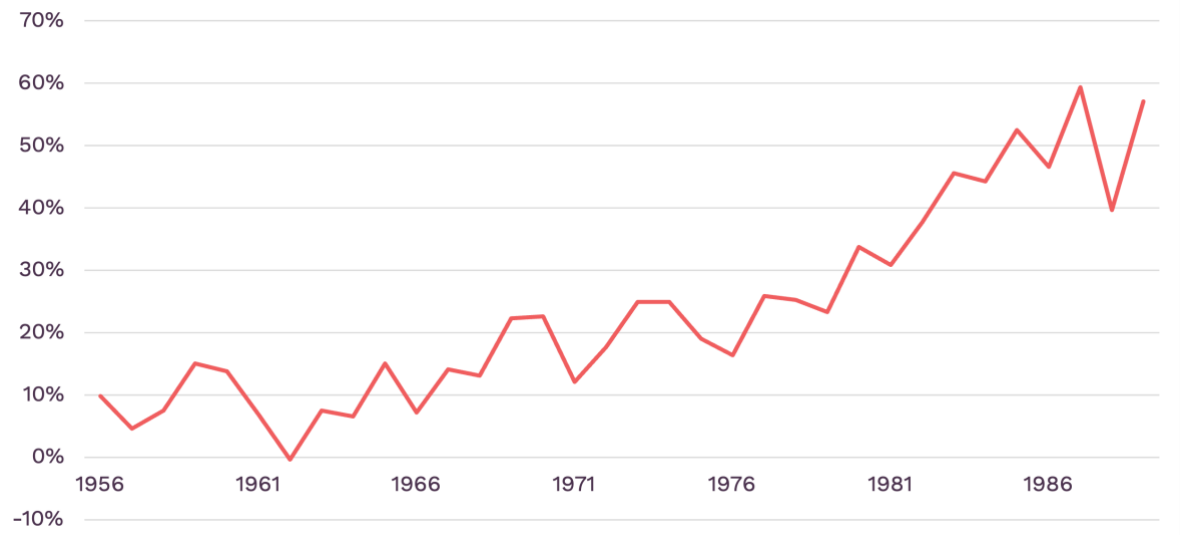
Global gender inequality generally improved. The global ratio of female-to-male average years of schooling increased continuously from 0.5 in the 1950s to 0.67 in the 1980s. Sub-Sahara Africa and the Western offshoots did experience some temporary declines in the 1960s-70s and 1960s-1980s respectively. The global ratio of female-to-male labour force participation increased between 1950s and 1970s. It stagnated between the 1970s and 80s, and then improved again. The stagnation on a global level was caused by declining levels of female labour force participation in East Asia and the Middle East and North Africa. Eastern Europe was by far the best performing region of the world in the 1970s, with a participation ratio of 0.92. Since the 1980s, this ratio continued to decrease, but it is still one of the better performing regions, with a ratio of 0.81 in 2010.

Sustainability

The environmental impact of human activity became more and more clear during this period as economic activity accelerated quickly. One example that illustrates this very clearly is the ozone layer that was rapidly thinning during this period (Figure 2.14). Ozone depletion is associated with increases in certain types of skin cancers, eye cataracts, and immune deficiency disorders, negatively impacting human health.

We also discussed the increasing use of fertilizer during this period. While fertilizers significantly enhance crop yields, thereby potentially reducing the amount of land needed for agriculture, they also pose challenges to environmental sustainability. Overapplication of synthetic fertilizers leads to nutrient runoff into water systems and ecosystems in many countries, resulting in considerable environmental harm (Ritchie et al., 2022). The excessive agricultural nitrogen use has led to exceedance of the safe planetary boundary for nitrogen. Currently, exceedances are most severe in north-western Europe (especially Germany, Belgium, Luxembourg, and the Netherlands), India, Pakistan, and eastern China. Smaller regions with high exceedances include the Nile Basin, areas in Saudi Arabia and along the Peruvian Coast (Schulte-Uebbing et al., 2022).

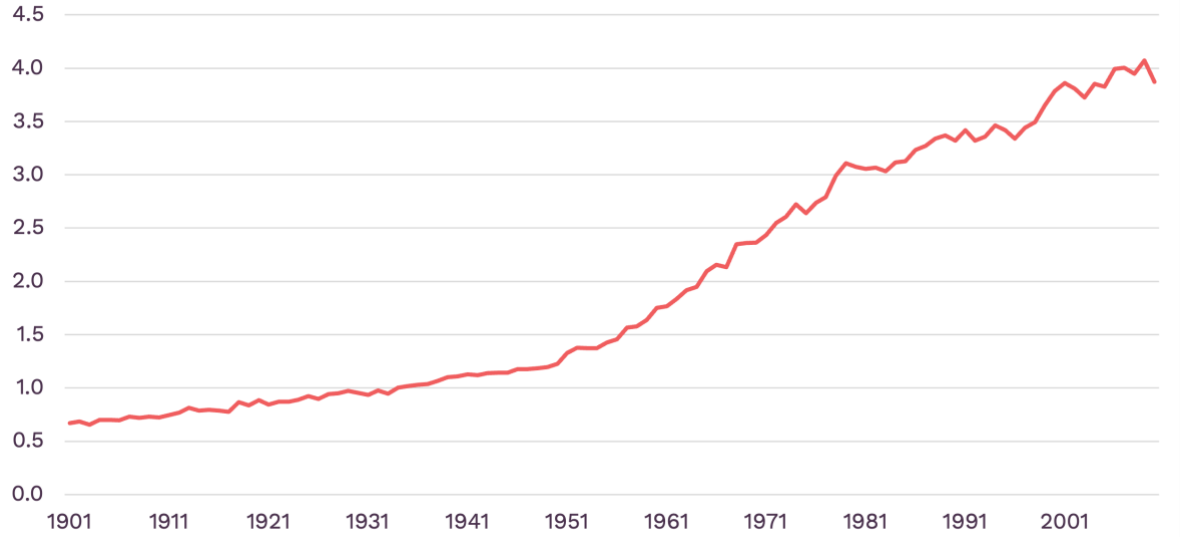
Figure 2.14 Percentage loss of total column ozone, 1956-1989 (%)



Maximum percentage total column ozone decline (2-year moving average) over Halley Antarctica during October, using 305 DU, the average October total column ozone for the first decade of measurements, as a baseline. Source: Data provided by JD Shanklin, British Antarctic Survey, UK. Available at: www.antarctica.ac.uk/met/jds/ozone/index.html#data

Another way in which the food system impacted the environment is by increasing water withdrawals. Between 1950 and 1990, global freshwater use increased nearly five-fold (Figure 2.15). The majority of water demand comes from the agricultural sector, but industry and households also demand an increasing amount of water as population and production continues to grow. While water consumption increases, the total amount of renewable freshwater resources available per capita is declining. As water use has an increasing reliance on non-renewable groundwater resources, this provides a threat to the sustainability of regional water supply and associated food production (Wada & Bierkens, 2014).

Figure 2.15 Global water use, 1901-2010 (thousand km^3)

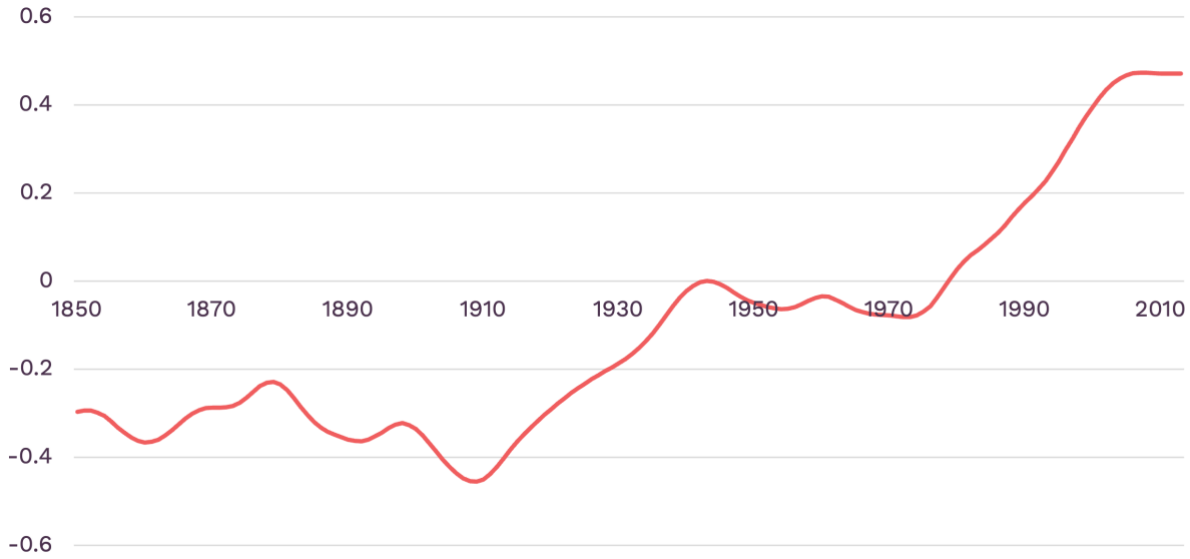


Global water use is sum of irrigation, domestic, manufacturing and electricity water withdrawals from 1901 to 2010 and livestock water consumption from 1961-2010. The data are estimated using the

WaterGAP model. Source: M. Flörke, Center for Environmental Systems Research, University of Kassel; Flörke et al. 2013; aus der Beek et al. 2010; Alcamo et al. 2003. Obtained from (Steffen et al., 2015)

Greenhouse gasses such as methane, CO_2, and nitrous oxide were emitted at an accelerated speed too. The total amount of emissions in the air accumulated rapidly, causing global temperatures to rise. Global surface temperature increased, being about 0.4 – 0.6 degrees warmer in this period than in the period of 1850 – 1913 (Figure 2.16). Biodiversity is increasingly threatened too, with the loss of species accelerating notably after 1950. From 1950-2000, the loss of species is three times as fast as in 1900-1950 (Netherlands Environmental Assessment Agency (PBL), 2010).

Figure 2.16 Global temperature anomaly, 1850-2010 (°C) (0 = 1961-1990 temperature)



Combined land and ocean observations, relative to 1961-1990, 20 y gaussian smoothed. In climate research, temperatures are usually measured as anomaly, meaning in comparison to a baseline period. Source: Climatic Research Unit (University of East Anglia) in conjunction with the Hadley Centre (at the UK Met Office). Obtained from (Steffen et al., 2015)

2.7 Coming Together and Falling Apart? (1990-now)

Key drivers

The Great Acceleration levels off during this period, although population, the economy, and many forms of environmental harm continue to grow. Digitalisation and financialization play transformative roles, driving transformative changes across societies. The future appeared boundless to some, until the 2008 financial crisis disrupted livelihoods worldwide, stimulating debate on the shortcomings of socioeconomic systems. One of the period's most remarkable achievements is the sharp decline in the number - and especially the share - of people living in extreme poverty. However, with increasing civil unrest, pressure on democratic principles, and rising temperatures, there are fears humanity might has reached the end of progress.

The rapid population growth that we saw in 1950-1990 levels off slightly around 2000. The growth rates fall in every global region but are mostly positive still. Only in Eastern Europe there's a decline in population size. The global population grows from 5.3 billion to 8.2 billion in 2023 (World Bank, 2024). International migration is playing a significant role in shaping population trends in several countries around the world. The number of international migrants increased from roughly 153 million in 1990 to about 281 million in 2020, increasing the relative share of international migrants in the total population (International Organization for Migration (IOM), 2024). For some regions, it's the main driver of population growth. In Europe, the contribution of international migration to population growth was higher than the balance of births over deaths for every year between 1990 and 2022 (Eurostat, 2024b). Another demographic trend is the increasing share of older persons in the global population. The global percentage of people aged 65+ in 1990 was 6.1 and 9.8 in 2022 (World Bank, 2024). This demographic shift has implications for various aspects of society, including labour and financial markets, the demand for goods and services such as housing and social protection systems, as well as for family structures. While many countries experience an ageing population, this is not the case for many African countries, which usually have a very young society, as further discussed in the deep dive on Africa.

Global economic growth did not get back on the rapid growth trajectory that was present in the 50s and 60s. Average annual growth rates are between 1-2% for each decade since the 1970s. For some years, growth rates are considerably higher, but this is dampened by downturns such as in the early 80s, early 90s, and the 2008 financial crisis. A large part of the growth comes from efficiency gains that are enabled by digitalisation and globalisation. Innovations in ICT made it possible to coordinate complex production activities at distance. This allowed companies to outsource various stages of production to different countries, taking advantage of lower labour costs. Richard Baldwin refers to this phase in globalisation where factories undergo international separation as the "Second Unbundling". Contrary to the First Unbundling – the rapid globalisation in the 19th century that allowed a separation of consumption and production locations – the movement of ideas and knowledge became more widespread now, as high-income nations' firms sent their marketing, managerial, and technical know-how along with the production stages that had been moved offshore (Baldwin, 2016). This stimulated the development of industrial manufacturing, providing an opportunity for convergence between global regions. High-tech manufacturing indeed located in different parts of Asia, including Korea, Japan, China, and India, stimulating economic development (DeLong, 2022b, p. 476).

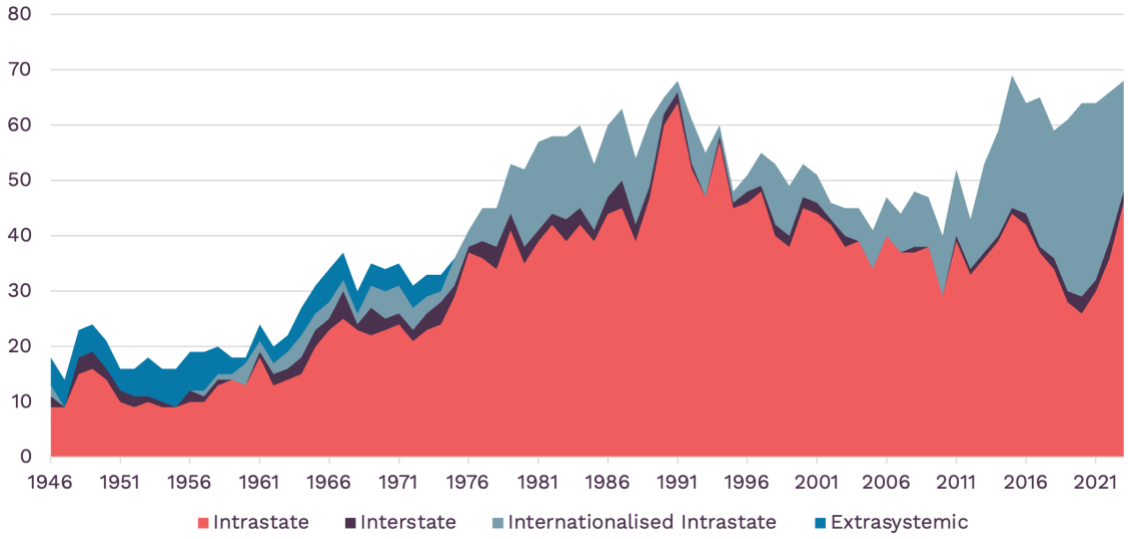
Labour markets were also transformed within Western economies. Some of the routine tasks in manufacturing and administration were automated, leading to a decline in demand for these types of jobs, while demand for jobs involving nonroutine cognitive tasks increased (Acemoglu & Restrepo, 2019; Autor et al., 2003). In Western Europe this led to an initial rise in unemployment (especially among men), while in the US it manifested as falling real wages for lower-educated workers (again, especially men) (DeLong, 2022a, p. 479). It exacerbated divergence in economic opportunities between lower-educated and higher-educated people.

Digitalisation also affected the financial sector. In combination with financial system deregulation - which was part of neoliberalist policies - and globalisation, this stimulated the development of novel and complex financial market instruments and an increased amount of capital flows and growing debts. Global foreign direct investments as share of GDP increased from 1.3% in 1990 to 5.4% in 2007, until the global financial crisis of 2008 made an end to this 17-year period of increases. In terms of FDI, this mostly affected middle- and higher-income countries. The net inflows of FDI in lower-income countries increased rapidly in the years after the financial crisis, going from 2.34% in 2008 to 5.58% in 2012, counteracting worries about contractions of FDI for lower-income economies at the time (World Bank, 2024). A possible explanation is that interest rates lowered considerably in high-income economies in response to the financial crisis (see e.g. Board of Governors of the Federal Reserve System (US), 2024). This created an environment of abundant global liquidity and cheap credit, encouraging investors to seek relatively high yields in lower-income countries. The rising share of Foreign Direct Investment (FDI) going into lower-income economies can also be linked to the Second Unbundling, as increases in FDI relate closely to the accelerating pace of offshoring (Suwandi, 2019).

The financial crisis resulted in spiking unemployment rates worldwide. Globally, unemployment rates increased from 5.4% in 2007 to 6.2% in 2009. The rise in unemployment rates was most severe in North America and Western Europe and regions with close economic ties such as Central and South-Eastern Europe, Latin America and the Caribbean, and advanced economies in Asia (International Labour Organization, 2013).

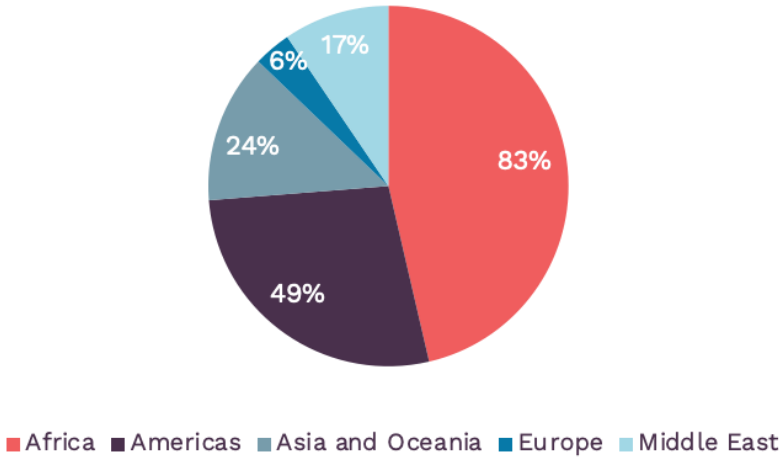
The financial crisis might be seen as the start of a more turbulent time. The period after World War II had been a relatively peaceful period in which the frequency, duration, and lethality of wars declined, also known as “The Long Peace” (Pinker, 2018). However, since 2011, there is an increasing number of armed conflicts and a rising number of deaths in conflict (Figure 2.17). The number of deaths due to conflict is also rising since 2011, although the number of fatalities is still very low compared to the period up to and including World War II. Most conflicts occur in Africa, followed by the Americas, and Asia and Oceania (Figure 2.18).

Figure 2.17 Number of conflicts by type, 1946-2023 (events)



Source: Uppsala Conflict Data Program and Peace Research Institute Oslo (2024) – processed by Our World in Data

Figure 2.18 Number of Armed Conflicts by region, 2022 (%)

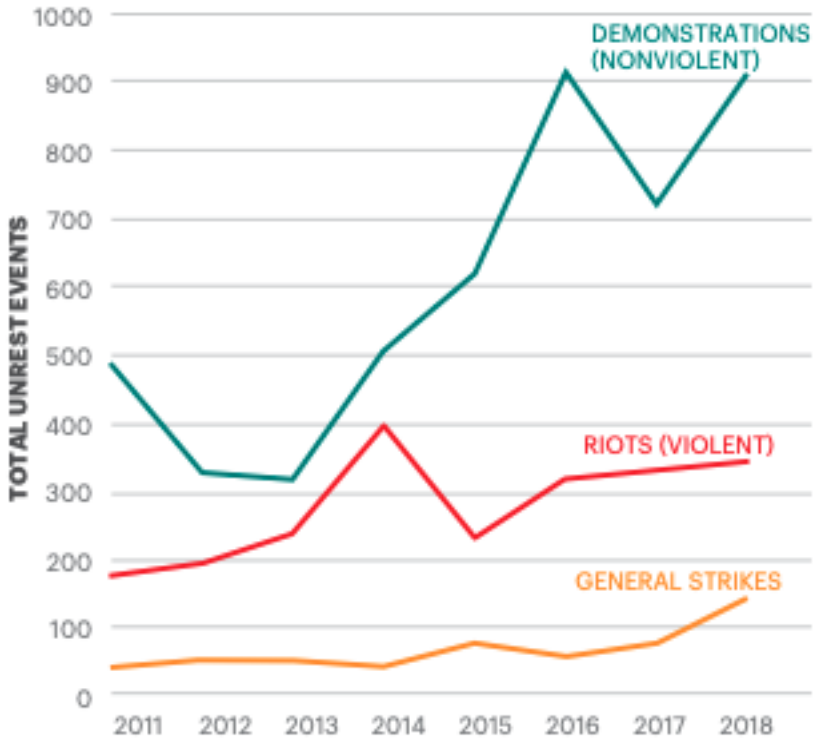


Source: Uppsala Conflict Data Program and Peace Research Institute Oslo (2024) – processed by Our World in Data

Apart from armed conflicts, we also see that the number of riots, non-violent demonstrations, and general strikes have increased recently (Figure 2.19). The high level of civil unrest in 2011 reflects the Arab Spring. People in Tunisia, Egypt, Bahrain, Yemen, Syria, and Libya entered the streets demanding a more democratic government. That same year, many more protests were held. Thousands of demonstrators in India went out on the streets to support Anna Hazare, a social activist and hunger striker, who fought for new anti-corruption measures. In Chile, there were huge marches by students and trade unions demanding higher spending on education also known as the Chilean Winter. The scale of civil unrest intensified after 2013, with major protests in many countries including Brazil, France, India, Nigeria, Pakistan, South Africa, Spain, Venezuela, and the US. Topics of demonstration

included elections, anti-corruption, cost-of-living, police violence, and environmental issues. In the period between 2011 and 2018, Europe had the largest number of protests, riots and strikes, with nearly 1,600 events from 2011 to 2018. The majority (65%) of incidents of civil unrest in Europe were nonviolent anti-government demonstrations. Another region in which civil unrest increased a lot is Sub-Saharan Africa, where civil unrest rose by more than 800%. Sub-Saharan Africa had the highest proportion of violent demonstration, with violent riots making up 42.6% of total events (Institute for Economics & Peace, 2020). There's limited quantitative data for the period after 2018, but it seems that civil unrest continues to manifest. More recent riots include the 2021 attack of the United States capitol by thousands of Trump supporting people (predominantly extreme right) and riots in the UK in 2024 (again, mostly by people with far right and anti-immigration sentiments). At the same time, we see counterdemonstrations occurring against the far-right, for example in the UK and in Germany. Other large-scale events in the past years include protests after the death of the Iranian Mahsa Amini, the Spring Revolution in Myanmar, climate strikes and demonstrations by movements like Extinction Rebellion, and many demonstrations regarding the Israeli Palestinian conflict.

Figure 2.19 Global trends in civil unrest, 2011-2018 (events)



Source: (Institute for Economics & Peace, 2020)

The increase in these types of events is likely to be influenced by the rise of social media. Social media gives everyone the power to share and allows to mobilise big groups of people more easily. While this might be a positive development, we also see that social media amplifies political polarisation and societal distrust. For a large

part, this is caused by construction. Divisive content is particularly likely to go "viral", misinformation is easily spread, and people engage increasingly with content that amplifies their own values and beliefs (Allcott et al., 2019; Rathje et al., 2021). As social media increasingly presents information about the world based on what people already think and believe, individuals are at risk of entering a funnel. This makes it increasingly hard to understand people that think differently. Social media is also criticised for having tremendous power protest or to cancel specific people, products, or ideas, while being much less successful in generating solutions for structural improvement. Social media is also linked to an increase in mental health issues, especially among the youth. More research on this topic is necessary, but multiple empirical studies illustrate clear linkages between smartphone use and depression (Brailovskaia et al., 2023; Kelly et al., 2018).

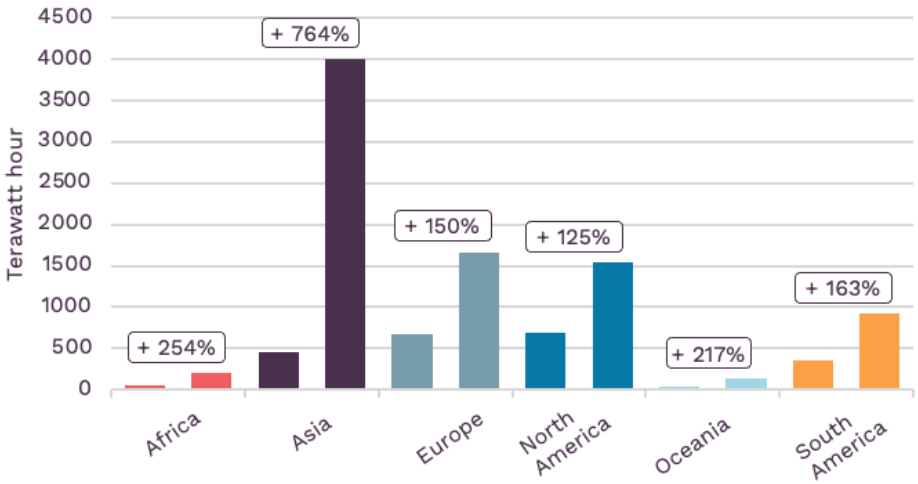
While citizens enter the streets to demand influence into the political debate, we see a rising trend of autocratisation, meaning there is decreasing limitations on the exercise of executive power through mechanisms such as rule of law, an independent judiciary, and constitutionally protected civil liberties. Throughout the beginning of the 21st century, more than half of the world's population lived in a democracy. But in 2016 this trend went into the reverse, with only 29% of global population still living in a democracy in 2023.[11] Freedom of expression, clean elections, and freedom of associations are under pressure in an increasing amount of countries (Nord et al., 2024). International cooperation is also in decline.

This is worrying from the perspective of human rights, but also from the perspective of environmental pressures. International institutions have been instrumental in shaping environmental policies in the past decades. The Montreal Protocol that was established in 1987 has been highly influential to stimulate the necessary steps for restoration of the ozone layer. One year later, the Intergovernmental Panel on Climate Change (IPCC) was established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) (IPCC, 2024). Climate change Assessment Reports of the IPCC have been feeding into policymaking ever since. In 2012, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services was established. A similar initiative to the IPCC, but then focussing on biodiversity. Another very well-known institutional effort is the Paris COP agreement of 2015, in which 196 countries committed to take necessary steps to limit the increase in the global average temperature to well below 2°C above pre-

[11] Democratization means that a country is making moves towards more democracy, regardless of starting point. Autocratisation is the opposite. V-Dem (2024) distinguishes four main types of regimens. A closed autocracy is the strictest form of an autocracy, being characterised by: "No multiparty elections for the executive; absence of fundamental democratic components such as freedom of expression, freedom of association, and free and fair elections." Electoral autocracies are defined as "Multiparty elections for the executive exist; insufficient levels of fundamental requisites such as freedom of expression and association, and free and fair elections." Electoral democracies are characterised by "Multiparty elections for the executive are free and fair; satisfactory degrees of suffrage, freedom of expression, freedom of association." The most democratic regime is called a Liberal democracy and is defined as including "judicial and legislative constraints on the executive along with the protection of civil liberties and equality before the law."

industrial levels" and pursue efforts "to limit the temperature increase to 1.5°C above pre-industrial levels." Countries all over the world are required to develop nationally determined contributions (NDCs) to reduce national emissions and adapt to the impacts of climate change and many governments are taking concrete steps to mitigate climate change. Climate investments are increasing in both the public and private sectors, and renewable sources of energy are displacing fossil fuels at historic rates in many countries. This is largely stimulated by a rapid fall in prices of renewable energy, following investments in research & development. The relative and absolute increase of renewable energy production is the largest in Asia (Figure 2.20). China plays a major role in this, as discussed in the deep dive about China.

Figure 2.20 Rise in renewable energy production between 1990 and 2022 (Terawatt hour)



Source: Ember (2024); Energy Institute - Statistical Review of World Energy (2024) - with major processing by Our World in Data

However, progress is much too slow. GHG emissions have reached unprecedented levels, tropical forests are being cleared at near-record rates, fossil-fuel subsidies are increasing, and coal-fired power plants continue to be constructed. Scientists estimate that current policies will fail to bring carbon emissions to zero, and could lead to roughly 2.5°C of warming by 2100 (Tollefson, 2023). With about 2°C warming, climate-changes in food availability and diet quality are estimated to increase nutrition-related diseases and the number of undernourished people, affecting tens to hundreds of millions of people, particularly among low-income households in low- and middle-income countries in Sub-Saharan Africa, South Asia and Central America. Climate change risks to cities, settlements, and key infrastructure will rise sharply in the mid and long-term with further global warming, especially in places already exposed to high temperatures, along coastlines, or with high vulnerabilities. Impacts that will only exacerbate beyond 2°C (IPCC, 2023).

Another development that is expected to bring profound changes to society is the rapid advancement of artificial intelligence (AI). AI enables machines to mimic

human-like capabilities such as reasoning, learning, and planning. It enables technical systems to perceive their environment, deal with what they perceive, solve problems and act to achieve a specific goal.

AI applications are already widely integrated across various sectors, from online retailers providing personalized content and recommendations to the development of smart air-conditioning and efficiency gains in fertilizer use. AI-driven language models have become increasingly prominent over the past 5 years. Videos are automatically transcribed, large volumes of text are translated online, and students use AI for homework. While these innovations offer clear benefits in terms of efficiency, they also present challenges.

AI can cause serious harm, whether through malicious intent or unintended consequences. For example, when they are used in politically motivated disinformation campaigns, as happened in the US when the Republican National Committee used AI to generate images for an anti-Biden political ad depicting a group of mostly White border agents apprehending what it called “illegals” trying to cross into the country. The video, which looks real, has reached close to a million people on social media. AI can also increase discrimination. A recent study examining 5,100 AI-generated images discovered that it exaggerates stereotypes on race and gender to extreme levels (Nicoletti & Bass, 2024). AI has also been linked to environmental pollution. The average electricity demand of typical Google search is 0.3 Wh of electricity, compared to 2.9 Wh for a ChatGPT request. With 9 billion searches daily, this adds up in terms of GHG emissions and water use of datacentres (International Energy Agency, 2024a).

As with many innovations, the impact of AI depends heavily on the institutional frameworks that govern its use. Currently, a small group of individuals at a few leading technology firms fully understand the extraordinary power of this technology. If society at large does not engage with AI's development and governance, decisions about how this technology shapes lives could rest solely in the hands of a select few, potentially exacerbating inequalities and creating new forms of societal risk (Roser, 2022).

Outcomes

Wellbeing and inclusion

How did wellbeing, the distribution of wellbeing, and the conditions affecting future wellbeing change in this past period? For this particular period, we can use happiness data to get an idea of people’s self-evaluated wellbeing. Happiness is usually estimated using data for life satisfaction, which is measured using surveys, asking people how satisfied they are with their lives.[12]

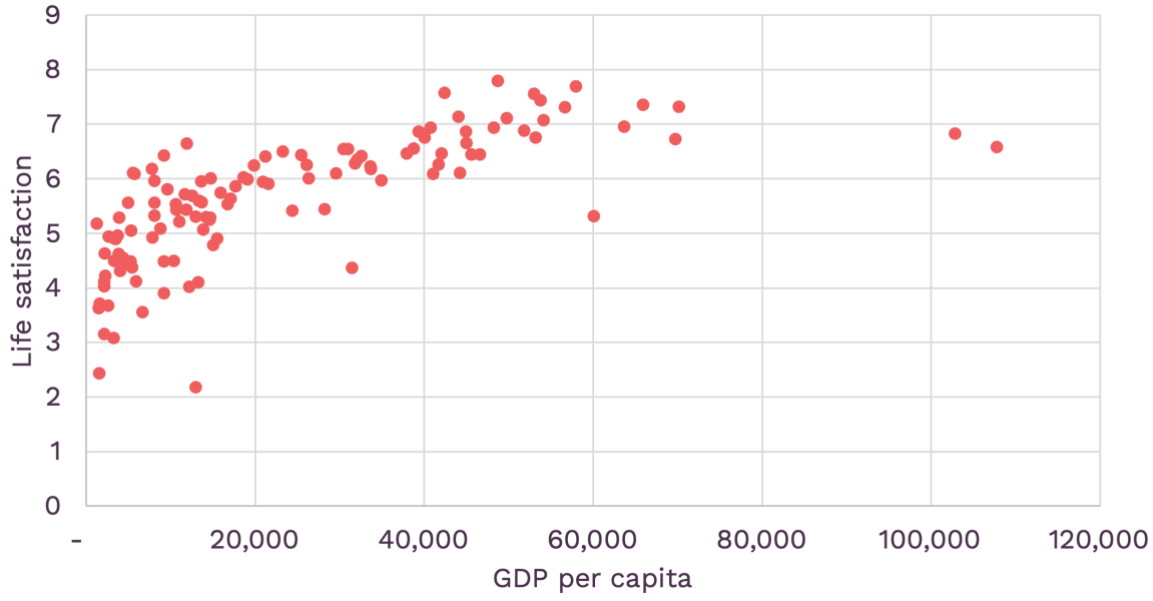
[12] The Gallup World Poll is the largest initiative to track global happiness developments. The poll asks respondents to evaluate their current life as a whole using the image of a ladder, with the best possible life for them as a 10 and worst possible as a 0. Each respondent provides a numerical response on this scale, referred to as the Cantril ladder. Around 1,000 responses are gathered annually for each country.

In the past decade and a half, there is no clear trends in life satisfaction in the global average. Developments in overall life satisfaction vary greatly from country to country, largely cancelling each other out. When looking at country differences, we see for example that between 2010-2022, life satisfaction increased 2.1 points in Serbia and 2.0 points in Lithuania, while decreases are as large as 3.5 points in Afghanistan and 2.7 points in Lebanon (Helliwell et al., 2024).

We can see trends at the level of global regions. Central and Eastern Europe and East Asia experienced large improvements in life satisfaction between 2006-2010 to 2021-2023. By contrast, life evaluations fell in South Asia and Middle East and North Africa. Happiness also fell in the Western Offshoots, (United States, Canada, Australia and New Zealand), by twice as much for the young as for the old. Life satisfaction inequality within countries increased by more than 20%, in all regions and age groups (measured by the standard deviation of each country's distribution). Negative emotions, another indicator used to assess happiness, are more frequent now than in 2006-2010 everywhere with the exception of East Asia and Europe (Helliwell et al., 2024). Overall, happiness is declining in most global regions. Positive developments in East Asia, which is a very populous region, masks this trend in global averages.

When comparing happiness levels from around the world at any given point in time, it is commonly observed that countries with higher average national incomes tend to have higher average life satisfaction scores (see Figure 2.21).

Figure 2.21 The relationship between life satisfaction (0-10) and GDP per capita (constant 2021 international $) in 2021



GDP per capita is in terms of Purchasing Power Parity (PPP) adjusted to constant 2017 international dollars. Source: (1) Life satisfaction: (Helliwell et al., 2024) (2) GDP: (World Bank, 2024)

In addition to life satisfaction, happiness is sometimes measured asking people about experiences of positive and negative emotions or a sense of fulfilment (Helliwell et al., 2024; OECD, 2013).

Similarly, richer people within a country tend to be happier than poorer people in the same country. However, there is no clear relation between happiness and income over time. This contradiction is called the “Easterlin Paradox”, which can be explained by social comparison and adaptation (Easterlin & O’Connor, 2021).

When looking at the development of GDP per capita in this period (Figure 2.21), the large gap between North America, Europe and Central Asia, and the other global regions stand out once more.

East Asia and the Pacific experienced a large transformation during this period, with average increases in GDP per capita of more than 4% between 1990-2022. In Sub Saharan Africa, Western Europe, the Western Offshoots, and Eastern Europe (the latter especially in the first decade after the fall of the Soviet Union) the growth rates are much lower. When looking at individual countries, we see that China and India experience rapid growth rates in GDP per capita, especially in the period 2000-2010. Many countries in Western Europe, Canada and the US actually see a decrease in growth rates in comparison to earlier decades, falling below 2-3% of growth. Kenia and Nigeria experience negative growth rates from 1990-2000 but grow afterwards.

When looking at the Human Development Index (HDI), all global regions experience improvements in wellbeing. Increases in average life expectancy, years of education, and per capita income (the underlying HDI components) are not as large as in the previous period, but still positive. Between-country inequality in HDI, as measured as the ratio of top 10% to bottom 50% has decreased. The OECD (2021b) illustrates that within country inequality is also declining with respect to life expectancy and education.

Global income inequalities between countries declined in this period too (again measured by the ratio of the top 10% average income to bottom 50% average income). This might be a consequence of the Second Unbundling, which brought more economic development to lower-income economies, and especially China. However, there are also signs of divergence when other measures are used, illustrating that the international separation of factories and the related global labour arbitrage was mostly profitable for high-income economies. Multinationals - which are traditionally mainly from high-income economies - are often seen as using their geopolitical and commercial influence to suppress wages, prices, and profits in developing regions such that prices in developing economies are systematically lower relative to prices in high-income nations (Suwandi, 2019). This leads to substantial price differentials between these two regions for labour, energy, and materials.

Southern wages are estimated to be 87–95% less than Northern wages at the same skill level, i.e. for equal work as defined by the ILO.[13] In the period between 1995-2021, the average Southern wage increased from €0.46 to €1.62 per hour (an increase of €1.16, or 250%), while the average Northern wage increased from €12.60 to €24.95 per hour (an increase of €12.35, or almost 100%) (Hickel et al., 2024). While the

[13] The definition for the global North is based on the IMF list of ‘advanced economies’. This includes USA, United Kingdom, Canada, Australia, Norway, Austria, Belgium, Germany, Denmark, France, Luxembourg, Netherlands, Finland, Sweden, Switzerland, Japan, South Korea, Estonia, Spain, Greece, Ireland, Italy, Latvia, Malta, Portugal, Slovenia, Slovakia, Taiwan, Cyprus and the Czech Republic. The global South compromises all emerging and developing economies, including China (Hickel et al., 2024).

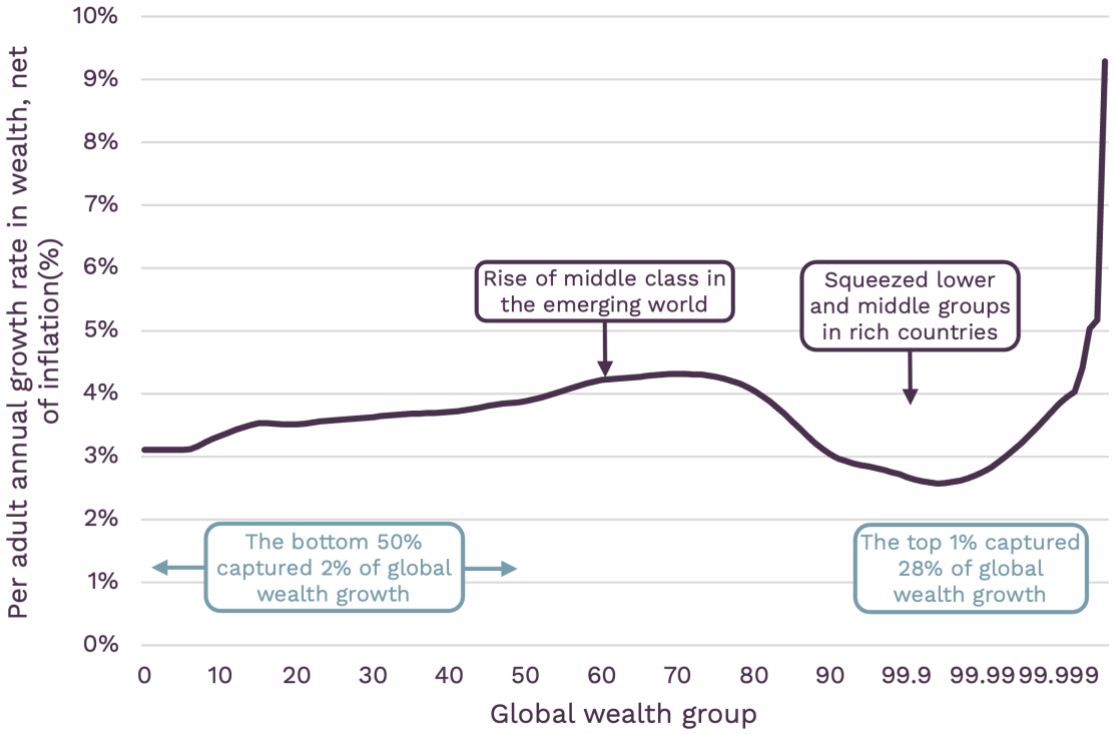
percentual increase is much higher in the South, the absolute gap between wages almost doubled from €12.14 to €23.34. Based on this perspective, no convergence is occurring.

The wage gap created an incentive for companies in the North to outsource production activities. This also shows in trade data. Hickel et al. (2024) estimate that the labour of production in the world economy is overwhelmingly performed in the global South (on average 90–91%), while the yields of production are disproportionately captured in the global North (roughly one-sixth of the production in the global South to the global North comes from China). We see something similar for global trade in energy and resources. The global North consumed 4.6 times as much raw material equivalents that originated from the global South than the global South consumed from the global North; for embodied land and energy the global North consumed more than double the amount.

This also has implications for people's time-use. Labour time per worker has decreased from 1995-2021 by 7% in the global North, while in the South it has increased by 1% (Hickel et al., 2024).

When looking global wealth developments, we see some interesting developments in the so-called "elephant curve" (Figure 2.22)

Figure 2.22 Average annual wealth growth rate, 1995-2021 (%)



Source: (Chancel et al., 2022a)

This graph presents the annual growth rate in wealth per global wealth group, resulting in an elephant-shaped line. The head of the elephant reflects the rise of

the middle class in the emerging world, as discussed earlier. We also see that lower- and middle-income groups in rich countries (which, from a global perspective, belong to the top 80-99%) experienced a decline in their wealth. The curve also makes wealth inequalities very clear. The global bottom 50% captured only 2% of the increases in global wealth from 1995-2021, while the top 1% captured 28% of the global wealth growth.

Digitalisation also had profound effects on people's personal lives. The number of people using the internet went from 2.62 million in 1990 to roughly 5 billion in 2020 Even more impressive is the number of people having a mobile phone subscription. This rose from 0.2% in 1990 to 107.3% in 2021 – there's more subscriptions than there's people. However, there's individual countries with subscription rates as low as 30% (South Soudan), while other countries have a rate of 205% (Libya). Hence, the number of 107.3% does not mean that everyone has a mobile phone subscription. Both developments come with great impacts on information provisioning, communication, and time-use.

One very different characteristic of this period relates to the recent rise in armed conflicts. This has consequences for the safety of millions of people and many people are forced to leave their homes. Between 2018-2023, the number of people living in internal displacement increased by 51%. The total number of internally displaced people as a result of conflict and violence is 68.3 million. At the end of 2023, an estimated 117.3 million people worldwide were forcibly displaced. This equates to more than 1 in every 69 people on Earth (UNHCR, 2024).

The recent rise in displacements is for the most part caused by the increase in conflicts. However, climate change also plays a role. A child born in 2020 will experience a 6.8-fold increase in heatwaves and a 2.8-fold increase in floods compared to a person born in 1960 (IDMC, 2022). This affects the risk of displacement both directly and indirectly, for example by destroying homes (directly) or by impacting food security (indirectly).

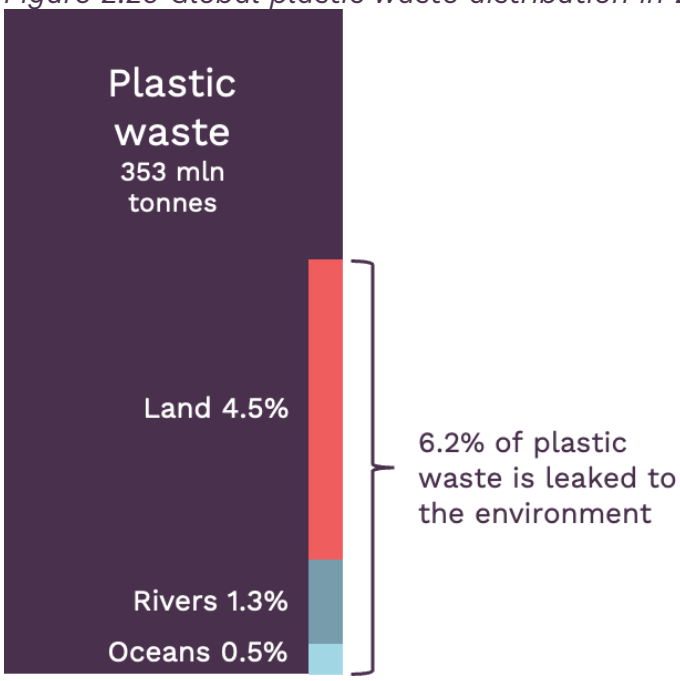
Sustainability

Human activity continues to create increasing environmental pressures throughout this period. In 2023, six out of nine planetary boundaries are crossed (Richardson et al., 2023), severely threatening a safe living space for current and future generations.

One planetary boundary that hasn't been discussed yet relates to novel entities, human-created things that can have a disruptive effect on the earth system. This includes radioactive materials, toxic substances, and micro- and macroplastics (the latter relating to plastic bags and bottles, etc.). Plastic pollution is a salient issue. Plastic use has increased for decades, and it's projected to almost double in the period between 2019 and 2060. However, what matters for environmental pollution is not necessarily how much plastic waste is produced, but how it's managed. When considering macroplastics, around 6% of plastic waste ends up in the natural environment (Figure 2.23). Most leakage occurs in lower income countries, where it

is generally more challenging to develop better waste management systems (OECD, 2022).

Figure 2.23 Global plastic waste distribution in 2019 (%)



Numbers don't add up due to round error. Source: (OECD, 2022)

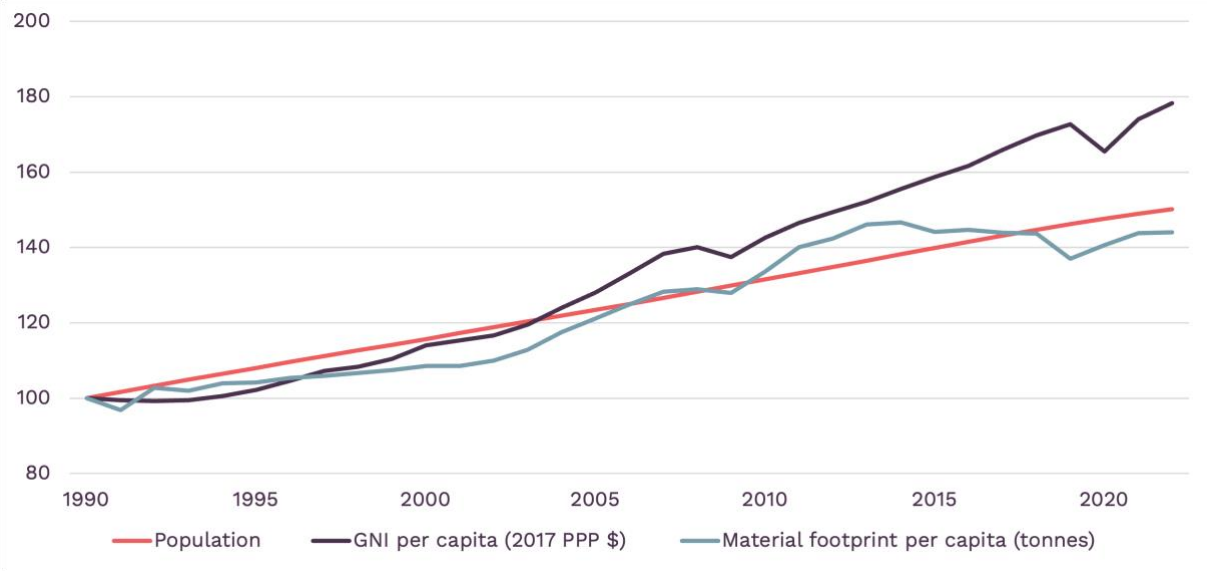
Microplastics are another reason of concern, both for the environment and for human health. These tiny particles of plastic less than 5 millimetres in size, have infiltrated oceans, soil, the air we breathe, and ourselves. There is still much unknown about the exact impacts of microplastics, but literature on the marine ecosystem finds evidence that for sea life, exposure can compromise feeding, metabolic processes, reproduction, and behaviour (Galloway et al., 2017).

The rise in consumption of goods is also reflected in the increasing material footprint (Figure 2.24). The total amount of raw materials extracted to meet final consumption demands has risen by almost 70% compared to the level in 2000. Meanwhile, Earth's average surface temperature in 2023 was the warmest on record, being around 1.2 degrees Celsius above the average for the baseline period (1951-1980 for this particular study) (NASA, 2024). That brings the Earth very close to the 1.5-degree warming. Total emissions continue to grow, meaning an increasing amount of additional greenhouse gasses ends up in the air each year.

Historically, GHG emissions have been strongly correlated with economic growth. However, in the past two decades, more and more countries have been able to achieve economic growth while reducing their emissions. This is mostly achieved by higher-income nations through replacing fossil fuels by clean energy alternatives. Often, these are the same nations in which air pollution is relatively low and deforestation is reversed. However, the majority of the global population still lives in

countries in which economic development is closely linked to environmental impacts.

Figure 2.24 Development of material footprint, 1990-2022 (1990=100)



Source: United Nations (2024b)

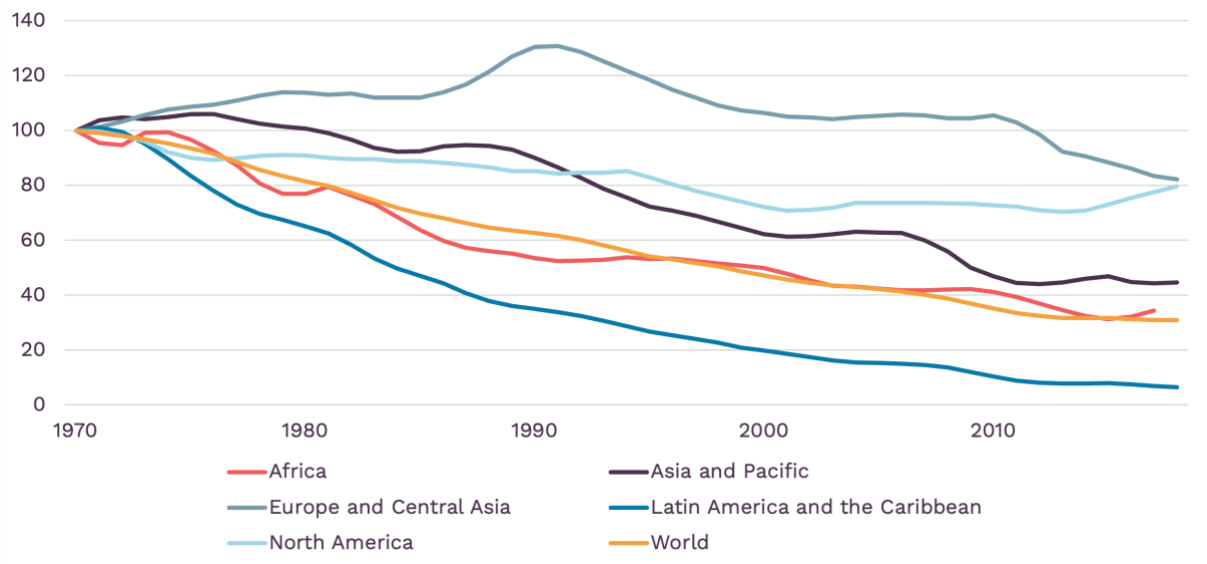
Biodiversity loss poses increasing threats during this period. Between 1970 and 2018, on average, there was a 69% decline in population size across 31,821 studied species for the "Living Planet Index" (LPI) (Figure 2.25).

Latin America and the Caribbean have seen the most severe decline of any region, experiencing an average decline of 94% across its studied species. The LPI highlights the conversion of grasslands, forests, wetlands and the harvesting of species for hunting and poaching as the main contributors to this decline. It was most severe for fish, reptiles and amphibians.

Europe and Central Asia has seen the smallest decline of all of the continents with an average decline of 18% since 1970. This can be partly attributed to successful conservation efforts. For example, most countries in Europe are increasing forest land and restoring wild ecosystems. However, Europe's biodiversity was already in a significantly depleted state at the starting point in 1970. This is not captured by this metric as it takes the level of means species abundance in 1970 as the "100%" for each region.

Large mammals have been particularly affected, and more recently, there is growing concern about the decline of insects that are crucial for pollination. The loss of pollinators, coupled with land degradation, poses severe threats to food production. Biodiversity loss also endangers global food security by weakening the resilience of agricultural systems against threats like pests, pathogens, and climate change. Additionally, the degradation of land and coastal habitats increases the risks of floods and hurricanes, while the risk of extreme weather has risen due to climate change (IPBES, 2019b).

Figure 2.25 Living planet index, 1970-2018 (1970 = 0)



Source: World Wildlife Fund (WWF) and Zoological Society of London (2022) – processed by Our World in Data

2.8 A Novel Narrative on Global Progress

This chapter has described how wellbeing, inclusion, and sustainability have developed from 1820 until now. Reflecting on more than 200 years of history, what can we conclude about a global progress narrative? Looking at a wide range of wellbeing indicators, we see that the world has made significant progress since 1820. Life expectancy has more than doubled, literacy rates increased 7-fold, and global GDP per capita – indicating material wellbeing – is 15 times as large as 200 years ago. The world is also much more safe and human rights are respected on a much grander scale, with the human rights index increasing from 0.18 in 1820 to 0.53 in 2023 and improvements occurring in all global regions. While these are positive trends, it is important to keep in mind that average developments mask underlying distributional aspects.

We have seen that the global narrative of progress is a story of heterogeneity. The current difference in average life expectancy per country is as large as 30 life years, and while some countries have doubled or tripled the size of their economy every few decades, others saw no sustained increase in GDP per capita during the same period. A positive development in this regard is the decline in between-country inequality in life expectancy, education, and GDP per capita since the 1990s. Additionally, the position of women has seen improvements over the long-run. Despite these encouraging trends, the world is still far from equitable and it is unlikely that true inclusion will be achieved with current systems that are still heavily influenced by post-colonial and patriarchal power structures. Moreover, income and wealth inequalities within countries remain high.

Last, our narrative of progress is characterised by increasing environmental pressures. Economic development and population growth have put increasing strain

on the natural environment, now up to an extent that it threatens a safe living space for humanity. While many governments are undertaking serious steps to limit negative impacts on the environment, six out of nine planetary boundaries are being transgressed and no sufficient decoupling of economic production and environmental impact is in sight.

The global narrative on progress is thus a narrative about improved wellbeing in every region of the world. But it's also a narrative about disparities and environmental harm, highlighting the limitations of the current development model. True progress towards sustainable and inclusive wellbeing is yet to be made.

2.9 The Key Drivers of Global Progress

This chapter has explored how wellbeing, inclusion, and sustainability are shaped by key drivers such as demography, technology, globalisation, the economy, nature, and institutions. Chapter 6 provides a more in-depth examination of the role of each driver in determining wellbeing developments, here the focus lays on the most influential key driver of all: institutions.

Economic development has long been viewed as a catalyst for improved living standards, often driven by technological innovation and globalisation. However, this chapter illustrates that economic growth alone does not guarantee sustainable or inclusive wellbeing. On the contrary, unchecked development can exacerbate inequality and environmental degradation.

Moreover, economic development, technology, and globalisation alone cannot explain the full picture. Institutions—both formal and informal—are critical in shaping how different drivers influence wellbeing across space and time. Informal institutions, such as widely held beliefs, ideologies, and narratives, have played a foundational role in major developments over the past two centuries. Enlightenment thought spurred technological advances and the intensification of resource extraction, contributing to improvements in living standards but often at a high environmental cost. Religion and ideologies like social Darwinism shaped patterns of colonisation and exacerbated tensions between nations, leaving lasting disparities and geopolitical instability. The rise of neoliberalism, which places faith in free markets, highlights how institutions can also drive rising inequality within countries.

The influence of informal institutions often manifests through more formal political and economic structures. For example, the belief in economic cooperation as a path to global peace underpinned the formation of institutions like the IMF and World Bank. Similarly, local labour movements laid the groundwork for the International Labour Organisation, while shifting views on human rights coincided with the global expansion of voting rights. Democratic governance, in particular, is seen as vital force for safeguarding human rights and fostering social security, which enhances the quality of life, especially for the most vulnerable. Finally, this chapter underscores the crucial role institutions play in mitigating the environmental impacts of economic development.

In conclusion, institutions are crucial structures that determine how other drivers, such as technology and economic growth, impact wellbeing, inclusion, and sustainability. To generate true progress towards sustainable and inclusive wellbeing, society needs strong and inclusive institutions. But recent trends in democratic governance, polarisation, and safety are illustrating worrying developments. Chapter 6 will go more into depth on this paradox and implications for the future.

CHAPTER 3. A WELLBEING ANALYSIS FOR AFRICA SINCE 1960

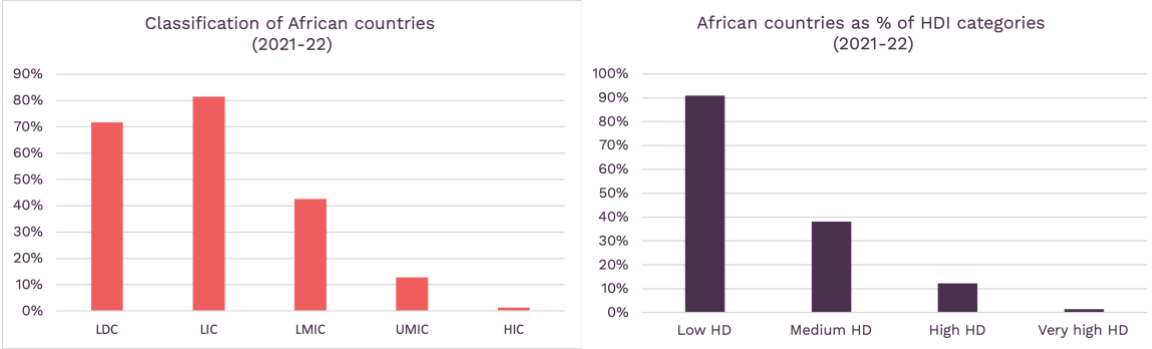
3.1 Introduction

Africa is a vast heterogenous continent with a great variety of geographies, people, and cultures. It has a rich history, with continental struggles and a history of colonial rule from several European nations. As such, Africa is the world's last decolonised continent. Some North and West African countries gained Independence in the 1950s, but most others in the 1960s. Several, predominantly southern African countries, became independent later[14]. South Sudan separated from Sudan in 2011, and South Africa held its first democratic election in 1993, formally ending the apartheid era.

Some countries have experienced economic growth and development while others have not. Many countries have been unable to sustain development. Africa's economic development has generally been slower than elsewhere (e.g. Asia; see global analysis). This is reflected in the overrepresentation of African countries in the groups of least developed and low-income countries as well as in the countries of low human development (Figure 3.1). Seychelles is the only high-income and high human development country on the continent. It is therefore understandable that the focus in Africa has been on rapid economic and human development.

Africa's ambition and aspirations were high at Independence, but momentum was 'lost' in the 1980s and 1990s due to economic challenges and associated implementation of Structural Adjustment Programmes (SAPs) in many countries. Renewed ambitions and aspirations emerged in the 21st century, aimed, among others, at economic and political integration, establishing continent-wide infrastructure and connectivity, reduced external financial dependency, as well as infusion of African culture, indigenous resources and knowledge in development. These aspirations are captured in the African Union's "Agenda 2063 entitled the Africa we want" (Agenda 2063, 2015). At the same time, a range of challenges persist and need to be overcome. These include climate change, poor intra African infrastructure and communication links, inequality and poverty, high unemployment, a recent upsurge in political instability, conflicts and irregular migration.

Figure 3.1 Classification of African countries according to income and human development status in 2021-2022 (% of total countries in each category)



Sources: (UNDP (United Nations Development Programme), 2024; World Bank, 2024)

[14] In the 1970s: Angola, Cabo Verde and Mozambique; in 1980 Zimbabwe and Namibia in 1990.

This chapter will address two core questions about Africa's post-colonial period: 1) How does the "old" economic perspective of economic growth compare to the new "WISE" perspective in Africa? 2) What are the underlying keys driver that are associated with WISE gains or lack thereof in Africa since 1960? A third question - Do certain developments bode well or poorly for the future of Africa, its regions, and countries? - will be left to the concluding chapter 6.

This chapter has the following sections. Section 3.2 briefly discusses the methods and data used. Section 3.3 looks at the historical trends of Africa with references to specific African countries for the period 1960 to present. The section discusses development key drivers and outcomes. Section 3.4 dwells on the diversity in development of 5 African regions. Sections 3.5 and 3.6 provide Africa's perspective on the two questions which were posed.

3.2 Methodology and Data

This "deep dive Africa" covers Africa's development over the period 1960 to the present and goes beyond the traditional measure of economic growth by also covering wellbeing, inclusion, and sustainability aspects of development.

Geographical scope

The analysis covers three spatial levels: Africa as a continent, African subregions and specific African countries. We used the OECD regional classification for Africa. Table 3.1 shows the countries that constitute each region.

Table 3.1 African regions and associated countries

Region	Countries
North Africa	Algeria, Arab Republic of Egypt, Libya, Islamic Republic of Mauritania, Kingdom of Morocco, Republic of Tunisia
East Africa	Union of the Comoros, Republic of Djibouti, State of Eritrea, Federal Democratic Republic of Ethiopia, Republic of Kenya, Republic of Madagascar, Republic of Mauritius, Republic of Rwanda, Republic of Seychelles, Somali Democratic Republic, Republic of South Sudan, Republic of the Sudan, United Republic of Tanzania, Republic of Uganda.
Southern Africa	People's Republic of Angola, Republic of Botswana, Kingdom of Eswatini Kingdom of Lesotho, Republic of Malawi, Republic of Mozambique, Republic of Namibia, Republic of South Africa, Republic of Zambia, Republic of Zimbabwe
Central Africa	Republic of Burundi, Republic of Cameroon, Central African Republic Republic of Chad, Democratic Republic of the Congo, Republic of Congo Republic of Equatorial Guinea, Gabonese Republic, Democratic Republic of São Tomé and Principe
West Africa	Republic of Benin, Burkina Faso, Republic of Cabo Verde, Republic of Côte d'Ivoire, Republic of The Gambia, Republic of Ghana, Republic of Guinea, Republic of Guinea-Bissau, Republic of Liberia, Republic of Mali, Republic of Niger, Federal Republic of Nigeria, Republic of Senegal, Republic of Sierra Leone, Republic of Togo

Historical scope

The analysis covers 1960 to the present and the outcomes are presented for the entire period. It became evident during the analysis that we needed to distinguish four sub-periods to analyse economic growth, wellbeing, inclusion and sustainability. Brief characteristics of each period are shown in Table 3.2.

Table 3.2 Key features on growth, wellbeing, inclusion and sustainability by period

Period	Key features
1960 - 1975	Most African countries gained Independence. The top Independence year was 1960 when 27 countries or half of the African countries gained Independence; ambitions and people expectations were high. Colonial structures had to be replaced or modified. Priorities were to build the nations and own governance structures and to rapidly develop infrastructure. In many countries, governance was unstable, and coups and conflicts occurred at the detriment of development. Countries opted for different development paths. The aims of Pan-Africanism slowly faded.
1976 - 1995	This period is characterised by an economic slowdown and stagnation. It is also the period of the structural adjustment programmes (mid 80-mid 90s), instability and reforms, HIV/AIDs and Independence of three remaining colonies[15] (Seychelles 1976, Zimbabwe 1980 and Namibia 1990).
1996 - 2010	This period is characterised by accelerating economic and human development and the re-emergence drive towards closer integration and cooperation through the African Union and associated regional economic communities; the period ended with a development dip due to the global financial crisis (2008-2009).
2011- present	This period saw the renewal of African aspirations, practical steps towards regional integration and cooperation and the development of a long-term vision for the continent ('The Africa we want'). There was increasing global polarisation and growing domestic and international headwinds, including resurgence of conflicts and the Covid pandemic. Growth and development levelled off. Some countries encountered new public debt challenges necessitating adjustments and reforms.

Data

In line with the other chapters, the analysis distinguishes six key drivers (demography, economy, technology, nature, globalisation and institutions) and three outcome areas (wellbeing, inclusion, and sustainability). Key indicators were selected for each driver and outcome area, based on (i) Relevance for Wellbeing, Inclusion and Sustainability; (ii) Balanced coverage of key drivers and outcomes; (iii) Availability of long time series, preferably dating back to 1960; (iv) Comparability with the other deep dives (China and EU/US) and the global analysis. The indicator categories are shown in Table 3.3. Specific African indicators were added based on their relevance for Africa such as youthful population, food security, undernourishment, and HIV/AIDs.

This chapter combines quantitative analysis with descriptive qualitative analysis. Databases most used are World Development Indicators, (WDI), United Nations (UN),

[15] In addition, Eritrea separated from Ethiopia in 1994.

Changing Wealth of Nations (CWON), World Inequality Database (WID), World Health Organisation Global Health Observatory (WHO-GHO), International Energy Agency (IEA), Food and Agriculture Organisation (FAO), World Economic Outlook (WEO) and World Energy Consumption data base (WEC)[16]. In addition, the African-specific Ibrahim Index for African Governance (IIAG) database was used to augment the WDI governance indicators.

Table 3.3 Selected context and outcome indicators

Aspect	**Indicator categories**
Key drivers	Demography, economic development & structure, nature/environment, technology, globalisation & governance/institutions
Wellbeing	Access to communication, material wellbeing, health/life expectancy, education, access to basic services, food security, poverty, (un-)employment
Inclusion	Income and wealth inequality, gender inequality, urban-rural inequality, inequality between countries
Sustainability	Climate change, use of electricity, renewable energy, freshwater resources, deforestation, biodiversity/ threatened species, and total and natural wealth

Scattergrams have been used to explore associations between indicators. The text refers to categories of strong, moderate weak and very weak/no associations. Associations must not be interpreted as a causal relationship.

Mean figures for Africa as a continent and the sub-regions were calculated as the average of African countries. Where applicable, figures were weighted based on population, GDP, land area, or GNI (Gross National Income). Indicators defined as share of GDP or GNI were weighted by GDP or GNI, indicators defined as share of land area were weighted by land area, indicators defined as share of population, were weighted by population. Population-related indicators such as life expectancy at birth were also weighted by population. In some instances, the simple average was taken because it was already defined in a comparable unit such as 'per 100 people'. In addition, a simple average is taken for the inequality data – expressed as Gini coefficient or top10%/bottom50% ratio – reflecting the average inequality in African countries. A lower threshold on data availability was set on two-thirds. In case of lower data availability, values were left blank[17].

Quantitative data can only go so far in providing insights. The discussion on African developments is therefore augmented with qualitative sources to provide historical and regional context. Qualitative data is based on several sources including books, reports, and academic literature.

[16] This global data base has historical energy consumption and greenhouse gas emission data for 12 African countries: Eritrea, Ethiopia, Libya, Malawi, Morocco, South Africa, Tunisia, Zambia and Zimbabwe.
[17] The WDI database uses the same threshold.

3.3 Africa before 1960

In this section, we discuss the development of key drivers and outcomes for Africa as a continent since 1960. Where relevant, reference is made to sub-periods mentioned above. The growing diversity between countries is also discussed using country examples as well as diversity ratios (e.g., top/bottom ranked country ratio).

Although we are focused on the period after 1960, we recognise that Africa has a long and rich history before that (see e.g. Crowder, 1984). This history is also important for understanding the past decades and future of this continent.

Prior to colonisation, Africa had large empires cutting across current countries and some extended into Europe from North Africa. African slaves were sent to other continents until slavery was abolished. Some former USA slaves were later resettled in Liberia. To limit conflicts between colonial powers, 'ownership' and boundaries of colonies were agreed upon in the Berlin Conference in 1884-85 (see also chapter 2 and (Craven, 2015). Colonialism has had major long-lasting impacts on Africa's development during the colonial era and far beyond, some lasting until today (e.g. land distribution) (see e.g. Crowder, 1984; Crowder & Ajayi, 1985; Madimba & Ukata, 2023).

Several disruptive factors played a pivotal role in Africa's development during the colonial era. Firstly, colonial powers did not fully appreciate and understand existing -often well developed- African governance systems. The latter were based on indigenous cultures, indigenous knowledge, practices, norms and values. New European governance systems were imposed, and traditional governance structures became subordinate. For example, Africa had effective traditional natural resource management systems embedded in local cultures, using indigenous knowledge systems with traditional norms and standards under the leadership of chiefs (see Box 3.2 in Section 3.5). Secondly, colonial powers followed different management and exit strategies and left different legacies. In general, colonial powers:

- Focused on short-term commercial benefits through agriculture, resources and trade;
- Formed alliances based on ethnic preferences and enhanced ethnic differences and rivalries;
- Introduced western religions that dominated indigenous religions. To-date there is a mixture of western and indigenous African religions and Islam;
- Altered boundaries that later contributed to conflicts and political instabilities; and
- Imposed dominant European languages many of which remain official languages to-date. Many countries have adopted multiple African languages along with the European languages as official languages.

The first and second world war (WW1 & 2) are also important landmarks in African history. African soldiers fought outside their countries and were exposed, among others, to racism and the war between two groups of colonial powers. Thereafter, ownership of some colonies changed hands from the losers to the winners (Omuteche, 2024). Africa became an important supplier of raw materials necessary

for post-war rebuilding. These experiences boosted the desire for Independence and subsequently the decolonisation process began.

Prior to Independence, the urbanisation level was generally low, and agriculture and mining were the leading commercial sectors. Most economies were dualistic in nature with a small commercial export-oriented economic sector and a large subsistence sector which was vital for most of the local population and their livelihoods. After a historical analysis of six countries[18], Bolt (2022) found that income inequality was very high before Independence because of skewed resource ownership (e.g. livestock in Botswana) and unequal power relationships (see also Piketty & Goldhammer, 2020). Inequality persisted after Independence, as the WID inequality analysis for the period 1995-2015 confirms (Chancel et al., 2019b). The next section discusses developments since 1960.

3.4 Key drivers since 1960

Figure 3.2 shows a dashboard of selected key indicators of development key drivers. First however, African diversities are briefly highlighted. African countries are very diverse in terms of population, land and economic size (Table 3.4) and as we will see in section 3.2 also in terms of outcomes. They are also culturally diverse in terms of ethnicity, religions, languages and livelihood strategies and sources. Moreover, ecosystems and natural resources also vary greatly from desert (e.g., Sahel and Namib) to tropical rainforests (e.g., DRC) and mineral occurrence (e.g., fossil fuels, diamonds and critical minerals). Many countries are landlocked (e.g., Zambia), others have coastal zones (e.g., Kenya) or are islands (Madagascar and Seychelles).

Table 3.4 Population (millions), GDP per capita (2017 constant international $), and land area (1000 km^2) of Africa and its regions in 2020

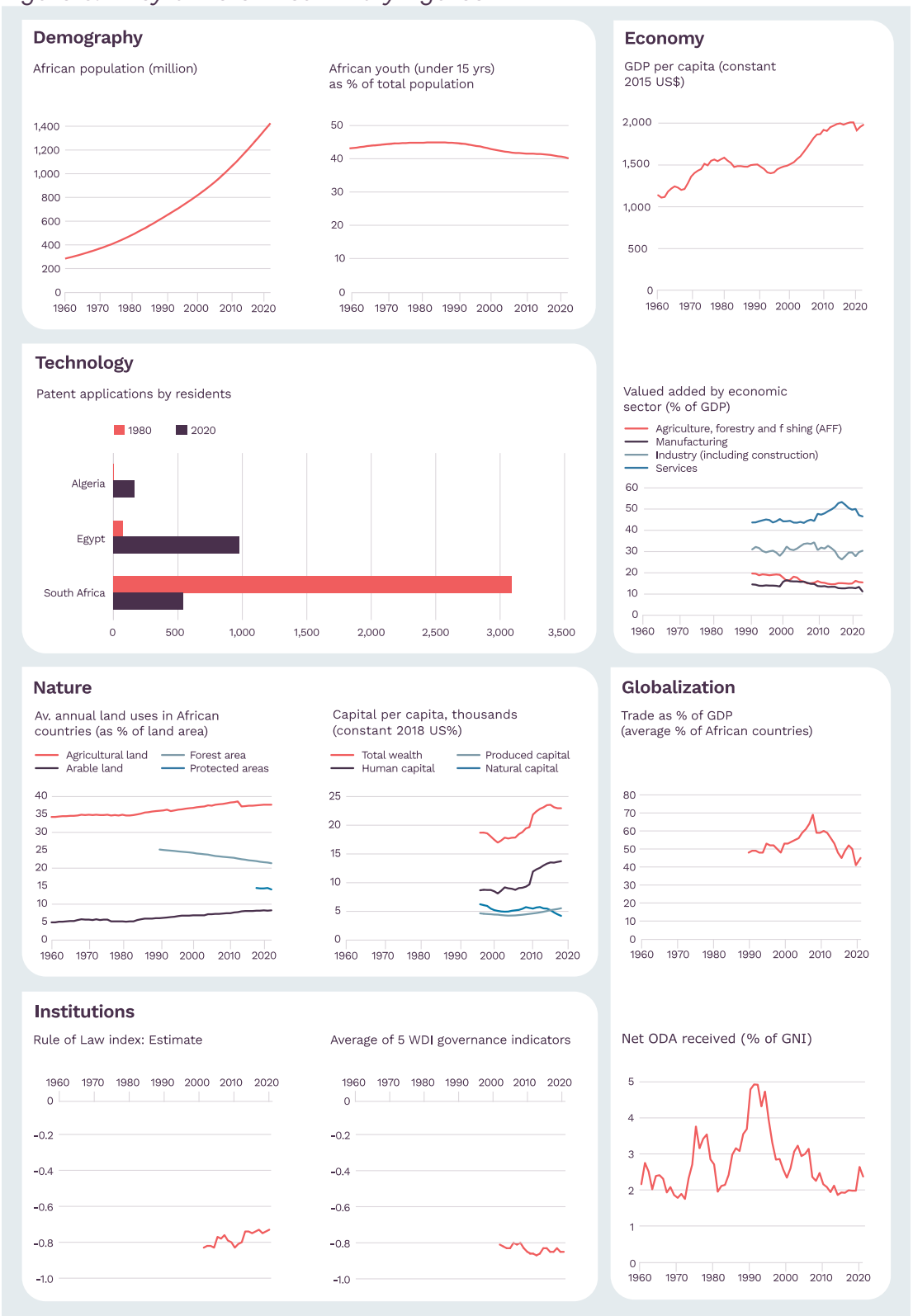
Region	Population (millions; 2020)	GDP per capita (billion constant 2017 international$; 2020)	Size in 000 km^2
Africa	1,358	4,746	29,380
North Africa	211	10,840	6,769
East Africa	395	2,656	6,393
Southern Africa	186	6,381	5,908
Central Africa	163	1,887	5,277
West Africa	404	4’012	5’033
Highest	Nigeria 208	Mauritius 20,220	Algeria 2,400
Lowest	Seychelles 0.1	Burundi 711	Seychelles 0.5

Source: (World Bank, 2024)

[18] Botswana, Ghana, Ivory Coast, Kenya, Senegal and Uganda (Omuteche, 2024)

Figure 3.2 provides graphics for selected key indicators for the six key drivers, mentioned in section 2. Additional indicators are discussed in the text that follows.

Figure 3.2 Key drivers in summary figures



Source: 1. Population, 2. Youth, 3. GDP per capita, 4. Patent applications, 5. Value added by sector, and 6. Land-use (World Bank, 2024) 7. Capital per capita (World Bank, 2021), 8. Trade, 9. Rule of Law, 10. Governance indicators, and 11. Net ODA received (World Bank, 2024)

Demography

Africa's population has grown rapidly over the period from 283 million in 1960 to 1.4 billion in 2022, increasing fivefold (Figure 3.2). The African population grew by 3.1% p.a. in 1960-1975, growth accelerated to 3.4% in 1976-1995 before it decreased to 2.8% in 1996-2010 and 2.6% after 2010. Because of the high population growth, Africa has a youthful population with a high proportion of people under 15 years old that peaked in the early 1980s (45%) and gradually declined to 40% in 2022. This created a youth dividend with longer term development opportunities but short-term challenges. More people and youth offer development opportunities such as economic expansion with a growing labour force, but it also creates economic, social and wellbeing challenges, the main one being rapid employment creation.

The share of older people (65+) has grown over time due to improved health care and higher life expectancy. The youth/elderly population ratio peaked in 1995, stabilised at the end of this period by 13.9 and thereafter decreased slowly. Traditionally, the elderly are taken care off by extended families. Pension schemes did not exist traditionally and even today are not yet widespread and mostly small. As extended family relationships are changing, governments assist the elderly (see e.g. World Bank, 2022) and the elderly may have to resort to selling their assets. Nor surprisingly, the elderly are the least happy population group in 40% of the African countries (Helliwell, et al., 2024).

Population densities are very high in Mauritius (633 people/km^2), Rwanda (533), Burundi and Comoros (433) and as low as 3 people/km^2 in Namibia. Urbanisation has been rapid and faster than the population growth. The 2022 urban population was fifteen times that of 1960. The urbanisation rate was highest in the periods 1960-1975 shortly after Independence that came with greater freedom of movement, the appeal of urban areas, and slow rural development. Like the youth dividend, urbanisation poses opportunities and challenges. Urban areas offer attractive markets, and it is generally easier to provide services to concentrated urban population clusters. Challenges include the provision of adequate urban infrastructure and facilities while balancing these with those of rural areas. Governments have not been able to expand and maintain urban infrastructure sufficiently. Almost half of the urban population in Africa still lives in slums, negatively impacting on living conditions and their wellbeing. The urban appeal by youth may also negatively impact on rural areas as youth desert rural areas.

Apart from urbanisation, there has been an increase in overall population mobility in the forms of migration, internally displaced persons (IDP) and refugees (World Bank, 2023). Regular migration is generally modest in size and a gradual process. In contrast, the number and origin of IDPs and refugees vary enormously from year to year. Conflicts, wars, and natural disasters cause large sudden flows of refugees and IDPs, mostly confined to the country itself (IDPs) and to neighbouring countries (refugees; see also (World Meteorological Organisation, 2023). Refugees mostly move to neighbouring countries, impacting not just the country of origin but the entire region. Such flows and irregular migration are difficult, often require international assistance, are costly to manage and give rise to social tensions, child, and gender-

based violence and xenophobia. Box 3.1 summarises the recent global state of migration with an African focus.

Box 3.1 Migration, refugees, and internally displaced persons in Africa

> Migration has become a sensitive topic in many parts of the world, with the discussion focusing on irregular migration and asylum seekers/ refugees. Migration can be regular through official channels or irregular outside official channels. Refugees are officially recognised as such and registered with UNCHR. Internally displaced persons are people who have moved within their own country because of conflicts and natural disasters. The migration narrative focuses on the negative aspects of irregular migration and refugees and does not sufficiently appreciate the positive aspects of migration. Migration seeks to better lives and wellbeing, and it alleviates labour shortages in some parts of the world. Moreover, remittances are an important source of income for many countries. Migration can also alleviate labour shortages in countries with ageing population. However, pathways for international migration from developing countries have narrowed. Globally, international migration has risen to 21 million in 2020, most of which live in the region of origin. Most refugees are hosted within neighbouring countries.
>
> Africa has several refugees 'hotspots' associated with conflicts and wars. The main countries of origin are: South Sudan, DRC, Sudan, Somalia and Central African Republic. The main host countries are: Uganda, Sudan and DRC, Ethiopia.
>
> African countries constitute half of the top 20 countries with Internally displaced Persons (IPDs). Conflicts and violence are the most common cause; natural disasters are the second cause. These are the DRC, Somalia, Ethiopia, Nigeria, Sudan, Burkina Faso, South Sudan, Mozambique, Cameroon and Central African Republic.

Source: (International Organisation for Migration, 2024)

Economy

African economic development and growth varied over time. Overall, the average per capita income grew by over 70% between 1960 and 2021 (Figure 3.2). As measured by Gross Domestic Product or GDP per capita, economic growth was fast in the early Independence period (1960-1975) but slowed down and stagnated in the 1980s up the middle of the 1990s around 1,500 constant 2015 US$. Thereafter, economic growth resumed only to level off again from 2010 to present at just below 2,000 constant 2015 US$.

Multiple economic difficulties in the 1980s led to the implementation of Structural Adjustment Programmes (SAP) in many countries and a rapid increase in net official development assistance (ODA) to around 3.5% of GNI, reaching an average of almost 5% in the early 90s. The IMF and World Bank have implemented SAPs in many African and Latin American countries with acute economic crises and mounting foreign debts often due to a combination of changing global commodity prices, overexpansion of infrastructural development projects and a bloated public sector. SAPs were implemented in over thirty African countries during the 1980s and early 1990s (Cleary, 1989), (UNECA, 1989) (Husein, 1996) (Bawa, 2020). IMF and World Bank supplied financial support to achieve economic stability and restore economic growth. This is a western styled neo-classical economic development approach that:

- Reduced the role of government, government expenditures and subsidies and encouraged private sector development;
- Aimed to liberalise the economy through currency devaluation, and abolishment of foreign exchange and import/export controls; and
- Aimed to attract foreign direct investments and increase domestic savings.

African governments had little choice but to accept the SAP measures to avoid 'bankruptcy'. However, many African governments were hesitant to fully implement the reforms because of the high social and environmental costs (e.g. unemployment, inflation, increased poverty, risk of social unrest, decline in public services and resource depletion).

In response to criticism of the SAPs, United Nations Commission for Africa (UNECA) developed in the late 1980s an African Alternative Framework to SAPs that went beyond traditional economic interventions and looked at specific African societal features (UNECA, 1989). The AAF-SAP aimed to balance the necessary short-term adjustments with long-term development that focused on sustainable development, people, income distribution and the nature of production as well as balancing the public and private sector. The AAF-SAP had broad ranging policy directions, including wellbeing, inclusion and sustainability aspects such as human resources and social protection, food security, poverty reduction, improving natural resource management and debt management. The AAF also emphasised the need for economic diversification and regional integration and paid more attention than SAPs to specific local conditions. Its adoption has been limited however due to the financial constraints faced by governments. The IMF and World Bank also broadened the SAP approach over time, for example with the development and implementation of Poverty Reduction Strategies.

Structural economic reforms programmes are still being implemented today in response to the growing need for debt restructuring of African countries recently (e.g. Ghana and Kenya). There is awareness, however, that reform programmes must go beyond economics, and incorporate wellbeing, inclusion and sustainability aspects in order to succeed.

Africa's macro-economic structure changed gradually (Figure 3.2). The main change is that the agriculture, forestry and fishing sector (AFF) became less important over time. The manufacturing sector remained small (13% of GDP in 2021) with an annual growth of 0.7%. The industrial sector grew at 0.6% p.a. but is larger (30% of GDP in 2021). The service sector is the largest contributor to GDP (47% in 2021) and has an annual growth rate of 0.3%.

There has been no significant transformation from agriculture to industries and manufacturing. The small size of the manufacturing sector reflects the absence of strong value chains between agriculture and mining on the one hand and manufacturing on the other hand. As a result, the export of primary products remains common on the continent. In contrast, the service sector is dominant, including the public sector, which is large in many countries and often considered bloated[19]. The

[19] Some government employment can be considered as social support, e.g. through labour intensive relief projects etc. Most SAPs advocated for a leaner public sector.

decline of the AFF sector reflects relatively low productivity gains, lack of agricultural innovations and modernisation. Agricultural productivity has grown slower than the population. While the AFF sector lost macroeconomic importance it remained very important for rural livelihoods and it usually remains its main source other than (urban) employment, remittances from and government support. Formal agricultural employment has decreased steadily over time reducing direct employment benefit from agriculture and contributing to urbanisation in search of jobs (urban-rural remittances). Regional economic communities and the AU now seek to boost manufacturing and industrialisation through economic integration and intra African trade.

Technology

Technology is about innovation, adaptations to local natural and socioeconomic conditions and the effective implementation of new technologies. Africa has not been very successful with agricultural technology improvements, leading among others to depressed rural livelihoods, vulnerabilities to climate change and persistent high levels of food insecurity. Africa did not experience an agricultural revolution as in Asia. In a study of long-term technological trends, Boserup (1981) argues that most countries achieve agricultural development through technology adaptation from elsewhere and -in Africa- limited intensification. Agricultural technologies have not changed on a large scale as subsistence agriculture still dominates in many countries and peasant farmers have a limited capacity to modernise. Significant agricultural productivity increases have not occurred, leading Africa's Agenda 2063 to emphasise the need for agricultural modernisation and productivity increases. Only 17 million ha. of agricultural land is equipped for irrigation, Egypt accounting for 4 million ha. (FAO, AUC, ECA and WFP, 2023). Productivity has risen only slowly for staple crops such as maize and cassava. Their annual growth rates were 1.7% and 0.8% respectively during the period 1960 to 2022.

Unlike agriculture, new communication technologies have been adopted extremely fast in the last three decades. Internet access and mobile phones are rapidly adding to and replacing fixed landlines. In 2000, 2.5% and 0.6% of the population had mobile phone and access to internet respectively. In 2021, these figures had increase by 91% and 39% respectively. During this period, the number of fixed phone lines varied between 3% and 4%. This is an example of leapfrogging of new communication technologies with great potential for increased wellbeing (social and economic contacts), inclusion (e.g. closing the gap between urban and rural areas) and sustainability (information sharing, remote resource management etc.). For example, Kenya became the world leader in mobile money in 2015 (The Economist, 2015).

Expenditures on research and development (R&D) on the continent are relatively low. Only seven countries have annual figures for R&D expenditures in the WDI data base. In 2019, expenditures are highest in Egypt and Rwanda (0.8% of GDP in 2019) and lowest in Burkina Faso and Mali (0.2%). Egypt has increased its R&D expenditures from 0.2% in late 1990s to 0.8% in 2021. Tunisia's R&D has been steady around 0.7% but South Africa's share has decreased from 0.8% to 0.6%. Indigenous knowledge

has the potential to inform new R&D and to improve natural resource management (see e.g., Eyong, 2007). It can also boost 'home grown' innovations and technologies and provides scope for greater participation of women in sustainable rural development (see e.g., Gwandure & Lukhele-Olorunju, 2023).

In terms of innovation and technology development, less than half of the African countries have data on patent applications in the WDI database. Just over 3,000 patent applications were recorded in 2020 in 20 countries, with 150 applications on average. The 1994 average figure is the same, suggesting no overall growth in patents. Egypt, Nigeria, and South Africa account for the highest number of applications. However, South Africa's number sharply decreased since 1994 while Egypt's and Nigeria's increase. Algeria, Kenya, Mauritius Morocco, and Algeria also contributed over 100 applications in 2020, increasing from 1994. As more countries apply for patents and increase their R&D expenditures, South Africa is losing its dominant position.

Nature

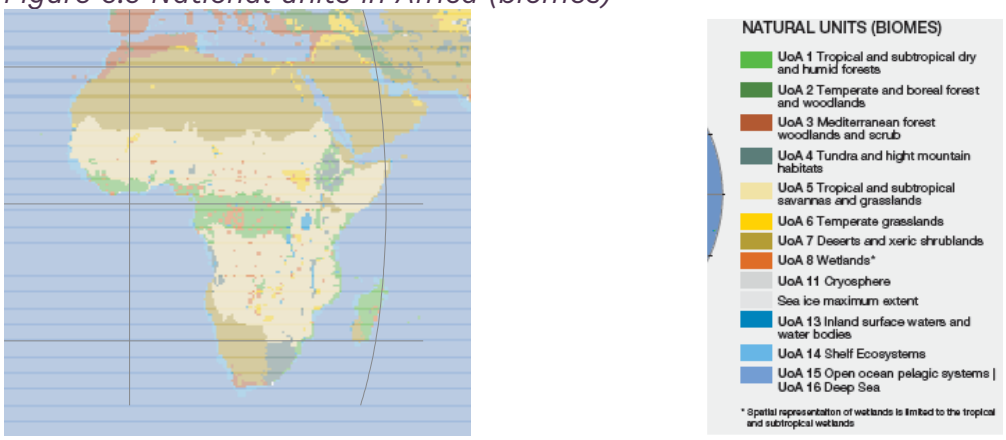
Land resources are critical for rural livelihoods and changes in land use and tenure have been major development key drivers. Figure 3.2 shows land use changes over time. Pastures and arable land have expanded to almost 60% of the land area, mostly by converting forest areas, whose size has been reduced to 21% of the land area. Obviously, urbanisation and build up areas have also reduced both agricultural and forest areas. Protected areas, set aside for nature and biodiversity conservation as well as for tourism, cover on average 14% of the African land area.

While land use changes are important, changes in land tenure and land management systems are critical for determining access to and people's use of land resources. Tenure differences between countries are significant, rooted in the different traditional and colonial histories of countries (Bruce, 1998). Traditionally, land was mostly communal, and land access determined by traditional systems and leaders. During the colonial era, private land tenure was introduced for white settlers reducing the communal or tribal land for the rural population. Since 1960, private land tenure was expanded to serve the better-off and state land introduced, mostly for protected areas. The management system of tribal land had often become ineffective leading to open access. In efforts to resolve the 'Tragedy of the Commons' in Tribal land, some was privatised, further limiting access to land for the rural population. Inequality in land ownership has persisted and is a contributor to current income and wealth inequalities (Chancel et al., 2019b). Land reforms (e.g., Zimbabwe) have proven to be difficult to implement effectively.

Access to land is also determined by the population density. Countries with high population densities face acute land scarcity (e.g., Burundi and Rwanda) and family land parcels are very small to sustain rural livelihoods.

Africa has a variety of ecosystems such as dry and humid forests, savannas and grassland, deserts and xeric shrublands, wetlands and inland surface water as well as water bodies and open ocean. The spatial distribution is shown in Figure 3.3.

Figure 3.3 National units in Africa (biomes)

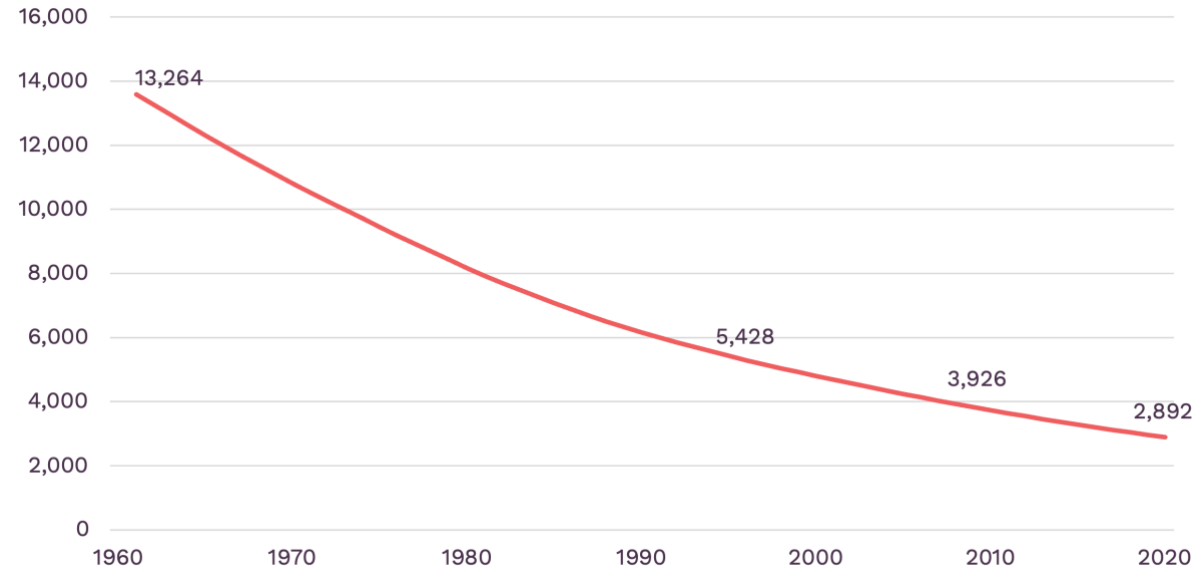


Source: (IPBES, 2019a), p.36

Per capita internal freshwater resources have decreased by more than fourfold between 1960 and the present, increasing water stress (Figure 3.4). Freshwater resources are also unevenly distributed within the continent. North Africa has the lowest freshwater availability while Central Africa has the highest. The average freshwater withdrawals in Africa are double that of the available internal resources.

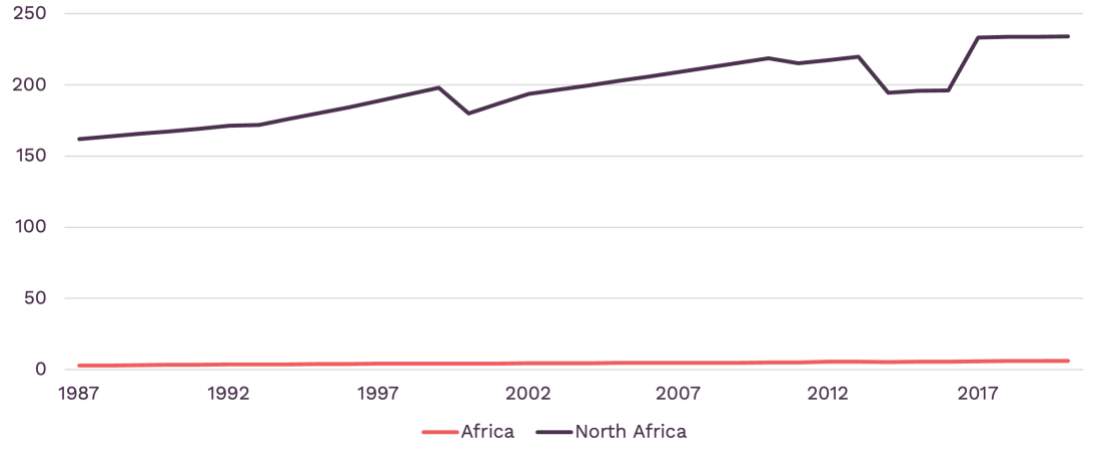
North Africa uses a staggering two to three times of its internal water resources, which are limited due to its desert climate (Sahel) (Figure 3.4 and Figure 3.5).

Figure 3.4 Renewable internal freshwater resources per capita, 1961-2020 (cubic meter)



Source: (World Bank, 2024)

Figure 3.5 Annual freshwater withdrawals, 1987-2020 (% of internal resources)

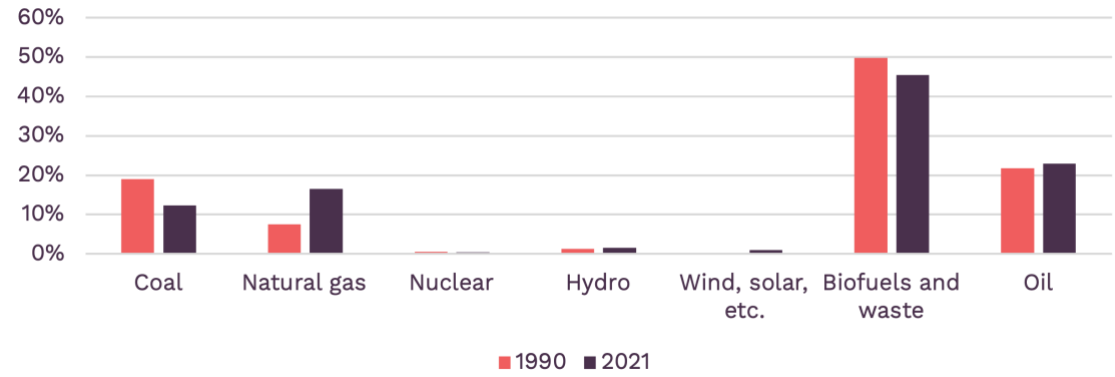


Note: The drop in North Africa 2000 & 2014-16 is entirely due to decreases in Egypt. Egypt uses 77 times its internal resources. Source: (World Bank, 2024)

Transboundary water resource management is vital for Africa as evidenced by the establishment of River Basin Organisations managing transboundary water resources. Similarly, integrated water resource management (IWRM) and greater water efficiency have become essential.

Africa has long relied on wood resources for its energy needs (Figure 3.6). The biofuel dependency reduced with the increase of fossil fuels. Total energy supply has increased by 3.4% annually between 1990 and 2022. Almost half comes from biofuel and waste (45%). Oil and gas have expanded to 40% together while coal and biofuels lost share.

Figure 3.6 Total energy supply by source between 1990 and 2021 (% of total)



Source: (IEA, 2023)

Hydro and solar/wind contribute only 1% only but both are increasing. Recently, the capacity of renewable energy resources has increased. Currently, around 30 GW is installed in SSA and this is expected to more than double by 2028[20] (International Energy Agency, 2024b). Renewable resources have a good potential to provide off grid

[20] South Africa will install 50% of the planned increased capacity.

energy at decreasing costs. It has potential for farms and villages that are far away from the national grid. Hydropower is another renewable energy source. Around ten countries are mostly dependent on hydropower for their energy supply (e.g., Angola, Congo, DRC, Ethiopia and Zambia). While hydropower is a renewable energy resource, climate change reduces its reliability because during prolonged drought dams dry up or dam levels are too low for power generation.

According to the State of the Climate in Africa 2022 report (World Meteorological Organisation, 2023), the continent's temperature increased by 0.8 °C above the 1961-1990 average in 2022. North Africa was hottest and recorded 1.4 °C above the average. Rainfall variability was high with droughts and floods occurring in different parts of the continent and shifts in the rainy seasons. The key drivers of rainfall variability are the different phases of El Nino-Southern Oscillation (ENSO) ENSO and the seas-surface temperature patterns in the Atlantic and Indian oceans. Sea level rise was like the global average at 3.4 mm/year with regional variations. Extreme weather events occurred across Africa, involving floods, droughts, cyclones, heatwaves, sandstorms and wildfires. While Africa is clearly heavily impacted by climate change, it contributes only around 6% of total global GHG emissions while its population is over 15% of the world's population. Therefore, the continent's foremost climate change challenges are mitigation, adaptation, and early warning. This requires building countries' and people's resilience.

According to the International Energy Agency, in 2021 Africa has 35 oil producing countries and 21 coal and gas producing countries. Less than half of the oil producing countries refine their crude oil into products. Egypt and Algeria have the largest refinery capacity. Angola, Nigeria and Libya were the largest crude oil exporter. Gabon and Equatorial Guinea export all their crude oil. Nigeria is also the largest importer of oil products. The picture is the same for coal and gas. Most fossil fuels are exported: 80% of the oil, 40% of the gas and 35% of the coal. These high percentages reduce economic diversification and intra African trade opportunities in fossil fuel-based products. Increasing domestic processing and prudent the use of non-renewable revenues is imperative to diversify and sustain development. Consumptive use of minerals revenues triggers the so-called 'mineral curse'[21] and mineral revenues are sustainably used for to benefit future generations.

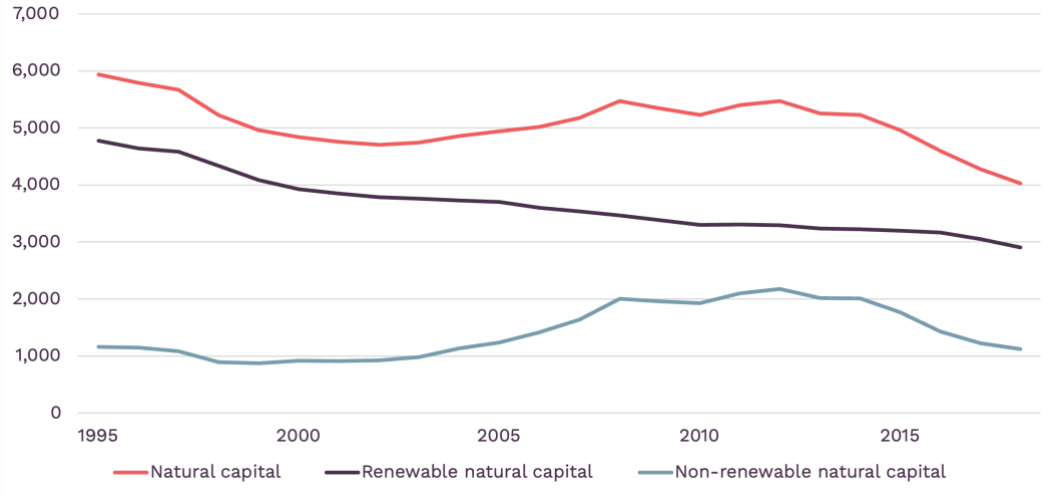
Africa is also rich in mineral critical for the global energy transition. According to UNCTAD (2024b), Africa holds 55% of cobalt deposits, 48% of manganese, 22% of natural graphite, 6% of copper and nickel, 1% of lithium and 0.6% of iron ore. These critical minerals offer new development opportunities.

The World Bank (2021) has estimated trends in different types of capital since 1995 (total wealth, human, produced and natural capital). Total wealth as well as human and produced capital have increased in time (Figure 3.2); with human capital growing fastest. In contrast, per capita natural capital has declined, most notably that of renewable natural capital (by one third) (Figure 3.7). This reflects degradation of such resources and is of particular concern to natural resource dependent countries. On average the value of non-renewable natural capital per capita has varied between

[21] Minerals also cause conflicts and wars to capture the mineral benefits or rent.

1,000 to 2,000 constant 2018 US$. The fluctuations are largely due to global price trends of fossil fuels [22]and minerals[23]. Renewable resources are more valuable to the average country than non-renewable ones. This is not the case in mineral rich countries such as Gabon where oil accounts for 30% of total wealth[24].

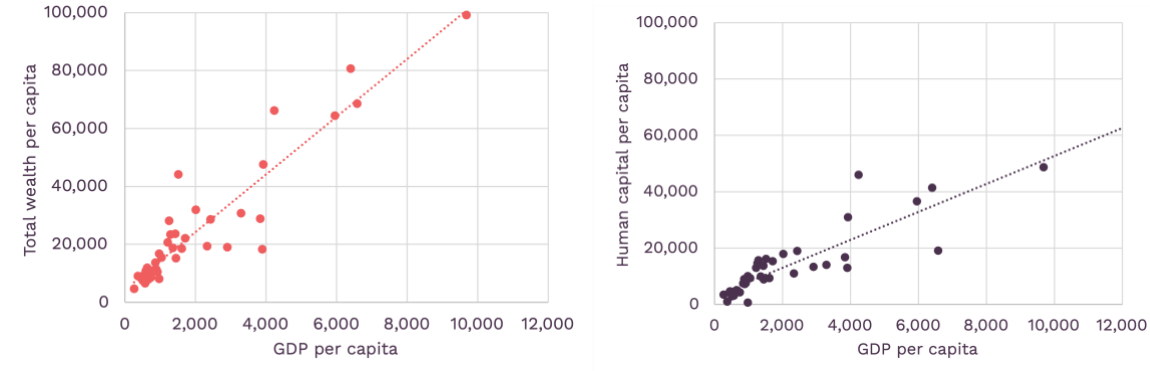
Figure 3.7 Trends in per capita natural capital, 1995-2018 (constant 2018 USD)



Source: (World Bank, 2021)

Surprisingly, the level of GDP per capita is not correlated to per capita natural capital. A higher GDP per capita is strongly associated with higher levels of per capita total wealth and human capital (Figure 3.8) while the association with human development is moderate.

Figure 3.8 Association between GDP and total wealth per capita (left) and GDP and human capital per capita (right) (constant 2018 USD)



Source: (World Bank, 2021, 2024)

[22] Oil, gas and coal.
[23] The following minerals are covered: bauxite, copper, gold, iron ore, lead, nickel, phosphate, silver, tin and zinc. Others such as diamonds and uranium are not included.
[24] Gabon has a high GDP p.c. (13'903, constant 2017 int-$) and HDI (0.687) but a relatively low governance index (IIAG of 48.4). Other fossil fuel rich countries are Chad, Congo, Nigeria and Morocco where fossil fuels are around 10% of the total wealth (World Bank, 2021)

Globalisation

Official development assistance (ODA) was high after Independence to support the development of the 'new" countries and peaked in 1991 (4.9% of Gross National Income (GNI)). This is the time when over 30 African countries received financial assistance to implement SAPs. ODA subsequently decreased to 2.4 % of GNI in 2021. Globally only around 2% of aid is spent on social protection (Nino-Zarazua et al., 2022); less than on education and health. However, ODA contributed to a larger portion of the population benefiting from social protection.

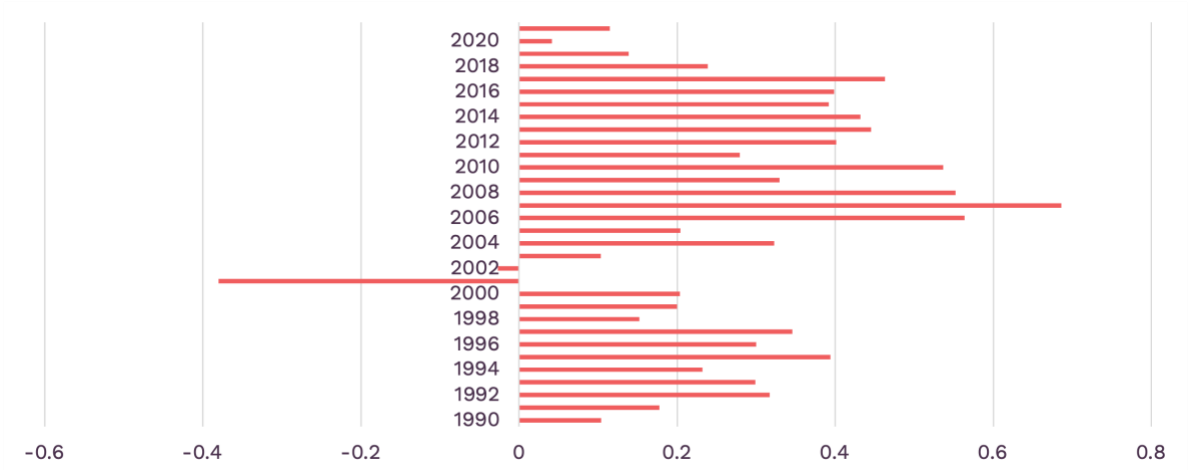
FDI are generally low with the outflows often exceeding the inflows and high annual fluctuations. Net FDI inflows varied annually between -0.4 to 0.7% of GDP (Figure 3.9). Outflows are highest in East and West Africa (see section 3.3).

Global remittances from migrants have grown rapidly and have become much larger than ODA and FDI, increasing from US$ 138 billion to US$ 831 billion in 2022 (World Migration report 2024). Remittances benefit many African countries too. Egypt and Nigeria are among the largest recipients and international remittances account for close to 30% of GDP in Gambia in 2022 (International Organisation for Migration, 2024).

The first debt crisis of the 1980s receded in the 1990s. Recently, average public debt rose sharply from 37% in 2011 to 68% in 2023 (UNCTAD, 2024a). Public debt exceeds GDP in five African countries and public debt is rising in others. A new debt crisis is looming and needs to be addressed, bearing the SAP lessons in mind.

The global perspective of Africa has changed and there is renewed interest in the continent for several reasons such global political polarisation and resurgence of cold war; Africa's possession of critical minerals and coal, oil and gas are also widely available; and finally, rapidly growing (urban) markets and abundance of productive labour.

Figure 3.9 Net outflows FDI, 1980-2021 (as % of GDP)



Source: (World Bank, 2024)

Institutions

Governance and institutions can be interpreted very broadly and often interpreted differently. Governance refers to how a society is organised and managed in and between the public, private and civic spheres[25]. Africa has experienced regular governance challenges since 1960. Below, some key governance aspects are discussed.

During 1960-1975, 38 countries gained Independence and started to build their own government and governance structures. In 1963 the then 32 independent countries established the continent-wide Organisation of African Union (OAU) based on the Pan African philosophy (Eze, 2013). Other countries later joined upon attaining Independence, and after 2000 there was a strong drive towards political and economic integration.

After Independence countries adopted different development and governance models. Countries such as Benin and Tanzania followed a socialist direction while others such as Botswana adopted a free market model. Over time countries changed models, e.g. from socialist to free market and/or vice versa. Some countries initially introduced a one-party system (e.g. Mali and Malawi) but later reverted to a multiparty system (e.g. Liberia and Sierra Leone); the opposite route was followed by others. Several countries continued to have stable governance (e.g. Botswana, Cabo Verde and Mauritius). Multi-party systems have been shaped in different ways. Colonialism, politicisation of ethnicity and social inequalities (e.g. education and urban-rural) impacted multi-party politics in different ways (Baleyte et al., 2020). It must be noted that multiparty democracies do not necessarily imply regular changes of governments even if these election processes are considered free and fair[26]. The same party may rule countries for long periods as it continues to win democratic elections[27]. There is a rural-urban division in political support where opposition parties are usually stronger in urban areas, while the ruling parties are dominant in rural areas. Moreover, liberation movements that transformed into political parties often have strong popular support for a long time after Independence (e.g. Angola and Mozambique).

The above also led to political instability. Military coups, conflicts and/or civil wars have occurred in some countries since 1960. Many countries experienced conflicts and strife while others managed to establish stable institutions and governance. During the post-Independence period (1960-1975) many countries were unstable. Several countries abolished the monarchy (e.g., Uganda and Libya). Civil wars (e.g., Somalia and Rwanda) and coups (e.g., Sudan) continued after 1975. Fortunately, countries like Liberia, Rwanda and Sierra Leone recovered during the 1990s. Stability

[25] The Mo Ibrahim Foundation describes governance as 'the provision of the political, social, economic and environmental goods and services that every citizen has the right to expect from their state, and that the state has the responsibility to deliver to its citizens' (Mo Ibrahim Foundation, 2024b).
[26] First-passed-the pole system tends to favour the ruling parties, especially when opposition parties are not united. The winning party may have fewer than 50% of the popular vote and yet have a majority in Parliament.
[27] In Botswana, the same party has been in government since Independence in 1966 until 2024.

and instability co-exist at the same time in different countries. The Arab Spring in the early 2010s led to governance reforms in North Africa.

In response to instabilities, increasing development differences between countries, the growth of the African population and market potential, calls for political and economic cooperation and integration at the continental and regional levels re-gained momentum. This led to the transformation of the OAU into the African Union (AU) in 2002 and the formation of Regional Economic Communities (REC)[28]. The New Partnership for Africa's Development (NEPAD) established the African Peer Review Mechanism (APRM) in 2003 as a voluntary tool for AU member states to monitor countries' governance performance in the areas of democracy and politics, economy, corporate and socio-economic development. Forty-two countries have signed up for the APRM, but its impact has been limited to-date as it is not yet widely used. Over the last two decades political and economic integration was strengthened through the adoption of the long-term vision for Africa (Agenda 2063), strengthening of the regional economic communities (RECs) and the African peer review process. RECs expanded their activities and became more engaged in trade liberalisation, for example through the African Continental Free Trade Area (see e.g. Nkala & Monyae, 2023).

Two governance metrics are briefly discussed below. The WDI governance index[29] comprising 5 different governance indicators and developments in rule of law. The population-weighted average of 5 indicators has deteriorated over the last two decades. All underlying indicators deteriorated, with an exception for rule of law which has improved over time (Figure 3.10).

Figure 3.10 Trend in rule of law and index of 5 governance indicators in African countries, population-weighted, 2002-2021 (index -2.5 ; 2.5)

The 5 governance indicators relate to: political stability, rule of law, accountability, government effectiveness, and corruption control. Source: (World Bank, 2024)

[28] Such as the Common Market for Eastern and Southern Africa (COMESA), the East African Community (EAC), the Economic Commission for West African States (ECOWAS) and the Southern African Development Community (SADC).
[29] Political stability/absence of violence and terrorism, Rule of law, Control of corruption, Voice and accountability, and government effectiveness.

However, when looking at a simple average for Africa, rule of law is also deteriorating (not pictured). The three most populous countries in Africa (Democratic Republic of Congo, Ethiopia, and Nigeria) saw an improvement in rule of law, which can explain why this positive development dominates when considering population-weighted developments.

The negative values also suggests that Africa's overall governance is below the global average as the indices are scaled with a global mean of zero. Somalia, Eritrea and South Sudan rank at the bottom for different WDI governance indicators; Mauritius, Botswana and Cabo Verde are ranked highest.

The Ibrahim Index of African Governance (IIAG) is an African database that monitors governance trends in Africa since 2012 (Mo Ibrahim Foundation, 2024a). The index is based on four pillars: 1. Security and rule of law, participation; 2. Rights and inclusion; 3. Foundation for economic opportunities; and 4. Human development. Unlike the WDI governance scores for the period 1996-2022, the overall IIAG average governance score (simple average, not population-weighted) marginally improved between 2012 (47.8) and 2021 (48.9) but it remains below 50 (out of 100). Mauritius tops the IIAG score (around 80), and Somalia, South Sudan and Eritrea are the bottom three countries (around 20). The top/bottom ratio has been constant at just over 4. In terms of the components, the foundation for economic opportunities and human development improved since 2012 but security and the rule of law, and participation and rights inclusion deteriorated. This presents significant risks for the future as the rule of law is moderately associated with the WDI indicators of voice and accountability and political stability and absence of conflicts and violence.

3.5 Outcomes since 1960

Wellbeing

Figure 3.11 shows developments in key indicators of wellbeing, inclusion, and sustainability. Average life expectancy at birth increased by almost 50% from 42 years in 1960 to 62 years in 2021. It recorded the highest increase after Independence (1960-1975), slowed down in the period 1975-1996 due to civil wars, SAPs and HIV/AIDS and increased rapidly again after 1995.

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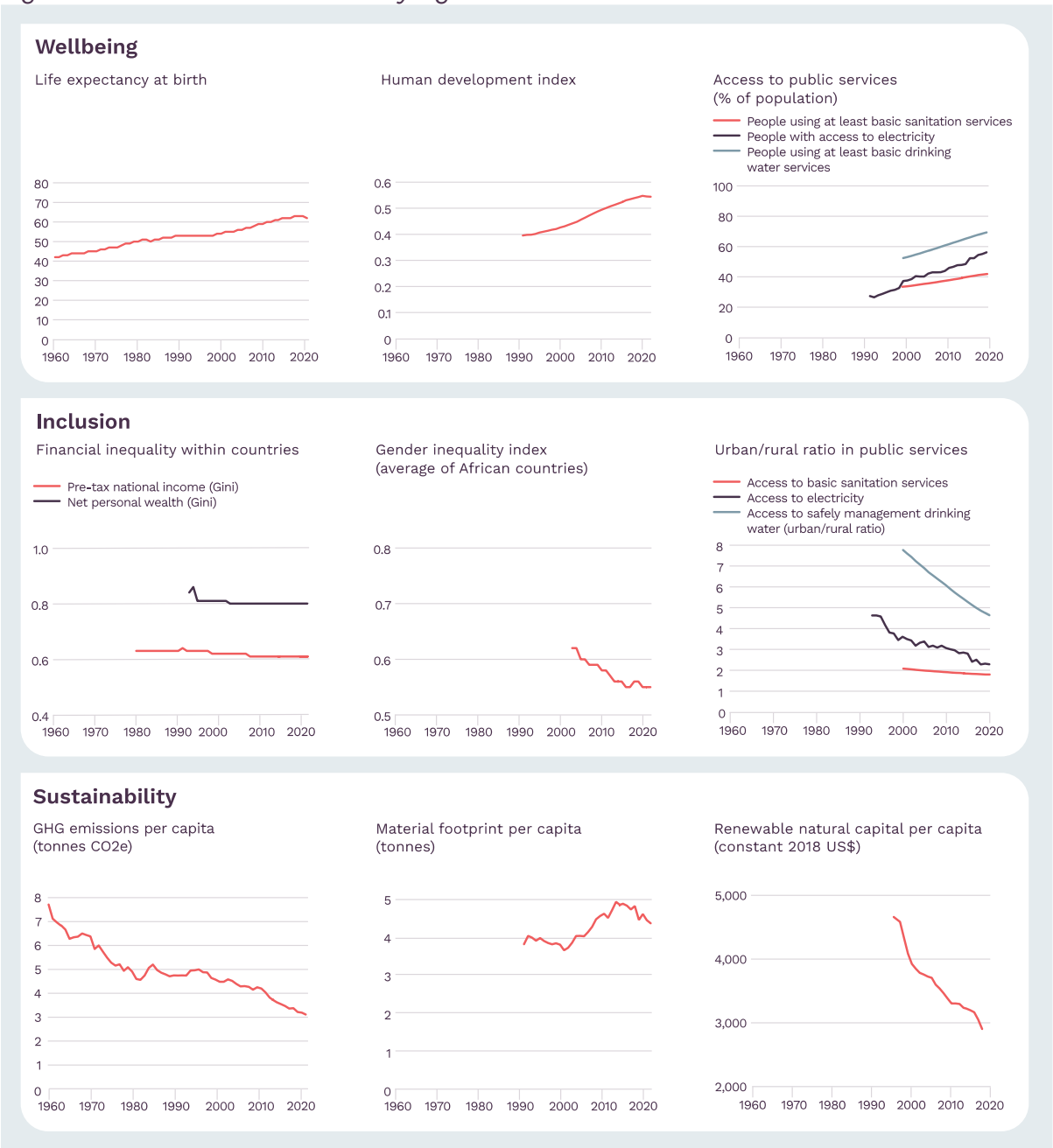
Figure 3.11 Outcomes in summary figures

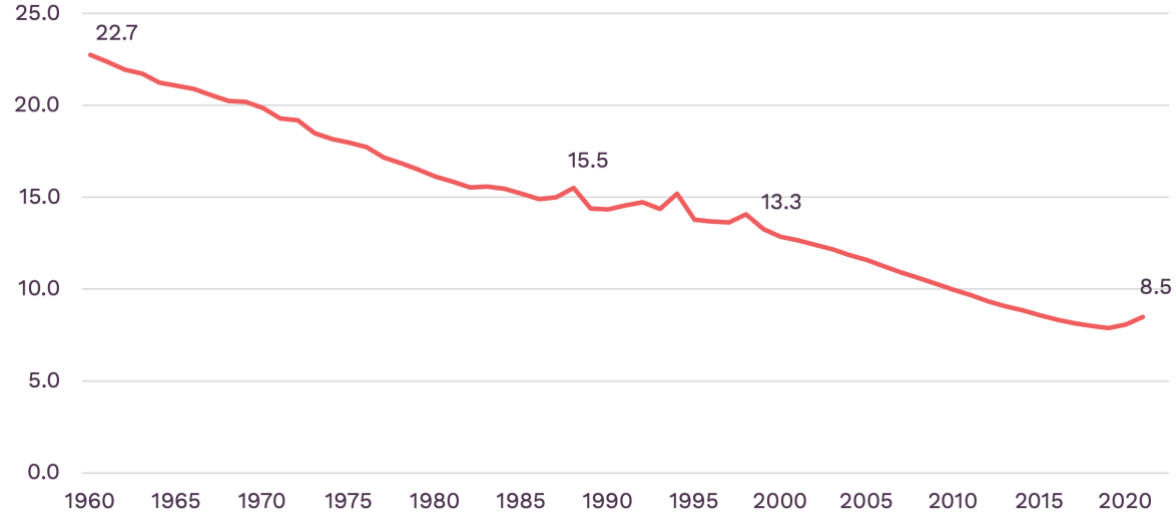


Source: 1. Life expectancy (World Bank, 2024), 2. Human Development Index (UNDP (United Nations Development Programme), 2024), 3. Access to public services (World Bank, 2024), 4. Income inequality (World Inequality Database, 2024), 5. Gender inequality index (UNDP (United Nations Development Programme), 2024), 6. Urban/rural ratio in public services (World Bank, 2024), 7. GHG emissions (World Bank, 2024), 8. Material footprint (UNDP (United Nations Development Programme), 2024), 8. Renewable natural capital per capita (World Bank, 2021)

Life expectancy is primarily driven by improvements in medical care, leading to a decrease in the crude death rate, lower child mortality, and lower mortality of women giving birth. The crude death rate declined almost threefold from 22.7 out of 1000 persons in 1960 to 8.5 in 2021, reflecting factors such as improved health care, improved living conditions and livelihoods (Figure 3.12). The death rate increases in 1988, 1994 and 1998 are due civil wars in Sudan/ South Sudan and the genocide in

Rwanda, which also reflect in a decline in average African life expectancy. Regional differences in life expectancy are discussed in Section 3.3.

Figure 3.12 Average crude death rate, 1960-2021 (per 1,000 persons)



Source: (World Bank, 2024)

HIV/AIDs became a pandemic during the 1980s and 1990s. The entire continent was affected but with major regional differences (see section 3.3). The disease peaked in 1995 at 4.6 cases per 1,000 uninfected persons and subsequently decreased to 1 case per 1000 in 2021. Antiretroviral (ARV) treatment as well as Mother-To-Child-Transmission (MTCT) prevention became more common, leading to a decrease in HIV/AIDS related death. However, HIV/AIDs had tremendous impacts on wellbeing and family structures through increased mortality, including that of breadwinners, an increase in the number of orphans and disruption of family structures (e.g. child-headed families), increased health expenditures for caring and treatment. Labour productivity declined together with livelihoods and governments had to divert expenditures for HIV and ARV treatment at the expense of development projects. Although the disease was no longer a death sentence it continued to put pressure on government expenditures with associated opportunity costs. HIV/AIDS remains a concern in southern Africa (see section 3.3).

Data on intentional homicides are insufficient to establish an African trend. In 2021, South Africa had the highest homicide figure (42 per 100,000 people). This could be related to its apartheid history and the high income and wealth inequality.

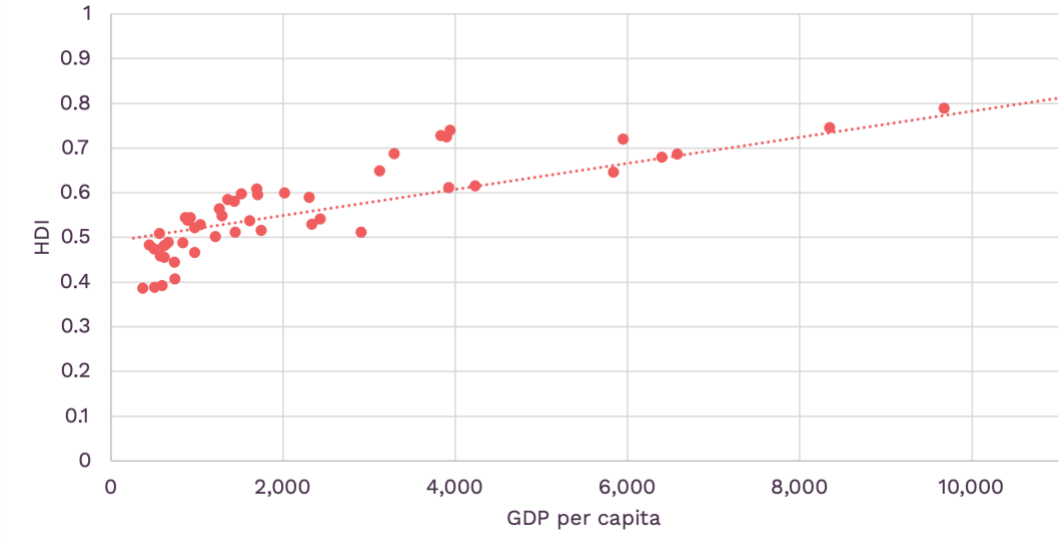
The average Human Development Index (HDI) for Africa increased from 0.395 in 1990 to 0.548 in 2019, only slowing down to 0.547 in 2022 due to COVID (Figure 3.11). Higher GDP p.c. levels are moderately associated with human development level (Figure 3.13). In other words, higher p.c. income tends to lead to higher levels of human development.

Literacy may be the most basic indicator of education and human skills. Due to data shortages, no trend can be established for Africa since 1960. There can be no doubt,

however, that literacy has increased over time, but literacy is not yet universal and differences between countries and gender are large. In 2021, overall adult literacy rates range from 27% (Chad) to 98% in Sao Tome and Principe. The mean years of schooling have increased over time from 3.1 years in 1990 to 5.6 years in 2021 with a large range between countries. In Botswana, Seychelles and South Africa, the mean years of schooling is over 10 years; while the figure is lowest in Niger (1.3 years) and Mali (1.6). Education enrolment has steadily increased at the primary level from 66% in 2000 to 76% in 2019[30]. Female enrolment is slightly below average at primary and secondary levels but enrolment at tertiary level is slightly above average. The years of compulsory education range from 4 to 10 years.

Access to medical services has generally improved, strongly associated with GDP p.c. levels. Countries with a higher GDP per capita have better access to medical staff (Figure 3.14). Generally, people's access to safe drinking water, sanitation, and electricity is not universal but has increased over time (see Figure 3.11). Access is highest for water and lowest for sanitation. In 2020, 69% of the population used basic water services, 56% electricity and 42% sanitation. Lack of sanitation services leads to open defecation and is a health concern[31]. Access to sanitation has a weak association with GDP p.c. This may be surprising as higher GDP p.c. is expected to facilitate higher investments in sanitation. However, as noted earlier, use of public services is determined by access and affordability. People may not be able to afford connecting to sanitation infrastructure or to invest in their own on-site facilities. This is important to note as income inequality remains very high in Africa.

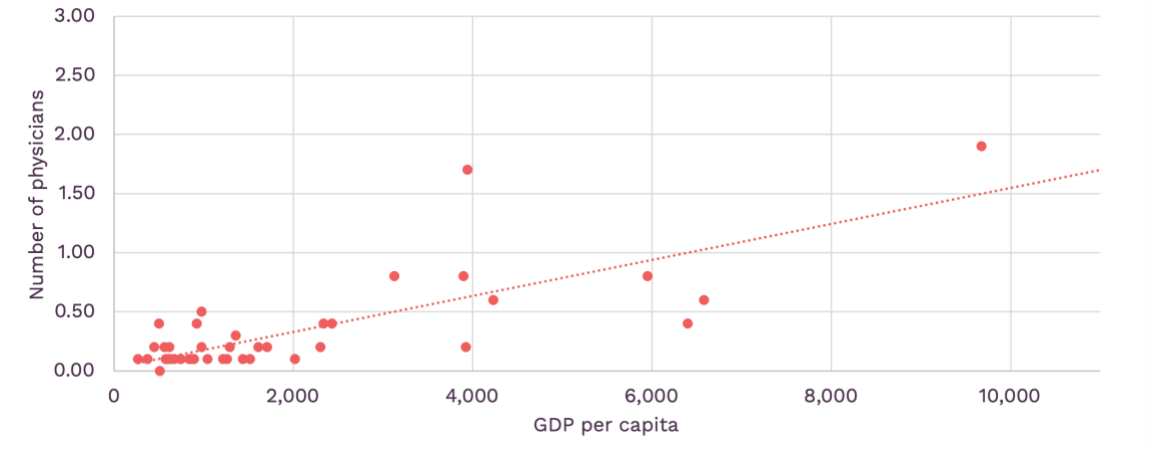
Figure 3.13 The relationship between per capita GDP and HDI of African countries in 2021



Source: (UNDP (United Nations Development Programme), 2024; World Bank, 2024)

[30] The number of countries with data for secondary and tertiary school was too low to calculate the mean (see section 2).
[31] In 2020. almost 20% of the African population still relies on open defecation.

Figure 3.14 The relationship between per capita GDP and number of physicians in 2021 (per 1,000 persons)

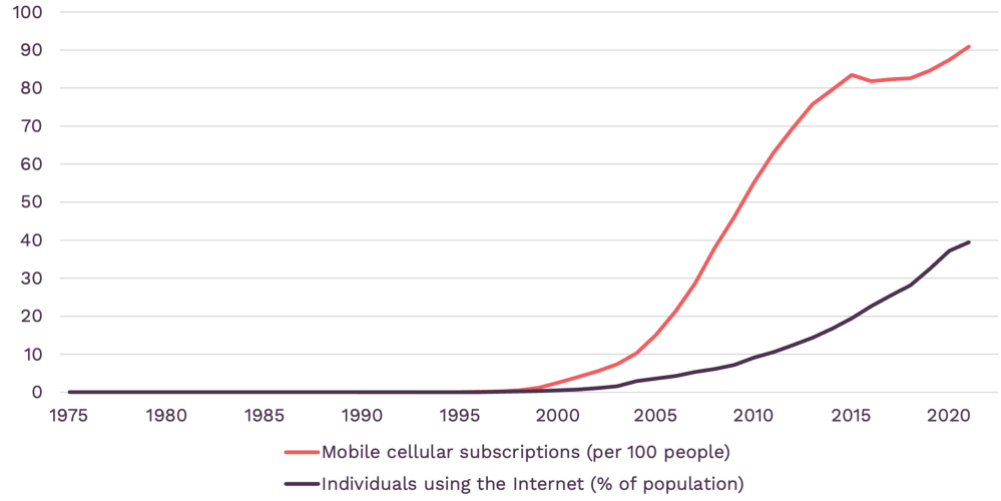


Source: (World Bank, 2024)

Food security and nutritional status are important components of wellbeing. WDI data shows that undernourishment -as the population-weighted average of African countries- decreased from 19% in 2001 to 16% in 2020. In 2020, a quarter of the African population faced severe food insecurity. Food insecurity and undernourishment adversely affect the wellbeing of close to a quarter of the African population. and offers a serious development challenge.

As discussed before, changes in communication technology have been one of the key drivers of development since the 2000s. This generally had a positive impact on wellbeing as it provided social and economic opportunities. Fixed phone line doubled (from 1 to 2 per 100 persons) but mobile phone and internet use grew rapidly improving people's ability to communicate. In 2010 there were on average 55 mobile phone subscriptions (out of 100 people) and 9% of the population had access to internet (Figure 3.15). These figures grew to 91 and 39% respectively by 2021.

Figure 3.15 Access to mobile cellular (per 100 people) and use of internet (% of population) of averaged African countries, 1990-2022



Source: (World Bank, 2024)

Governments have been unable to keep up with the provision of adequate housing for the rapidly growing urban population. In 2000, WDI data show that 45% of the urban population lived in slums/poor conditions with associated health risks and vulnerability to floods, fires etc. The situation improved but 19% of the urban population still lived in urban slums in 2020.

Inclusion

Figure 3.11 shows pre-tax income inequality, the gender inequality index and the urban-rural public service access gap. These and others are discussed below.

Per capita economic growth over the entire period 1960-2020 is diverse, with different impacts on wellbeing and inclusion. The ratio of GDP p.c. in the last and first year led to four growth groups[32] (based on WDI data):

- Five high growth countries (ratio of over 5): Botswana, Cabo Verde, Egypt, Equatorial Guinea (1980-2021), and Seychelles;
- Fourteen moderate growth countries: (ratio 2 - 5): Burkina Faso, Eswatini, Ethiopia, Kenya, Lesotho, Malawi, Mali, Mauritius (1976-2021), Morocco (1996-2021), Mozambique, Rwanda, Tanzania, Tunisia and Uganda;
- Twenty-four growth countries (ration 1 - 2): Algeria, Benin, Cameroon, Chad, Congo, Cote d Ivoire, Djibouti, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Mauritania, Namibia, Nigeria, Sao Tome and Principe (2001-2021), Senegal, Sierra Leone, Somalia, South Africa, Sudan, Togo, Zambia and Zimbabwe;
- Nine countries with negative growth (ration less than 1): Angola (1980-2021), Burundi, Central African Republic, DRC, Liberia (2000-2021), Libya (1999-2021), Madagascar, Niger, South Sudan (2008-2015).

Due to the different growth ratios, inequalities between countries have rapidly increased, as reflected in an increase in the top/bottom country ratio from 20 in 1970 to 60 for p.c. GDP in 2021. Burundi had the lowest GDP p.c. (264 constant 2015 US$) and Seychelles the highest (15,860 constant 2015 US$). In terms of GDP p.c. inequalities between countries has increased rapidly.

The World Inequality Database (WID) and report offers good insights in the African income and wealth distribution (e.g. Chancel et al., 2019a). Inequalities within countries are here estimated as Gini ratios of income and wealth and the ratios of the top 10/bottom 50 earners or wealth owners. Inequality between countries have already been measured above as GDP per capita growth ratio. Inequalities between countries as the ratio of the highest to lowest country Gini ratio and of the highest and lowest top 10/bottom 50 earners or wealth owners; ratio top and lowest GDP p.c. country.

[32] Where time series differ from 1960-2021, the period is indicated.

Data from the World Inequality Database illustrates that the top 10% of income earners in Africa capture half of the national income; in South Africa, the figure is even as high as 65%. Chancel et al. (2019b) analysed income and wealth inequality in Africa for the period 1990-2017 and found that Africa is among the most unequal regions in the world. The ratio between the top10/bottom50 has decreased from 26 in 1980 to 22 in 2022. This means that the top 10% earn 22 times what the bottom half earn. Since 1980 changes in income distribution have been modest. The high inequality has many causes related to the key drivers (see also Chancel et al., 2019a, p. 24):

- A range of historical factors, including continued benefits of white settlers, perpetuation of highly unequal land distribution and racial inequalities;
- Inadequate and slow responses of many governments to reset development that addressed colonial injustices. Former colonial powers often retained strong influence in new institutions and governance (e.g. through financial and technical assistance);
- New elites were formed that captured institutional structures and maintained inequality;
- Declining agricultural employment and with low productivity;
- Unequal distribution of the mineral rent in mineral rich countries; and
- High unemployment level and reliance on the informal sector.

Based on a Theil decomposition, Chancel et al. (2019a) conclude that 75% of the existing income inequalities is due to inequality within countries and only 25% due to inequality between countries. Wealth inequality has been higher than income inequality since 1993. In 2022, personal wealth inequality Gini ratio was 0.80 compared to 0.61 for income inequality. Both ratios have marginally improved since 1995. Income inequality is likely to remain high as the current wealth inequality will restrict the future income generation capacity of the current bottom income earners. Greater wealth may provide more wellbeing, greater resilience and offers better and more secure future income perspectives. Income and wealth inequalities have been captured by the ratio of the most unequal to the least unequal country Gini ratio. Inequality ratios for income and wealth have not changed in time, but the wealth ratio is five time higher than that of income.

The World Bank assessed inequality in southern Africa. The countries of the Southern African Customs Union (SACU) have among the highest inequality in the world; however, inequality has improved slightly with a Gini ratio for SACU of 0.587 in 2010-15. The study further found that:

- Urban inequalities are lower and have decreased more than in rural areas;
- Inequality of opportunities (e.g., family situation and wealth, education, place based, unequal land ownership) is the main driver of income inequality. In South Africa, the race and apartheid legacy is also an important determinant;
- Progressive income tax and social transfers reduce inequality in SACU countries.
- Social safety and welfare programmes reach a large part of the population (40 to 70%) but need better targeting.

- Recurrent disasters such as drought, floods, and diseases aggravate inequality.

It concludes that the education and health expenditures need to become more effective to create equal opportunities and reduce inequality. The assessment recommends that land reforms, agricultural modernisation and efficiency increases reduce future inequalities (Victor et al., 2022).

Inequalities in HDI, life expectancy and access to education

Inequality in life expectancy has reduced from 2 to 1.5 between 1960-2021, reflecting improved health care and living conditions throughout Africa. In 2021, Chad had the lowest life expectancy (53) and Algeria the highest (76). The HDI gap between the top and bottom country has decreased from 3.4 in 1990 to 2.1 in 2021. In year 2021, Seychelles (0.795) had the highest and South Sudan the lowest level of human development (0.381). Inequality in mean years of schooling is high and has not changed significantly since 1990 (around 9). The difference between years of compulsory education has remained stable at around 2.5. Inequality in primary school enrolment between countries decreased dramatically (WDI).

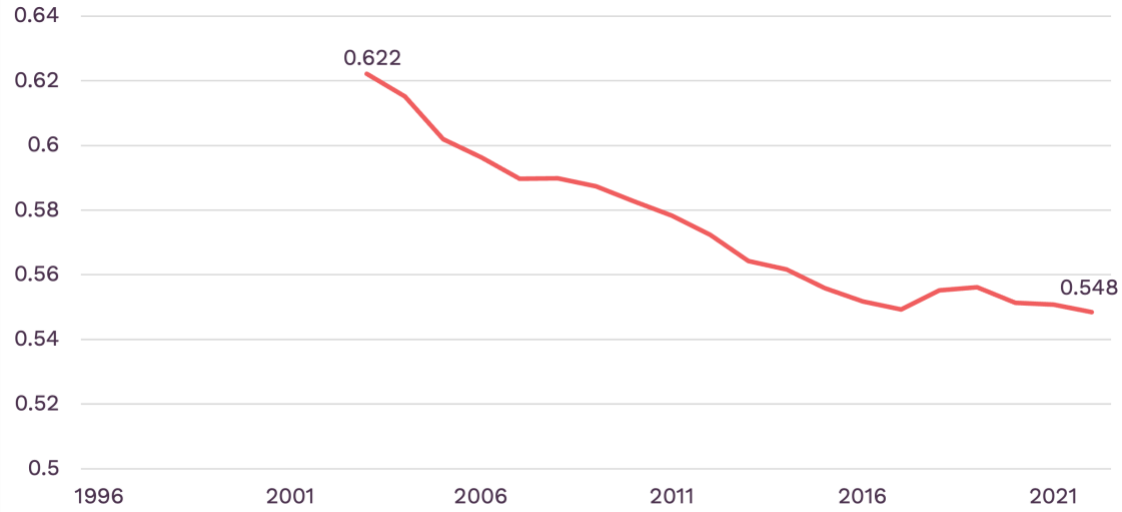
Urban-rural inequalities

Figure 3.11 shows the inequalities in access to public services such as sanitation, drinking water and electricity. The urban/rural ratio for sanitation services has decreased from slightly above 2 in 2000 to 1.8 in 2020. Urban-rural inequalities in electricity are larger. Around 70% of the urban population has access to electricity, while this is 20% for the rural population. The urban/rural ratio for electricity decreased from 4.6 in 1993 to 2.3 in 2021. The gap for safely managed drinking water was largest but has significantly reduced to 4.6 in 2020. These gaps may be the result of two factors: provision of services infrastructure and affordability of the services. People may have access to electricity services but be unable to pay.

Gender inequality

The gender inequality index (GII) is only available from 2006 onwards. Figure 3.16 shows a considerable reduction in gender inequality from 0.622 in 1996 to 0.548 in 2022. Women have a slightly higher life expectancy than men (around 7% in period 1990-2022). In 2022, a higher HDI is moderately associated with a smaller gender difference in life expectancy between African countries. In other words, human development is associated with greater gender equality. While the overall GII decreased the gap between the most and least gender unequal country has widened.

Figure 3.16 Gender inequality index of averaged African countries 2006-2022 (index)



Source: (UNDP (United Nations Development Programme), 2024)

Sustainability

Figure 3.11 shows average per capita GHG emissions, the trend in forest area and the average p.c. renewable natural capital. These and other indicators are discussed below.

African sustainability challenges include GHG emission and climate change, deforestation, growing water scarcity, energy use and transition, and biodiversity. Natural resource management (NRM) is also a challenge after the collapse of traditional NRM systems. Sustainability challenges lead to economic costs of resource degradation. WDI figures show that on average for African countries the Adjusted Net National Income (ANNI) p.c. was 25% lower than the GDP p.c. (2006-2020). For this period, Seychelles had the highest average ANNI p.c. and Burundi the lowest.

GHG emission and climate change

Africa's GHG emissions are relatively low compared to other global regions. Differences between countries are large. South Africa, Nigeria, Egypt and Algeria emit the largest amounts of GHG emissions. Average African per capita emissions ranged between 4.8 and 4.2 tCO_2e/person during the period 1990-2010 and declined after 2010 to 3.1 (Figure 3.11). Libya has the highest p.c. GHG emissions (11.3 in 2020; associated with its oil production) and Burundi the lowest (0.3). GDP p.c. is moderately associated with GHG emission, suggesting that future economic growth is likely to increase p.c. emissions. This can be mitigated if production becomes less emission intensive. GHG emissions per constant US2015 US$ have decreased from 1.8 tCO_2e in 1990 to 1.2 tCO_2e in 2020. Africa's contribution to global GHG emission associated with fossil fuels has increased from 5.4% in 1960 to just over 7% over the last two decades while its population share is over 15% (Malanima, 2022). Therefore, the main concern is Africa's vulnerability to climate change, the expected adverse

impacts and the limited ability to take adequate mitigation measures. Chancel, Bothe & Volturlez (2023) show that low and middle-income countries are most affected by climate change, and less able to mitigate and adapt. This also applies to Africa. Emission inequalities within countries are also significant due to the different consumption patterns of the top and the bottom earners. Climate change is estimated to have a significant negative impact on GDP p.c. and agricultural productivity, poverty, livelihoods and wellbeing. Climate change will also affect low lying, coastal areas and countries. Overall, 2% of Africa's land area lies below 5 meter above sea level and is at risk. Seychelles and The Gambia are most vulnerable to sea level rise with 26% and 19% of their land below 5 mt. above sea level. Just global climate change policies and programmes need to be developed aimed at increasing the African adaptation and mitigation capacity with means provided by countries that have contributed most to GHG emissions.

Water resource use and management

Water resources have come under increasing pressure. Decreasing p.c. freshwater availability drives water stress, the need for increased use of ground and grey water, and for increasing water use efficiency. The average African freshwater use is twice the available internal freshwater resources. Egypt is an extreme example of a country with huge internal water shortages, mostly relying on transboundary water from the Nile. This requires cooperative transboundary water resource management (TWRM) to avoid water conflicts. This has happened through the establishment of river basin organisations that manage transboundary water resources in the last two decades.

Energy consumption and transition

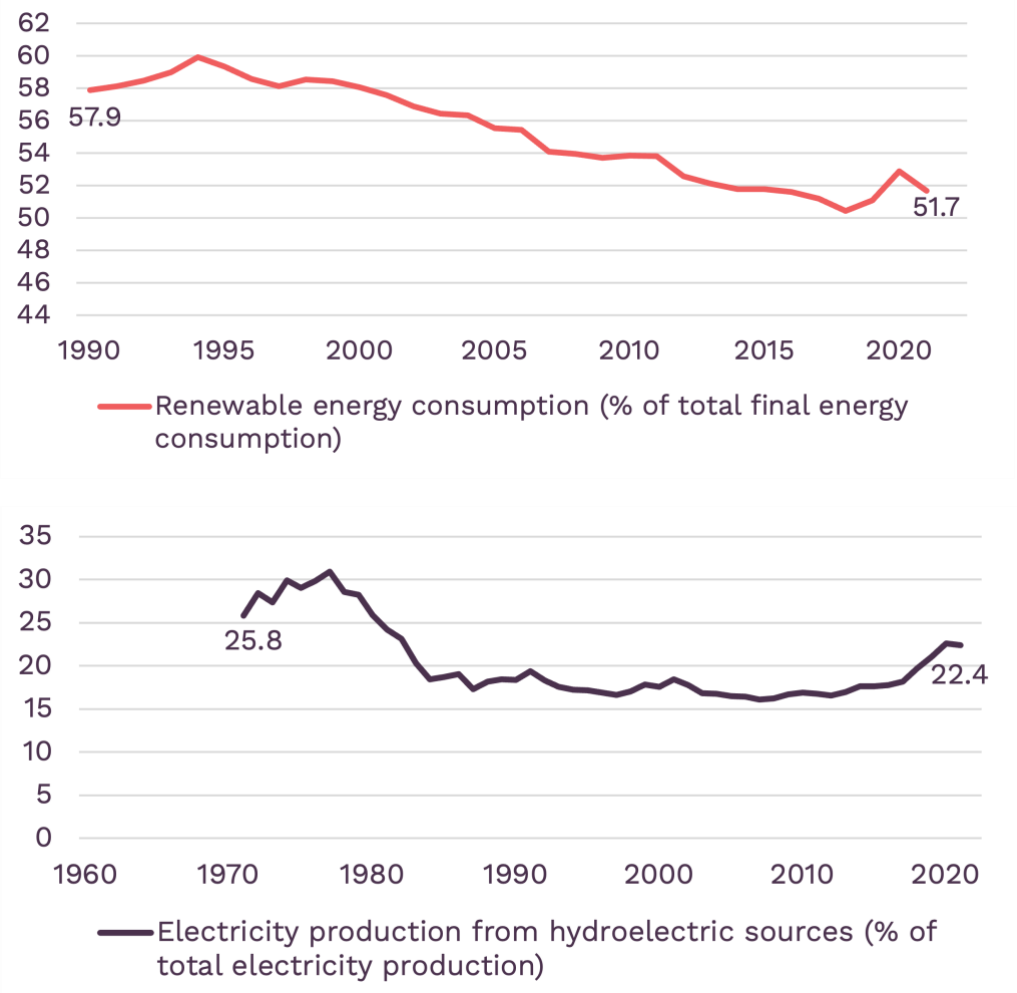
WDI data show that since 1990 renewable energy sources provide over half of the final energy consumption, but the share is slowly declining (Figure 3.17). The World Energy Consumption database[33] shows that African energy consumption increased by fivefold between 1960-2020 (Malanima, 2022). Two energy transitions have occurred. Firstly, Africa transitioned from predominantly renewable energy sources, mostly wood, to fossil fuel for commercial and urban household use with continued wood use in rural areas for households and rural activities. As a result, fossil energy consumption grew fastest until mid-1990s. More recently, a second transition is slowly taking shape from fossil fuels and wood to a mixture of fossil fuels, biofuels and solar power and wind. (IAE, 2023) mention that Africa has an installed renewable energy capacity of 32 GW and expects to double this by 2023, mostly in South Africa, Ethiopia, Nigeria, Angola, and Kenya. It indicates that several countries are primarily dependent on hydropower, whose production is susceptible to the impacts of climate change (high temperatures and greater rainfall variability). While energy source may

[33] The global data base distinguishes eight regions, including Africa, represented by 72 countries covering 81% of the global population. In addition, data for twelve African countries is included.

be available, consumption may be suppressed because of the by the high costs in relation to household incomes.

IEA data show that gas, coal and hydropower are the main sources of electricity in Africa (IEA, 2023). Total energy supply is strongly associated with GDP p.c. In other words, economic growth leads to higher energy needs and requires larger supply. Countries need to invest in energy supply infrastructure to prepare for and facilitate such growth.

Figure 3.17 Renewable energy consumption, 1990-2020 (% of total energy consumption) and hydropower for electricity production 1971-2015 (% of total)



Source: (IEA, 2023)

Biodiversity

African countries have on average set aside 14% of their territorial area as protected areas. Differences between countries are large. Some countries have no protected areas; other have over 40 % of their territory protected (e.g., Zambia). Data on threatened species are only available for a few years, showing no trend. In the latest year 2018 on average per country 20 bird species were threatened, 43 fish species

and 19 mammal species (World Bank, 2024). On average 82 species are threated in each country. South Africa (54), Madagascar (179) and Tanzania (121) had the highest number of threatened bird, fish and mammal species respectively.

Natural resource management

Though not captured in the global data bases used, natural resource management (NRM) is a major concern. The collapse of traditional NRM systems coupled with growing resource pressure due to population growth has exposed resources in communal areas to open access and associated resource degradation. While governments have attempted to resolve the 'Tragedy of the Commons' by (re-)introducing 'Common Property Resource Regimes' and/or privatisation of the commons, many communal areas and resources are not yet effectively managed. This adversely affects rural livelihoods and wellbeing of the rural population who depend on collection of wild food and medicines, building and fencing material, fuelwood, medicines and forage for livestock.

Box 3.2 summarises a new innovative resource management model that aims to improve the sustainability of communal areas and improve wellbeing of the local population.

Box 3.2 Community based natural resource management (CBNRM) as a tool for improved rural development and resource conservation

CBNRM is an innovative response to central governments' limitations to manage local natural resources adequately and efficiently, increase the community benefits of local natural resources and to encourage community involvement in their management. CBNRM aims to balance rural development and resource conservation. From a conservation perspective, the idea was to re-establish common property resource management and overcome resource degradation and the Tragedy of the Commons. It is argued that CBNRM is consistent with decentralised natural resource management that existed before colonisation.

How does CBNRM work?
The CBNRM programme started in Zimbabwe in the 1980s and spread to over 17-mostly southern- African countries (www.encapafrica.org) and extended to other natural resources than wildlife such as forests[34], fisheries and useful plants. Several countries developed CBNRM policies and legislation. International collaboration partners historically provided technical and financial support for the programme's implementation. The typical CBNRM model is that communities obtain exclusive resource use rights in a defined area and receive all or part of the resource benefits[35]. CBNRM thus involves full or partial devolution of authority over natural resources from central government to defined rural communities. These benefits are meant to provide communities with incentives to conserve the natural resources. In return, communities must establish a representative community-based organisation, develop resource management plan and demonstrate accountability. Communities receive the resource benefits and can subcontract resource use rights, e.g., through partnerships with

[34] Tanzania has a Community-Based Forest Management programme together with a Joint Forest Management programme.
[35] These benefits need to exceed the costs of resource management and be secure over time (tenure).

commercial operators. In most countries, the granted resource use rights are time bound, and renewal is subject to compliance with the conditions.

CBNRM outcomes
Generally, communities decide on the distribution of revenues, investments to be made, choice of a joint venture partner etc. In Zambia, 40% of the revenues must benefit individuals/ families. In practice, communities pay salaries of CBO employees, invest in community projects (e.g., community buildings, grinding mills, tractor for community services, and camps sites), and social support (e.g., scholarships, school fees, funerals and orphan support). Families can also be compensated for wildlife damage to their fields or buildings. Cash transfers to households or individuals are limited and CBNRM revenues are at best a secondary source of income for most families and thus has had a limited impact on poverty reduction. In terms of resources, CBOs have natural resource guides for hunting (where applicable) and in Namibia communities have invested in wildlife restocking. There is evidence that poaching is reduced in community areas. Communities monitor the local natural resources and in doing so start to appreciate the value of local natural resources. In Botswana rangelands managed by CBOs are generally in better condition, and more biodiverse than rangelands used by livestock.

The future of CBNRM
CBNRM growth has slowed down over the last decade due to disappointing outcomes coupled with unrealistic expectations, donor withdrawal and inadequate domestic support. Communities are not homogenous in terms of social and economic groupings making collective action difficult. Most community members have little education, skills and management capacity. They need long-term support based on their perceived needs to develop and learn from the inevitable mistakes.
Inequality between and within CBNRM projects is growing. Projects close to Protected Areas generally do well due to resource abundance and wildlife richness. The benefit distribution within communities is also unequal where the community elite tends to capture a large share of the benefits as they tend to control the community-based organisation.
Some conservations argue that CBNRM projects have become development projects with inadequate attention for natural resource conservation. They increasingly prefer co-management of Protected Areas and revenues generated as payment for ecosystem services (PES).

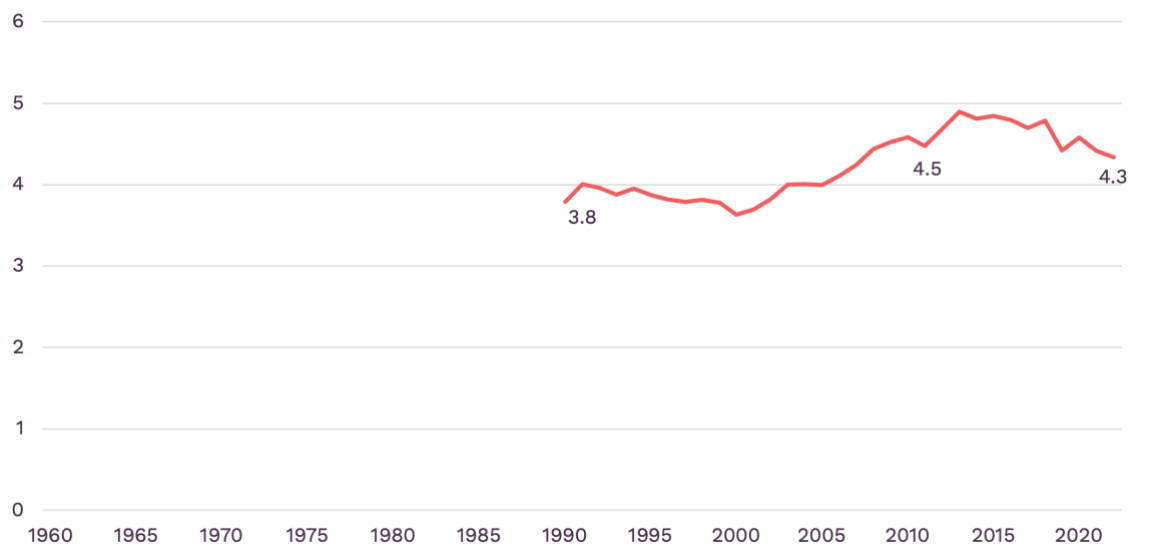
Namibia's CBNRM programme has been most successful. It shows that CBNRM needs strong government commitment, and an effective support framework with government, non-government organisations (NGOs) and the private sector. Moreover, the results of the CBNRM projects need to regularly be monitored, with annual progress reports and a developed data base to show results, lessons learned from successes and failures. CBNRM does not aim to maximise family or community incomes, and in this sense, it goes beyond GDP. CBNRM often operates in remote and environmentally marginal areas which have proven to be difficult to be governed by central government. It empowers local communities to varying extent, but in most cases government controls keys management/ governance aspects (e.g., issuing quota for the resource use rights). In Namibia, communities are actively involved in the establishment of quota setting. Communities have the power to decide on the revenue distribution, which offers opportunities to improve wellbeing, ensure inclusion and sustainability.

Sources: (Jones, 1999, p. 199; Jones et al., 2006; Mbaiwa, 2006; Shackleton & Cambell, 2001; Turner, 2004)

Material use

The material footprint has increased since 1990 to 4.3 T/person (Figure 3.18). This is only a third of the global average of 13.2T/person in 2024 (UNEP, 2024). Therefore, the United Nations Environmental Programme (UNEP) report argues for a just transition towards more equitable per capita resource use. This would imply that low- and middle-income countries would be able to increase their material footprint while high-income countries would reduce their material footprint and create space to stay within the natural boundaries.

Figure 3.18 Material footprint of Africa, 1995-2022 (tonnes/capita)



Source: *(World Bank, 2024)*

Wealth

Total wealth for Africa has grown faster than the population growth reaching over 21,000 constant 2018 US$ in 2018 (Figure 3.2). This put the continent in a good position positive for future development. However, sustainability concerns exist for the decrease in per capita renewable natural resources, which threatens the livelihoods and subsistence of the rural population and low-income groups that depend on free renewable natural resources. The low adjusted net saving rate (ANS) is also a sustainability concern.[36] For the period 2005-2020, the average ANS for African countries was 4.2% of GNI with a downward trend. The country ANS figures range from -25% to + 26% of GNI. Cabo Verde had the highest adjusted savings; Burundi the lowest. Nine countries had a negative average ANS. This is not sustainable on the longer term. Prudent use of revenues from non-renewable natural resources is another sustainability concern. Mineral rich countries can be trapped in the 'resource curse'. It is critical for resource rich countries to capture much of the

[36] Adjusted net savings are equal to net national savings plus education expenditure and minus energy depletion, mineral depletion, net forest depletion, and carbon dioxide. This series excludes particulate emissions damage.

resource rent for the country's benefit[37] and to invest the revenues in human and productive capital to sustain future development (Iimi, 2006). Such responses require prudent macro-economic management (e.g., sustainable budget index in Botswana and managing the adjusted net savings index) and strong institutions. Revenue use for consumption is tempting but not sustainable[38].

3.6 Regional Analysis for Africa

The previous sections focused on Africa while highlighting individual African countries. These showed growing diversity in development and wellbeing, inclusion and sustainability. This section briefly highlights differences in development key drivers and outcomes by African region, i.e., North Africa, East Africa, Southern Africa, Central Africa and West Africa. Table 1 shows to which region each country belongs.

North Africa is often grouped together with the Middle East in database and global reports and called the Middle East and North Africa (MENA) group[39]. This reflects North Africa's proximity to the Middle East, shared cultures and religion with Arab countries and political associations with Arab countries (Arab League and the AU). As noted earlier, northern African countries also gained Independence earlier than most African countries. This distinct nature of North Africa is reflected in the context and development outcomes discussed below. Below first, the main differences between key drivers are discussed followed by discussion of the WISE outcomes.

Differences in key drivers

Figure 3.19 on the next page shows key drivers for the five African regions. It compares differences for the earliest and last year for which data are available. The Figure shows that population has increased in all regions. East and West Africa are most populated (around 400,000); North, Southern and Central Africa have around half that number. Central and West Africa have the most youthful population and are the only regions where the youth/elderly ratio has increased since 1960. This ratio decreased most in North Africa due to a low birth rate. Urbanisation is an Africa-wide phenomenon: in North Africa, Southern Africa and West Africa almost half or more of the population lives in urban areas, and urbanisation is 30% in East and 46% in Central Africa.

In terms of economic developments, GDP per capita differences between regions are large. GDP p.c. is highest in North Africa and has almost tripled since 1975 to just under constant 2015 US$ 4,000. Southern Africa had the highest income in 1975, but it declined to US$ 2,865 in 2021. The average GDP p.c. of the other regions is much lower in 2021; in Central Africa the income may have decreased due to political

[37] The risk exists that in some cases the rent is captured by companies and the country's elite. This can hold development back and is likely to create political instability.
[38] This is known as the 'Dutch disease' when the Dutch government used gas revenues for consumption.
[39] The other African countries are often grouped under Sub-Saharan Africa (SSA).

instability in the 1970s to 1990s. The value added of agriculture has decreased in all regions, particularly in North and Southern Africa. Agricultural value added remains most important for GDP in East and West Africa. As noted earlier, agriculture remains a vital rural source of livelihoods.

Figure 3.19 Key drivers in summary figures, African regions

Source: (World Bank, 2021, p. 20, 2024)

For technology, data were insufficient to estimate regional averages. Country results have been mentioned earlier in section 3.2. In terms of nature, the ecosystems of

the regions vary widely. North Africa is dominated the dessert and extremely dry conditions. Tropical forests are found in Central Africa and parts of East and West Africa. Savannas are also found in East and West Africa and in most of Southern Africa. Rainfall and internal freshwater resources are highest in Central Africa and lowest in dessert and semi-arid areas. Most regions experienced deforestation, West and Southern Africa have the largest but dwindling forest areas. Forests in North Africa constitute a small portion of the land and are marginally increasing. Based on the average of the region's countries, the forest area of Central Africa is stable over the period 199-2020 (Figure 3.20).

International trade is highest in Central Africa. Trade has increased in Central Africa and Southern Africa, while it decreased in East Africa, North Africa, and West Africa comparing to 1990 level. Official development assistance is highest in East, Central and West Africa. It has greatly reduced in North Africa to 1.4%, and it is lowest in Southern Africa (being 1.3%, coming from 0.4%). This is associated with the differences in regional GDP p.c. Foreign direct investments show large annual fluctuations and do not reflect a clear trend. FDI is generally low.

Looking at differences in institutions and governance, the mean of the five WDI governance indicators is negative for all regions, but Southern Africa scores the best although the score has significantly declined since 1996. Central Africa followed by East and West Africa have the lowest score with a s slight improvement since 1996. Southern Africa and North Africa record a deterioration.

Outcomes

Figure 3.20 on the next page shows regional differences in wellbeing, inclusion and sustainability indicators, which are briefly elaborated below.

North Africa has the highest level of wellbeing as measured by life expectancy (72 in 2021), human development, access to basic sanitation, electricity and mobile phones as well as years of schooling. It is generally followed by Southern Africa. East, Central and West Africa are at comparable but lower levels of wellbeing. HIV/AIDS has had the most severe impact in Southern Africa with North Africa least affected. Southern Africa's increase in wellbeing has been slower than that in North Africa, which may be the result of instability associated with the late decolonisation and subsequent civil wars and political turmoil in several southern African countries.

Southern Africa has the highest level of income and wealth inequality. Income and wealth inequality are high in all African regions and show little signs of improvement, except in North Africa. There is an inequality gradient from the south (very high inequality) to the north (relatively low inequality) (Chancel et al., 2019a). The GII increased in Central Africa meaning gender inequality worsened. Gender inequality decreased in other regions, most rapidly in North Africa (from 0.59 in 2010 to 0.52 in 2022). Central and West Africa have the highest levels of gender inequality.

GHG emissions per capita have decreased since 1995 in all regions. However, regional differences in p.c. GHG emissions are large. The p.c. emissions are highest in North

and Southern Africa (around 5 T/person) and lowest in West Africa (around 2T/person). The levels reflect the moderate association with p.c. GDP. Renewable energy consumption as a percentage of total energy consumption is highest in Southern and Central Africa, and very low in North Africa as it relies more on fossil fuels. The high reliance on renewable energy can be attributed to biofuel and the high-income inequality that leaves more families depending on free wood resources.

Figure 3.20 Outcomes in summary figures, African regions

Source: (UNDP (United Nations Development Programme), 2024; World Bank, 2021, 2024; World Inequality Database, 2024)

The share of renewables has declined in East, Central and West Africa. Per capita wealth is increasing in all regions. It is the highest in Southern Africa, followed by West and North Africa. P.c. human capital is highest in Southern Africa but increasing fastest in West Africa. This is a good base for future development. Based on CWON data, natural resource capital is most important in East, Central and West Africa (40 to 50% of total wealth). Natural capital accounts for around 20-25% of total wealth in North and Southern Africa. Measured as percentage of natural capital, fossil fuels and mineral are most important in North, Southern and West Africa (25 to 30%) and least important in East and Central Africa (less than 10%). North Africa has the highest material footprint, which has significantly increased since 1995. Southern Africa has the third highest footprint but the footprint in 2020 is smaller than in 1995 related to slowing down of GDP p.c. in the region.

P.c. freshwater withdrawal in North Africa is very high and far exceeds the internal freshwater resources. This is due to the exceptional water use in Egypt. In other regions, withdrawal is well below the internally available water resources.

Table 3.5 summarises the main development key drivers and outcomes by region.

Table 3.5 Summary of regional key drivers and outcomes

Region	Key drivers	Outcomes
North Africa	Most urbanised; Highest material wellbeing & increased; agricultural VA decreased; largest decrease in ODA;	Highest level of wellbeing: life expectancy, human development, access to public services, years of schooling; high p.c. GHG emissions; low renewable energy consumption; high, increasing material footprint; exception high p.c. freshwater consumption far more than internal freshwater resources. stable but low p.c. renewable natural capital
East Africa	Large human population with West Africa; agriculture large contributor to GDP; high ODA.	Lower level of wellbeing (like West and Central Africa); declining renewable energy consumption; medium level p.c. renewable natural capital and decreasing.
Southern Africa	Second highest material wellbeing but decreased; agricultural VA decreased; highest trade % of GNI; largest decreased in ODA	Increase in wellbeing but slower than in North Africa; highest level of HIV/AIDS; high p.c. GHG emissions but decreased after 1995; high renewable energy consumption; high, decreasing material footprint; high but decreasing forest resources; stable p.c. renewable natural capital
Central Africa	Most youthful population with West Africa; Half of population is urban; decreased material wellbeing;	Lower level of wellbeing (like West and East Africa); low GHG p.c. emissions; high renewable energy consumption but declining; stable forest area; highest p.c. renewable natural capital but decreasing.
West Africa	Large human population with East Africa; half population is urban; most youthful population with Central Africa; agriculture large contributor to GDP	Lower level of wellbeing (like East and Central Africa); declining renewable energy consumption; high but decreasing forest resources; highest (1995) but rapidly decreasing p.c. renewable natural capital.

3.7 A Novel Narrative on Africa's Progress

The first question posed in this report was "How does the "old" economic perspective of economic growth compare to the new "WISE" perspective?" In other words, does it change our view on developments in Africa?

Before this question is answered it must be noted that this synthesis is not comprehensive due the broad scope of our analysis, the complex processes and interactions between drivers, and outcomes as well as to the methods used (section 2). Furthermore, it is restricted to the limited key drivers and outcome indicators of our framework. A lot more can and should be done as follow up.

In term of the old economic growth paradigm, Africa's GDP p.c. increased 50% between 1970 and to just under US$ 2,000 per capita (constant 2015) in 2022, reflecting an average annual growth rate of 0.8%. However, there have been significant differences in economic growth over time and between countries. Growth around 2% per annum occurred in the periods 1960-1975 and 1996-2010 but growth stagnated in the periods 1976-1995 and 2011 to the present. GDP p.c. of the top-ranking GDP p.c. country grew rapidly while the GDP p.c. of the lowest ranked remained constant resulting in growing GDP p.c. inequality between countries (Figure 3.16). Internationally, the gap of Africa with other parts of the world has grown, as shown by the overrepresentation of African countries in the least developed and low-income countries (Figure 3.1).

The WISE paradigm (sustainable and inclusive wellbeing) offers a broader and more precise picture of African development, but we found that economic growth (i.e., material wellbeing) is a key part of the WISE paradigm. In Africa, economic growth is necessary even though it may not improve all aspects of wellbeing. Wellbeing has progressed but lags behind most other parts of the world. Inequality and sustainability challenges are significant. Some have existed for a long time, for example little progress has been made in reducing income and wealth inequalities. While urban-rural and gender gaps still exist, these gaps are gradually narrowing. Sustainability challenges have mostly increased.

Most indicators of wellbeing have significantly improved over time, including life expectancy, human development, school enrolment, mean years of schooling, access to medical services improved, access to water, sanitation and electricity and communication.

North Africa and Southern Africa have had the highest levels of wellbeing. North Africa has further improved its wellbeing facilitated by close links with the Middle East and proximity to European markets. In contrast with North Africa, wellbeing improvements have slowed in Southern Africa due to political instability and the heavy toll of HIV-Aids and COVID.

Further wellbeing improvements are needed in Africa as, for example, access to public services is not yet universal, a significant portion of the population is food insecure, undernourished and still relies on open defecation due the lack of affordable sanitation services. The wellbeing in rural areas is generally lower than in

urban areas due to poorer access and use of public services, low agricultural yields, and limited job opportunities.

In terms of inclusion, Africa is one of the most unequal regions in the world. In Africa, the top 10% earners accrue 58% of the national income. Inequality has marginally improved since 1980 but remains very high. Wealth inequality is even higher than income inequality, which suggests that income inequalities are likely to persist in future. Wealth and Income inequality is the highest in Southern Africa and the lowest in North Africa (the so-called 'North-South inequality gradient' (Chancel et al., 2019a)). Gender inequality persists but it is becoming less. The Gender Inequality Index is decreasing, and the gender gap in years of schooling is also narrowing.

Sustainability challenges have grown over time and have become more numerous. Deforestation, especially in West and East Africa, growing water stress in North Africa and Africa at large, climate change as well as inadequate management of natural resources such as open access in communal areas pose increasing challenges. While Africa's p.c. GHG emissions are relatively low, the continent is expected to be seriously impacted by climate change, as it is vulnerable to the climate change impacts and has a limited mitigation and adaptation abilities. Deforestation has steadily progressed, and available p.c. freshwater resources have dwindled, and average country freshwater abstraction exceeds internal freshwater resources. This requires integrated and transboundary water resource management.

Africa has seen two energy transitions and diversifications over time. Initially, there was a broadening of energy sources beyond the traditional wood resources by expanding the use of fossil fuels. More recently, a new energy transition and diversification is emerging moving beyond fossil energy to renewable sources such as solar and wind power. Renewables such as solar power hold good potential for off-grid applications in rural areas and for agriculture, also driven by decreasing costs of solar power.

Per capita renewable natural capital is decreasing in most regions except North and Southern Africa. This is a serious long-term concern that is likely to affect rural livelihoods and increase income inequality. Fortunately, per capital total wealth has increased offering hope for Africa's future development.

3.8 The Key Drivers of Africa's Progress

It is important to note upfront that key drivers impact on the outcomes in terms of wellbeing, inclusion and sustainability, but key drivers also impact on each other. For example, Africa's youthful population – often labelled as a youth dividend - offers economic opportunities (skilled human resources) and challenges (e.g., youth unemployment). Political stability and governance are needed for investments to drive economic growth and development.

Section 3.4 showed that technology and globalisation have only been modest drivers. The global analysis shows that Africa only accounts for a small portion of global trade, mostly in the form of primary commodities. As a result, countries are dependent on

exports of a few commodities and hence vulnerable to global price volatilities. Technology data for African countries were limited. The most striking innovations have been in the communication sector. The Internet and smart phones have conquered Africa in a brief period, offering better communication opportunities for families and companies. However, Africa has not widely adopted modern agricultural technologies (e.g., green revolution and irrigation), contributing to low yields, low employment opportunities and adversely affecting rural livelihoods and wellbeing. The decline of the agricultural sector has contributed to persistent income inequality.

Demography, governance and nature have been more important drivers of progress in Africa. Africa‘s population has grown rapidly and now counts to 1.4. billion people, 44% of the population reside in urban areas and 40% are younger than 15 years. As stated above, the youth dividend has created opportunities and challenges. Opportunities include the growing labour force and productive potential with higher skills and productivity of the youth, growing urban markets for goods, and growing trade opportunities between rural and urban areas and between countries. However, the related challenges include adequate expansion and maintenance of public services, significant creation of employment and economic opportunities, especially for the influx of youth into the labour force; addressing youth unemployment and disgruntlement that may cause social unrest. Refugees and IDPs driven by human conflicts and/or natural disasters present further demographic challenges to the countries and regions involved. These are driven by political instability, conflicts, and natural disasters.

Section 3.4 suggests that a lack of adequate governance and institutional structures have held back progress in outcomes. The governance indicators of the WDI show relatively poor and mostly decreasing governance performance. Political instability and violence have affected African countries since 1960, but at various times in different countries. There is a tendency towards autocracy in the world and Africa (Nord et al., 2024), increasing the risks of nations’ failure (Acemoglu & Robinson, 2013). The governance results of the IIAG are similar but slightly better than the WDI indicators. Contrary to our expectations, the association of governance with WISE indicators is generally weaker than those of human development and p.c. GDP. The importance of good governance is however clear from the finding that the country rankings analysis showed an overlap between better or poorer countries in terms of GDP p.c., human development, and governance. Furthermore, it is important to note that the governance indicators are interlinked. The rule of law is associated with government effectiveness, control of corruption and political stability and accountability. In turn, political instability and violence have led to significant refugee flows to neighbouring countries.

Nature has been important for wellbeing and has contributed to inequalities (e.g., unequal land distribution and access to natural resources) and sustainability challenges due to growing resource scarcity (e.g. water), overutilisation and inadequate management and declining per capita renewable natural resources. Minerals have boosted material wellbeing and p.c. GDP of countries, but the lasting wellbeing impacts depended on capturing of the mineral rent and their investments for future generations.

As noted above, economic growth is important for material wellbeing. However, longer schooling, increased use of basic sanitation services and higher p.c. human capital are more associated with human development than with p.c. GDP, suggesting that the broader paradigm of sustainable and inclusive wellbeing adds value to the traditional economic approach.

Chapter 4. A Wellbeing analysis for China since 1978

4.1 Introduction

China's development in the past decades has been remarkable. Much of the research has focused on the economic aspects of this transition, particularly the policy decisions that have shaped the country's development path. This narrative often emphasizes key milestones such as the economic reforms of the early 1980s, globalisation in the 1990s, and China's accession to the World Trade Organization in 2001. These reforms introduced market-oriented policies, opened the country to foreign investment, and facilitated the shift from an agriculture-based economy to one driven by industry and services.

Within this context, significant regional disparities and the resulting internal migration have also been widely discussed. The rapid development of coastal regions and major urban centres, fuelled by investment and industrialisation, contrasts sharply with the slower progress in the interior and rural areas. This uneven development has led to substantial internal migration, with millions moving from rural regions to cities in search of better employment opportunities and improved living standards. These demographic shifts have had profound social and economic implications, further shaping the landscape of modern China.

However, alongside this rapid economic development, challenges have also emerged. While China's economic achievements are covered extensively, there is less focus on the deeper narratives regarding the changes in the wellbeing of the Chinese people. As the economy slows down, attention is increasingly shifted towards how to enhance the overall wellbeing of the public and explore sustainable development pathways for the future.

This chapter aims to explore China’s historical development from a different vantage point—one that goes beyond the traditional economic focus. By examining China's evolution through the lens of wellbeing, inclusion, and sustainability, we seek to provide a more comprehensive understanding of China’s recent history (since 1978). This approach allows us not only to understand China’s economic story but also to focus on broader narrative of wellbeing.

4.2 Methodology and Data

This chapter focuses on the development of wellbeing, inclusion and sustainability in China from 1978 to the present.

Geographical scope

The trend analysis is done both at the national and regional levels. The regional analysis is important because it highlights the diversity of experiences across China's vast expanse by categorizing the country into four distinct regions: East, Central, West, and Northeast China (see Table 4.1). This classification enables a more detailed

examination of regional variations, considering the unique economic, social, and geographic contexts that shape development in each area. Within these regions, specific provinces are highlighted to illustrate key trends and provide a deeper understanding of the forces shaping development across the country. By combining national and regional analyses, this report ensures that the findings are both broad in scope and rich in detail.

Table 4.1 Regional focus of the deep dive

Regions	Provinces
East China	Beijing, Tianjin, Hebei, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong, Hainan (10 provinces)
Northeast China	Liaoning, Jilin, Heilongjiang (3 provinces)
Central China	Shanxi, Anhui, Jiangxi, Henan, Hubei, Hunan (6 provinces)
West China	Inner Mongolia, Guangxi, Chongqing, Sichuan, Guizhou, Yunan, Tibet, Shanxi, Gansu, Qinghai, Ningxia, Xinjiang (12 provinces)

Historical scope

The analysis covers four distinct phases, each marked by important policy shifts and socio-economic transitions (Table 4.2). The rationale for this division is based on key historical milestones and the evolution of China's economic and social policies during these years.

Table 4.2 Time periods of the analysis

Period	Iconic event	Key features
1978-1991	Transition period	This period marks the beginning of China's economic transition, shifting from a centrally planned economy toward a more open and flexible system. During these years, China introduced agricultural reforms, allowed private enterprises to emerge, and opened up to foreign investment in SEZs. The focus was primarily on economic growth and lifting the population out of extreme poverty. The changes during this period laid the foundation for the rapid economic development.
1992-2000	Market-oriented reform	The early 1990s saw China accelerating its transition to a market economy, further liberalizing its trade policies, and deepening its integration into the global economy. The decision to establish the socialist market economy in 1992 marked a significant shift. During this time, regional disparities began to emerge, particularly between coastal and inland regions. But economic development remained the primary focus in this period.

2001-2012	Globalisation	This phase begins with China's entry into the WTO in 2001, which significantly boosted its global economic role and led to large increases in international trade and foreign investment. The period is characterised by rapid industrialisation, urbanisation, and economic growth. However, these advancements also facilitated income inequality, regional disparities, and environmental degradation.
2013-2023	From growth to development	Economic growth began to slow down, a series of issues started to emerge such as high level of debts, overcapacity of the production, trade tension, and shift to consumption-led economy. China government increasingly focused on sustainable development, environmental protection, and reducing poverty. The "Ecological Civilization" concepts reflect this shift towards balancing economic growth with environmental protection. The period has also seen the efforts on social welfare systems and demographic challenges, such as aging society and declining birth rates.

Data

This report draws on a variety of data sources to provide a comprehensive analysis of China's development across multiple dimensions. The primary sources of data include the WDI from the World Bank, the WID, and the National Bureau of Statistics of China (NBS). These databases offer a wide range of indicators that are essential for assessing the main perspectives in this report: key drivers and outcomes of wellbeing, inclusion, and sustainability.

This study provides a comprehensive overview of wellbeing, inclusion, and sustainability in China. Our objective is to reveal historical changes in these areas, highlighting major trends and identifying regional differences. We cover both contextual drivers, which are the foundational elements shaping these developments, and outcome measures, which assess the results of these factors. Contextual drivers include population, GDP, patent applications, total exports and imports, and governance scores. Outcome indicators for wellbeing, inclusion and sustainability are listed in the Table 4.3.

Table 4.3 List of indicators for wellbeing, inclusion and sustainability

Aspect	**Indicators**
Wellbeing	Material wellbeing, life expectancy, education, living conditions and services
Inclusion	Poverty, income inequality, gender inequality in education, inequality in living conditions and services
Sustainability	CO_2 emissions, air pollution, energy use, land and biodiversity

In addition to the national datasets, this report gathers similar datasets tailored to regional analysis within China. While most indicators are consistent with those used in the national-level analysis, but some differ because of data availability (see Table 4.4). This dataset provides in-depth insights into the country's diverse regions, allowing for a more detailed and accurate assessment of regional disparities and development patterns. By incorporating data for the WISE database, the report enhances its ability to capture the complexities of regional dynamics across China, offering a more comprehensive understanding of the nation's development at the regional level.

Table 4.4 List of indicators for wellbeing, inclusion and sustainability at the regional level

Aspect	**Indicators**
Wellbeing	Material wellbeing, life expectancy, education, labour market, living conditions and services
Inclusion	Poverty, income inequality, inequality in life expectancy, gender inequality in education
Sustainability	CO_2 emissions, air pollution, energy use, land and biodiversity

The time period of this analysis on China begins in 1978. However, a brief overview of the background prior to 1978 is presented in Box 4.1, showing the preceding context. The rapid growth in China from 1978 onward, as we have come to understand from most previous studies, was also a result of the economic and social practices accumulated prior to this year.

Box 4.1 China before 1978

The year 1978 stands as a crucial point in Chinese history, marking a turning point that shaped the following decades. Many of the policies, reforms, and events that have decided China’s progress can be traced back to this crucial year.

Before 1978, China experienced a period of social and economic disturbances. The complexity of the international environment and the internal challenges significantly influenced policies at the time. The early years witnessed power consolidation, land reforms, and industrial nationalization, followed by various political campaigns, social experiments, and economic policies.

From a population perspective, both high birth rates and decrease in death rates facilitated the growing population at an average annual rate of 2.44% during 1960-1977, reaching a large population base of 940 million by 1977. From an economic perspective, although economic growth began to recover during this period, it remained relatively slow. The per capita GDP grew at an average annual rate of approximately 2.68%, increasing from $238 in 1960 to $347 in 1977.

Low productivity necessitated the integration of women into the workforce to help secure a stable food supply. This led to a widespread phrase ‘Women hold up half the sky’ as more women began participating in agricultural and other work and shared equal rights with men. In parallel, China prioritized equal education opportunities,

allowing more girls to access the education. This focus on education resulted in a significant improvement in literacy rates, reaching to 66% in 1982 as the earliest record. These efforts laid the foundation for the rapid growth in post-1978 era.

China started to open up and reformed its economy from 1978. A series of policies transitioned China from a centrally planned economy to a more market-oriented one, foreign investment encouraged, productivity improved, leading to rapid economic growth and lifting many people out of poverty.

The following sections outline key developments in China from 1978 to the present. It begins by examining key drivers to provide a comprehensive view of changes in demography, economy, technology, globalisation, and institutions. Then, we focus on outcome indicators for wellbeing, inclusion, and sustainability and study how the key drivers impact sustainable and inclusive wellbeing in China.

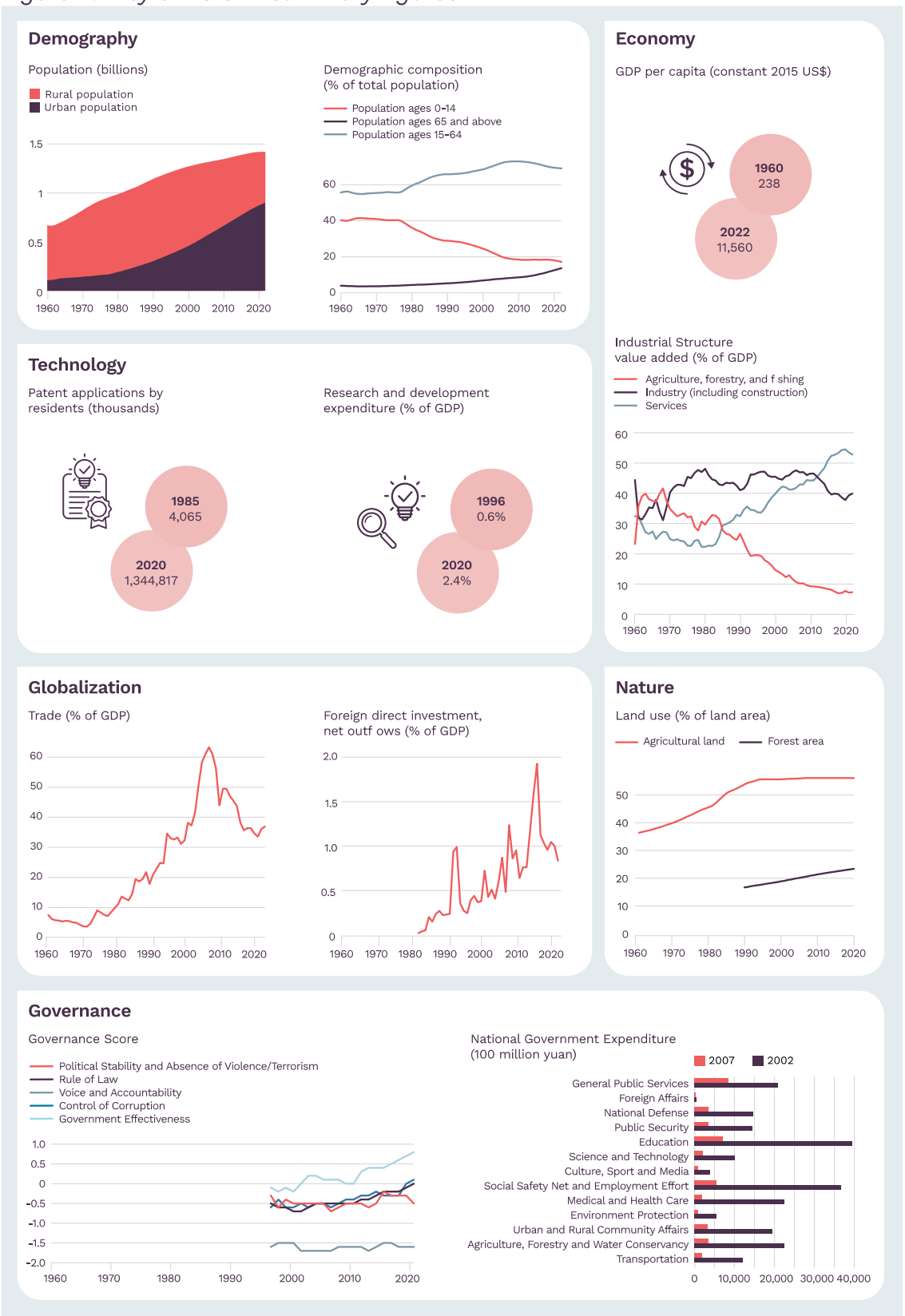
4.4 Key drivers since 1978

In China, the most crucial factor driving the development of wellbeing, inclusion and sustainability is institutional reform and improvement, which will be described first. Next, human capital (China’s large and educated population) provides a steady labour force over the past few decades. This section will also analyse the impact of globalisation, which is an accelerated after China's accession to the WTO. Furthermore, technological advancements over the past decades have not only fuelled the growth of large enterprises but also significantly improved the convenience of everyday life. In terms of natural resources, while we have witnessed increasing demand, there has also been a gradual shift towards ecological restoration and more efficient resource utilization in response to environmental degradation. Finally, this section will conclude with a discussion of the economy.

Institutions

The analysis of the key drivers of wellbeing, inclusion, and sustainability starts with institutions. In the Chinese context, these are important in understanding how policies shape the broader economic and social landscape in China. In China, the government plays a crucial role in directing resources, setting development priorities, and implementing regulations that influence economic growth, social equity, and environmental sustainability. By examining these institutional factors, we can gain insights into how authorities promote wellbeing, inclusion, and sustainable development, and how these policies are tailored to address China's unique challenges and opportunities.

Figure 4.1 Key drivers in summary figures



The figure illustrates key contextual indicators for China national-level analysis, including: 1. population, 2. age structure, 3. GDP per capita, 4. industry structure, 5. number of patents, 6. R&D expenditure (% of total government expenditure), 7. trade (% of GDP), 8. foreign direct investment, net outflow (% of GDP), 9. Land use (% of land area), 10. governance score, 11. government expenditure. Source: 1-10. (World Bank, 2024) 11. (National Bureau of Statistics of China, 2024)

The governance scores in Figure 4.1 captures the characteristics of Chinese government in five aspects, i.e., political stability and absence of violence, rule of law, voice and accountability, control of corruption, and government effectiveness. It shows especially an increasing and relatively higher level of government effectiveness and a relatively lower level of voice and accountability in China, compared to the global average (which is 0 by design, see also Chapter 2 and Chapter 3). The effectiveness of the Chinese government in implementing economic and social policies is often highlighted by its ability to mobilise resources and execute large-scale projects efficiently. However, the government still faces challenges related to corruption, bureaucratic inefficiencies, and regional disparities. Efforts to address these issues include anti-corruption reforms aimed at improving transparency and administrative efficiency.

Since 1978, the institutional development in China has been shaped by the country's transition from a centrally planned economy to a more market-oriented system, alongside significant political, legal, and social reforms. These reforms can be broadly categorized into three key phases: the initial reforms of the late 1970s and 1980s, the deepening reforms of the 1990s and 2000s, and the more recent efforts to modernize governance and improve institutional efficiency. The whole period since 1978 has seen the evolution of governance structures, economic institutions, legal frameworks, and social policies that have collectively contributed to China's rapid economic growth, large-scale urbanisation, and significant innovation advancements.

The economic reforms in 1978 marked the beginning of China’s shift from a centrally planned economy to a market economy. First, one of the most impactful social institutions around 1980s was the "Iron Rice Bowl" system, which means that providing lifetime employment, housing, healthcare, and pensions to workers. This system, derived from the planned economy, provided security and stability for millions of Chinese citizens, especially urban workers. Starting in the 1980s, China began to abolish the Iron Rice Bowl as part of broader economic reforms aimed at transitioning to a market-oriented economy. This reform introduced market mechanisms and labour flexibility but also caused social problems, with widespread layoffs and increased job insecurity. Second, the introduction of the "household responsibility system" in 1978 allowed farmers to retain surplus produce after meeting food production quotas, leading to increased productivity and income. Third, China carried out significant legal reforms to support its market-oriented economic policies starting from the 1980s. A more formal legal system was established, with laws governing contracts, property rights, and business transactions.

The second phase of reform, especially during the 1990s and early 2000s, further emphasized economic restructuring and global integration. The privatization of state-owned enterprises (SOEs) and the establishment of Special Economic Zones (SEZs) were central to this phase, leading to the inflow of foreign investment and technological advancement. SOEs were restructured in the 1990s to improve efficiency, leading to the privatization of many small and medium-sized enterprises while retaining state control over key industries like energy, telecommunications, and transportation. The reform of SOEs and the introduction of labour contracts ended

lifetime job security. Workers were encouraged to compete for jobs based on merit, and private enterprises began to play a greater role in employment. SEZs were established in the early 1980s to attract foreign investment and experiment with market-based economic practices. These zones became engines of economic growth and models for broader reforms across the country. Moreover, joining the WTO in 2001 solidified China's position as a global economic power. However, these reforms also led to rising income inequality and environmental degradation as rapid industrialisation and capitalization outpaced regulatory frameworks.

Apart from economic institutions, social reforms also took place. The household registration (Hukou) system, established in 1951, classified citizens as either rural or urban residents, tying their access to social services like education, healthcare, and housing to their registration status. In early years, the Hukou system helped prevent overcrowding in cities by controlling rural-to-urban migration, ensuring that urban infrastructure and resources were not overwhelmed. As China urbanised rapidly, millions of rural migrants moved to cities for work, but their rural Hukou status prevented them from accessing urban services. This created a marginalized underclass of migrant workers without access to healthcare, education, or social security, deepening social divisions. Though the Hukou system has been gradually relaxed in recent years, disparities between rural and urban residents remain significant, highlighting the mixed impact of institutional reforms on social equity. In addition, education reforms have aimed to improve access and quality, with a focus on expanding higher education and vocational training to support economic modernization. The "Gaokao" (national college entrance examination) system has been central to these efforts, although it has also been a source of social pressure. Besides, health institutions have been significantly reformed, especially after the SARS outbreak in 2003, leading to increased government investment in public health infrastructure and services. The introduction of basic health insurance schemes for rural and urban residents has also been a key development.

The third and most recent phase of reforms, from the 2010s onward, has focused on modernizing governance and addressing the consequences of earlier reforms. With the slowing of economic growth, the government shifted its focus from high-speed growth to high-quality growth. Therefore, reforms now prioritize environmental regulation, income redistribution, and social welfare expansion, alongside efforts to enhance institutional efficiency in government and industry. Anti-corruption campaigns have been strong since 2013, with an increasing number of corruption cases involving Chinese Communist Party (CCP) officials from 173 thousand in 2013 to 626 thousand in 2023 (Statista, 2024). Government responsiveness is another important dimension of recent reforms. "12345" Hotlines and mayor's mailboxes are set up for each municipality, and it is mandatory for each inquiry from the public to be followed and responded, with satisfaction rate a key indicator.

At the same time, the government is working to address the dual challenges of an aging population and declining birth rates, which threaten long-term growth and social stability. Efforts to improve social care and healthcare infrastructure have been key components of this period's institutional reforms, though significant challenges remain. The rural-urban divide has been a significant challenge, with

reforms focused on extending social security and public services to rural populations, which had previously been excluded from benefits possessed by urban residents.

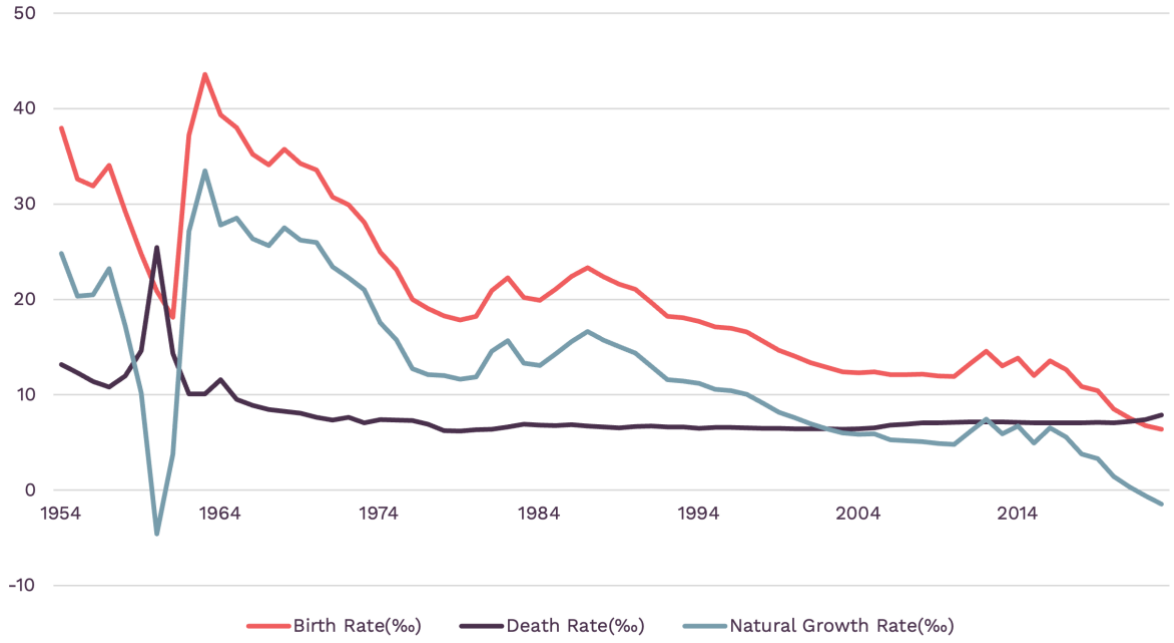
Demography

A large population base affects wellbeing, inclusion, and sustainability via resource allocation, labour markets, social equity, and environmental pressures. China has experienced a period of steady population growth alongside significant demographic shifts that have shaped the nation's social and economic landscape. China's population grew from 963 million in 1978 to approximately 1.4 billion by 2022, with an average annual growth rate of around 1.2%. Since 2022, China has entered a phase of negative population growth, marking a significant shift in its demographic profile.

Since 1978, the population structure has started to change due to policy guidance and population mobility. Introducing the one-child policy in 1982 marked a critical turning point in China's demographic trend. This policy successfully constrained population growth, with the average annual growth rate dropping to about 1.05%, gradually lowering the birth rate and significantly impacting the population pyramid of China. Additionally, urbanisation accelerated as people migrated from rural to urban areas, driven by industrialisation and better economic opportunities in cities. This led to substantial shifts in the urban-rural population balance, with the urban population increasing significantly from 17.9% of the total population to 27.3% in the period of 1978-1991 (see Figure 4.1). By 2000, China's population had reached approximately 1.27 billion, but growth had further slowed to an average annual rate of 0.59%, largely due to the continued impact of the one-child policy. By 2012, the population had grown to roughly 1.35 billion.

However, recent decade also saw the emergence of an aging population, with the proportion of elderly citizens steadily rising. In recent years, China has faced dual demographic challenges: a declining birth rate and a rapidly aging population. The birth rate has decreased continuously in the past four decades, from the peak of 43.6% in 1963 to 6.39% in 2023 (see Figure 4.2). Although there was a slight increase in birth rates following the relaxation of birth control policies in 2010s, i.e., two-child and three-child policies, the trend soon returned to a downward pattern. High cost of living, changing family values, and concerns about work-life balance continue to discourage many couples from having more children, especially in the young generation (Yang et al., 2021). Hence the initial optimism surrounding these policy changes has not translated to a sustained increase in birth rates. From the perspectives of aging society, an estimated 402 million people, as 28% of the total population, will be over the age of 60 in China (WHO, 2015). Due to the cultural influence of filial piety in China, supporting the elderly has strained the burden for young people in today's one-child family households (Deutsch, 2006). However, the traditional care model does not offer an effective solution for these younger generations.

Figure 4.2 Birth rate and death rate in China, 1954-2023 (per 1,000 people)



Source: (National Bureau of Statistics of China, 2024)

Globalisation

Globalisation in China can be broadly divided into three distinct phases based on trends in total exports and imports. The first phase runs from the late 1970s to the 1990s. Key reforms during this period included the establishment of Special Economic Zones (SEZs), which attracted foreign investment and introduced new technologies. SEZ refers to a complex of related economic activities and services including trade zones, export-processing zones, industrial parks, free ports, and enterprise zones. These free trade zones were set up to experiment with free trade before China’s accession to the WTO. These reforms laid the foundation for China's initial integration into the global economy, leading to increased trade and FDI.

The second phase began with China's accession to the World Trade Organization (WTO) in 2001, which significantly accelerated the country's integration into global markets. This period was marked by a substantial increase in trade volumes, solidifying China's position as a key player in global manufacturing, often referred to as the "world's factory." SEZs continued to play a critical role by promoting exports and attracting further foreign investment, driving China's rise as a global manufacturing hub.

The most recent phase of globalisation, which began in the 2010s, has been characterised by a shift in China's development strategy. As the country sought to balance its economic structure, there was a relative decline in the share of trade as a percentage of GDP (see Figure 4.1), accompanied by a stronger focus on expanding domestic consumption. Also, rising wages began to influence the global value chain (GVC), prompting a shift of manufacturing and production to other Southeast Asian countries. During this period, China also deepened its integration into global institutions and continued to exert influence on international trade and investment.

For example, the launch of the Belt and Road Initiative (BRI) in 2013 marked a significant step in expanding China's global economic influence. Through infrastructure development and investment projects across Asia, Africa, and Europe, China extended its economic reach, further embedding itself in the global economy. However, since 2018, trade tensions have also begun to surface, with the U.S. and other countries imposing high tariffs on Chinese goods, including on electronics, steel, and Chinese EVs, in response to state support for the industry.

Technology

Technology in China has developed rapidly since the 1980s to the 2020s. In 1985, there were around 4,000 patent applications from Chinese residents, but by 2022, this number had soared to 1.58 million, making China the global leader in patent filings (WIPO, 2023). This increase reflects the country's increasing emphasis on innovation and intellectual property protection. In addition, we also can see the increasing investment in research and development (R&D) to support the technological innovation. In the 1990s, R&D spending was a small portion of the GDP, but by 2020, it had surpassed 2% of GDP, with both the government and private sectors contributing heavily. Next, we will focus on three phases of technological development during the four decades.

In the 1980s and 1990s, China's focus shifted towards Total Factor Productivity (TFP) improvements and the development of its manufacturing sector. During this period, the government encouraged joint ventures and partnerships with international firms, which allowed for the transfer of technology and expertise. This strategy enabled Chinese manufacturers to adopt more advanced production methods, leading to significant growth in industrial capabilities. Manufacturing became a driving force behind China’s economic transformation, positioning the country to enter the global market.

The late 1990s marked a crucial period with the rise of the internet and digital technologies. Internet access expanded rapidly, with the percentage of internet users growing from just 0.2% of the population in 1998 to 73% by 2021. Likewise, mobile phone adoption soared, with mobile cellular subscriptions per 100 people increasing from 0.1 in 1993 to 121.5 by 2021. This digital revolution laid the foundation for China’s later emergence as a global technology leader.

In recent decade, China's focus has shifted to high-tech industries, particularly in areas like electric vehicles (EVs), artificial intelligence (AI), and 5G. China now leads the world in EV production, with companies such as BYD and NIO driving advancements in battery technology and autonomous driving. Additionally, China’s investments in AI and 5G have positioned the country at the forefront of next-generation technological innovation. Furthermore, industries like e-commerce, fintech, and biotech have experienced rapid growth, with China now accounting for nearly half of global online transactions. According to eMarketer, over 710 million digital buyers in China contributed to online retail transactions totalling $2.29 trillion in 2020. In 2021, China surpassed the United States as the leading e-commerce market, generating $1.5 trillion in revenue (ITA, 2023).

Nature

China's economic development is inseparable from natural resources. China is rich in natural resources, including coal, rare earth, and gas. It holds the fourth-largest coal reserves globally, making up 13% of the world's total, and its rare earth reserves account for nearly 40% of the global supply (BP, 2021; Jaganmohan, 2024). Meanwhile, China's resource demand is substantial as well, leading to significant imports of oil, gas, and iron ore. According to a UNEP report, China has surpassed other countries in material consumption, resulting in significant environmental pressure, however, the country is also recognized as one of the most effective in improving resource efficiency (UNEP, 2013). China has made it the largest consumer of primary materials, consuming four times more than the USA. Between 1970 and 2008, China's per capita material consumption increased from one-third to over 1.5 times the global average (UNEP, 2013). In recent decades, the development and management of China's natural resources have experienced significant changes, reflecting the country's shifting priorities from an extensive use of natural resources to a more balanced approach. This transition can be seen across different phases, where the focus moved from agricultural and industrial expansion to ecological restoration and green development.

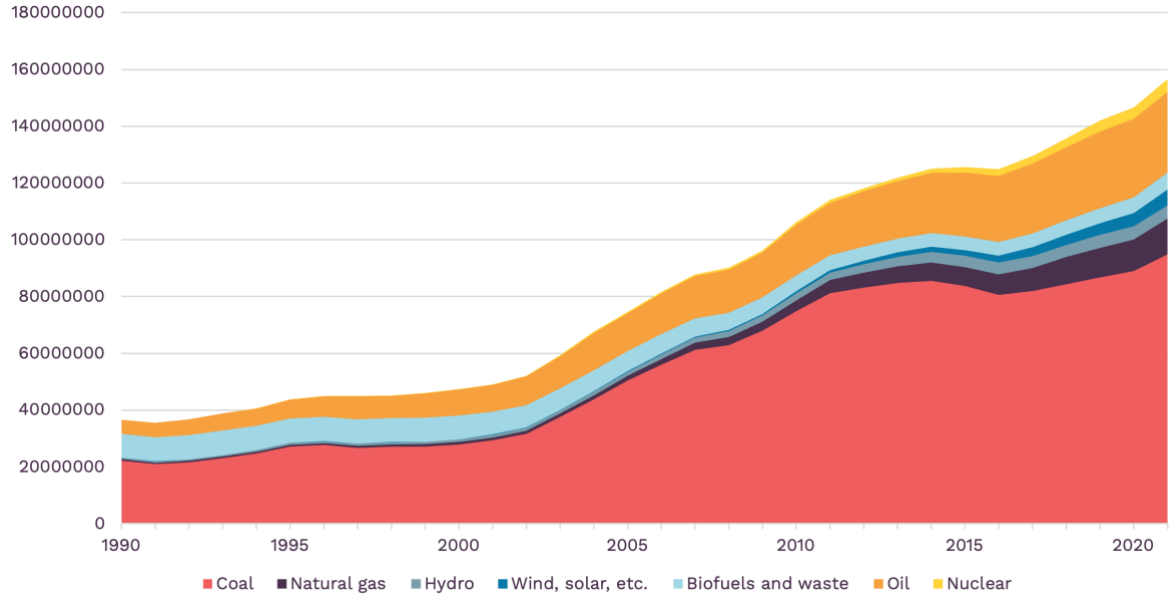
Since 1978, China's primary focus was on rapid economic growth, which led to intensive exploitation of natural resources, especially land and energy. Agricultural production continued to expand significantly to meet the needs of the growing population, leading to the large-scale conversion of forests and grasslands into agricultural land. The proportion of agricultural land increased from 44.5% in 1978 to 54.4% of the total land area by 1991, after which it remained stable. Similarly, the rapid industrialisation led to a high demand for coal, oil, and minerals, which were extracted at an unprecedented rate. However, this growth came at the expense of the environment, with widespread deforestation, soil erosion, and water pollution becoming prevalent, particularly in southern and southwestern China.

During the 2000s to 2010s, there has been more focus on ecological restoration and the efficient use of resources, as the consequences of earlier resource mismanagement became evident. Large-scale reforestation projects such as the "Grain for Green" program since 1999 were implemented to combat deforestation. These efforts helped increase forest coverage and reduce soil erosion. These initiatives contributed to an increase in the proportion of forest from approximately 18.9% in 2000 to over 23% by 2020, and in an increase of forest cover from 177 million hectares in 1990 to 220 million hectares in 2020 (FAO, 2020). In addition, although China has large total amount of freshwater resources, its per capita water availability is low, and the distribution of water is uneven across regions. In the 1990s, two-thirds of Chinese cities faced water shortages (Zhang et al., 2023). In response to severe water shortages, China has invested in water conservation and management initiatives, such as the South-North Water Transfer Project in 2000s. This period also saw the start of a shift towards cleaner energy, with growing investments in renewable energy sources like solar, wind, and hydropower.

From the 2010s to the present, China has been seeking the balance between economic growth with environmental protection. There has been a significant

increase in the supply of clean energy in this period, especially natural gas, solar, and wind energy (see Figure 4.3). However, coal remains the primary energy source. Also, forest cover continued to grow, and biodiversity protection became a priority. In 2021, the number of national natural reserve reached 474, covering 98 million hectares (National Bureau of Statistics of China, 2024). Advanced technologies like satellite monitoring and big data analysis are now widely used to manage water, land, and forest resources more effectively.

Figure 4.3 Total energy supply (TES) by source, People's Republic of China, 1990-2021 (Terajoules)



Source: (IEA, 2023)

Economy

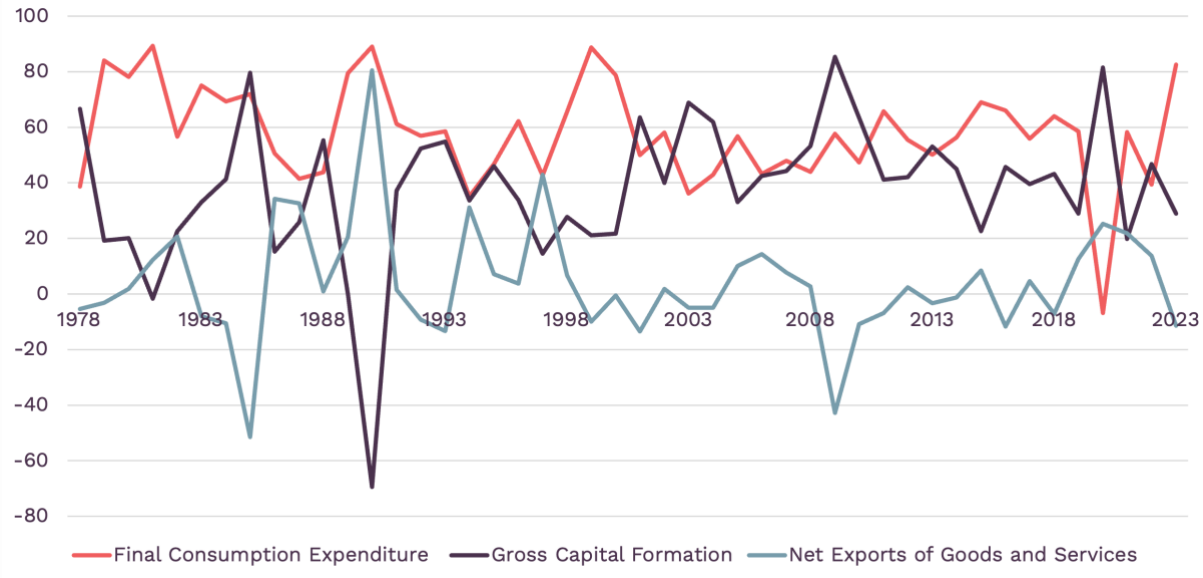
China has been characterised by rapid economic transition and ditto growth over the past decades. With the implementation of the reform and opening-up policy, China has gradually shifted from a planned economy to a market economy, maintaining high-speed economic growth with 16.15% annual growth rate of GDP from the late 1970s through the early 2010s, and becoming a key driver of global economic growth. By 2010, China had become the second-largest economy in the world (Al-Haschimi & Spital, 2024). Although per capita GDP exceeded US$10,000 in 2019, it was about one-fourth of the OECD average, indicating significant potential for further catch-up growth.

Between 1978 and 1991, China's economy grew at an average annual rate of around 16%, driven by the initial stages of economic reform, the rise of rural enterprises, and improved agricultural productivity. During this period, agriculture remained the dominant sector, while industry was growing, and services were still in their early stages of development. The economic reforms laid the foundation for more rapid industrial growth, though the overall economic structure was still heavily reliant on the agricultural sector.

From 1992 to 2012, China's economic growth accelerated, with GDP increasing at an annual rate of over 15%. This growth was fuelled by deepening market reforms, increasing foreign investment, and the country's integration into the global economy. China's industrial structure also experienced significant shifts. As industrialisation accelerated, particularly heavy industries such as steel, cement, and manufacturing became the central role in driving economic output. However, the composition of the economy diversified over time, shifting from agriculture to industry and later to services. In these two decades, the tertiary sector (services) has expanded rapidly, leading to the current services-based economy that emphasizes innovation, technology, and high-value-added industries.

Since 2013, China's economic growth has slowed to a more moderate pace, averaging around 7% annually. This slowdown reflects a shift towards sustainable development, innovation-driven growth, and a greater focus on domestic consumption. As data shown in Figure 4.4, China's GDP has remained relatively stable since 2012, excluding the pandemic period in 2020. Final consumption has taken a leading role in driving GDP, while reliance on investment has decreased. However, challenges have arisen both internally and externally. Internally, issues such as overinvestment in infrastructure—highlighted by financial problems in major construction firms like Evergrande—have raised concerns. Externally, geopolitical tensions have impacted globalisation, and rising wages have led to shifts in global value chains, with some production moving from China to other Southeast Asian nations (Gao et al., 2023). Despite these challenges, China remains a major global economic force.

Figure 4.4 Contribution Share to the Growth of GDP from expenditure perspective, 1978-2023 (%)

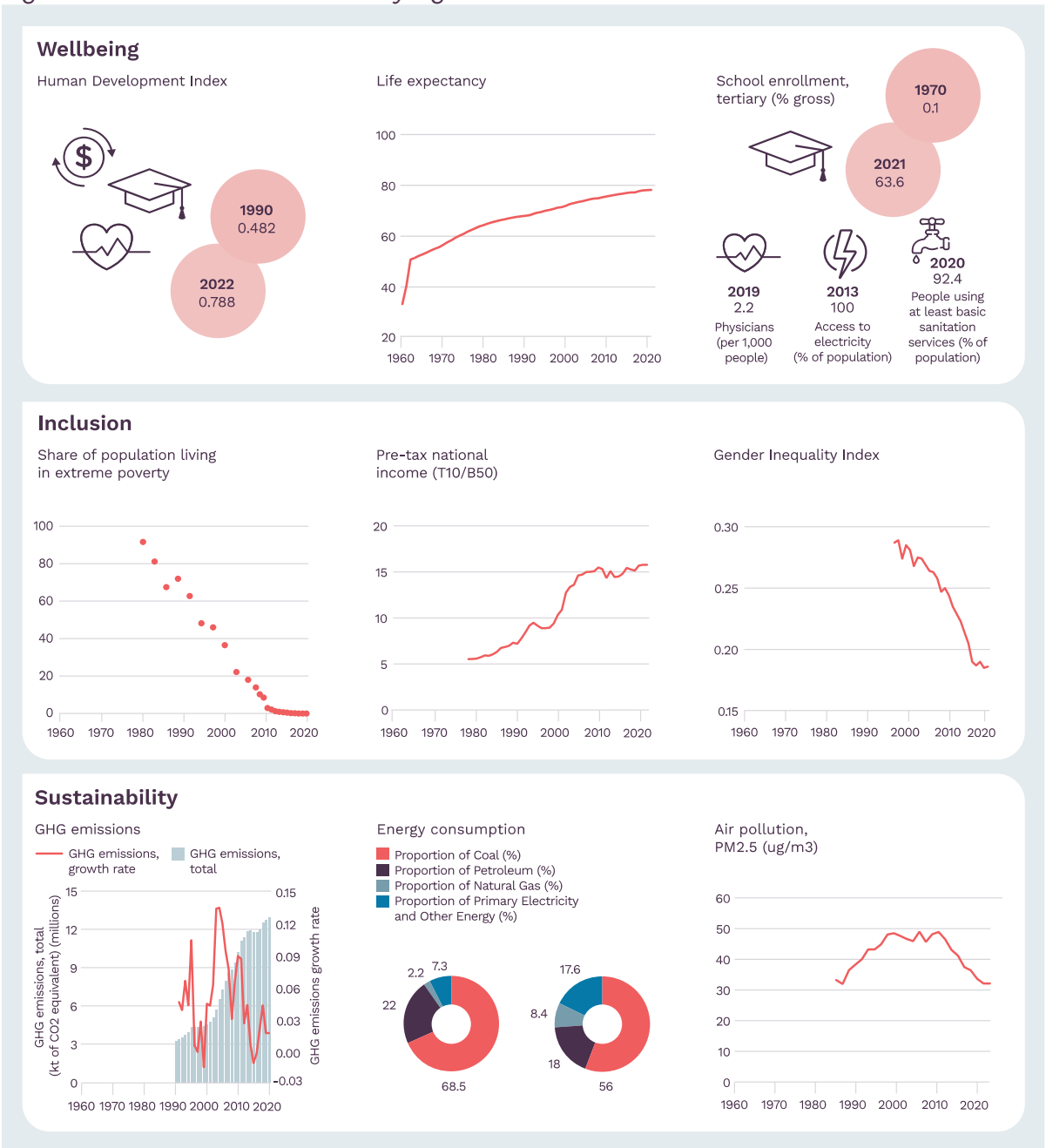


Source: (National Bureau of Statistics of China, 2024)

4.5 Outcomes since 1978

Driven by the key drivers, China has had significant improvement in wellbeing over the past few decades. The following dashboard provides an overview of some key outcome indicators at the national level (Figure 4.5).

Figure 4.5 Outcomes in summary figures



Source: Human development index, Life expectancy, School enrolment, Physicians, Access to electricity, People using at least basic sanitation services, Share of population living in extreme poverty, GHG emissions. (World Bank, 2024). Pre-tax national income (T10/B50), (WID, 2024) Gender Inequality index. (UNDP (United Nations Development Programme), 2024). Energy consumption, (National Bureau of Statistics of China, 2024). Pollution PM2.5. (Shen et al., 2024)

Wellbeing

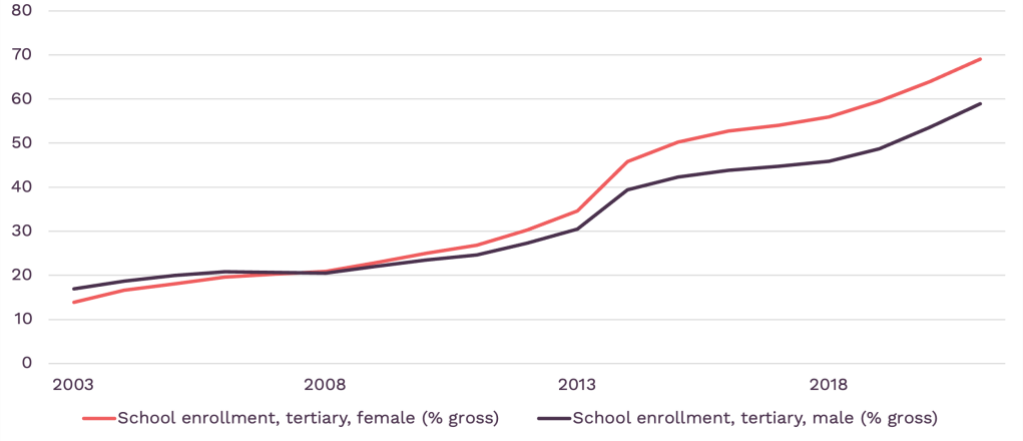
Wellbeing in China has seen remarkable progress, driven by rapid economic growth, social reforms, and government initiatives aimed at improving the quality of life for its citizens. Over the past few decades, China has significantly increased access to education and healthcare, and improved infrastructure, which has contributed to a rise in overall life satisfaction. These advancements are reflected in the rise of the HDI from 0.482 in 1990 to 0.788 in 2022, demonstrating widespread improvements across health, education, and living standards. In the early 1990s, China's HDI was relatively low, consistent with its status as a developing country emerging from decades of political and economic reforms. However, since the country began promoting economic reforms in 1978, coupled with a strong focus on social development, China has experienced rapid improvements in these areas. According to the UNDP, an HDI of 0.788 places China in the category of countries with "high human development." While China is among the few countries that have transitioned from low to high levels of human development, it still lags behind many developed countries, ranking 79th globally (UNDP, 2022). Next, we will analyse in detail the key performance related to this progress, including health, education, and living standards.

Health is one of the most substantial areas of progress, with life expectancy increasing from under 40 years in 1960 to approximately 78.1 years in 2020. This large rise highlights the improvement of healthcare services, disease control, and living conditions. Particularly from the 1980s onward, healthcare access expanded rapidly, driven by significant investments in infrastructure and the implementation of public health campaigns. The medical system saw continuous reforms aimed at increasing efficiency, access, and quality of care, particularly in rural areas. By 2019, China had achieved 2.2 doctors per 1,000 people, exceeding the World Health Organization's (WHO) recommended standard, a crucial factor in improving health outcomes. Moreover, public health campaigns in China fostered a growing sense of public health awareness within society. When epidemics occur, people consciously respond to the health guidelines, recognizing that individual actions have a direct impact on the safety of the public. This awareness became particularly crucial during the COVID-19 pandemic in 2020. In recent decade, the fight against pollution-related health issues, such as reducing smog and improving air quality, contributed to longer life expectancy and better overall health outcomes, especially in urban regions. The development of healthcare has also reflected broader social changes, with a growing middle class increasingly demanding higher-quality services and pushing further advancements in medical technology and health infrastructure, which greatly contributed to the rising life expectancy and better overall health outcomes. However, challenges remain. A study noted that urbanisation in China, characterised by a shift to Western-style diets, sedentary lifestyles, rising outdoor air pollution, but also advances in accident prevention, would significantly affect future health. These challenges have been confirmed in recent years and continue to pose notable risks to the health of the population (Gong et al., 2012).

Education has experienced significant growth as well (Figure 4.6 and Figure 4.7). In 1970, less than 0.1% of the population had tertiary education, but by 2021, over 60%

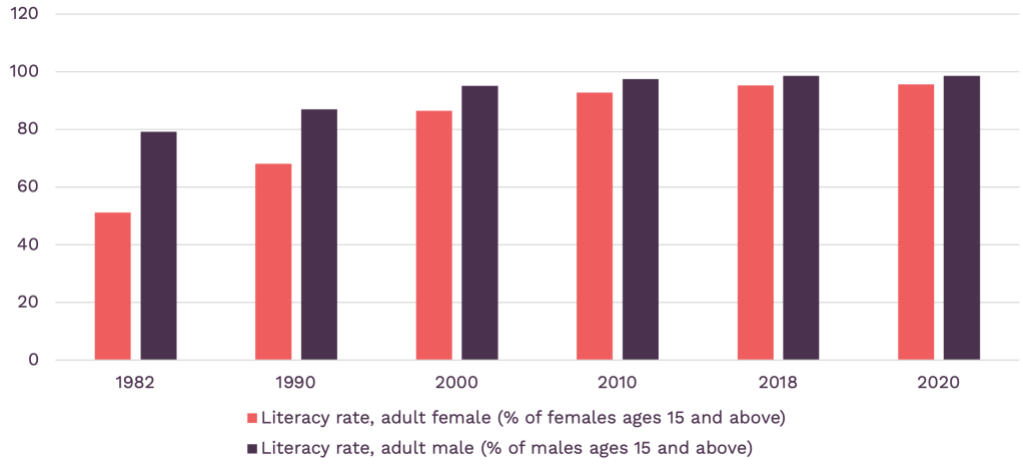
had received higher education, marking a remarkable shift in educational attainment. This increase was not just the result of higher enrolment in universities but also a reflection of broader educational reforms that prioritized both access and quality. Throughout the 1990s and 2000s, China made substantial investments in its education system, including the implementation of universal nine-year compulsory education in 1998. This led to near-universal literacy and better education outcomes across all levels of schooling. The average years of schooling have increased, as well as we saw the expansion in school enrolment. The government's commitment to education as a strategic national priority meant that from primary education to higher education, there was a deliberate push to expand opportunities, raise standards, and reduce regional disparities in access. The focus on building a more educated workforce has been key to driving China's economic growth, especially as the country shifts away from labour-intensive industries toward a more knowledge-based economy. In this context, the emergence of the "talent dividend" has become more prominent as population growth slows, with the higher education sector expected to continue playing a crucial role in sustaining innovation and competitiveness.

Figure 4.6 School enrolment by gender in China, 2003-2021 (% gross)



Source: (World Bank, 2024)

Figure 4.7 Literacy rate by gender in China, 1982-2020 (% of population ages 15 and above)



Source: (World Bank, 2024)

In terms of living standards, China has seen vast improvements in quality of life, particularly with regard to access to essential services such as electricity, gas, and sanitation. 100% of population can get access to electricity in 2013, and gas in 2017, which are significant milestone that supported further industrial and social development. At the same time, improvements in public infrastructure brought substantial gains in hygiene and sanitation. For example, the percentage of the population using basic sanitation services rose from 57.7% in 2001 to 92.4% in 2020. These gains in living conditions were driven by urbanisation, government-led infrastructure initiatives, and the prioritization of public health. Particularly in urban areas, reduced pollution, increased green areas, enhanced housing quality, and improved public transport have all contributed to better health outcomes and a higher quality of life.

This improvement in living standards has occurred in parallel with economic reforms that have raised income levels, creating a growing middle class with higher expectations for both material wellbeing and quality of life. The shift from focusing on basic needs to pursuing better living standards can also be seen in consumption patterns, reflecting the decline of the Engel's coefficient from 63.9% in 1978 to 29.8% in 2023, and a rapid rise in per capita disposable income rose significantly from 343.4 yuan in 1978 to 39.2 thousand yuan in 2023.

In addition to these objective characteristics, subjective wellbeing or happiness is also a crucial measure for summarising overall wellbeing in China. True wellbeing improvement can be claimed when people feel a sense of happiness and benefit from high-quality living services. Many studies have focused on measuring happiness using survey method. The World Happiness Report illustrates an upward trend of China’s happiness index from 4.98 to 5.97 in recent decade (Helliwell, et al., 2024). Also, a research challenges the earlier pessimism about China's wellbeing by demonstrating a rising level of subjective wellbeing and a narrowing gap across social indicators, incorporating the perspectives of social capital and geographic context (Clark et al., 2019). This rising trend in subjective wellbeing reflects not only the material improvements in people’s lives but also a growing sense of security, social support, and satisfaction with personal achievements and social environment. As China continues to develop, the emphasis on both objective and subjective aspects of wellbeing will be essential in ensuring a more holistic approach to improving the quality of life for its citizens.

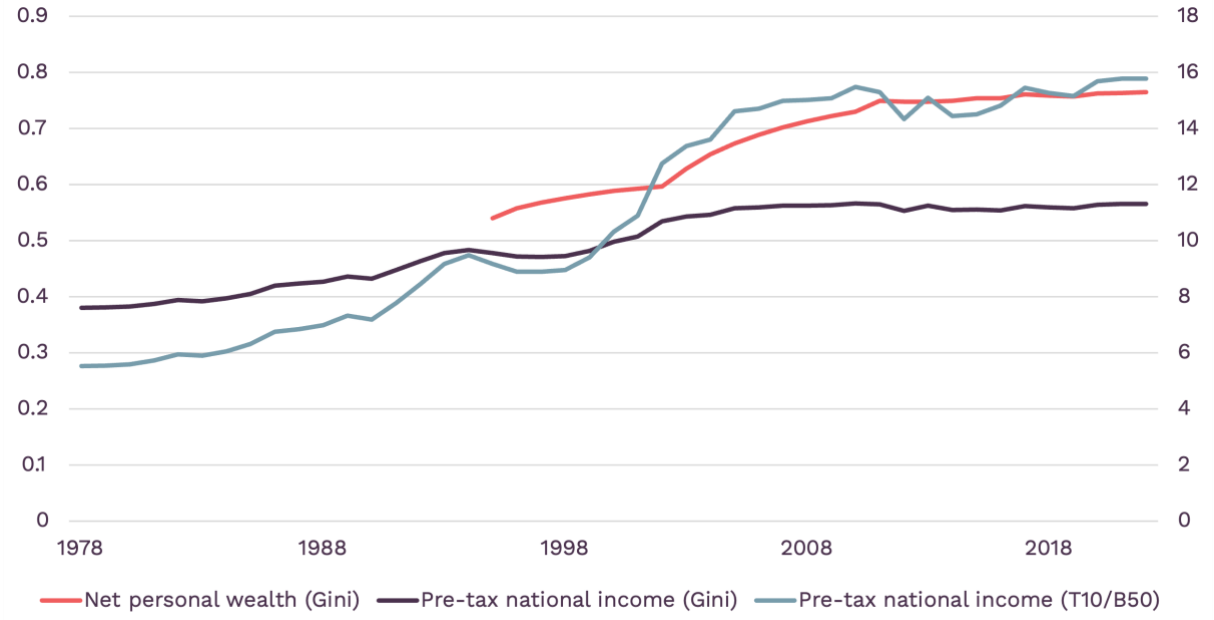
Inclusion

The development of average wellbeing over the past few decades has a clear upward trajectory. However, inclusion is much harder to summarize with a simple trend. There are too many complex dimensions: on one hand, there has been significant progress, while on the other, certain challenges have persisted or even worsened. Progress can be seen in areas such as poverty, where millions have been raised out of poverty. However, issues like income inequality and the urban-rural divide continue to pose significant challenges. Although China was more equal than Europe in the late 1970s and comparable to the most egalitarian Nordic nations, it has now reached

level of inequality similar to those in the U.S., considering its vast population and the significant urban and rural disparities (Piketty et al., 2019). We will focus on China's inclusive development in terms of poverty reduction, income inequality, the urban-rural divide, and gender inequality.

Over the past few decades, China has lifted hundreds of millions out of poverty through targeted initiatives, rural development programs, globalisation and economic reforms. According to World Bank data, the proportion of people living below the international extreme poverty line of $2.15 a day dropped from 91% in 1981 to just 0.1% by 2020. The trend of poverty reduction has shown varying speeds of decline during different periods. In 1978, the implementation of the Household Responsibility System revitalized the agricultural sector and improved rural incomes, which marked the start of a rapid decline in poverty. It led to a sharp drop in the poverty rate from 91.6% to 67.5% in the period of 1981 -1987, reducing the number of people in poverty by about one-third. However, between 1987 and 1993, the progress in poverty reduction stagnated before resuming again. Following China's accession to the WTO in 2001, the poverty rate declined rapidly, reaching 8.5% by 2012. The government's strategy in poverty reduction evolved over time, shifting from broadly economic growth to more targeted approaches, such as the "targeted poverty alleviation" program, which focused on identifying and addressing the specific needs of poor regions and communities. These efforts included improving infrastructure, education, healthcare, and housing in rural areas. By the end of 2020, the government of China announced that it had eradicated extreme poverty.

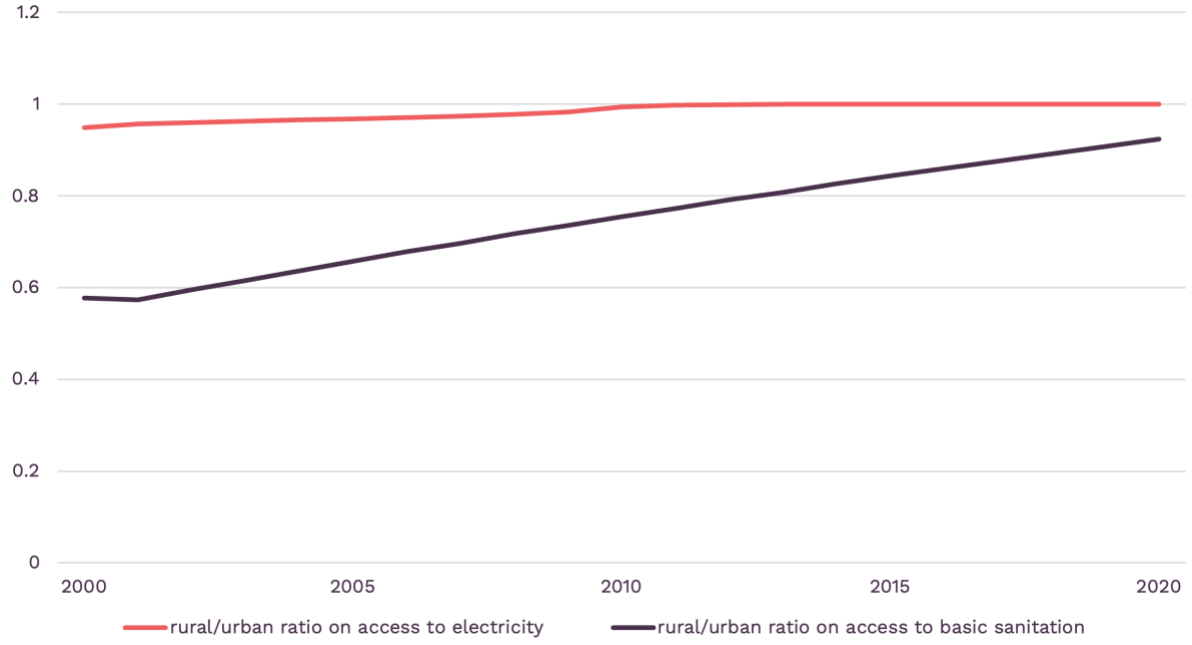
Figure 4.8 Pre-tax national income (Gini index), Pre-tax national income (top 10% to bottom 50% ratio), and net personal wealth, 1978-2022 (Gini index)



Source: (World Inequality Database, 2024)

The rapid economic growth has led to certain increases in national income, but this growth has been accompanied by rising income inequality, with a growing gap between the richest and the poorest. Since 1978, the early stages of reform have widened income inequality, with the annual growth rate of income for the top 10% earners/the bottom 50% earners exceeding 3% between 1978 and 1991 (Figure 4.8). This was largely due to coastal cities being the first to benefit from the reform policies, while a small proportion of educated group gained access to new opportunities. However, this income inequality grew rapidly from 2001 to 2012, increasing from 10.9% to 14.3%, before stabilizing around 15% in more recent years. The top 10% of earners saw their incomes rise rapidly, while income growth for the bottom 50% of the population lagged behind. Additionally, the disparity in wealth distribution was also expanded, with the top 1% of groups owning over a third of the country's total wealth.

Figure 4.9 Urban rural gap on access to basic sanitation and electricity, 2000-2020 (ratio)



Source: World Bank, 2024

The urban-rural gap has been a defining feature of the economic and social development since the late 1970s (Figure 4.9).

Initially, economic liberalisation policies and rapid industrialisation focused heavily on urban areas, particularly in the coastal regions. This led to significant disparities between urban and rural areas in terms of income, living standards, and access to services. The rural population, which relied mainly on agriculture, experienced slower income growth compared to urban residents who benefited from higher-paying jobs in manufacturing and services. By the 2000s, the urban-rural income gap had widened significantly, with urban residents earning on average more than triple the income of their rural residents. To address this growing disparity, the Chinese

government implemented policies aimed at narrowing the gap, including the Rural Revitalization Strategy, which invested in infrastructure, education, healthcare, and economic opportunities in rural areas. The reasons see that urbanisation and industrialisation contributed to this widening gap, as higher-paying jobs were concentrated in cities, leaving rural populations at a disadvantage.

In addition, there have been improvements in gender equity over the past decades, with a decline of gender inequality index from 0.287 in 1998 to 0.186 in 2022. This improvement is evident in women's access to education, employment, politics, and family life. For example, in 2013, the college enrolment ratio for females compared to males was 0.82, but it increased to 1.17 by 2022. This indicates that the number of women enrolling in higher education has surpassed that of men over the past decade. In 2022, the number of female students in higher education reached 29.03 million. While challenges remain, particularly in access to higher-paying jobs and leadership positions. Nevertheless, China has been actively working towards gender inclusion, implementing policies and initiatives aimed at enhancing women's opportunities and promoting equality in various sectors.

Sustainability

China's government has shifted emphasis on sustainable development, as part of the growing awareness and urgent concern over environmental issues. Rapid economic growth, driven by large-scale industrialisation and urbanisation, led to a range of challenges that negatively impacted the wellbeing of its citizens. From 1978 to 2012, during the 30 years of high-speed growth following the reform and opening-up, environmental concerns were given less priority than economic development. However, in the past decade, China has significantly intensified its efforts to address certain environmental challenges. We can also observe the containment and improvement of many issues. In this section, we will focus on the most critical challenges China has faced in its journey toward sustainable development, including climate change, environmental degradation, energy use and transition, and biodiversity.

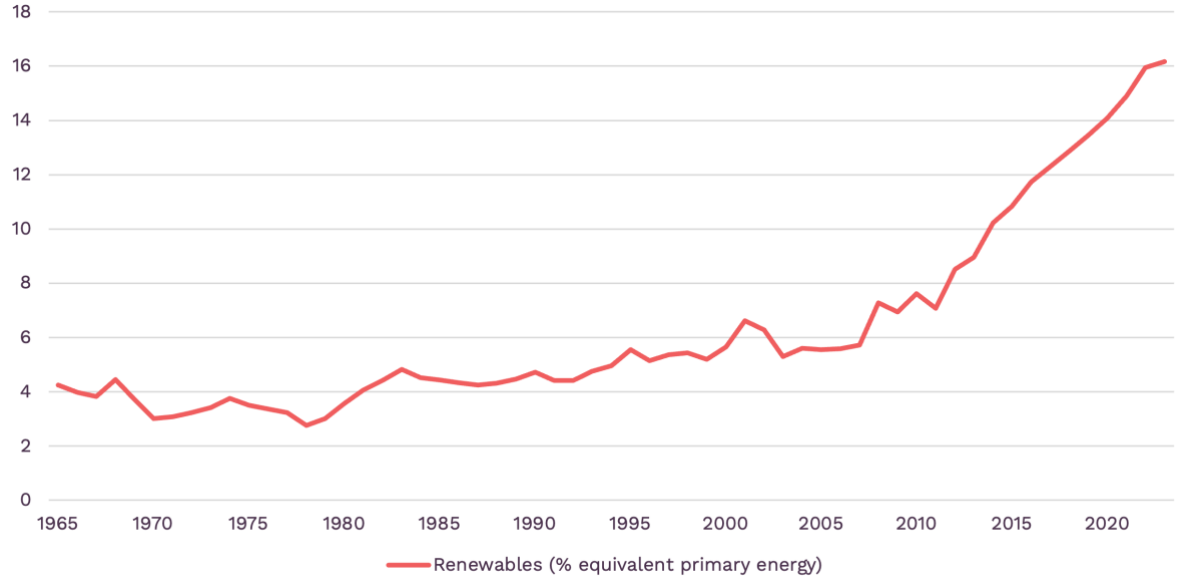
CO_2 is one of the primary greenhouse gases that contribute to climate change. China surpassed the US in 2006 to become the world’s largest emitter of carbon dioxide, recording an average annual growth rate of 15.4% in CO_2 emissions and emitting 9.5 billion tonnes of CO_2 in 2012 (Gregg et al., 2008). The reasons behind the significant amount of carbon emissions include China’s large population, rapid urbanisation, international trade, high carbon intensity in industry and a heavy reliance on coal as the primary energy source (Guan et al., 2008; Peters & Hertwich, 2008). Specifically in trade, a large portion of these emissions is associated with the production of goods for consumers in other countries (Yan & Yang, 2010). Since 2013, the growth rate of GHG emissions has slowed, largely due to the adoption of stricter energy saving policies and more effective mitigation measures. These include mandatory disclosure of energy and carbon intensity targets in the Five-Year Plans, as well as policies to regulate coal resources use, and promote energy-saving and carbon-reduction transition in key industries. However, after 2020, there was a sharp rebound in the

growth of carbon dioxide emissions (Liu et al., 2021), posing significant challenges to the achievement of China's carbon reduction targets.

China's air quality experienced both periods of deterioration and substantial improvement. China experienced growing air quality issue that peaked in 2013, primarily due to heavy reliance on coal, rapid industrial growth, and the increased use of automobiles. High concentrations of particulate matters, SO_2, NO_x, and other pollutants became common in major cities, leading to frequent smog episodes and serious public health concern. After implementing a series of policies to combat pollution, we can see a substantial reduction in key pollutants like PM2.5 and SO_2. By 2020, PM2.5 levels in major cities had dropped by over 40% compared to 2013. However, challenges persist, particularly in less developed regions and during the winter coal-burning season. Nonetheless, China's ongoing investments in renewable energy, stricter environmental regulations, and industrial reforms continue to drive improvements in air quality, reflecting a shift toward more sustainable development practices.

China shifted towards cleaner energy sources. In the early 2000s, coal accounted for nearly 70% of China's energy consumption, driving severe pollution and high carbon emissions. Driven by environmental concerns and sustainability goals, China has increasingly invested in renewable energy such as solar, wind, and hydropower. As a result of these investments, the use of renewable energy has also significantly increased, especially after 2011 (see Figure 4.10). By 2022, the share of coal in China's energy mix had decreased substantially, with renewables and natural gas playing a larger role. However, transitioning away from coal-based energy was a complex and long-term process that required investments in technology, infrastructure, and policy frameworks. Coal still remains a dominant energy source in many regions.

Figure 4.10 Share of primary energy consumption from renewable sources, 1965-2023 (% equivalent primary energy)



Source: (Energy Institute, 2024), with major processing by Our World in Data.

In addition, in terms of biodiversity, the rapid expansion of agriculture, urbanisation, invasive species, and infrastructure development led to significant habitat loss in the early period. Many species, particularly large mammals like the South China tiger, faced severe threats from habitat destruction. Moreover, overfishing and pollution also caused declines in aquatic biodiversity, particularly in major river systems and coastal areas. Furthermore, in 2020, over 660 invasive species were identified nationwide, with 71 of them posing or potentially posing a threat to natural ecosystems (China Daily, 2022). Since 1990s, China has established an extensive network of nature reserves and protected areas to conserve its biodiversity. By 2020, these areas covered about 18% of the country's land area, protecting key habitats and endangered species. Besides, efforts to restore and protect wetlands have also been prioritized, recognizing their role in maintaining biodiversity and water quality. The Ramsar Convention on Wetlands has designated several Chinese wetlands as sites of international importance.

4.6 Regional Analysis for China

In this section, we conduct the analysis of wellbeing, inclusion, and sustainability and its drivers across various regions in China. We focus on four distinct areas of China (see Figure 4.11): East China, known for its economic dynamism, high-tech and rapid urbanisation; West China, characterised by its rich natural resources, as well as relatively lower economic development; Central China, a region transitioning from agriculture to industry with a growing emphasis on industrial upgrading; and Northeast China, traditionally an industrial base, now facing challenges of economic restructuring and demographic shifts.

This section is structured into two parts: the first part, key drivers, provides an overview of the population, the economy, technology, globalisation, and institution factors shaping the regions, while the second part, outcomes, assesses the current state of wellbeing, inclusion, and sustainability across East, West, Central and Northeast China.

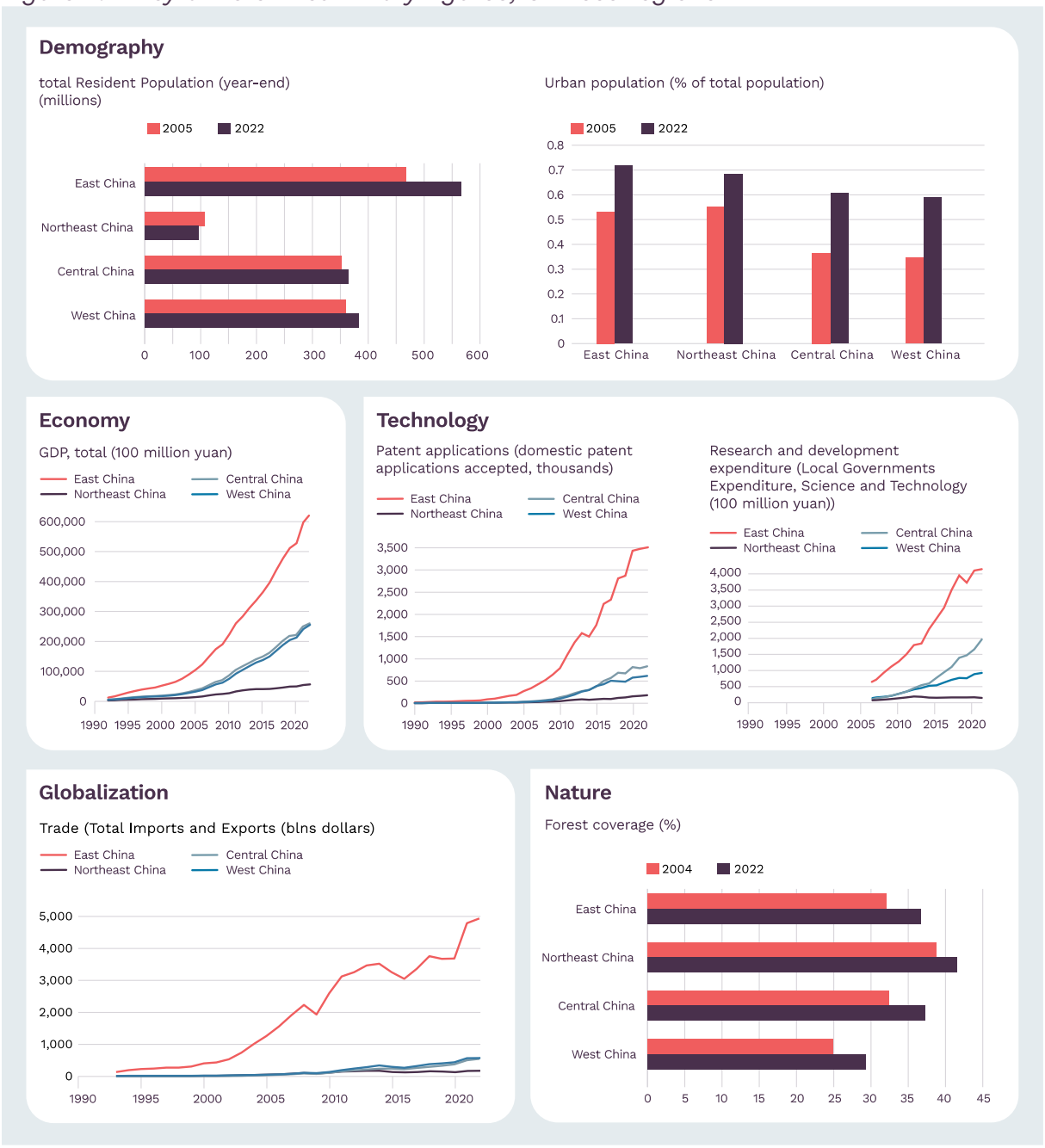
Figure 4.11 Four district areas in China

This figure was created using Stata ver. 17 (https://www.stata.com/)

Key Drivers

Figure 4.12 illustrates the key development drivers for the four Chinese regions. The dashboard highlights significant regional variation across these dimensions. Each region exhibits unique patterns, reflecting diverse rates of development, external influences, and internal dynamics. This variation brings complexity to China's growth, as different regions face distinct challenges and opportunities in their development path.

Figure 4.12 Key drivers in summary figures, Chinese regions



Source: (National Bureau of Statistics of China, 2024), with minor processing to derive aggregates and averages.

Institutions: The government has implemented regionally differentiated policies over these decades. The regional development strategies building for the four major regions include: Eastern Leading Development, Western Development, Northeast Revitalization, and Central Region Rise[40]. In the years following 1978, the country

[40] "Eastern Leading Development, Western Development, Northeast Revitalization, and Central Region Rise" are translated from the Chinese strategies of "西部大开发" (Western Development), "东北振兴" (Northeast Revitalization), "中部崛起" (Central Region Rise), and "东部率先发展" (Eastern Leading Development). The original meanings should be interpreted in accordance with the Chinese context.

focused on rapidly developing its economy and advancing the reforms. To achieve these objectives, the government implemented preferential policies that heavily favoured eastern and coastal regions, aiming to leverage their geographical advantages. For example, in 1979, Guangdong and Fujian were the first two provinces to open up to foreign investment with the special policies and flexible measure, and four SEZs were established in these two provinces in 1980, including Shenzhen, Zhuhai, Shantou, and Xiamen. However, as regional disparities widened, the government shifted its focus to more balanced regional growth since 2000s. To promote regional coordination, major strategies were introduced, such as the Western Development Strategy launched in 2000 to accelerate growth in underdeveloped western provinces through infrastructure investment and resource exploitation. Northeast Revitalization in 2003 aimed at transforming old industrial bases in the Northeast by upgrading industries and reforming SOEs. The Central Region Rise Plan has established in 2005, focusing on modern agriculture and manufacturing to promote the growth in the central provinces.

Demography: There is a trend of population concentrating in economically developed regions, leading to rapid growth in the eastern regions and rural populations migrating to urban areas. First, Figure 4.10 displays a comparison of total population between 2005 and 2022. We can see that the population increase is most significant in the eastern region, with slower growth in the western and central regions. Meanwhile, the northeastern region had net loss in population due to out-migration. Furthermore, in the earlier years, the population was mainly rural, with significant regional disparities in development and living standards. However, with the economic reforms in the late 20th century, rapid urbanisation and industrialisation began to reshape the demographic profile, leading to a massive migration from rural to urban areas. Urban population grew exponentially among all regions (see dashboard), driven by the search for better economic opportunities.

Globalisation: Based on total exports and imports since 1993, the eastern region has shown the most significant performance in trade globalisation compared to the other three regions. East China became highly integrated into the global economy, with a dramatic growth of total trade value from 138.6 billion US dollars to 4.95 trillion US dollars between 1993 and 2022, depending on its major ports as crucial roles in international trade. Although the total trade volumes in the Northeast, Central, and Western regions are not as high as in the Eastern region, each of these regions has demonstrated rapid growth over this period with approximate annual growth rate of 14.6%, 8.0%, and 7.3% respectively. Northeast China's globalisation was focusing on trade with neighbouring Russia, and recent policies to attract foreign investment. Central China increased its global integration, also leveraging improved transportation infrastructure to boost trade and investment. We can see the growing global connection in west region through initiatives like the Belt and Road Initiative, enhancing trade and infrastructure links with Central Asia and beyond.

Technology: Technological advancement was most significant in East China, particularly in high-tech industries, e-commerce, and renewable energy, supported by significant R&D investment. West China has been slower in technological adoption but seeing growth in infrastructure and renewable energy projects. Northeast China

focused on modernizing traditional industries and exploring new sectors like automotive and renewables. Central China witnessed growing technological development, supported by expanding educational and research institutions, and an increasing focus on logistics and information technology.

Nature: In terms of natural resource distribution, the four regions exhibit distinct patterns. West China holds significant reserves of minerals, oil, and gas, but challenges such as geographic isolation and underdevelopment limit their full exploitation. Northeast region, known for its vast forest, takes the largest forest coverage among the four regions (see Figure 4.12). Also, it historically possessed substantial resources for developing heavy industries like coal and oil but is now facing transition from these industries to diversify its resource use. In central region, it shows a balanced distribution with fertile agricultural land and emerging industrial resources. However, East China is relatively resource-scarce but benefits from efficient utilization and advanced technology, focusing on high-value industries and sustainability.

Economy: The four regions developed in different ways. East China, with its major cities and coastal provinces like Shanghai and Guangdong, rapidly industrialised and urbanised, benefiting from early economic reforms. This region remained the most developed region, characterised by a diverse economy in manufacturing, finance, and technology. In contrast, despite significant government investments in infrastructure and initiatives like the Belt and Road, the west region remained less developed due to its geographical isolation and challenges, such as provinces like Xinjiang and Tibet Meanwhile, Central China links the more developed East with the less developed West. Its structure shifted from an agricultural-oriented region to more diversified industrial and service sectors, supported by strategic infrastructure investments that enhanced its role as a logistical and transportation hub. Northeast China faced economic challenges as its traditional heavy industries like steel and coal declined. This region has struggled with economic stagnation, despite government efforts to revitalize the economy through restructuring state-owned enterprises and promoting new industries.

In summary, China's regional development has been shaped by a combination of institutional policies, demographic shifts, globalization, technological advancement, natural resource distribution, and economic incentives. The government's regionally differentiated policies, such as the establishment of SEZs in the East and targeted development plans for the West, Central, and Northeast regions, have led to varying levels of growth. Meanwhile, the concentration of populations in more developed regions has accelerated urbanisation, especially in the East. Globalization has further reinforced the economic dominance of coastal areas, while technology and infrastructure development have played key roles in bridging regional disparities. Natural resource distribution and economic strategies have also determined the pace and focus of regional growth.

Under these driving factors, the results in terms of wellbeing, inclusion, and sustainability differ across regions. In the following discussion, we will explore how these forces have shaped regional disparities and contributed to varying outcomes in these areas, highlighting both the achievements and challenges in the quest for balanced development.

Outcomes

Figure 4.13 on the next page provides an overview of regional developments in wellbeing, inclusion, and sustainability.

Wellbeing

Over the past four decades, China's regions have experienced significant variations in wellbeing, shaped by economic development, geography, and policy initiatives (Figure 4.13). While the government has implemented policies aimed at reducing these disparities, significant gaps persist between the more developed East and the less prosperous West, Central, and Northeast regions.

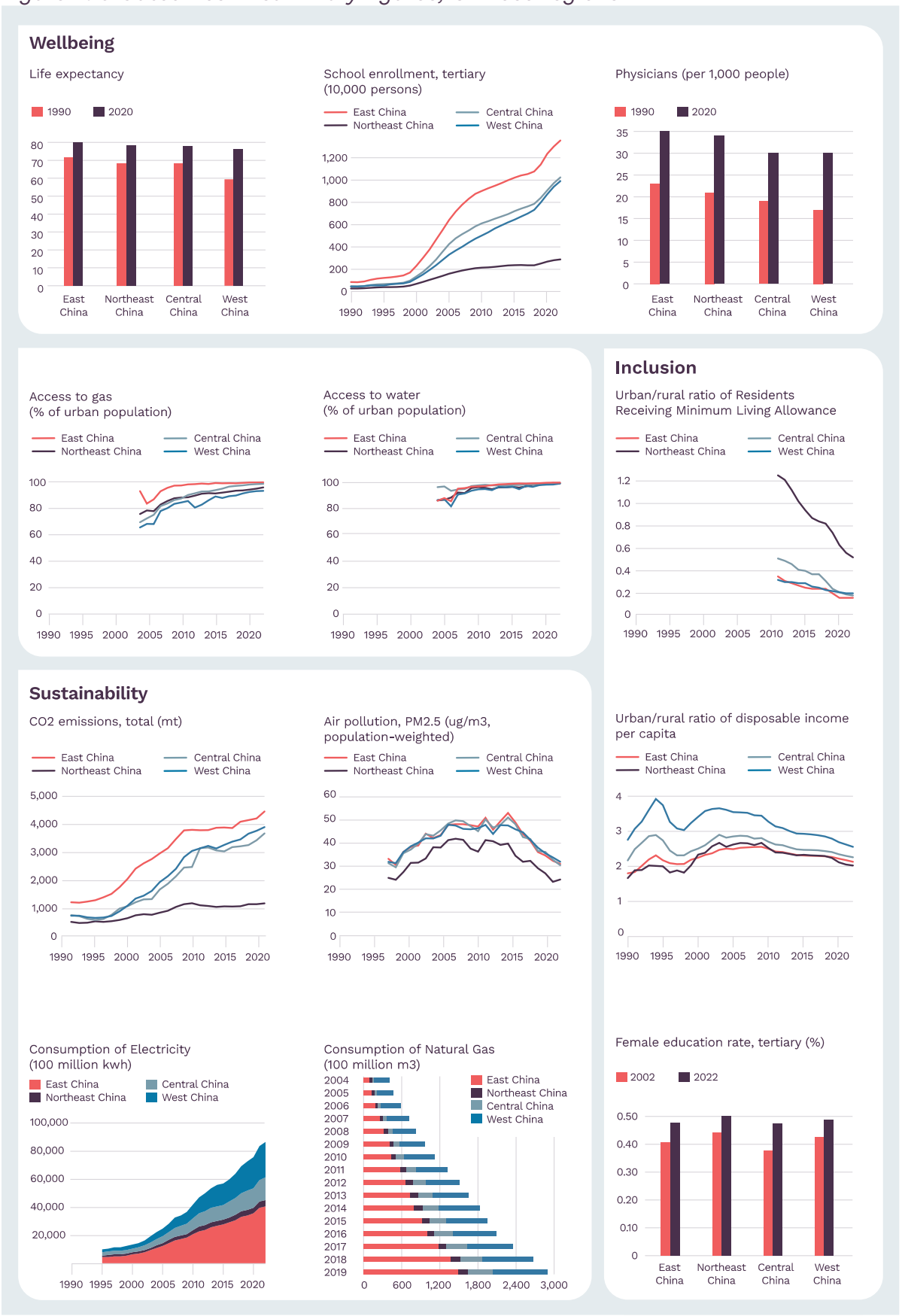
In the East, led by major cities such as Beijing, Shanghai, and Guangdong, rapid economic growth, urbanisation, and extensive investments in public services have resulted in higher living standards. Access to healthcare, education, and infrastructure is significantly better than in other regions, leading to higher life expectancy and improved overall health outcomes.

In contrast, the West, including provinces like Xinjiang, Tibet, and Gansu, faces slower economic development, especially in rural and remote areas. Limited access to quality healthcare, education, and public services has resulted in lower life expectancy and overall wellbeing. Despite significant government efforts in infrastructure development and poverty alleviation, these regions continue to lag behind the East due to their more challenging conditions.

Central China shows a mixed picture, with urban centres seeing improvements in living standards and infrastructure, while rural areas continue to struggle with disparities similar to those seen in the West. Migration to urban centres has boosted economic growth but has also highlighted the gap between urban and rural access to education, healthcare, and social services. Government policies have focused on addressing these imbalances, particularly through urbanisation and poverty reduction strategies.

The Northeast, which once thrived as China's industrial hub with provinces Liaoning, Jilin, and Heilongjiang, has faced unique challenges due to industrial decline. The region has suffered from job losses, an aging population, and deteriorating public services. Efforts to revitalize the economy, retrain workers, and address the social impacts of economic restructuring have been ongoing, but progress has been slow, leaving the region struggling to recover from its former industrial dominance.

Figure 4.13 Outcomes in summary figures, Chinese regions



The figures illustrate key outcome indicators for four regions in China, using data aggregated (for total amount) or averaged (for ratio) at the provincial level. Indicators included are: 1. school enrolment,

tertiary, 2. life expectancy, 3. physicians, 4. access to gas, urban, 5. access to water, urban, 6. urban/rural ratio of residents receiving minimum living allowance, 7. urban/rural ratio of disposable income per capita, 8. female education rate, tertiary, 9. CO_2 emissions, total, and CO_2 emission growth rate, 10. PM 2.5 concentration, 11. consumption of electricity, 12. consumption of natural gas. Source: 1-8,11-12. (National Bureau of Statistics of China, 2024). 9, (CEADs, 2024), with minor processing to derive CO_2 emissions growth rate. 10, (Shen et al., 2024).

Inclusion

East and Central areas faced similar challenges related to inclusion. The regions experienced significant internal migration, with many people moving to urban centres in search of better opportunities. While this migration helped economic growth, it also highlighted disparities in access to education, healthcare, and social services between urban and rural areas. Another issue of inclusive development, especially in in Northeast China, relates to dealing with the social impacts of industrial decline. Job losses and economic restructure affected certain communities, leading to issues of unemployment. Efforts in this region included policies aimed at boosting employment and retraining workers. Furthermore, western area focused on integrating ethnic minorities and rural populations into broader development plans. The region's diverse ethnic composition and rural landscape increased challenges for equitable access to resources and services. Government policies targeted poverty alleviation and regional development.

Sustainability

The regional disparities in terms of sustainability reflect variations in economic growth, environmental challenges, and resource management strategies, influenced by each region's unique geographic, economic, and social contexts. Rapid urbanisation and industrialisation led to significant environmental challenges, especially in the East, with recent efforts emphasizing green technology and conservation. Both West and Northeast regions are rich in natural resources but face different environmental challenges. We will focus on CO_2 emissions, air pollution, and energy use.

In terms of regional difference in CO_2 emissions, the total amount of CO_2 emissions closely resembles the trends in economic growth. Specifically, the eastern region always accounts for the largest share and has seen rapid growth. The central and west China experienced slower growth before 2012, but their growth rates have accelerated since then. Conversely, the northeastern region, comprising only three provinces, has the smallest share of total emissions. However, it showed a certain level of growth before 2012, but the growth trend has been flat since 2012. A study reveals that approximately 57% percent of China’s emissions are related to goods consumed in provinces different from where they were produced, as well as more than 80% of the emissions associated with goods consumed in the highly developed coastal provinces are imported from less developed provinces in central and western China, where many low-value but high-carbon-intensive products are manufactured (Feng et al., 2013).

We have observed that air pollution has shown a trend of increasing and then decreasing from 1998 to the present, peaking around 2014 across various regions (Figure 4.13). Air pollution in eastern region, including major industrial cities like Beijing and Shanghai, faces severe air pollution due to high industrial activity, vehicle emissions, and dense population. Also, the central and western regions also face very serious air pollution issues as rapid economic growth in recent two decades. Northeastern China's lower PM2.5 levels are mainly due to its lower population density, slower economic growth, reduced industrial emissions, and favourable wind patterns that disperse pollutants. Efforts to address air pollution have been more focused in the pollutant regions, with substantial improvements in air quality in some cities due to stricter regulations and policies.

Energy consumption patterns differ markedly between China's regions. The eastern region, with its economic development and industrial activities, consumes the most energy, predominantly from fossil fuels. The western and central region follows, with increasing energy demands as development expands. The northeastern region relies heavily on coal and energy-intensive industries. In response to sustainability goals, China has been working to diversify energy sources, promote energy efficiency, and reduce reliance on coal across all regions, but progress varies.

In conclusion, China's regional development reflects a complex situation among wellbeing, inclusion, and sustainability efforts. While the eastern regions have benefited from rapid industrialisation, urbanisation, and substantial government investment in public services, they also face significant environmental challenges due to high energy consumption and CO_2 emissions. Central and western China have made strides in economic growth, especially through urbanisation and poverty alleviation programs, but still lag behind the East in terms of living standards and access to essential services. The Northeast, once a thriving industrial hub, struggles with economic restructuring and aging demographics, highlighting the difficulties of balancing economic recovery with social inclusion. Despite these regional disparities, China continues to implement policies aimed at reducing gaps and promoting more balanced, sustainable development nationwide.

4.7 A Novel Narrative of China’s Progress

This chapter tested whether a new narrative based on sustainable and inclusive wellbeing provides a more comprehensive and multidimensional analysis of China’s recent history (since 1978). While previous analyses prioritize economic metrics like growth, productivity, and industrialisation, this report focuses on “Beyond-GDP” dimensions: wellbeing, inclusion, and sustainability. By adopting this broader lens, the report highlights key narratives that go beyond economic performance and features how China is doing in its pursuit of quality-of-life improvements, reductions in inequality, and fostering of environmental sustainability.

For current wellbeing, this perspective summarizes the improvements in the quality of life for all citizens, including access to healthcare, education, and environmental conditions such as air quality. In China's context, HDI provides a general landscape of China’s development, including life expectancy, education and income level. This

report illustrates how a series of driving factors have significantly enhanced the quality of life for the citizens, enlarged healthcare access, extended education opportunities, and improved living conditions.

Inclusion in China shows that the benefits of economic growth are distributed across different segments of the population. There are apparent inequalities, including the urban-rural gap and disparities between different regions. While rapid economic growth has led to substantial increases in national income, this report emphasizes the challenges related to inequality. The poverty alleviation strategies and its rural development initiatives have lifted hundreds of millions of people out of extreme poverty, a significant achievement. However, the analysis critically acknowledges the large income gap between the richest and poorest communities, particularly between urban and rural populations. By including these perspectives, the report provides a balanced view of the progress made and the challenges that remain.

Another major theme in this report is sustainability, examining the efforts to balance current and future wellbeing. While significant progress has been made in reducing air pollution, addressing climate change remains a substantial challenge due to the continued high levels of CO_2 emissions. By integrating environmental sustainability into national development strategy, China's government aims to ensure that its growth is not only robust but also sustainable for future generations.

4.8 The Key Drivers of China's Progress

In China, the key factors driving the development of wellbeing, inclusion, and sustainability include institutions, demography, globalisation, technology, nature and the economy. Each of these factors not only supports these goals in varying degrees but also presents its own set of challenges.

The government plays a pivotal role in societal changes by formulating policies, directing resource allocation, and promoting social reforms to ensure that economic development benefits all citizens. For example, policies such as targeted poverty alleviation, which has successfully lifted millions out of poverty, and the "dual carbon goals" policy also start to promote green development. However, challenges include uneven policy implementation and insufficient resource allocation by local governments, which can lead to disparities in policy effectiveness across different regions.

Population, innovation, and natural resources are critical to understanding the perspectives of human, physical, and natural capital, all of which support WISE development in various ways. Over the past few decades of rapid development, a large population base has provided abundant workforce that supports economic and social development, particularly through improved education and workforce quality. Policies such as the nine-year compulsory education have also helped improve the quality of education and workforce skills. However, in the latest decade and continuing today, challenges such as an aging population has begun to affect the labour market and is placing increasing pressure on social security systems.

Balancing these factors is essential for maintaining long-term economic stability and addressing the needs of a changing demographic landscape.

Technology has driven advancements in new energy vehicles and renewable energy and improved public services through the “Internet Plus” strategy. However, technological development also brings challenges such as the digital divide, which creates gaps in technology access and benefits between urban and rural areas and between wealthy and poorer regions.

Natural resources management includes initiatives like reforestation projects and the establishment of nature reserves to protect ecosystems. Despite these efforts, challenges such as resource over-exploitation and environmental pollution persist, particularly in the context of rapid urbanisation and industrialisation, making it difficult to balance economic growth with environmental protection.

Globalisation has driven economic growth and facilitated technology exchange through initiatives such as the Belt and Road Initiative and international cooperation in past decades. However, it also presents significant challenges, including uncertainties in international markets and fluctuations in the global economy that can pressure the domestic economy. Furthermore, globalisation can exacerbate regional and social economic inequalities. Recently, there has been a decline in global economic openness due to rising tensions and tariffs, which further complicates these challenges.

Rapid economic growth has lifted millions out of poverty, significantly improving living standards and access to essential services such as healthcare and education, thereby enhancing overall wellbeing. As the economy has expanded, the issues like regional disparities, with eastern coastal areas being wealthier than other regions, exacerbated social inequality and limit inclusion. Additionally, economic growth has led to the environmental deterioration at the early stage of development, but it also invested in sustainable development, including advancements in clean energy and infrastructure, which are crucial for minimizing environmental impact and ensuring long-term ecological balance. However, the challenge remains to ensure that this growth continues to be inclusive and sustainable, balancing the needs of the present with the preservation of resources for future generations.

In conclusion, this chapter reveals a novel narrative of China's development, one that shifts from economic metrics to a more human-centred and environmentally conscious approach. Viewed through the “WISE” lens, economic growth is not an end in itself but a means to foster broader societal goals. This concept strengthens that real progress is measured not only by GDP, but by the wellbeing of individuals, the inclusive opportunities across different social groups, and the sustainability of environmental practices.

The “WISE” framework highlights that wellbeing is not limited to the material wealth accumulated over the past few decades in China, but also includes improvements in health, education, and overall quality of life. It promotes inclusion by advocating for equal access to resources, opportunities, and benefits for all people, ensuring that marginalized populations are not left behind. However, achieving inclusive development in China still faces significant challenges, despite the remarkable

progress in poverty reduction. Sustainability, as a key pillar, emphasizes the importance of long-term ecological balance, advocating for policies that protect natural resources, address climate change, and support stable economic growth.

This new narrative illustrates how China, as it navigates the complexities of globalisation, is steering its development model toward a future that prioritizes fairness, environmental responsibility, and shared prosperity. Driven by multi-dimensional development paths and comprehensive policies, China’s government is striving to shape a future where economic progress is balanced with social wellbeing, inclusion, and the preservation of the planet for future generations. This shift represents not only a significant transition in China's domestic development but also positions the country as a contributor to global sustainable development efforts.

Chapter 5. A Comparison of Progress in European Union and United States With a Focus on Inequality

5.1 Introduction

When viewed from a global perspective, the EU and the US exhibit many similarities. Both have undergone significant economic and social transformations over the past decades, shaping their positions as influential global entities. However, at closer inspection, there are also many differences between the regions. While the US is often celebrated for its robust economic performance, the EU supposedly provides more generous public services and a more elaborate redistributive system that reduces inequality at the cost of some economic growth. By analysing differences in key drivers and outcomes related to wellbeing, inclusion, and sustainability, we offer a novel perspective on the development paths of the EU and the US. This broader view, which goes beyond mere economic performance, provides insights into the essential factors needed to create a future that enables sustainable wellbeing for all.

Our comprehensive analysis of wellbeing in the two regions lends support to three key takeaways. First, wellbeing is more equitably distributed in the EU, despite higher average living standards in the US. Secondly, the EU achieves wellbeing at a significantly lower environmental cost, particularly in terms of greenhouse gas emissions. Thirdly, differences in the distribution of wellbeing and GHG emissions are mostly driven by institutional characteristics such as education systems and labour policies.

This report will outline the methodology in the next section. It will then explore key drivers of wellbeing in the EU and US. After that, the developments of wellbeing, inclusion, and sustainability are discussed. The final section presents the conclusion.

5.2 Methodology and Data

This chapter presents a descriptive comparative analysis on the development of wellbeing, inclusion, and sustainability in the EU and US and its key drivers. The goal is to provide a comprehensive overview of how these aspects have evolved over time, highlighting key trends, synergies, and differences.

Geographical scope

This deep dive focuses on Europe and the United States. The scope of Europe is defined as the EU27, referring to the European Union as it was composed after the 2004 historic expansion.[41] This choice has been made for the practical reason that data from the World Bank – which has been widely used in this analysis, as we will

[41] This includes the following countries: Austria, Belgium, Bulgaria, Croatia, Republic of Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

come to shortly – was readily available for the EU27. For historical accuracy and consistency, the former East Germany (the German Democratic Republic) and West Germany (the Federal Republic of Germany) are considered as a unified entity in line with their current status.

Methodological framework

This analysis distinguishes between key drivers and outcomes. Key drivers are the background elements and conditions that shape and influence developments in wellbeing, inclusion, and sustainability. As described in the introduction to this report, these factors are based on a wide range of literature related to theories of societal process and stagnation, including work by Weber, Acemoglu, and DeLong. Key drivers selected for this study are developments related to demography, economy, technology, globalisation, nature, and institutions. While presented as separate factors, they are highly interconnected, influencing and reinforcing one another. Outcome factors are structured along the lines of the WISE framework, which stands for wellbeing, inclusion, and sustainability. Wellbeing reflects the average wellbeing of the current generation, encompassing both experienced wellbeing and objective factors such as material living standards, education, and health. Inclusion relates to the distribution of wellbeing, comprising the distribution of wellbeing determinants and opportunities across spatial scales (within countries, between countries, and globally) and social groups (gender, ethnicity, socioeconomic background, etc.). Sustainability refers to the wellbeing of future generations, encompassing social and socioeconomic conditions for future wellbeing, such as education and infrastructure, as well as environmental aspects, emphasising the necessity of operating within Earth's planetary boundaries. For each of these conceptual domains, a selection of themes and underlying indicators is considered. The selection of themes is based on interdisciplinary approaches to the measurement of wellbeing, as described in Jansen et al. (2024). Table 5.1 summarizes the domains and themes included in this deep dive.

Table 5.1 The themes used for wellbeing, inclusion and sustainability

Conceptual domain	Themes
Wellbeing	Human development, subjective wellbeing, material wellbeing, life expectancy, education, living conditions and services, safety, work, subjective wellbeing
Inclusion	Poverty, income inequality, wealth inequality, gender inequality, inequality in life expectancy, inequality in education
Sustainability	GHG emissions, electricity use, renewable energy, freshwater resources, deforestation, biodiversity/threatened species, government debts, total wealth, human capital, natural capital

Data

The study employs data from several databases. Most data are provided by the WID from the World Bank, HDI from the United Nations, WID, and the OECD. In several instances, additional sources are used to dive deeper into a sub-topic. The specific data sources used for the figures and text are referenced throughout the report.

The overall data quality for both the US and the EU27 is robust, given the stringent data collection and verification protocols of the source organizations. For an in-depth discussion on data quality, refer to the respective documentation provided by these sources.

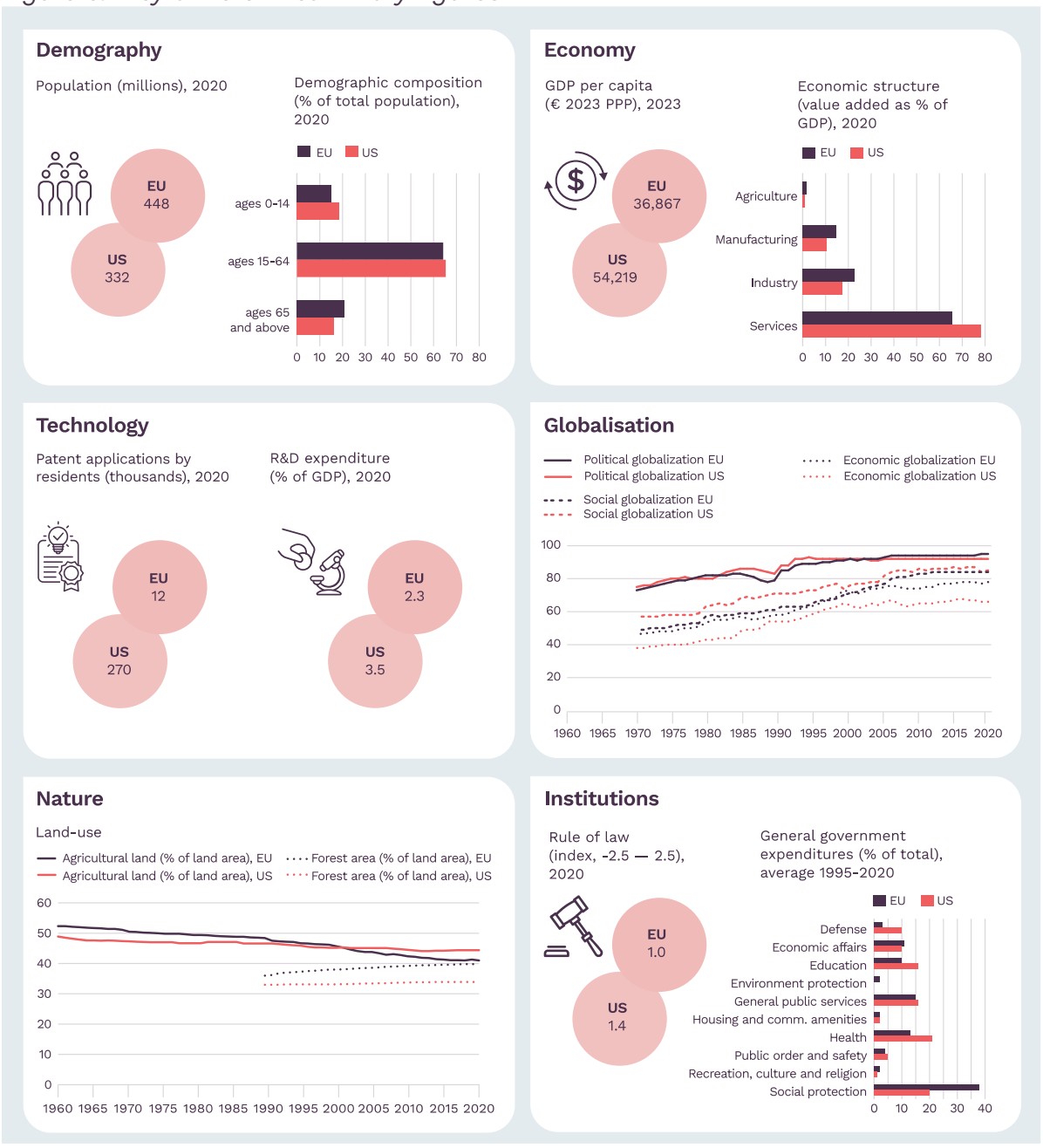
Where data for the EU27 was lacking, population-weighted aggregates were constructed using underlying country data. This was the case for all UN data, a small selection of WDI indicators (patents and governance estimates), and OECD data on government expenditures. Aggregates are only calculated when data for at least two-thirds of the total population of the EU27 is available, to ensure a representative sample. For the UN and WDI data, population coverage is always above 99%. For OECD data on public and private social expenditures population coverage of EU27 increases from 71% to 93% throughout the period, potentially impacting the accuracy and stability of the aggregates. This limitation does not significantly impact the general trend lines and conclusions related to this time series.

5.3 Key drivers for the EU27 and US since 1960

This section describes the main highlights of developments in the EU and US from 1960-now. First, we look at contextual indicators to get a good understanding of developments in demographics, the economy, technology, globalisation, and governance. Second, we look at outcome indicators for wellbeing, inclusion, and sustainability to understand how contextual developments impact lives in the EU and US.

Since 1960, the EU and the US have experienced significant changes. Both regions have seen their populations grow and age. In the EU, the population size increased by 25%, reaching 450 million inhabitants in 2022. The US saw a much larger increase of 83%, with a population of 330 million in 2022. In terms of aging, the demographic balance has shifted dramatically. In 1960, there were about three times as many young people (under 14 years old) as elderly (65 and older) in both regions. By 2022, this ratio had equalized to about 1:1, with the EU having a slightly lower ratio and the US a slightly higher one. This has considerable implications for various aspects of society, including labour and financial markets, the demand for goods and services such as housing and social protection systems, as well as for family structures.

Figure 5.1 Key drivers in summary figures



Source: Population, Demographic composition, GDP per capita, and Economic structure (World Bank, 2024); Patent applications, R&D expenditure, Land-use, and Rule of Law (World Bank (2024)), with minor processing to derive EU population-weighted aggregates; Globalisation (ETH Zürich (2024)), with minor processing to derive EU population-weighted aggregates; General government expenditures (IMF, 2019).

While population grew, the economy developed. GDP per capita more than doubled between 1970 and 2020 in both the EU and US. While the total size of the economy only differs by 0.5%, the average GDP per capita is considerably higher in the US than the EU, reaching a level of 54,219 in 2023 in the US, while GDP per capita amounts 36,867 in the EU (units in € 2023 PPP) (WID). The US has seen larger productivity growth than the EU over the past decades, which can affect output, employment, and wages (Lazear, 2019; Sharpe et al., 2008; Strauss & Wohar, 2004). The relative

slow productivity growth in the EU from the 1970s onwards is attributed to the slower emergence of the knowledge economy in Europe compared to the United States (Van Ark et al., 2008). The US has a relatively large service sector (Figure 5.1) and experienced high productivity growth in the ICT (European Central Bank., 2021). The US spends relatively more on R&D than the EU, measured as % of GDP. While the gap on R&D expenditure was narrowing after the financial crisis, it is widening again since 2017, with the US spending 1.2 percentage points more as a fraction of GDP than the EU in 2020. When looking at the number of patent applications, the gap is more substantial, with more than 20 times as many patent applications in the US than in the EU in 2020.

When looking at the economies in a global perspective, the EU is more economically globalised than the US, as illustrated by Figure 5.1. This is partly caused by the relative larger share of import and exports as % of GDP in the EU and higher financial direct investment (as % of GDP) in the EU relative to the US. Social and political globalisation is more similar in the two regions.[42] Both regions have experienced increasing globalisation rates from 1970 until 2008, the start of the financial crisis. More recently, the US became less globalised, and globalisation of the EU is stagnating.

Economic development also influenced the natural environment of the two regions. Perhaps surprisingly, we see an increasing share of forest land and decreasing share of agricultural land from the 1960s onwards. Both regions had experienced large rates of deforestation before this period already, and conservation and reforestation efforts started to increase. The application of synthetic fertilizer and better crops also helped to make better use of existing agricultural lands, decreasing the need to expand agricultural lands, as discussed in Chapter 2. Environmental developments that affect the potential wellbeing of future generations negatively, are discussed in the outcomes section under 'sustainability'.

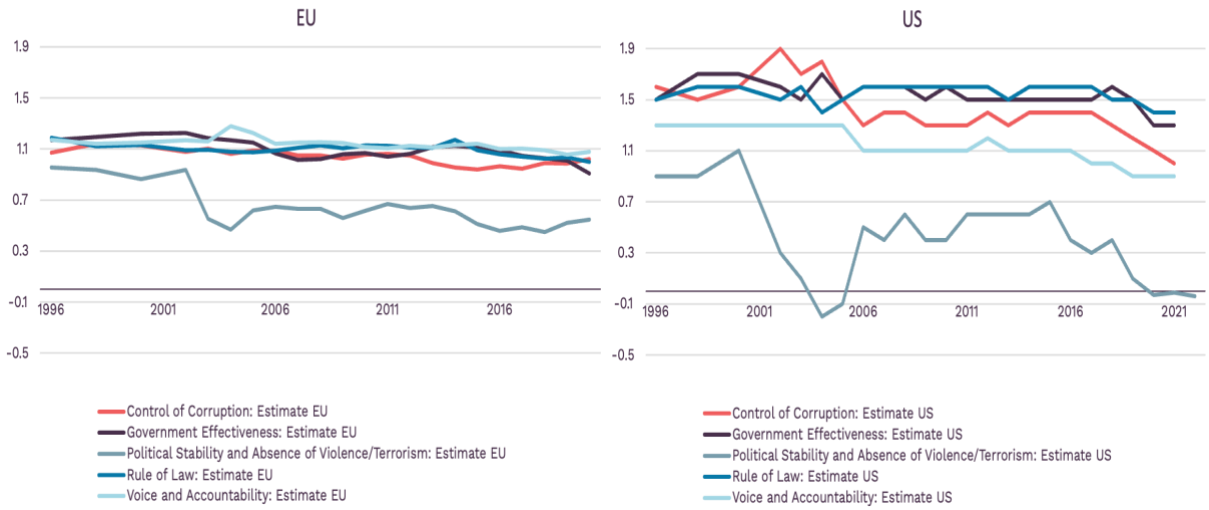
In terms of institutional characteristics, there are numerous distinctions between the political system of the EU countries and the US. We will limit our discussion to developments related to the political regime and public expenditures. The Polity2 index captures the political regime authority, and more specifically the key qualities of executive recruitment, constraints on executive authority and political competition. According to this index, the EU scored lower than the US until the 1970s, but there has been convergence since. EU countries became more democratic, reaching the maximum score of 10 in 2002, 28 years after the US reached this level of democracy. More recently, since 2016 – the year Donald Trump ran for President and won the elections - the US' score is deteriorating. In 2020, it was down to a score of 5. This trend fits within a broader trend of autocratisation as discussed in the global analysis (Section 2.4).[43] Looking at governance estimates from the World

[42] Economic globalisation is based on variables related to trade and finance, including exports and import of goods (% of GDP), trade regulations, foreign direct investment (% of GDP) and investment restrictions. Social globalisation consists of personal contact, information flows, and cultural proximity, including indicators such as international telephone traffic, internet access, and trade in cultural goods. Political globalisation includes indicators such as the number of embassies and international organizations. For more information see https://kof.ethz.ch/en/forecasts-and-indicators/indicators/kof-globalisation-index.html

[43] Autocratisation is also occurring in Europe, particularly in Hungary and Poland (Nord et al., 2024)

Bank, the US scores better than the average EU country on control of corruption, government effectiveness, and rule of law. However, the best performing countries in the EU perform similar or better than the US. The EU scores better in most years on political stability and absence of violence/terrorism. Figure 5.2 illustrates a clear decreasing trend in in the estimates for the US since 2017.

Figure 5.2 Governance scores in the EU and US (estimates), 1995-2020 (index)

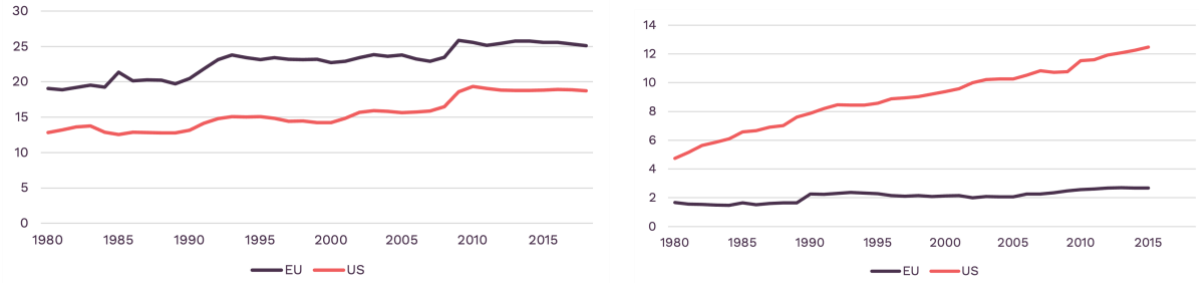


Source: World Bank (2024), with minor processing to derive population-weighted aggregates for the EU.

Next, we consider government expenditures as it's often stated that the EU provides more public service provisioning. The EU spends a relatively large part on social protection, almost double the share of total general government expenditures (measured in percentage points) relative to the US. This includes expenditures on old age (pensions), survivors (financing protection for widows and widowers and dependent children, in case of the death of family breadwinner), incapacity-related benefits, health, family, active labour market programmes, unemployment, housing, other areas including low-income supplements, and crisis housing. The US spends relatively more on health, education, and defence (Figure 5.1).

Having a closer look at social protection expenditures over time, expenditures raised in both regions compared to 1980 (Figure 5.3). In recent years, expenditures (as % of GDP) are stagnating and declining in both the EU and the US. Looking at private social expenditures (mainly health insurance and pensions), we see more heterogeneity in the trendlines. In the US, there has been a rapid increase in private social expenditures, while in the EU, there has only been a small increase. However, when looking at EU country-level, differences are large. The Netherlands has even higher private social expenditure than the US, reaching 13% in 2019. When looking at public and private social expenditures together, including expenditures via the tax system ('net total social expenditure'), France is the biggest social spender, with expenditures over 30% of GDP, just followed by the US, despite having low levels of public spending (OECD, 2023).

Figure 5.3 Public and private social expenditures, 1980-2020 (% of GDP)



The graphs illustrate the development of public and private social expenditures as percentage of GDP in the EU and US. This includes expenditures on old age, survivors, incapacity-related benefits, health, family, active labour market programmes, and unemployment. Source: (OECD, 2024), with minor processing to derive EU population-weighted aggregates.

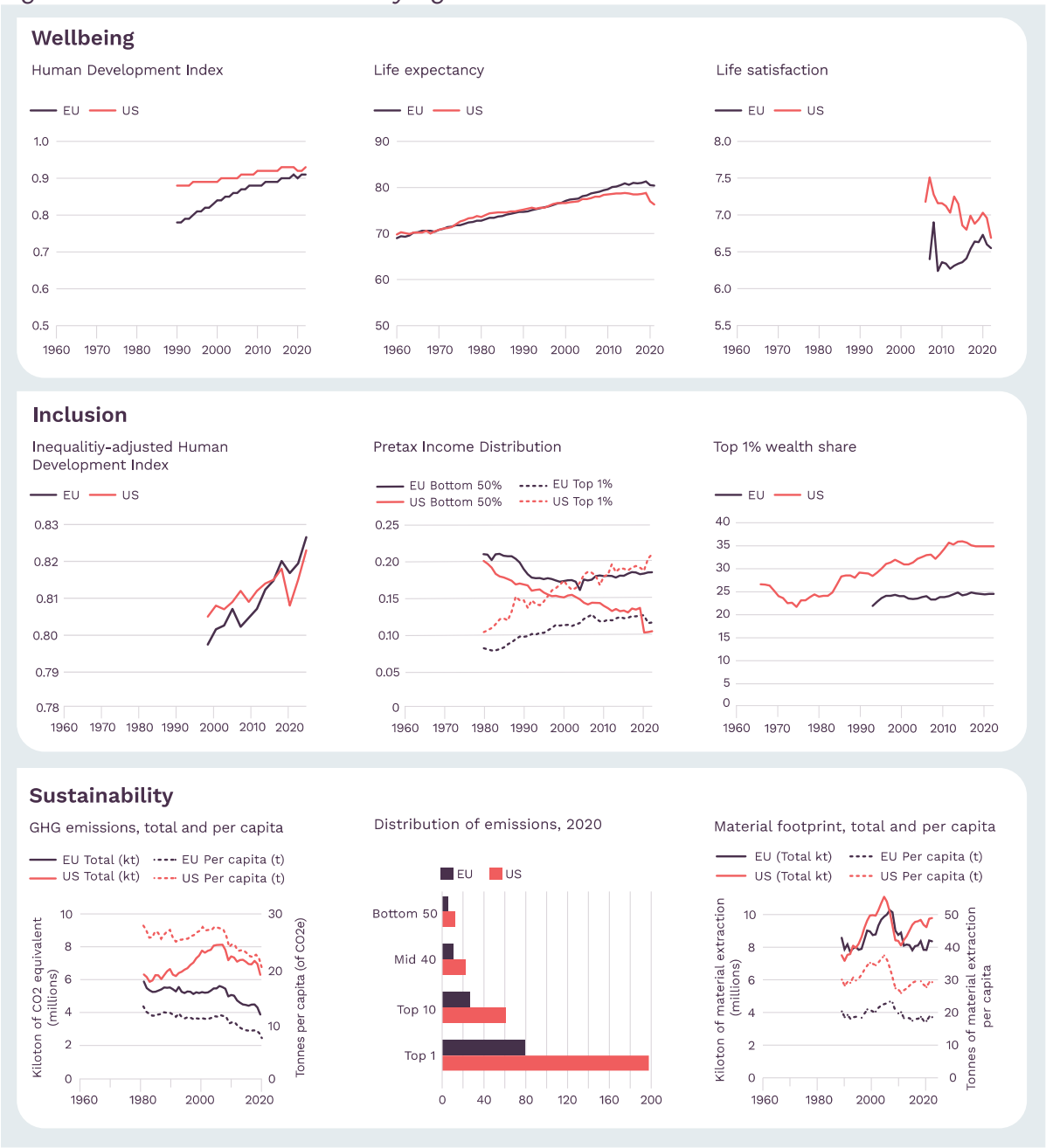
5.4 Outcomes for the EU27 and US since 1960

How did the contextual developments impact lives in the EU and US? Figure 5.4 on the next page presents an overview of developments in a selection of important outcome indicators.

Wellbeing

The EU and the US demonstrate comparable positive trends in overall wellbeing. We see positive developments from 1960 until around 2010, after which some indicators start to stagnate or decline, especially in the US. Average wellbeing in the EU was generally lower than in the US, but convergence has occurred due to progress in the EU and stagnation in the US. This is well illustrated by the HDI, which is based on indicators for life expectancy, education, and income per capita (Figure 5.4). The HDI illustrates a positive trend in both regions from 1960 onwards. A small dip occurred during the COVID pandemic, mostly due to a temporary fall in life expectancy. The US scores higher on the HDI than the EU. This is caused by a higher GDP per capita and more years of education, amounting to 13.7 years while this is 12.2 in the EU in 2020. Zooming in on life expectancy, the EU outperforms the US since around 2000. Life expectancy in the US started to stagnate in the 2010s and even fall since 2016. Average life expectancy in the US is now 76, and 80 in the EU. The gap can partly be explained by the higher prevalence of overweight in the US, which is associated with decreases in life expectancy and increases in early mortality (Peeters et al., 2003). In 2016, more than two thirds of adults were overweight in the US (68%). However, prevalence of overweight has also been on the rise in the EU, reaching 59% in 2016. For both regions, the sharpest increase was between 1976-1989, but the growth rate is still positive and there is no stagnation occurring.

Figure 5.4 Outcomes in summary figures



Sources: Human Development Index (UNDP (United Nations Development Programme), 2024), Life expectancy (World Bank, 2024), Life satisfaction (Helliwell et al. 2024), Inequality-adjusted Human Development Index (UNDP (United Nations Development Programme), 2024), Pretax Income Distribution (World Inequality Database, 2024), Top 1% wealth share (household wealth) (World Inequality Database, 2024), GHG emissions (World Inequality Database, 2024), Distribution of emissions (World Inequality Database, 2024), Material footprint (UNDP (United Nations Development Programme), 2024).

Compared to the global average, EU and US citizens have a very high income, many years of education, and high life expectancy. The prevalence of overweight is relatively high, while the percentage of undernourishment is low.

When comparing the development of GDP per capita and a wellbeing index compromised of life expectancy, education, and governance (the “Augmented Human

Development Index" excluding the income dimension), we see a strong correlation between income and wellbeing for 1960-2000 (>99%) for both regions[44]. Starting in 2000, this starts to break down. For the EU this drops to 90% while for the US it falls to 28%. This reflects the fact that GDP continues to grow while life expectancy and the measure of liberal democracy are decreasing in the US.

Another way to look at wellbeing is by asking people how satisfied they are with their lives using survey methods. This is one of the most common approaches to measure happiness. Results illustrate that life satisfaction in the EU has increased over the period from 2007-2020, while decreasing slightly since, now being at a level of 6.5 in 2022 (where 0 is the worst and 10 is the best possible imaginable life for someone). In the US, a declining trend in life satisfaction already started in 2007, going from 7.5 to 6.7 in 2022.

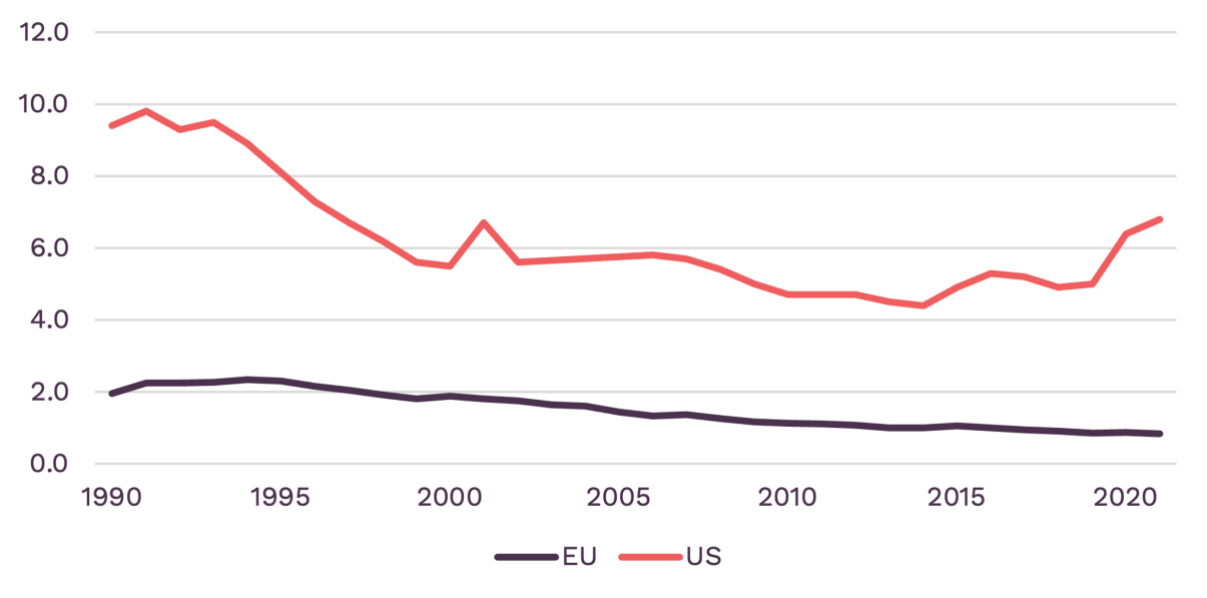
The higher level of life satisfaction can partly be explained by the higher GDP per capita and more freedom to make life choices in the US. Social support, which is also known to influence life satisfaction, scores similar in the EU and US (Helliwell et al., 2024). Unemployment is also lower in the US for most years, which might also play a role. However, while having a job is important for happiness, so is leisure time. Annual hours worked (by persons engaged, employed and self-employed) have decreased steadily since 1960 in both regions and is now at a level of 1,640 hours in the EU and 1,765 hours in the US in 2019. If we assume 49 workweeks a year, the average hours worked per week is 33.5 in the EU and 36 in the US. Until 1983, hours worked was highest in the EU, since then, US citizens work more. Within the EU, there's considerable differences, with people in Greece and Poland working over 2,000 hours per year, while people in Denmark and Germany, work around 1,380 hours per year (Feenstra et al., 2015).

Another relevant aspect to consider is safety, for which the number of homicides often serves as proxy (see e.g. OECD, 2014a). The number of intentional homicides is considerably lower in the EU than in the US. In the EU, the number has decreased from 1990 until 2020 from 2 intentional homicides per 100,000 people to 0.8 in 2021. In the US, the number of homicides decreased from 9.8 in 1991, to 4.4 in 2014. Since then, it's on the rise again with 6.8 homicides in 2021 (Figure 5.5).

Overall, the US has a slightly better performance than the EU on most indicators, including the HDI and life satisfaction, but convergence is occurring. While the abovementioned developments are interesting, it's also important to consider the distribution of wellbeing to really grasp how wellbeing has developed within EU and US societies.

[44] Data of the Augmented Human Development Index (AHDI) is not readily available for EU27. Instead, we used estimates for Western Europe for this analysis. Data for both the AHDI and GDP per capita is based on (Prados De La Escosura, 2021).

Figure 5.5 Intentional homicides, 1990-2021 (cases per 100,000 people)



Source: (World Bank, 2024)

Inclusion

To paint a comprehensive picture of living standards and wellbeing in the two regions it is critical to move beyond averages and to consider the distribution of important indicators across the full population.

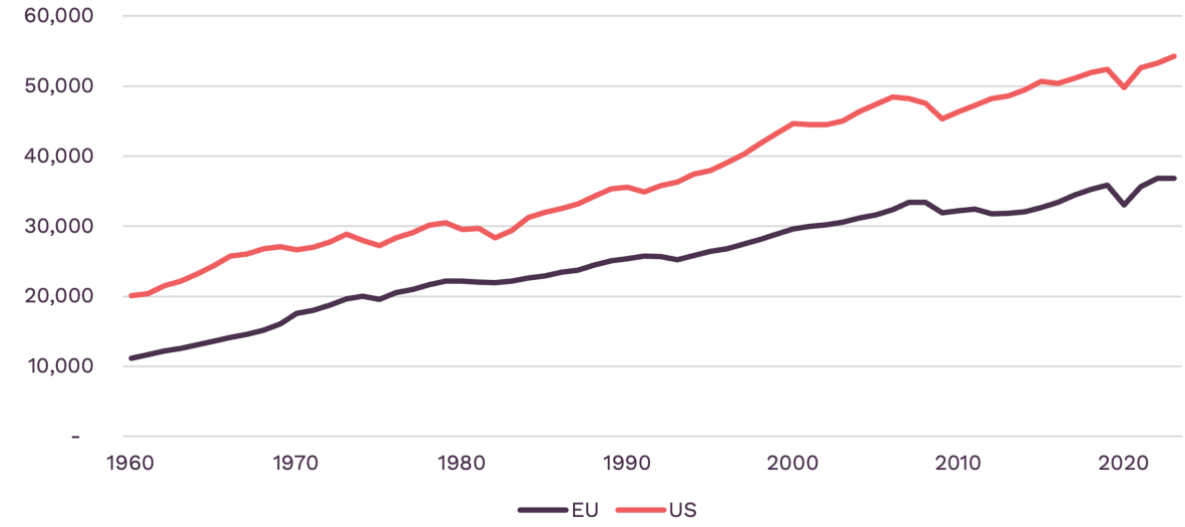
While the US clearly performs better on the HDI, the Inequality-adjusted HDI illustrates that there's relatively small differences, with the EU performing better since 2018 (Figure 5.4). This is an important indication that wellbeing is more equally divided in the EU than in the US. Moreover, it shows how considering the distribution of important indicators can significantly change the conclusions that one may be tempted to draw from average indicators.

Economic indicators also illustrate that the move from aggregate indicators to distributional analyses can significantly change the conclusions on the relative performance of the EU and US. To illustrate this, the following section will on state-of-the-art datasets on the distribution of income and wealth in the two regions. The focus on economic inequality is motivated not only by simple material considerations but also by a vast academic literature which shows that economic inequality has adverse impacts on various wellbeing indicators such as health, educational attainment or democracy (Case & Deaton, 2022; Chetty et al., 2020; Elkjær & Klitgaard, 2024). To cite one prominent example, Case & Deaton (2022) show an astonishing and widening divide between low- and high-educated US Americans with respect to morbidity, opioid addiction and emotional distress – further aggravating already existing differences in life expectancy between low- and high educated. Income and wealth inequalities have also been linked to affecting equal opportunities and the potential for upward mobility (OECD, 2015). A quantification of wellbeing differences therefore cannot go without a thorough investigation of economic inequity.

Income inequality

To begin with, conventional wisdom suggests that the EU has a significantly larger welfare system and redistributive apparatus than the US. This is said to reduce social inequality in the EU at the cost of decreased economic prosperity as opposed to the US. At first sight, such a line of reasoning is supported by the evolution of net national income per adult.

Figure 5.6 National income per capita in the EU and US, 1960-2022 (PPP, 2023 €)



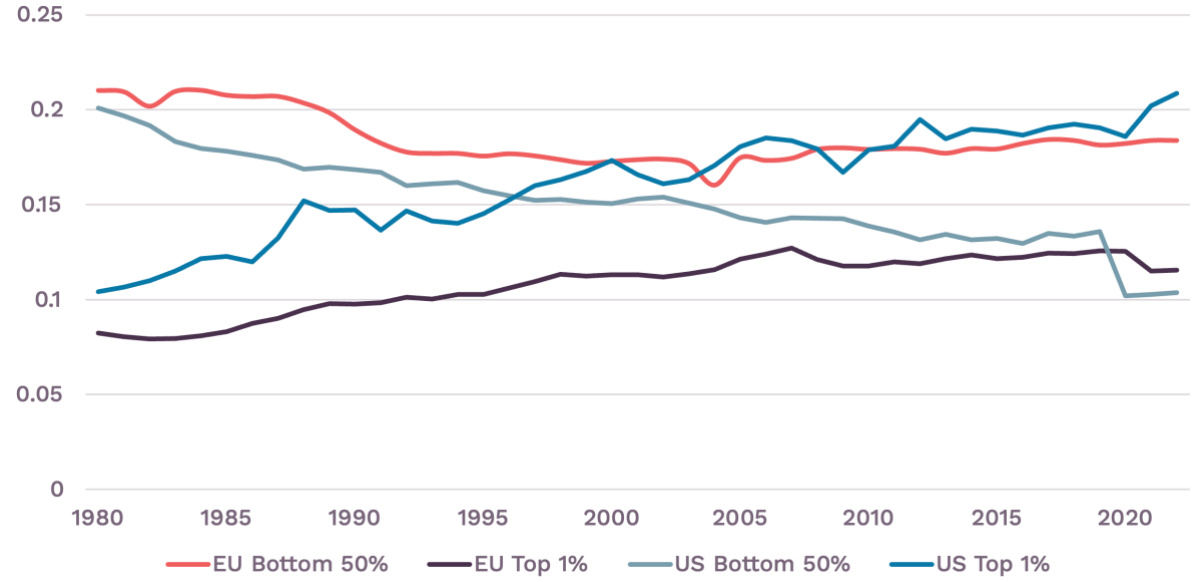
Source: (World Inequality Database, 2024)

While income levels in the US have been higher than in Europe throughout the entire period starting post-WWII, a slight divergence in growth rates also began to emerge in the 1990s (Figure 5.6). During this period up until the financial crisis, the US did not only exhibit higher income levels but also slightly outperformed the EU in terms of national income growth, thus moderately widening the average income gap between the US and EU.

Yet, as Figure 5.7 shows, this spell of accelerated national income growth coincides with increasing inequality within the US, where the share of the top 1% increase faster compared to the EU. While the share of national income captured by the poorer half of the population was comparable at values equal to just above 20% of total national income in both the EU and the US in 1980, the bottom 50% share has steadily declined in the US since. At the same time, the share of income received by the bottom 50% has been relatively stable at a value of around 18% in the EU since the early 1990s. These diverging inequality trends lead to some surprising observations: In 2022, an average adult from the bottom half of the EU population receives higher absolute income than their US counterpart despite higher average incomes in the US. This is true before taxes and transfers, i.e. before the effect of any European redistributive system might kick in to tilt the balance. Hence, even though average incomes are higher and have been growing at a faster pace in the US, US income

growth has not lifted all boats equally. If anything, it has contributed to a widening gap between an economic elite and the poorer half of the population. While such trends are also observable for the EU, they have been less pronounced in the past. The fact that despite higher average income, the poorer half of the US population seems to be worse off than the bottom 50% in the EU also translates into higher rates of relative poverty observed in the US (defined as population share below 50% of median income). According to the OECD, the poverty rate in the US was around 18% in 2022 and thereby even exceeded the poverty rates of the EU countries with the highest prevalence of poverty such as Romania or Estonia or Bulgaria.

Figure 5.7 The development of national income and the income distribution in the EU and US, 1980-2022 (% of total income)



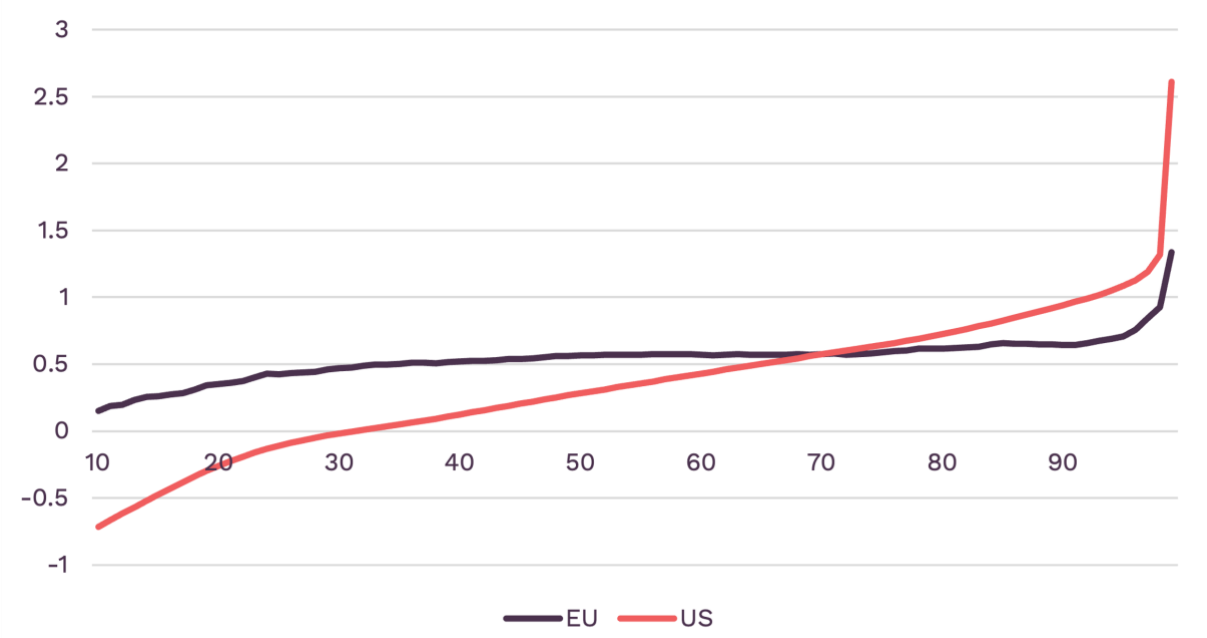
Source: (World Inequality Database, 2024)

Figure 5.7 shows that inequality differs starkly between the two regions already before any redistribution comes into play. The general observation that the tails of the income distribution have been drifting apart more rapidly in the US than in the EU over the past forty years and especially so since the 1990s remains valid. To see this explicitly, consider the distribution of national income growth shown in Figure 5.8. The plot shows the share of total growth in national income captured by each pre-tax income percentile. It is evident that the higher levels of average growth in the US have been extremely beneficial to a relatively small group at the very top of the distribution while the bottom income groups have even seen their real incomes decline since 1980 (Blanchet et al., 2022). While the bottom half of American income earners have seen their relative share decline steadily, the bottom 50 share in the EU has been fairly constant since the 1990s.

Figure 5.9 sheds light on the effect of taxes and transfers for domestic inequality by examining the respective post-tax income shares of the Top 1 and Bottom 50% of income earners in both regions. Even after transfers, the Top 1% in the US capture

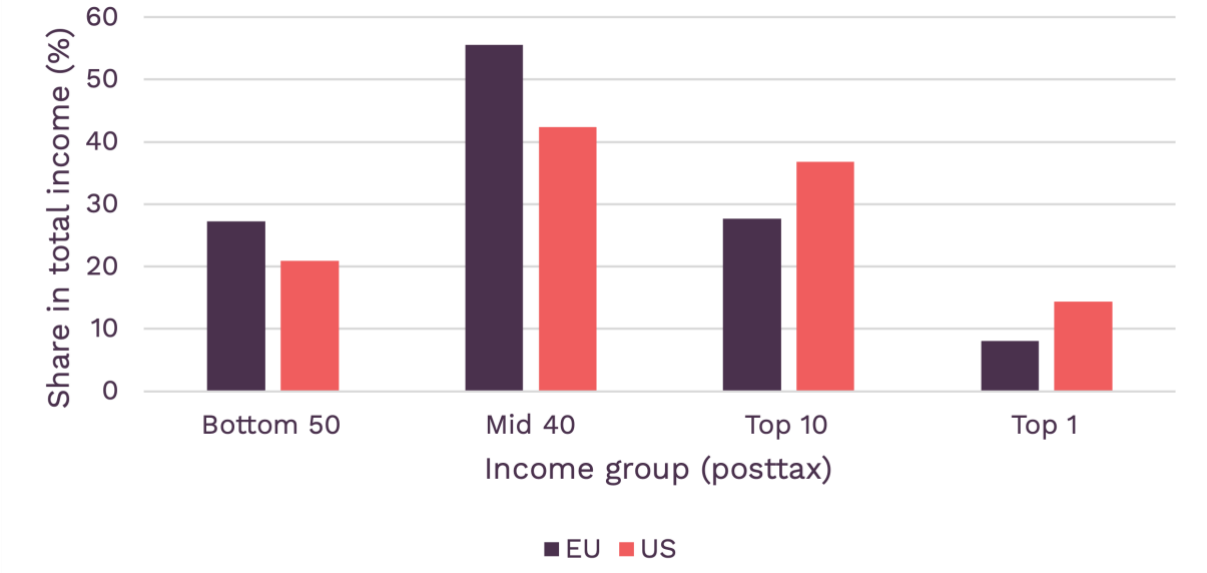
almost 15% of post-tax income in 2022, a share that is twice as large as the fraction captured by the European top income earners.

Figure 5.8 Share of total growth in national income captured by each pre-tax income percentile in the EU and US, 1980-2022 (%)



The first percentile is highly volatile and therefore excluded from the graph. Source: (World Inequality Database, 2024)

Figure 5.9 Post-tax income shares in the EU and US, 2022 (%)



Source: (World Inequality Database, 2024)

Interestingly, recent research shows that the US tax and transfer system is one of the most redistributive in the world (Fisher-Post & Gethin, 2023). The fact that pre-tax inequality is already significantly higher in the US than in Europe thus shows that the diverging paths of the two regions in terms of income inequality cannot be attributed to a more generous system of public provisioning and welfare states in the EU but largely derives from the set of institutional arrangements that determine pre- rather than redistribution.

This observation naturally raises the question which institutional factors determine the pre-tax distribution of income and thus shape the higher initial degree of inequality in the US. While a full exploration of the key drivers of income inequality is beyond the scope of this chapter, some factors deserve mentioning.

One factor is that income mobility in the US has been decreasing. Chetty et al. (2017) argue that the ideal of the American Dream has been fading since the 1940s where substantial income mobility (defined here as the fraction of children who earn more than their parents) was a much more broadly accessible goal throughout all social classes. This no longer appears to be the case. Moreover, Chetty et al show that purely increasing average income growth is an insufficient policy objective to re-establish income mobility given the unequal capturing of gains from growth, as shown in Figure 5.8. One driving force of this phenomenon is the increasing polarisation of wages. While wages have been stagnant or even on decline for wage earners at the bottom of the wage distribution, they have been increasing more strongly for high-skilled workers in the US than in the EU (Bauluz et al., 2023). A similar observation was discussed in the global analysis, linking this phenomenon to the impact of globalisation (Section 2.7 Coming Together and Falling Apart? (1990-now)). Chetty et al. illustrate that institutional structures related to education play a role as well. The US educational system disproportionately allocates substantial returns on education and human capital to a small fraction of the population that benefits from elite education, which remains largely inaccessible to the vast majority of Americans (Chetty et al., 2020).

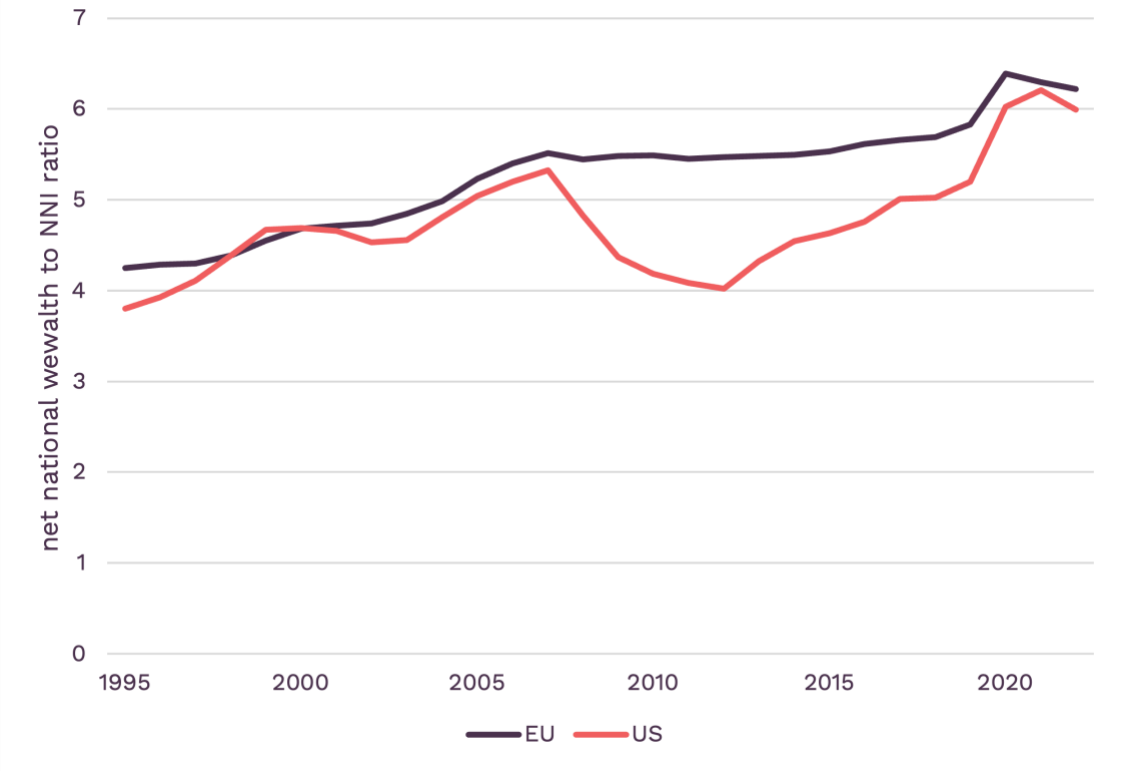
Wealth Inequality

The above section has been concerned with the current state and key drivers of income inequality in the US and EU. Yet, it is now widely agreed that the distribution of wealth is significantly more unequitable than that of income. A comprehensive assessment of economic inclusion can thus not go without a closer look at the distribution of wealth in the two regions. Two begin with, aggregate wealth has followed similar paths in Europe and the US since the 1990s despite a dip in US aggregate wealth following the financial crisis of 2008.

Figure 5.10 shows that aggregate wealth in both economies has increased from a volume equal to roughly four times national income in 1995 to about six times national income in 2022 (Blanchet & Martínez-Toledano, 2023). Given the higher

income levels in the US, this equal ratio immediately implies that per capita wealth in the US exceeds the levels in the EU.

Figure 5.10 Wealth to income ratio and the top 1% wealth share in the EU and US, 1995-2022 (ratio)

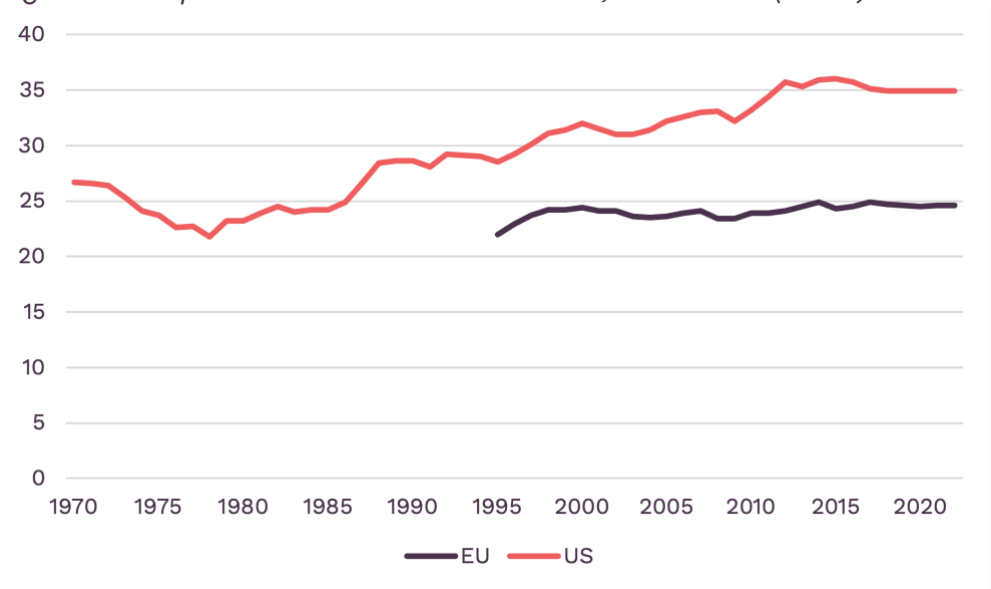


Source: (World Inequality Database, 2024)

Despite the relatively comparable evolution of aggregate wealth, a closer look at the distribution once again unveils more pronounced inequality in the US. Figure 5.11 illustrates the share of total wealth captured by the Top 1% of wealth owners in both economies. As for income, the share of national wealth captured by the wealthiest US Americans has been on a remarkable rise since 1980 resulting in a Top 1% wealth share of around 35% in 2022. At the same time, the top wealth owners in the EU capture a relatively constant share of just under 25% of total wealth since the 2000s. Hence, the US Top 1% holds a net wealth share that is almost 1.5 times as large as the European top wealth owners in 2022 (Figure 5.12). In absolute terms, this translates into an average wealth position of roughly € 12.6 million per capita (2023 PPP) within the Top 1% of US wealth owners as compared to € 2.3 million average wealth among the wealthiest Europeans in 2022. The more moderate rise in wealth inequality in Europe is partly attributable to the stronger rise in house prices relative to financial assets in Europe, and the larger importance of housing in the portfolios of middle and bottom wealth groups. While in the US, financial assets gained slightly more in value and considerable more in volume compared to the EU – while these are predominantly held by top wealth groups (Blanchet & Martínez-Toledano, 2023).

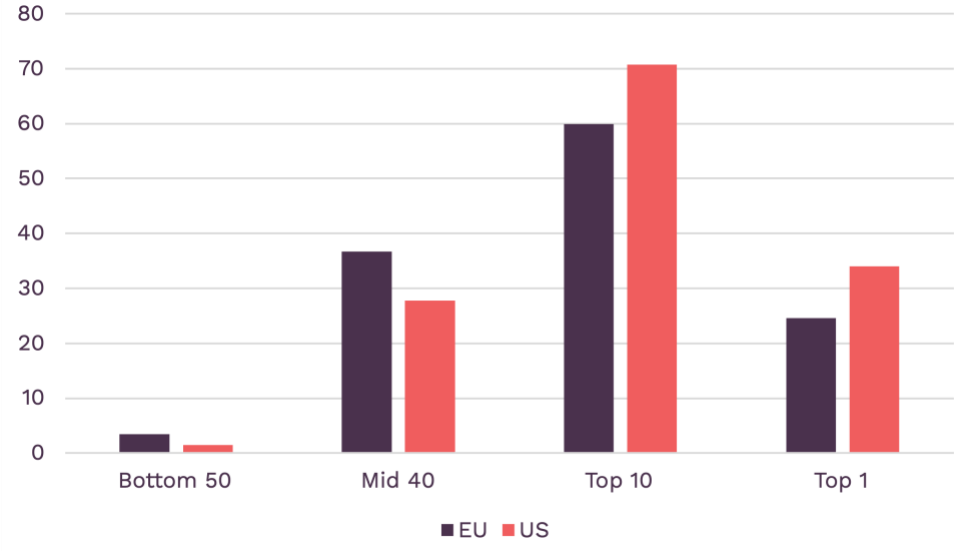
However, while the increase in top wealth shares has proven to be more moderate in the EU over the past 50 years, it is noteworthy that the bottom half of the population with respect to wealth ownership is virtually propertyless in both economies. The Bottom 50% of wealth owners account for a meagre 3.5% of total wealth in the EU and an even more striking share of 1.5% in the US in 2022. Hence, while the European middle class is slightly better off in terms of wealth ownership than its US counterpart due to the aforementioned price effects (36.7% vs 27.8% wealth shares for the Middle 40% in 2022 respectively), wealth remains extremely concentrated at the top of the distribution with the Bottom 50% holding close to no wealth in both regions.

Figure 5.11 Top 1% wealth in the EU and US, 1970-2022 (share)



Source: (World Inequality Database, 2024)

Figure 5.12 Distribution of total wealth in the EU and US, 2022 (%)

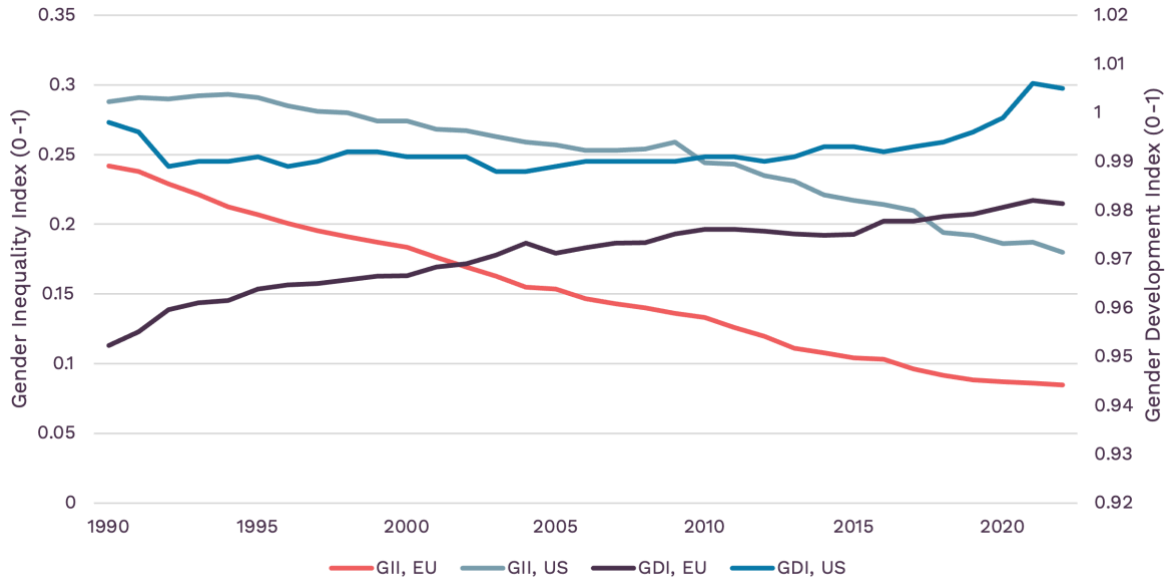


Source: (World Inequality Database, 2024)

Gender inequality

So far, we have discussed inequalities within the total population. Another important aspect to consider is gender inequalities. When it comes to gender inequality, it is clear that the EU and US perform better than the global average, but it is hard to conclude which of the two regions performs best. The UN's Gender Inequality Index illustrates a lower level of gender inequality in the EU, while the UN's Gender Development Index illustrates that it is the US who is performing best when it comes to Gender Development (Figure 5.13). To understand these results, we have to look at the underlying data of these indices. The Gender Inequality Index considers reproductive health, empowerment, and the labour market. Given that the EU has a much lower maternal mortality ratio (maternal mortality rates have more than doubled in the US since 1990, while the EU saw the number of maternal deaths per 100,000 live births drop by 70%) and higher female representation in Parliament, the EU scores better on this index despite the US having a higher female labour force participation rate. The Gender Development Index is based on the ratio of the average female HDI compared to the average male HDI, which considers life expectancy, mean years of schooling, and expected income. The US scores better on this index mostly because of a smaller difference between estimated earned income for men and women is smaller in the US compared to the EU. Overall, The EU seems to perform best in relation to health and political engagement, while the US seems to perform better in the economic domain.

Figure 5.13 Gender inequality between the EU and US, 1990-2020 (index)



Gender inequality Index: lower value is better; Gender Development Index: higher value is better. EU has lower inequality (good), but also lower gender development (bad). For the US vice versa. Source: (UNDP (United Nations Development Programme), 2024)

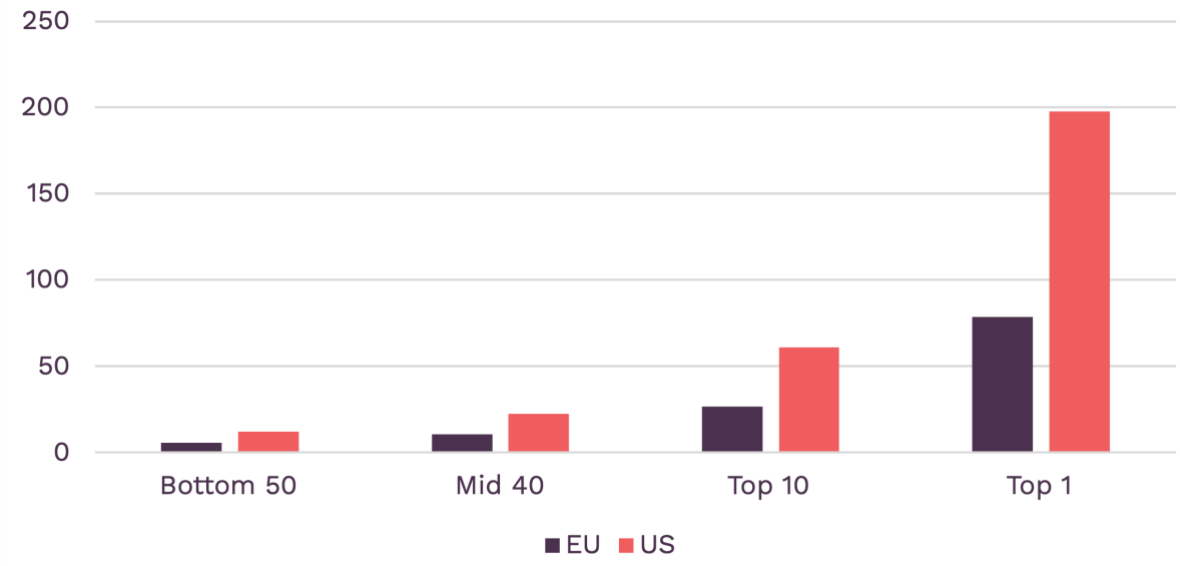
Sustainability

The inclusion section illustrates that despite high levels of inequality in particular with respect to wealth in both regions, the distribution of economic welfare is inarguably more equitable in the EU than in the US. While average living standards in the US exceed those in the EU throughout the study period, the poorer half of the population in the US actually generates lower incomes than the bottom half in the EU. We have thus investigated the different systems of economic welfare generation and provision. This section interests itself in the environmental cost of these systems. Some of these costs are borne within the EU and the US, for example when wastewater pollutes local water and land, or when the air is polluted locally by industrial processes. A significant portion of the costs, however, is incurred in other regions (Chancel, Bothe, & Voituriez, 2023). These costs can be direct, such as when materials are imported from abroad, causing local environmental (or social harm, as discussed in the global analysis). They can also be indirect, as seen in the global effects of greenhouse gas emissions linked to EU and US consumption.

To begin with, Figure 5.14 shows that wellbeing is generated at significantly lower environmental cost in terms of GHG emissions in the EU as compared to the US – an empirical reality that holds true throughout the entire study period. Despite nonnegligible reductions in the average consumption-based carbon footprint in the US, the average emissions per capita in the US still exceed those in the EU by a factor of more than two in 2020 (19 t vs 8 tCO_2e). To be clear, average per capita emission levels in the EU remain far beyond levels that are consistent with equal-split emission budgets for reaching the 2C or let alone 1.5C target (Chancel, 2022). Nonetheless, it is noteworthy that the US uses more than twice the material input in terms of greenhouse gas emissions to generate a modestly higher national income. While these differences in aggregate emissions are driven by a multitude of factors such as geography, city structure, etc., there are two noteworthy observations to be made regarding the first-order sources of higher per capita emissions in the US. First, primary energy consumption per capita in the US is significantly higher than in any single EU country. In 2023, energy consumption was 30% higher in the US than in Finland, the EU country with the highest primary energy consumption per capita (Energy Institute, 2024). Secondly, the disaggregation of this primary energy consumption by fuel type shows a stronger dependency of the US on fossil fuels while the share of renewables in primary energy has been increasing more starkly in the EU over the past two decades (Energy Information Administration, 2024; Eurostat, 2024a). Hence, at the macro level, lower total energy consumption per capita combined with an increasingly strong presence of renewables in the energy mix can partly explain the better performance of the EU regarding GHG emissions per capita. The choice of energy sources also plays a key role in explaining differences within the EU. Some European countries have per capita emissions not far from the global average, including France, Portugal, and Sweden. This is also much lower than some of their neighbours with similar standards of living, such as Germany, the Netherlands, or Belgium. France, Portugal, and Sweden have a much higher share of electricity produced from nuclear and renewable sources, than Germany, the Netherlands and Belgium (Ember (2024) – with major processing by Our World in Data).

Yet again, the aggregate GHG emissions developments shown in Figure 5.4 are instructive to understand average differences between the two regions but largely uninformative about the underlying distribution of emissions across different population segments. Figure 5.15 therefore shows the breakdown of per capita emissions by emitter group in the two regions. These per capita emissions distribute the totality of national carbon footprints to the population taking into account emissions from private consumption, government consumption and capital formation (Chancel, 2022). It is immediately evident that the US exhibits higher inequality not only with respect to income and wealth but also in terms of environmental variables such as carbon emissions. The Figure clearly shows that the high levels of aggregate emissions in the US are driven to a significant extent by extreme emissions per capita emissions at the top of the income distribution. At the same time, while the Bottom 50% of emitters in the US still largely exceed the Paris consistent carbon budgets, this is less true for the low-emitting half of the EU population who are already much closer to carbon neutrality than aggregate numbers would suggest. It is thus evident that in both regions, climate change mitigation will require substantial reduction efforts at the top of the distribution. Given the extreme degree of carbon inequality in the US, equitable mitigation strategies will require the Top 1% of US emitters to cut their emissions by almost 95% by 2030.

Figure 5.14 Distribution of GHG emissions in the EU and US, 2020 (t CO_2e per capita)



Source: (World Inequality Database, 2024)

Moving beyond greenhouse gases, the EU also has a lower overall material footprint per capita (the sum of the material footprint for biomass, fossil fuels, metal ores and nonmetal ores) compared to the US. In the EU, the material footprint per capita is 19 tonnes, while this is 50% more in the US, with 29 tonnes of material use in 2022 (UNDP (United Nations Development Programme), 2024). Water consumption is also much higher in the US than in the EU. The US' annual freshwater withdrawals (both

total and per capita) is more than double that of the EU, for each year in the past 10 years (World Bank, 2024).

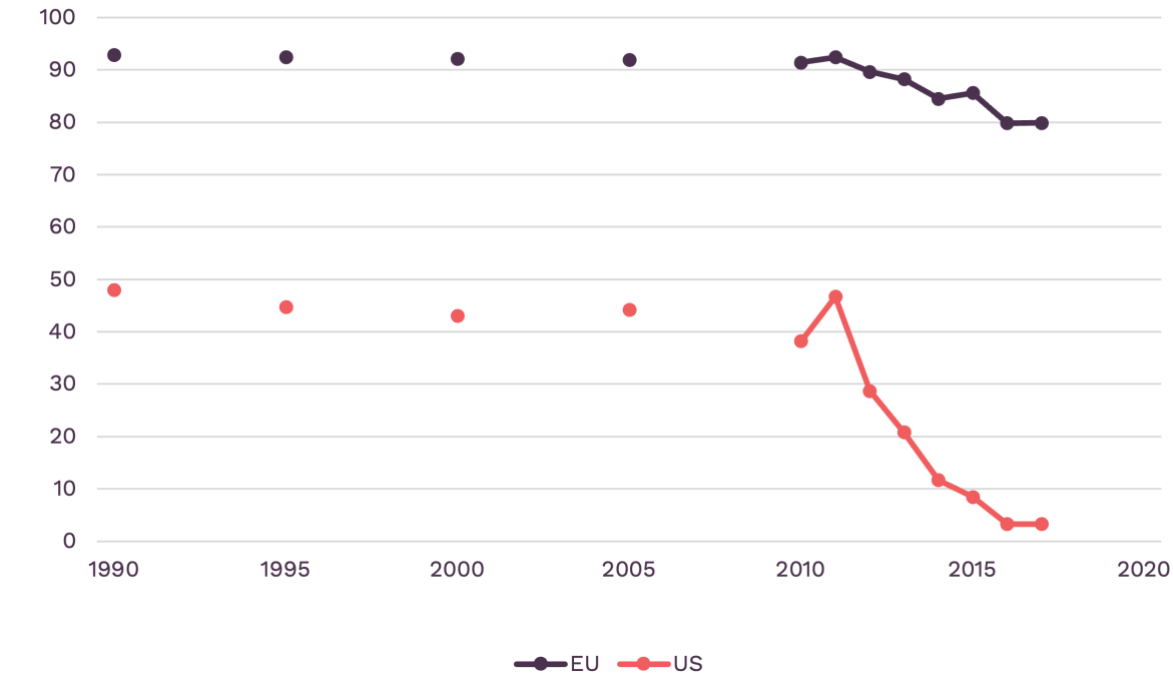
Land-use indicators illustrate the EU has slightly less agricultural lands as percentage of land area than the US from 2001 onwards. For both regions, agricultural land has been decreasing since the 1960s, but for the EU, this process goes faster (HYDE, WDI). Agricultural land includes land dedicated to growing crops and pastureland, which includes meadows and pastures used for livestock rearing. Going back in time, the increasing rise of agricultural lands in the 19th and 20th century coincided with tremendous deforestation rates (Ellis et al., 2010). Deforestation reduces wilderness and poses a global threat to biodiversity and the capacity to deliver ecosystem services (Qu et al., 2024). In the 21st century, we see that the decrease in agricultural lands in the EU and US coincides with increasing rates of forests.

Regarding toxic local pollutions, air pollution has received increased attention in the public and academic debate in recent decades, presumably fostering the implementation of a number of air quality policy instruments. Air pollution is known to be one of the deadliest environmental hazards with a total of up to 5 million excess deaths per year attributable to consequences of pollution exposure globally (WHO, 2021). Fine particulate matter, and in particular PM2.5, is known to be one of the most harmful pollutants. Given the small size of these particles, they can surpass the so-called lung barrier and penetrate into the human blood stream causing damage to the respiratory and cardiovascular system. Stark differences are observed between the EU and US with respect to population exposure to PM2.5 with the US having much lower levels of the population that are exposed to air that exceeds guidelines limits from the World Health Organization (see Figure 5.15). This successful reduction is largely attributable to the Clean Air Act which regulates attainment of air quality standards at the county level since the 1970s in the US and legally requires counties that are classified as not attaining air quality standards to enact reduction measures. Such a stringent policy instrument is currently not existent in the EU although air quality standards exist, and member states are in principle required to report reduction efforts to the EU when exceeding limit values for various air pollutants.

Another important environmental development in both the EU and US is the decline in biodiversity. Biodiversity is caused by habitat loss (often related to deforestation), pollution, over-exploitation of resources, and growing impacts of invasive alien species and climate change. A loss of biodiversity can severely impact the functioning of ecosystems, and thereby also the services it provides essential for human life and wellbeing, including pollination, water purification, fisheries, and recreation. Historical data illustrates that biodiversity is most negatively impacted in the EU. With values for the year 2000 illustrating that Western Europe experienced a decline in mean species abundance of 32%, while in the USA, the decline is 23% (OECD, 2014a). More recent data, as provided by the LPI shows that the EU performs slightly better than the US. However, as the LPI measures biodiversity developments taking 1970 as a base year, it is unable to capture that more species were already in a depleted state in 1970 in the EU compared to the US. The differences between the

EU and US are already observable in 1700, with the EU having a much larger share of land used for agriculture and settlements compared to the US (Ellis et al., 2010).

Figure 5.15 PM2.5 Air pollution in the EU and US, 1990-2017 (% of population exposed)



The graph shows percentage of the population that is exposed to air pollution exceeding levels of the WHO guideline, where mean annual concentrations of PM2.5 (particulate matter with an aerodynamic diameter of ≤ 2.5 μm). Source: Cohen et al., 2017

5.5 A Novel Narrative of European and American Progress

This chapter illustrates that the EU and the US have comparable positive trends in overall wellbeing with positive developments from 1960 until around 2010, after which some indicators start to stagnate or decline, especially in the US. Average wellbeing in the EU was generally lower than in the US, but convergence has occurred due to progress in the EU and stagnation in the US. This chapter also highlights how averages obscure distributional differences of wellbeing in the EU and US. Despite higher average GDP per capita, the poorer half of the population in the US generates lower incomes than the bottom half in the EU. Given the correlation between income and wellbeing, this provides an important indication that the bottom 50% in the US is worse off compared to the EU in terms of wellbeing. In addition, some striking differences in GHG emissions were discussed, material footprints, and water consumption. US citizens have a much larger environmental footprint than people living in the EU. When it comes to air pollution on the other hand, this is better in the US than in the EU. What explains the different outcomes in wellbeing, inclusion, and sustainability, and what can we learn from this for the future?

5.6 The Key Drivers of European and American Progress

The analysis, although it is not conclusive, does provide a strong indication that government policies and institutional arrangements are instrumental in determining wellbeing outcomes – more than general economic performance. This link is easily understood by the broader scope of wellbeing measures as compared to indicators of pure economic welfare. It is evident that important key drivers of wellbeing, such as health or education, are intrinsically tied to the quality of public services and the availability of public funds. While affluent households typically have the capacity to untie their wellbeing from public provisioning on these dimensions through private education, healthcare, etc., this is not true for a large part of the population in the EU and the US. Hence, a path towards equitable wellbeing will necessarily lead through a strong and especially accessible system of public provisioning.

In the case of income inequality, it is illustrated that differences in income inequality can hardly be explained by redistributive policies, which includes both taxation and public expenditures. Rather, they are determined by institutional characteristics influencing the distribution of pre-tax income. These institutional characteristics are largely influenced by active policy choices, as illustrated by Chetty et al. (2020) who discuss the role of limited wage and educational mobility in the US in determining the pre-tax income distribution. Hence, increasing public expenditures or changing tax policy is not enough as long as the accessibility of public provisioning and unequal opportunities in general persist.

As stated above, our analysis shows that the same “quantity” of average wellbeing is generated at lower environmental cost in the EU than in the US. Additionally, recent events have shown that even in high-income regions such as the EU and the US, poorer households are significantly more likely to suffer from environmental hazards. Heat related mortality, damages from floods or wildfire risk are all largely concentrated among relatively poorer households and will disproportionately affect their wellbeing, thereby aggravating an existing income gradient with respect to many dimensions of wellbeing.

Chapter 6. Conclusions

The world is currently being confronted by many social and ecological crises. Geopolitical tensions, poverty, living costs, housing, inflation, rising inequalities, climate change, biodiversity loss, AI, polarisation, populism, migration and an ageing society are causing uncertainty for many people. Many are looking for solutions and turning to their leaders for answers.

Yet on the other hand, others argue that there is no better time to be alive. Many long-term trends in terms of material wellbeing, health and education show that the average person on the planet enjoys a quality of life that would be unthinkable for all the generations that came before us. The ability of this generation to communicate, have an education, and live a comfortable life is unique for the average person.

These "pessimistic" and "optimistic" narratives also frame societal attitudes about the future. The former narrative inevitably provides a bleak vision, since the crises that society is facing will prove to be overwhelming. The latter narrative relies heavily on the notion that humanity will be able to overcome these crises, especially through innovation and technology. If society was able to resolve major problems in the past, why be pessimistic about the future?

What narrative is correct? And for what reason? This report argues, first and foremost that it is not a matter of being "optimistic" or "pessimistic". The assessment should not be based on the inclination of the authors, but rather on a quantitative and qualitative assessment of long-term trends and implications for the future. Secondly, especially when discussing the future, it needs to be kept in mind that the future is not set in stone - human agency is involved. It will depend on the implementation of institutional and behavioural changes to deal with the ecologic and social crises.

What should be the foundation of this quantitative and qualitative assessment? It is fairly easy to pick and choose indicators to prove one narrative or the other. This report, therefore, proposes a conceptual framework which is a synthesis of main of the main quantitative frameworks which have analysed progress and its determinants. The conceptual framework has two dimensions:

- *Progress*. "Are things getting better or worse?" and "Is the current state of affairs good or bad" are two foundational questions underlying the narratives that were discussed above. Fundamentally, this depends on your definition of progress. Very often in academic and policy circles, growth of Gross Domestic Product (GDP) is viewed as a measure of societal progress. However, scientists have known for many decades that this is not a correct interpretation of GDP. Since, the early 1970s hundreds of alternative "Beyond-GDP" measures have been proposed. Recently, there has been convergence towards wellbeing (average), inclusion (distribution of wellbeing within and between countries) and sustainability (future wellbeing). In this literature, economic growth is still important but more as a means to an end, rather than an end in itself. This view of progress is used in this report.

- *Key Drivers of Progress*. What enhances progress and what reduces it? Which are the factors that determine whether things are getting better or worse? This literature is dominated by economists that are investigating the driving forces of economic growth. Technology, human capital and institutions are some of the factors in this discussion. In this report, we provide a broader review of literature that looks at economic growth and its determinants and empirical literature that looks at this issue from a broader perspective. They key drivers that are identified are economy, technology, globalisation, population, nature and institutions. Each of these has effects on wellbeing, its distribution and its development in the future.

This framework, which is based on broad synthesis of the literature, therefore makes it harder to cherry pick indicators that support a certain narrative. This is not to claim that this a perfectly objective approach, but by using a formal framework, the room for arbitrary choices reduces. In addition, this framework has been applied to analyse four geographical and temporal scopes (The world since 1820, Africa since 1960, China since 1978 and US-EU since 1960). The two core questions that were answered 1) was progress achieved and 2) what were the key drivers of progress (or reason for a lack of progress). The answers to these two questions will be discussed in more detail in the next two sections. Using these sights, we will also tackle the third question in this chapter: What can this historical analysis tell us about the future?

6.1 A Novel Narrative of Progress

The new narrative is based on a redefinition of progress. Rather than looking at economic growth as a measure of progress, the framework looks at three dimensions of growth: average wellbeing now and in the future as well as the distribution of wellbeing within countries and between countries. Within this section, we will reflect on the outcomes of this new narrative and how it relates to the traditional narrative.

Average wellbeing has improved in all global regions.

Looking at a wide range of wellbeing indicators, the world has made significant progress since 1820. Life expectancy has more than doubled, literacy rates increased 7-fold, and global GDP per capita – indicating material wellbeing – is 15 times as large as 200 years ago. The world is also much more safe and human rights are respected on a much grander scale, with the human rights index increasing from 0.18 in 1820 to 0.53 in 2023 and improvements occurring in all global regions. While these are positive trends, it is important to keep in mind that average developments mask underlying distributional aspects.

Wellbeing is unequally distributed and trends are mixed.

The current difference in average life expectancy per country is as large as 30 life years, and while some countries have doubled or tripled the size of their economy

every few decades, others saw no sustained increase in GDP per capita during the same period.

When considering our deep dives specifically, we see that that for many European countries, life expectancy is above 80 years. In the US and China, life expectancy is in the high 70s. For many African countries life expectancy is much lower, around 60-65 years. We see similar differences for GDP per capita. GDP per capita is almost $74,000 in the US, almost $54,000 in the EU, around $22,000 in China, and again much lower in many African countries, with the average for Sub-Saharan Africa being around $4,000 (in 2023, values in constant 2021 international $) (World Bank, 2024).

A positive development in this regard is the decline in between-country inequality in life expectancy, education, and GDP per capita since the 1990s. Additionally, the position of women has seen improvements over the long-run. Despite these encouraging trends, the world is still far from equitable and it is unlikely that true inclusion will be achieved with current systems that are still heavily influenced by post-colonial and patriarchal power structures. Moreover, income and wealth inequalities within countries remain high.

Environmental pressures are becoming existential.

Economic development and population growth have put increasing strain on the natural environment, now up to an extent that it threatens a safe living space for humanity. While many governments are undertaking serious steps to limit negative impacts on the environment, six out of nine planetary boundaries are being transgressed and no sufficient decoupling of economic production and environmental impact is in sight.

How does this narrative differ from the economic narrative?

The global narrative on progress is thus a narrative about improved wellbeing in every region of the world. But it's also a narrative about disparities and environmental harm, highlighting the limitations of the current development model.

This narrative sets itself apart from the traditional literature on economic development in five ways. First of all, it's based on a large variety of wellbeing indicators, where economic literature usually focusses on economic indicators. This makes our narrative more human-centred. Second, it considers distributional aspects in depth, while economic literature is often focussed on averages, with no or limited consideration for differences between and within countries and groups of people. This makes our narrative more flexible with regards to local circumstances. Third, it takes into account conditions that might affect future wellbeing. Planetary boundaries, the key natural tipping points, are not usually, or only limited included in an economic narrative of the future. This is a tremendous shortcoming, as the natural environment will impact the wellbeing of future generations. This makes the narrative more future-oriented compared to economic narratives of development.

6.2 The Key Drivers of Progress

This report has specifically linked development of wellbeing, inclusion and sustainability to six core drivers (economy, technology, globalisation, population, institutions and nature). How have these key drivers affected these outcomes?

Economy: Contributes to wellbeing, at the expense of inequalities and environment

Over the long run economic growth has raised average wellbeing in many developed nations it seems to have reached a peak. On the other hand, we see a lot of countries being trapped, to growing from an economic sense. Despite the fact that there were some periods in which income and wealth inequalities improved, these were mostly due to wars and crises. No institutional systems have been able to resolve economic disparities and most recently, these inequalities are getting worse. The economic system has also greatly increased reliance on the earth resources and also has created enormous pressures on the climate and ecosystems. The economic system is creating a debt to future generations by reducing the foundations of their wellbeing.

Technology: From “giant leaps for mankind” to “smaller steps for business”

This 200-year period has seen some remarkable inventions in medicine, transportation, construction, agriculture, and communication. These have enhanced people’s health and quality of life enormously. The most recent wave of technologies based on ICT technology have also changed lives considerably. While some technologies are still clearly beneficial (e.g. COVID vaccines), some authors argue that the current generation of technologies are no longer leading to major improvements in the wellbeing of people. In fact, many of the current technologies such as smartphones and social media are also being linked to anxiety and depression as well as polarisation and reduction in trust in institutions. In addition, technology’s impact on economic growth seems to diminish in recent decades. It seems that many current technologies are particularly beneficial for the profits for companies (large multinational often operating in a monopolistic setting) and the wages of their workers. Yet at the same time, the quality-of-life impacts of these technologies is diminishing.

Globalisation: Fast and slow

Global relationships have seen periods of collaboration, but also periods of war, exploitation and tensions. The first period of enhanced international trade (1870 to the first world war) was driven by lower transportation costs because of steam technology as well as lower tariffs. The second period of increase in international trade (1990-2008) was characterised by the ascension of China (and more broadly

“factory Asia”) in the world economy. While this reduced poverty, especially in China, it also led to tensions as many traditional industries and economic activity in developed countries declined. This last wave of globalisation was also based on neoliberal free market ideologies, which gave national governments less democratic control over what types of goods they would accept for trade. Since 2008, some globalisation indicators show a slowdown due to geopolitical tensions and the increasing implementation of tariffs and other trade restrictions.

Demography: More people and city dwellers, with an empowered role for women

The increase in the overall population in the past 200 years has been unprecedented. Relatively speaking the share of people living in Asia and Africa has also increased with developed countries having relatively fewer people. Overall, the population has also shifted from a mostly rural one to mostly urban. There have been marked changes for women. Women have gained the right to vote in almost all countries, the share of women in Parliament and managing positions has increased considerably, and female labour participation has improved. More generally, cultural norms have evolved and women have a larger agency over their lives. However, there is still work to be done as some countries have seen little improvements historically and society is still far away from gender equality globally.

Nature. From resource driven growth to transgression of planetary boundaries

The important technologies that drove the developments in the first century or so (steam, combustion engine and electricity) were all based on fossil fuels (coal, oil and a various respectively). In addition, the mass production of products that were based on these technologies (e.g. cars also required a great number of metals and minerals). The use of these resources did lead to some local environmental problems like air pollution. Resources are finite and therefore may become depleted, but it seems that before humanity hits the limits of Earth’s resources, much bigger environmental problems will emerge. These enormous environmental pressures started to become evident after the 1970s. This has led to the situation that six of the nine planetary boundaries are transgressed, including climate change and species loss.

Institutions: The principal driver

Changes in the economy, technology, globalisation, demography, and nature can have positive or negative impacts on inter- and intragenerational wellbeing. However, institutions stand out as the “principal driver”, determining how developments in other key drivers affect wellbeing outcomes. This includes formal and informal institutions at the local, national, and international level.

Over the two centuries, there have been periods of global corporation, universal suffrage and improvements in human rights, but there have also been times of conflicts, wars and oppression. For the last 10-15 years there is evidence that institutions are under a lot of pressures.

If institutions are the principal drivers, what are its determinants of good governance? Looking at history, its seem that there is a large degree of serendipity involved with specific leaders, events, wars and crises having a major impact on the trajectory of time. There is also evidence that societal pressures, though protest and conflicts did lead to major institutional change such as the social welfare state and women's rights.

History is serendipitous, the future is not set in stone

The core message is that all drivers from economy, technology, globalisation and demography and nature can have a beneficial or detrimental effect on wellbeing, inclusion and sustainability. Whether this happens or not is up to the "principal driver" - the institutions in which international, national and local arrangements are made. Yet these institutions can be influenced by public discourse and protest. History has shown various moments in which the pendulum has swung the other way. The implication is also that the future is not set in stone – people and their institutions can be directed towards enhanced wellbeing, while caring for an equitable society and managing the relationship with nature.

Temporal and Spatial Heterogeneity

This report has also highlighted the enormous diversity of developments between countries and regions. Even within countries, developments in key drivers could be different depending on the time periods identified. In fact, progress can change for the better or worse very quickly. Some highlight from the various deep dives for Africa, China, EU and US.

- The global analysis and deep dives showed that there is great heterogeneity of developments in outcomes and drivers within a country (Chinese regions) or within a continent (African countries).
- The analysis also makes clear how that countries and continents can be in very different socio-economic, demographic or environmental phases. For example, while Africa has a youth dividend, many other countries. At the same time, there are also trends that are common over many countries, such as urbanisation
- The report also shows that the themes that are relevant for wellbeing, inclusion and sustainability can be very different. The indicators and topics that are interesting per continent, country, or province can be different.

6.3 The Prospects for Future Progress

A turning point in history?

The historical analysis confirms that the future is not a given because it will depend on actions at local, national, and global levels which lead to concrete actions to tackle the challenges that humanity faces. The overall trajectory of wellbeing will depend on the development of the six key drivers and the expectation of how they will develop in future. Does humanity's future look bright or should we brace ourselves for a bleak future? Some major trends that can be seen is that wellbeing indicators are stagnating or declining in some countries and environmental pressures will negatively affect the wellbeing of future generations. This suggests that humanity might be at a turning point in history where global wellbeing might stagnate or even decline in the not-too-distant future. But to assess such a claim requires a breakdown of the trends and prospects of the 6 key drivers mentioned before.

Economy. Smaller by default or design?

The economy is facing multiple headwinds coming from the other drivers (slowing productivity growth (technology), aging society (demography), and environmental pressures such as climate change (nature). Many authors have argued that some economies should start to get used to less or no economic growth.

What does this mean for average wellbeing? On the one hand material wellbeing will, grow less or even reduce in some regions. Yet, given that the relationship between wellbeing and GDP is non-linear, this might not actually affect wellbeing as much. Where there is major problem is in the public expenditures, which is dependent on tax income (from economic activities). Health, education and many other public services that enhance wellbeing require a funding and also labour.

The above are headwinds that are already upon us and would suggest lower growth rates. The above analysis has shown that institutions should make sure that the economic changes do not exacerbate existing inequalities. Some authors actually argue that institutions should take a far more active control of the economy by directing it towards the challenges that are faced. This "mission driven economy" is different to the idea that an economy should not be directed (in this philosophy, it should simply be motivated by profits to maximise social outcomes). In the case of de-growth scholarship, they suggest that the mission is to reduce economic growth in order to stay withing planetary boundaries while enhancing wellbeing.

Technology. Past its peak and in need of re-direction?

Economy-wide productivity is declining globally suggesting that one of the key foundations of economic growth is slowing down. While many see the ICT revolution as a new general-purpose technology which radically changed the economy, the

impact on productivity seems limited. Also, there is also growing evidence that the wellbeing impacts of technology are less pronounced as some of the innovations of the past 2 centuries. The latest technological trend is Artificial Intelligence, which also promises to revolutionize many sectors. However, it is not clear yet that these developments will be beneficial for wellbeing, and it what way. In fact, digital divides are also increasing inequalities and AI is already being used for nefarious purposes.

All in all, technology seems to be developing is ways that are driven by market forces and profits rather than human wellbeing. This is also because the share of income going to labour and capital (profits) is not a given. So, if sectors, such as renewable energy and electrical vehicles, are growing the positive impact on workers is not guaranteed. In fact, some authors argue that while the previous scares of technology taking over labour were exaggerated, there is evidence that this time, huma employment will dimmish and people will need help in their lives.

Institutions need to make sure that innovations create technologies that improve people wellbeing now and in the future and also need to be cognisant of the enormous role that technologies have in creating inequalities. Solutions such as Universal basic income and services would then also need to be provided, if a large portion of the workforce is laid off.

Globalisation. Short term isolation leading to longer term regional hubs?

The future of globalisation is hard to predict. On the one hand there seems to be a slowdown in international collaboration and trade as geopolitical tensions mount. The energy transition which is needed will also have a major disruptive effect because it will shift from imports of fossil fuels (and the countries that extract them) to metals needed for renewables (and the countries that mine an refine them). This is bound to lead to tensions as trade relationships, power differences and incentives are very different than the current trade patterns.

From an institutional perspective, global trade will also need to be redirected towards the green transition because these technologies require resources and inputs from global value chains. Beyond trade, the global institutions need to work towards ending conflicts and tensions around the globe. A lack of stability and wars will have a detrimental effect on a lot of the drivers.

Demography. A soft landing for the population take-off?

There are great imbalances in the world in terms of regions where there is growth in population size and places where there is decline. As a results of the various regions and countries having very different demographic trajectories, some are facing “aging society” while other benefit from a youth dividend. Note that the story of a tight labour market is entirely different to the technological vision that a UBI will need to be instated in future because automation and robots and AI will have replaced human labour.

There are also imbalances in terms of urban-rural populations with there being overcrowding in some cities while some rural areas are being abandoned. These types of economic and demographic changes are further exacerbated by climate migration, which is caused by increasing inhospitable areas in the

The challenges for institutions will be to create a soft landing for the various imbalances, nationally and internationally, that are evident in the population dynamics. Managing these demographic structures will be vitally important to making sure that there are positive outcomes for wellbeing. For example, the African chapter has shown that a young population can be a benefit but can also lead to social unrest if there are no jobs for the youth.

Nature. How to live well within limits?

The acute environmental problems such as climate change and biodiversity loss require immediate action because they are starting to affect the current generation and will have profound impacts on the wellbeing of our (great) grandchildren. This requires shifts in the food and energy systems which will also lead to large changes in the resources needed. For examples, for the energy transition implies a shift from fossil fuels to metals because of electrification. Even if the transition is set in motion, some impacts on future generations can no longer be avoided. The world is set to warm around 2-3 degrees which will have large impacts on a lot of social and environmental systems.

Institutions will need to prioritize green transitions while at the same time also adapting to changing to environmental conditions. At the same time, it will need to look at whether these transitions are “just” both within countries but also globally.

Institutions. Trending the wrong way?

The ask of institutions seems overwhelming. At many different spatial levels (local, national and international) solutions need to be found to manage wellbeing and its distribution for the current generation as well as creating a path for future wellbeing.

At the same time, it is very doubtful that the current political institutions can be directed towards these items. Political systems of all kinds are experiencing periods of instability. The prospect of war seems more likely than a period of stability in which countries will be working on a common future harmoniously.

The Institutional Challenge: Globally *and* Locally Embedded Solutions

The problems are so great that it requires strengthened institutions from the global to local level. Whether it is reducing fossil fuel subsidies to reduce climate change, managing transnational migration, implementing a wealth tax to reduce inequalities,

or creating rules to regulate BigTech, none of these policies can be based on unilateral action. They all demand global cooperation. Yet both national and international institutes are under intense pressures because of geopolitical tensions and mistrust by citizens of the national and international institutes. Societies are experiencing unrest of citizens with a lot or scepticism of top-down policies from their own governments, let alone global institutes or regional ones like the EU. This is the institutional paradox: institutions are required to solve the problems of the 21st century, but people are increasingly turning away from these exact institutions.

We suggest three key areas for future action that have the potential to help solve this paradox:

1. **Develop a clear and relatable vision of progress** that resonates with citizens and can be adopted by businesses, governments, and international institutions. A focus on sustainable and inclusive wellbeing can provide a basis for such a vision. Citizen participation is essential to further specify societal goals, defining sustainable and inclusive wellbeing in ways that are attuned to local contexts but with consideration for universal basic needs and planetary boundaries.
2. **Reform formal and informal institutional structures** to establish the necessary conditions to deliver on sustainable and inclusive wellbeing. Multi-level governance systems are crucial for addressing global challenges while simultaneously responding to local needs, thereby bridging the divide between global priorities and local realities. Existing international structures should be improved, making them more collaborative, representative, and inclusive. On the level of businesses, corporate governance structures should be redesigned, creating room to focus on long-term value creation for all stakeholders involved. For individuals, relevant "reforms" in informal institutional structures are highly context dependent. These could include greater local democracy and deliberative bodies for local communities.
3. **Address societal lock-ins** to enable the translation of humanity's goals through reformed institutions into concrete actions that people, businesses, and governments can take. Societal lock-ins harm adaptive capacities, decreasing society's resilience. On the level of governments and businesses, an exemplary lock-in is growth-dependency. For individuals lock-ins might exist in consumption patterns, for example in relation to diet and transport. Addressing these lock-ins is crucial to make room for the profound changes that are required at all levels of society.

Prospects for Africa, China, EU and US

This report has also covered four regions in detail: Africa, China, Europe and the United States. What are their prospects based on the historical analysis. The following three boxes are not comprehensive policy assessments, but they do provide broad insights based on long term historical trends.

Box 6.1 Africa's Prospects

Africa is often considered to have a bright future given its population, markets, minerals and other endowments. The realisation of such a positive prospect depends on exploiting the opportunities that Africa and its constituent countries have and addressing and resolving their challenges. There are still big differences in wellbeing between countries.

Africa's future should be driven by its people, governments, private sectors and civil societies (see e.g. Agenda 2063, 2015). The dependency on ODA should be reduced, African financial resources need to be mobilised, intra African cooperation and integration needs to strengthen, and globally more development space is needed for Africa. Globally, a just transition is needed to create more development space for low-income countries and to reduce the development space of high-income countries in order to remain within the global resource boundaries. Just transition also needs to be applied within countries where the high-income groups reduce its resource use and create development space for increased resource use by the low-income groups. (modified based on (UNEP, 2024). The AU's (Agenda 2063, 2015) recognises that Africa needs multifaceted transformation, diversification, cooperation and integration to achieve 'the Africa we want'.

Transformation includes, inter alia, modernisation of the economy, including the agricultural sector and creating value chains within countries, cashing in on the youth dividend and the potential offered by urbanisation, and more inclusive governance and institutions. The AU, regional economic communities, peer reviews of AU countries, including the IIAG monitoring process can contribute to improved governance.

Diversification includes reducing reliance on export of raw materials, increased processing of agricultural products and minerals. It also includes expansion of tourism that has benefitted North Africa, facilitated by its proximity to Europe, and countries like Seychelles, Mauritius and Cabo Verde.

Integration includes inter alia, expansion of Africa wide infrastructure, increased intra African trade, using the regional economic communities and the AfCFTA opportunities (see e.g. Nkala & Monyae, 2023).

To realise Africa's potential, more inclusive and stable governance is required at the country, regional and continental level. Economic growth and transformation together with good governance will be essential to accelerate and sustain inclusive and sustainable wellbeing. Economic growth alone is insufficient to achieve this. A well implemented Agenda 2063 together with the implementation of the Sustainable Development Goals (SDG) could bode well for Africa's future, but the implementation of both has so far proven to be challenging and possibly unrealistic. Progress has been made with the African Continental Free Trade Area. While studies have shown the potential benefits of the AfCFTA, implementation has been slow, and its impacts still needs to be monitored and assessed. The SDG goals are unlikely to be achieved in many countries. The same may be the case for Agenda 2063. Recent setbacks in governance and political stability (e.g. parts of west Africa where some countries left ECOWAS) are of concern to African regions and the continent at large. Building regional political and economic integration offers hopes for increased political stability, cooperation and creation of economic and wellbeing benefits. If governance does not improve significantly, Africa will continue to develop in diverse ways (between countries) and over time (ups and downs).

Africa's prospects depend on many factors, but several key ones are listed below:

1. Accelerated economic growth (GDP per capita) that focuses on growth that is important for wellbeing and whose benefits are fairly distributed;
2. Improving governance, political stability, reduced conflicts, government efficiency, corruption control, and accountable and inclusive institutions. Regional cooperation and peer reviews of countries' performance must contribute to greater stability and better governance. Regional cooperation extends to transboundary resource management (e.g. water and wildlife)
3. Improving food security and expansion of public services while ensuring affordable access (e.g. by targeted subsidies);
4. Economic integration and trade though the development of regional economic communities, exploiting the potential of the AfCFTA, improvement of the infrastructure network in Africa and reducing transport costs, the economic diversification and building of value chains;
5. Reducing income and wealth inequality by targeted pro-poor policies and social protection schemes. This has proven successful in southern Africa, but better targeting is needed;
6. Sustainability: Strengthen and expand transboundary resource management (e.g. water, forestry and wildlife), increase resource use efficiency, boost renewable natural capital and productive use of revenues from non-renewable resources minerals and fossil fuels; establishment of effective, decentralised resource management systems in communal areas (e.g. CBNRM)
7. Better use of technological development opportunities, in particular adaptation of available global technologies to Africa and use of IKS in new technologies, and regionalisation/ globalisation, benefitting from foreign direct investments.
8. Optimal use of the potential offered by demographic changes such as youth dividend and urbanisation.

Box 6.2 China's prospects

China's future is shaped by ambitious goals aimed at fostering sustainable development and enhancing quality of life. The "14th Five-Year Plan" and the 2035 vision outline objectives such as high-quality economic growth, technological innovation, green transition, enhancing wellbeing, and promoting common prosperity. However, achieving these goals will require overcoming challenges such as aging population, regional disparities, environmental degradation, and the need for effective governance system (Dollar et al., 2021). The future of wellbeing is expected to see continued improvements due to ongoing investments in social welfare, healthcare, and education. Expanding access to quality healthcare, providing better pension scheme, and enhancing educational opportunities will contribute to higher living standards.

However, ensuring that these benefits are equitably distributed remains a challenge. Additionally, China faces significant demographic changes, with a rapidly aging population projected to reach around one-third of the population by 2050. This shift will pose challenges such as a shrinking labour force, increased dependency ratios, and strains on public finances and social support systems. The government is addressing these issues with policies to raise the retirement age, improve social security, promote healthy aging, and invest in eldercare services.

Despite these efforts, low birth rates and high living costs have limited the impact of recent family support policies. The combination of a slowing economic growth rate and rising living pressures could further strain middle- and low-income households. To maintain and improve wellbeing in the face of these challenges, China will need to continue focusing on reasonable distribution of benefits, healthcare innovations, and

workforce retraining to ensure long-term resilience and stability. This also relates to issue of inclusion.

To further highlight the future inclusive development, it is crucial to reduce inequality and expand opportunities for marginalized groups. The government's emphasis on "common prosperity" represents a shift towards broad benefits for the people of China by addressing income inequality, bridging the rural-urban divide, and reducing regional disparities. To achieving the goal of common prosperity, first, China needs to establish a well-functioning, and just market mechanism aiming at reducing income inequality in the future, gradually reducing government intervention in the market. Second, if wealth distribution inequality continues to worsen, the trend of slow decreasing income inequality may reverse, with a likely rise again in the income gap. Therefore, measures must be taken to address wealth distribution inequalities, creating opportunities for low-income groups to accumulate wealth. Third, promoting urban-rural integration is essential, with increased investment in rural areas to drive industrial transformation and social infrastructure upgrades, thereby improving the living standards and wellbeing of rural residents. According to the mixed economy model in China, a significant portion of wealth is held by the government, providing a unique opportunity for implementing reforms that could address inequality while sustaining growth (Piketty et al., 2019).

When it comes to sustainability, it involves not only environmental protection but also ensuring long-term wellbeing. The country is working towards achieving a peak on carbon emissions in 2030 and carbon neutrality in 2060, as well as promoting a green economy, which requires reducing pollution, promoting clean energy, and improving resource efficiency. First and foremost, carbon dioxide emissions must be decoupled from economic growth (Liu et al., 2021). Furthermore, green technology innovation and the development of renewable energy sources, such as solar, wind power, and electric vehicles, will remain key strategies. But China still lags behind in certain areas of technological research and innovation, particularly in negative emissions technologies, which poses challenges for industrial upgrading and economic restructuring. In addition, China faces significant environmental issues, including extreme weather and the impacts of global warming, which threaten ecosystems and public health. Addressing these issues will require robust environmental regulations, significant investments, and careful management of resources, rather than improving green technologies only.

However, the broader sustainability extends beyond environmental concerns, involving a balance between economic growth and social wellbeing. To ensure the wellbeing of future generations, China must focus on fair resource distribution, reducing income inequality, and improving health and education standards. Balancing economic activities with environmental protection and social development will be crucial for creating a healthier, more promising future.

Box 6.3 European and American Prospects

Future prospects of wellbeing and its distribution in the EU and US will significantly depend on the political trajectories each region takes. Our analysis highlights the critical role of robust and accessible public provisioning systems in shaping sustainable and inclusive wellbeing. With upcoming elections in the US and the evolving consequences of recent elections in the EU, the direction of public service provisioning remains uncertain.

Historically, the Democratic Party in the US has demonstrated stronger support for public services, environmental policies, and policies that stimulate inclusion compared to conservatives. This suggests that a potential victory for Kamala Harris could positively impact sustainable and inclusive wellbeing as opposed to a scenario in which Trump wins the elections.

Similarly, in the EU, central and left-wing parties have traditionally emphasized the importance of public services more than their right-wing counterparts. Right-wing parties made gains in recent elections, but as the specific policy implications for the European Union are still unfolding, it is hard to conclude about its implications.

We can consider two recent large-scale initiatives in the EU and the US that are likely to influence sustainable and inclusive wellbeing: the European Green Deal and the Inflation Reduction Act.

The European Green Deal was launched in December 2019 with the goal to transform the EU into a climate neutral and competitive economy, while making sure that no person and no place is left behind. Policies relate to the climate, the environment, energy, transport, industry, agriculture, and sustainable finance and have a focus to ensure a just and socially fair transition. The EU Green Deal is improving wellbeing in the short run by creating millions of jobs. In the longer run, The European Green Deal is expected to benefit the wellbeing of future generations by limiting further environmental degradation, reducing air pollution, and through the provisioning of healthier food. The EU Green Deal has the potential to reduce inequalities within and between countries and regions through the "just transition mechanism" which provides financial and technical support to the regions most affected by the move towards a low-carbon economy. It will help mobilise at least €55 billion over the period 2021-2027 that can be used to facilitate employment opportunities, improve energy-efficient housing and fighting energy poverty, and provide financial support for and investment in research and innovation, among others.

In the US, the Inflation Reduction Act (IRA) is an important initiative with the potential to shape future developments for the better. In force since August 2022, it is expected to improve wellbeing in the short term by providing job opportunities for decent wages. In the longer run, wellbeing is likely to benefit from reduced air pollution and tax policies that stimulates investments in clean energy and health care, likely reducing costs for both. Reductions in GHG emissions is another factor that influences wellbeing positively in comparison to a scenario in which no measures are taken. Moreover, the IRA is estimated to yield cumulative global economic benefits from reduced greenhouse gas pollution of over $5 trillion from the present to 2050. While the reduction of inequality is not an explicitly mentioned goal of the IRA, enhancing "economic fairness" is, and some of the measures are likely to put downward pressures on inequality. So-called place-based policies direct investments in clean energy, electric vehicles, and battery sectors towards relatively disadvantaged communities with lower wages, lower college graduation rates, and lower employment rates. This might be an important step in improving the lack of wage mobility as discussed by Chetty et al. (2020). On the other end of the spectrum, there's more taxes for the rich. Large corporations will have to pay a 15 percent minimum tax on their profits and a one percent excise tax on stock buybacks and redemptions will also be implemented. This is likely to reduce inequality in the post-tax income distribution.

The long-term effectiveness and reach of these initiatives will largely be influenced by the political environment and priorities set by the leaders elected in these regions.

6.4 Future Research

This report provided an analysis of two centuries of global development, as well as deep dives for Africa, China, the EU and US. Drawing from a wide array of datasets and complemented by qualitative sources, we explored how wellbeing has evolved over time and discussed drivers behind these developments. However, various opportunities exist to improve research that stimulates the transition towards sustainable and inclusive wellbeing. Some of these developments will be tackled in the WISE Horizons project, but the hope of the authors is also that this report stimulates broader research.

Firstly, there is a need to deepen the understanding of the driving forces behind sustainable and inclusive wellbeing through formal statistical testing of the relationships between key drivers and outcomes. As this report demonstrates, panel data is available across numerous themes, offering ample opportunity for regression analysis to strengthen this understanding. The empirical analysis could also be done using macro-economic databases, such as input-output tables augmented by environmental and socio-economic data, to analyse the relationship.

Future research might also focus on a better understanding of what sustainable and inclusive wellbeing entails across different cultures. It is important to understand which notions of wellbeing are universal, and which notions might differ across population groups.

Research is also necessary on the integration of power dynamics and institutional structures in statistical models. Institutional structures play a critical role in shaping wellbeing outcomes, yet they are often overlooked in traditional models. Models can be used for scenario analysis, providing insights into the impact of certain levers.

In a broader sense, it is important to improve understanding of what constitutes "institutions" and how they can best contribute to sustainable and inclusive wellbeing. This includes exploring innovative governance models for both businesses and governments that align more closely with these goals.

Additionally, research should address the major societal "lock-ins" that limit adaptive capacities and resilience in an increasingly interconnected and complex world. These lock-ins, such as the global reliance on economic growth and the dominance of a few Big Tech companies, restrict flexibility and undermine long-term wellbeing. Understanding and addressing these barriers will be critical in unlocking more sustainable pathways forward.

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