# 1. Introduction

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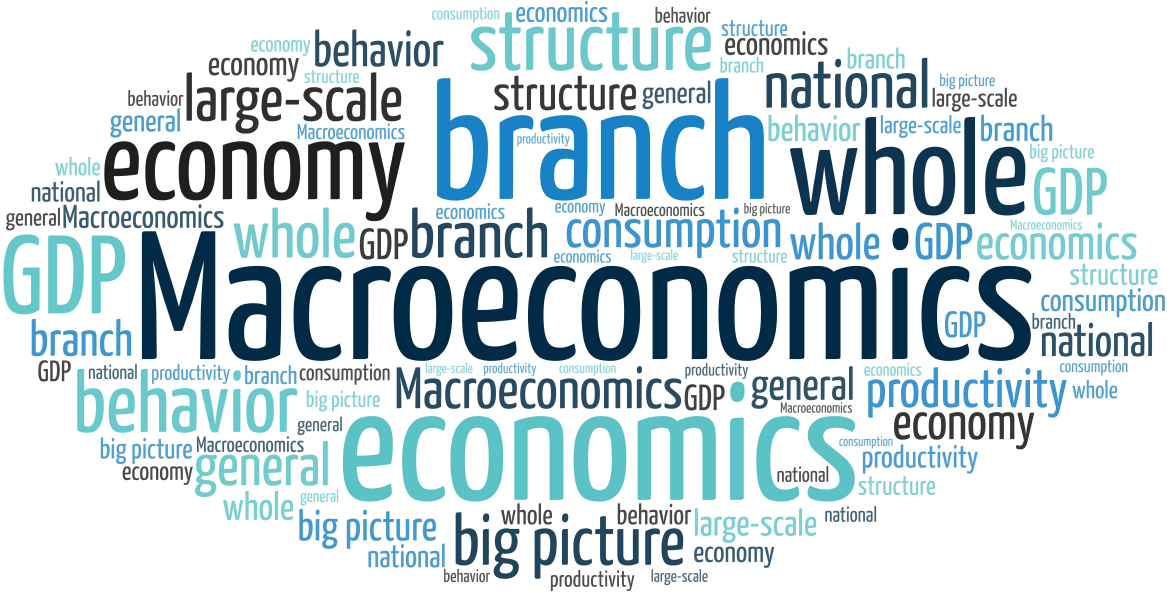
Macroeconomics I, 2023

# Welcome to Macro I

- Hi, I am Yvan Becard, a French macroeconomist and professor at PUC
- I am here to teach you the program's first graduate macroeconomics course
- The goal of this course is to get acquainted with the concepts and tools that are necessary to understand and conduct modern macroeconomic research
- Before I get into the course presentation, let me give you a brief introduction of macroeconomics

# What Is Macroeconomics?

- Macroeconomics comes from three ancient Greek words: makrós means “large”; oikos means “home”, “household”; nomos means “law”, “custom”
- So the word translates roughly to “large household management”
- Macroeconomics is the branch of economics that deals with the structure, behavior and performance of the economy as a whole


Macroeconomics
economics
economy
branch
whole
structure
behavior
GDP
national
big picture
large-scale
general
productivity
consumption
Macroeconomics

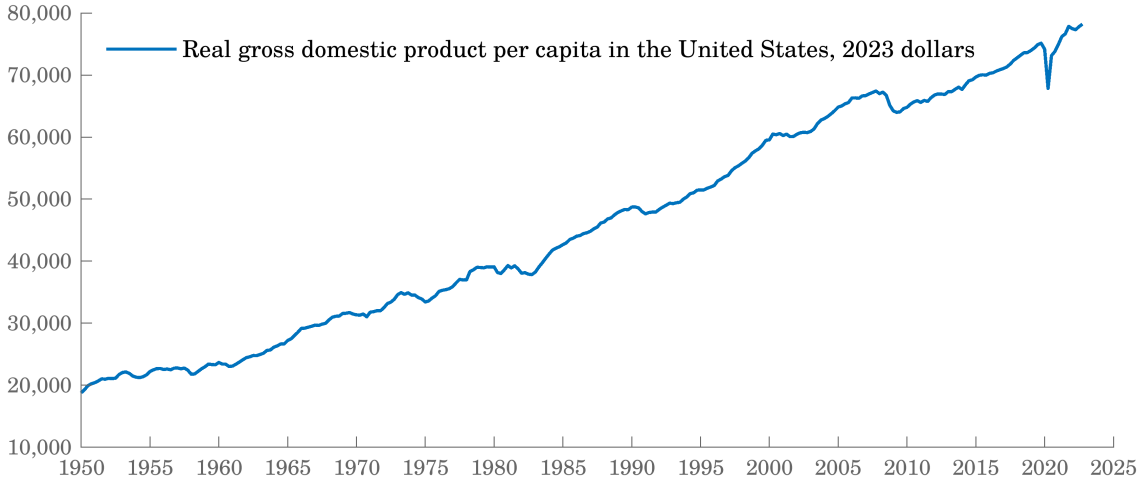
# The Big Picture

- Macroeconomics is about large-scale economic phenomena, which occur at the regional, national, continental, or global level
- Macroeconomics covers topics such as national income, employment, wages, consumption, saving, inflation, international trade, international finance
- Macroeconomists typically study aggregate indicators, eg gross domestic product, unemployment rate, inflation rate, trade balance, public debt
- But they also use microeconomic indicators, eg percentiles of the income distribution, consumer spending, firm sales, bank loans, house prices

# Big Questions in Macroeconomics

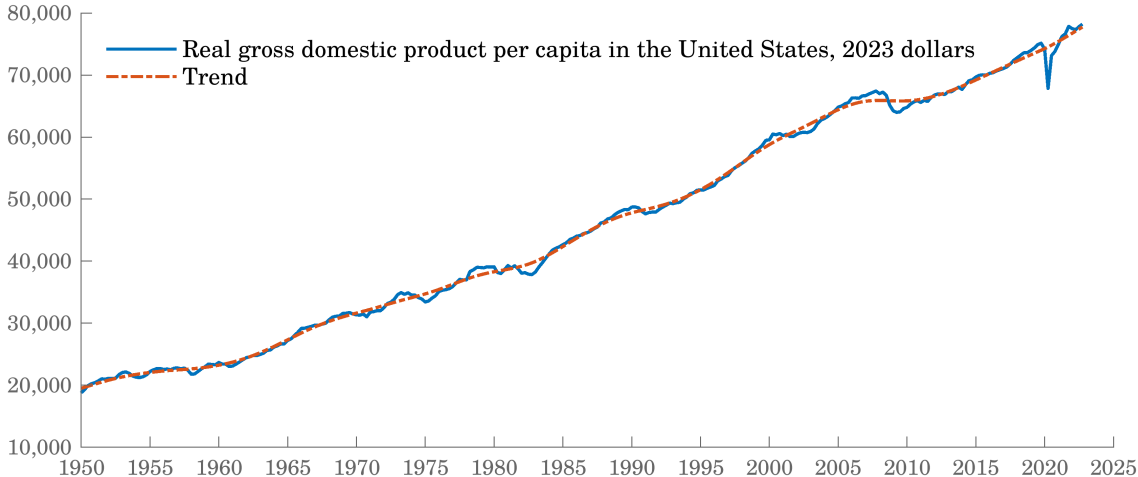
- What drives economic growth? Why are some countries still poor?
- How does globalization affect inequality? Can it benefit all?
- Will technology and automation create unemployment?
- How do we achieve a green and sustainable economy?
- How do we promote full employment within a welfare state?
- What is the proper size and scope of the government?
- Why are economies unstable? What causes recessions?
- How are prices determined? What is a good level of inflation?
- What are the links between financial markets and the real economy?
- How should monetary and fiscal policy be used to stabilize the economy?

# Output Per Person in the United States



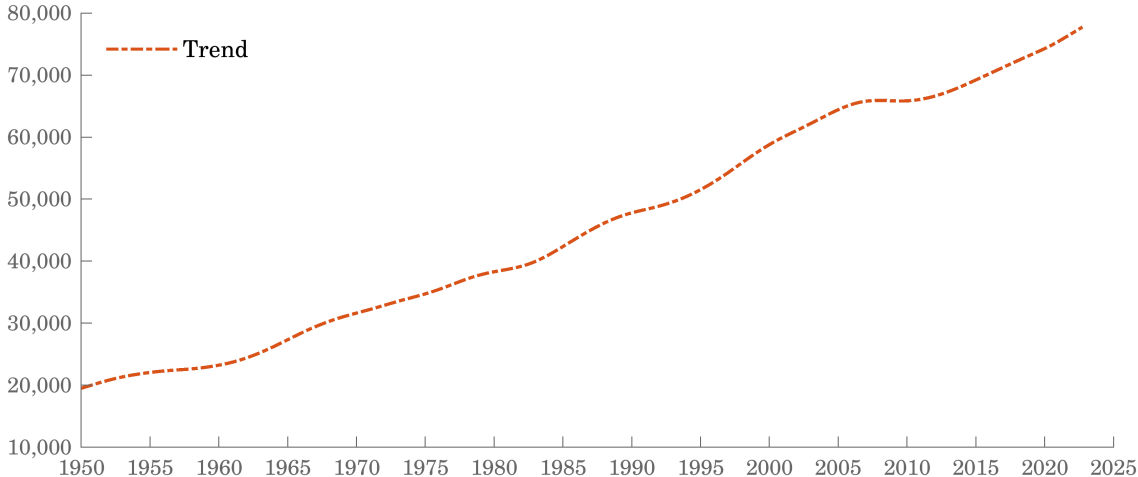

Source: US Bureau of Economic Analysis

# Output Per Person in the United States



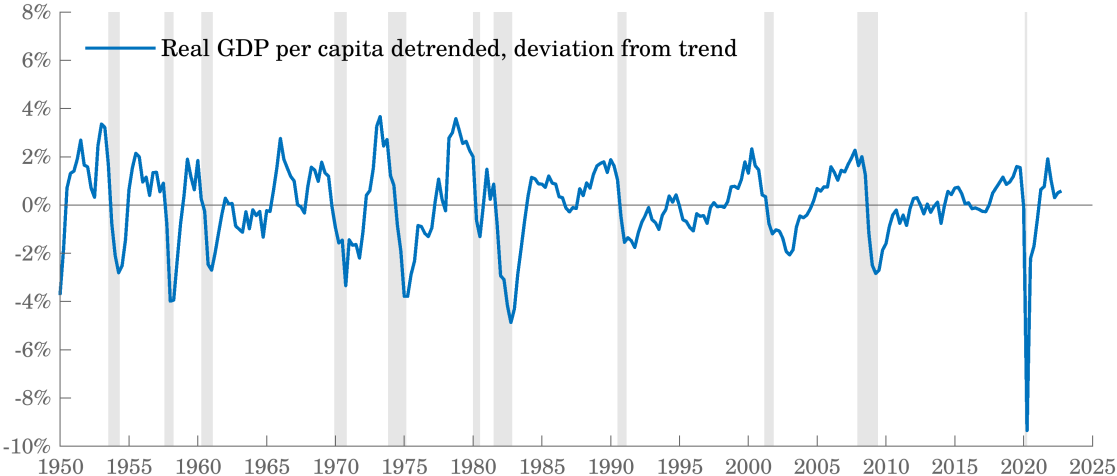

Source: US Bureau of Economic Analysis

# The Long-Term Component




Source: US Bureau of Economic Analysis

# The Short-Term Component




Source: US Bureau of Economic Analysis

# Two Main Areas in Macroeconomics

1. The long run: economic growth
   - Study the determinants of increases in national income
   - Development, inequality, productivity, education, institutions
2. The short run: business cycles
   - Study the causes and consequences of economic fluctuations
   - Crises, unemployment, inflation, monetary and fiscal policy

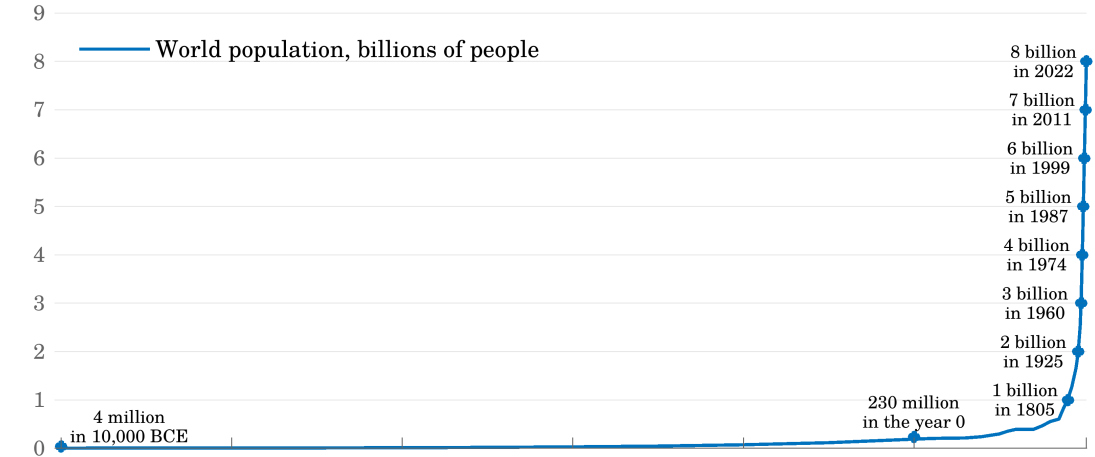
# 1. The Long Run: Economic Growth

# Game Changer

- There is one truly important event in the economic history of the world: the onset of economic growth

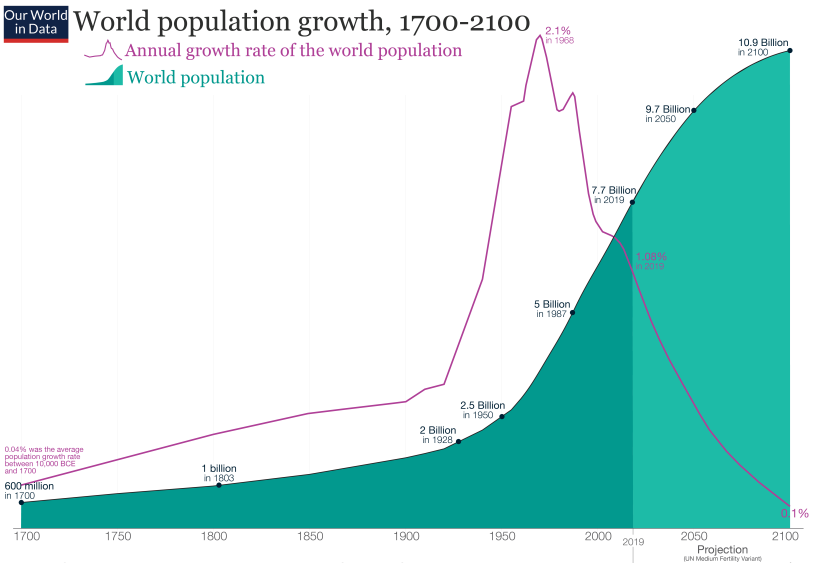
> "Once one starts to think about [growth], it is hard to think about anything else."
>
> Nobel Laureate Robert Lucas, 1988

# World Population Over the Last 12,000 Years




Sources: HYDE, United Nations

# World Population Level and Growth Rate

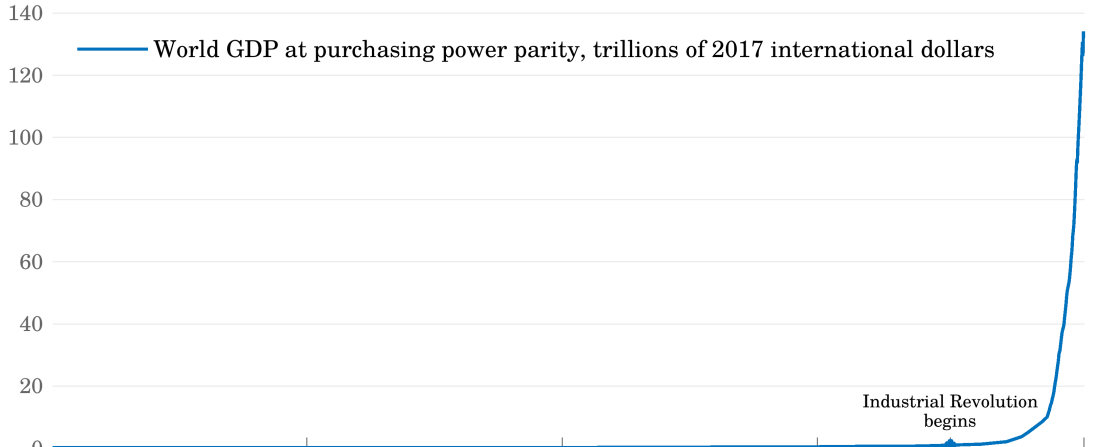



Data sources: Our World in Data based on HYDE, UN, and UN Population Division [2019 Revision]
This is a visualization from OurWorldinData.org, where you find data and research on how the world is changing.

# World Population

- It took humanity all of human history until 1800 to reach the first billion
- A major change occurred with the Industrial Revolution: the global death rate collapsed while the birth rate remained high (it has declined since)
- The fifth and sixth billion were attained in 12 years
- In the 20th century the world grew from 1.65 to 6 billion people
- In 1970 there were half as many people as there are now

# World GDP Over the Last Two Millennia

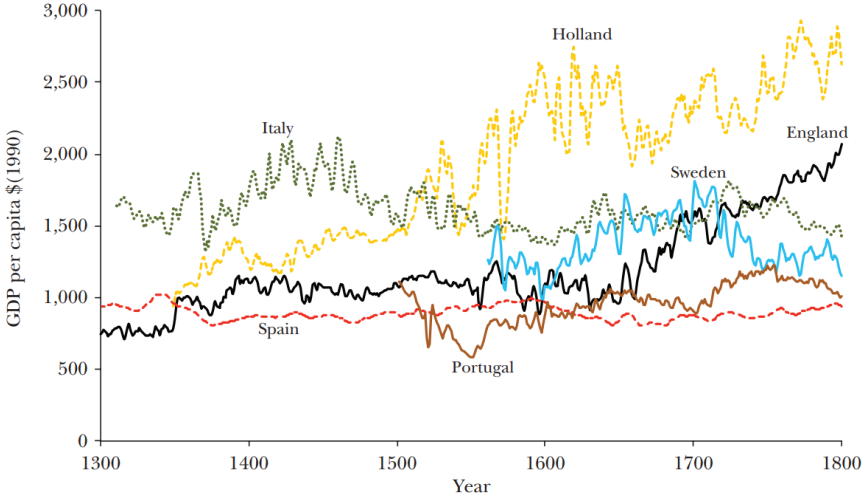



Sources: Maddison Project Database 2020 and World Bank

# Two Phases in Economic History

1. Pre-industrial society: from the first *Homo sapiens* around 200,000 BCE to the start of the Industrial Revolution in 1760
   - Pre-agriculture: few humans, all hunter-gatherers
   - Post-agriculture (10,000 BCE): most humans are rural farmers
   - People are poor and live short lives (35-40 years)
   - Output grows in line with population
2. Industrial society: from 1760 to today
   - Technological progress unleashes economic growth
   - The world becomes mostly urban
   - People live much longer (70-80 years)
   - Output grows faster than population

# GDP Per Capita in Europe, 1300–1800

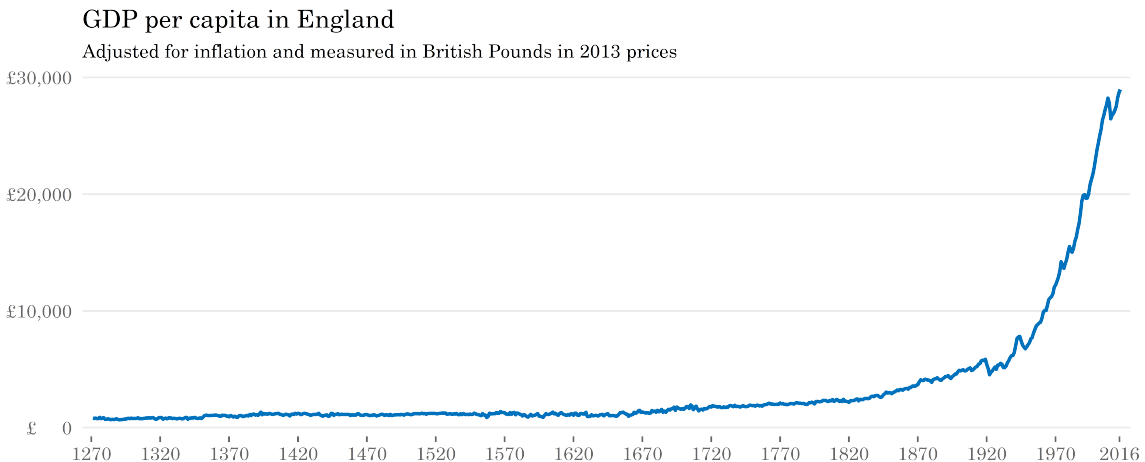



Three-year average; Spain eleven-year average
Source: Fouquet and Broadberry (2015)

# Before the Industrial Revolution

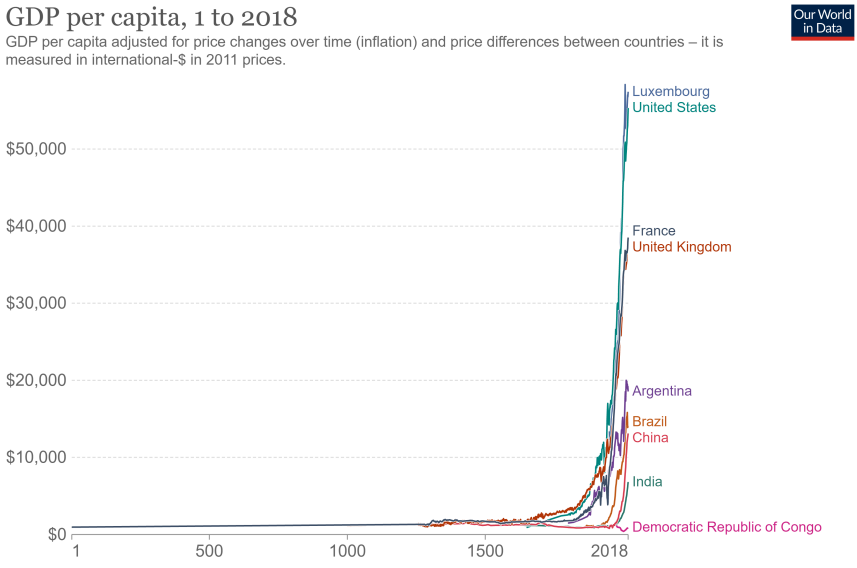
- In most places of the world, income per head remained almost unchanged for centuries, if not millenia
- Occasional periods of growth occurred but did not last
- Life did not change much: shelter, food, clothing, energy supply, light source stayed similar for a very long time
- Most people were poor, illiterate, and died before age 40

# Economic Growth in England




Source: Broadberry, Campbell, Klein, Overton, and van Leeuwen (2015) via Bank of England (2020)

# Growth Around the Globe



# After the Industrial Revolution

- Today the world is immensely wealthier
- Income per head has been multiplied by 14 over the past two centuries

Real GDP per capita PPP in 2011 dollars

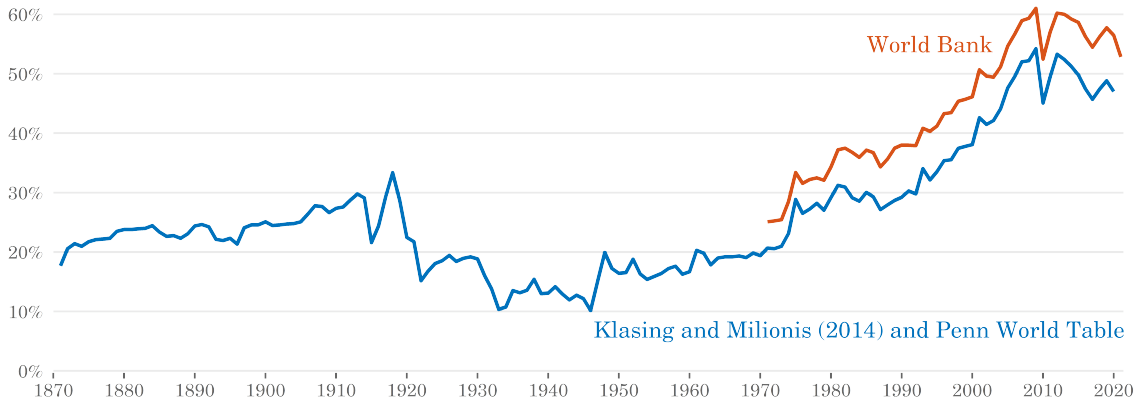
| Country | 1820 | 2018 | Total increase | Per-year increase |
|---|---|---|---|---|
| United States | $2,674 | $55,335 | 21-fold | 1.40 percent |
| Western Europe | $2,307 | $39,790 | 17-fold | 1.31 percent |
| Latin America | $953 | $14,076 | 15-fold | 1.24 percent |
| East Asia | $1,089 | $16,327 | 15-fold | 1.25 percent |
| World | $1,102 | $15,212 | 14-fold | 1.21 percent |

Source: Maddison Project Database 2020, University of Groningen

- An average European or American today produces in two weeks what their ancestor in 1700 produced in one year

# Globalization

World trade as percentage of world GDP

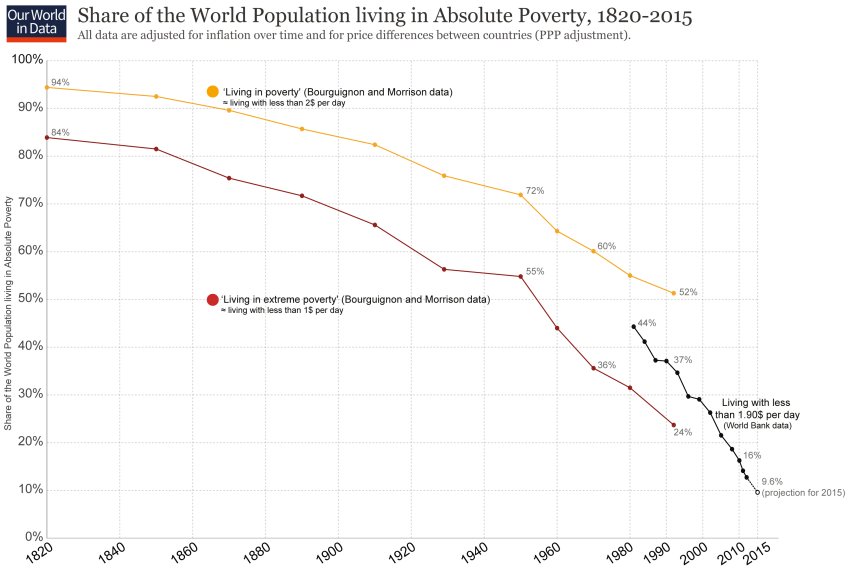



Sources: Klasing and Milionis (2014), Penn World Table 10, and World Bank

# Consequences

- The consequences of a richer world are immense
- Poverty
- Nutrition
- Health
- Education
- Violence
- Democracy

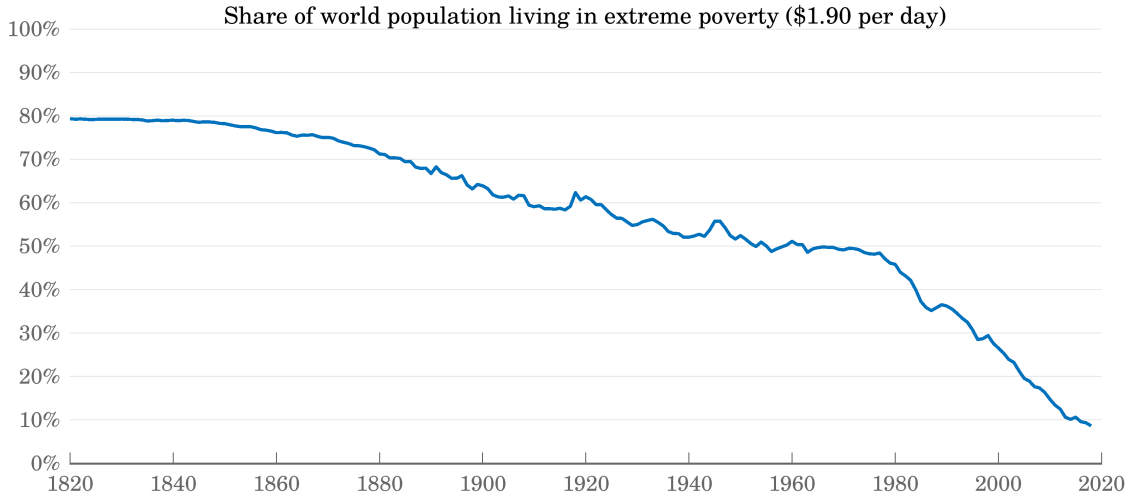
# Extreme Poverty




Data sources: 1820-1992 Bourguignon and Morrison (2002) - Inequality among World Citizens, In The American Economic Review; 1981-2015 World Bank (PovcalNet)

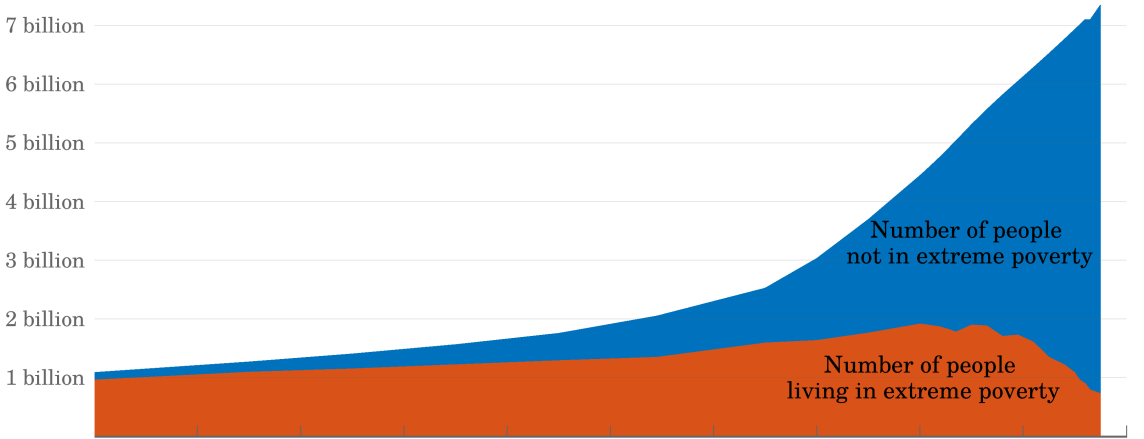
The interactive data visualisation is available at OurWorldinData.org. There you find the raw data and more visualisations on this topic.

# Extreme Poverty



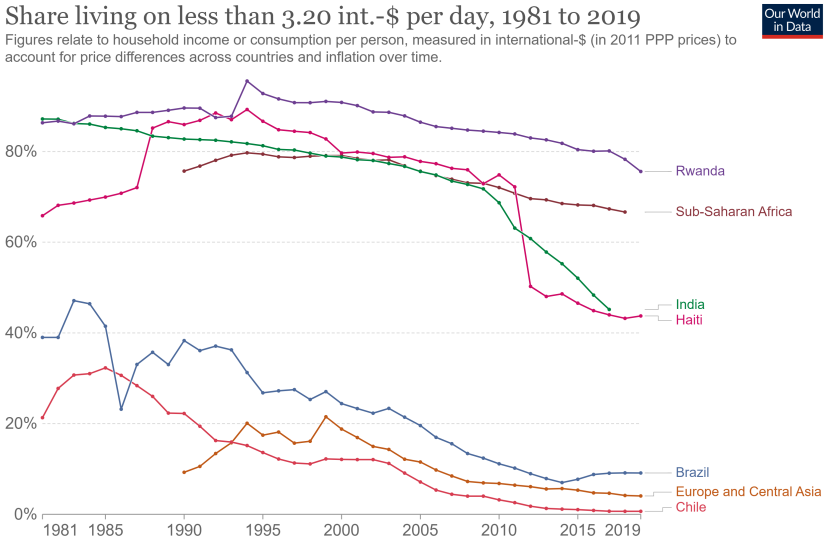

Source: Moatsos (2021)

# World Population Living in Extreme Poverty




Source: Ravallion (2016) updated with World Bank (2019)

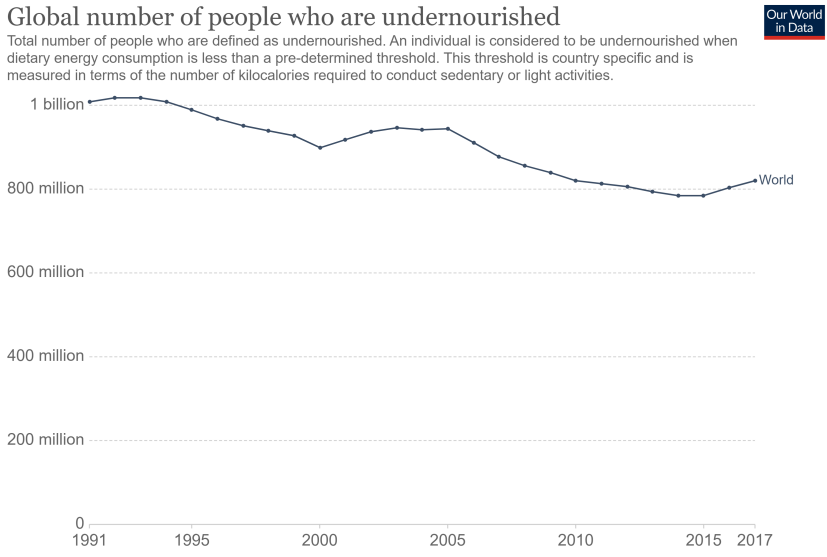
# World Population Living in Poverty



# Poverty

- Over most of human history 95 percent of the world population lived in extreme poverty, ie less than $2 a day
- Poverty has fallen massively even as the world population has exploded
- Today 10 percent of the world lives in extreme poverty
- A much larger share remains poor

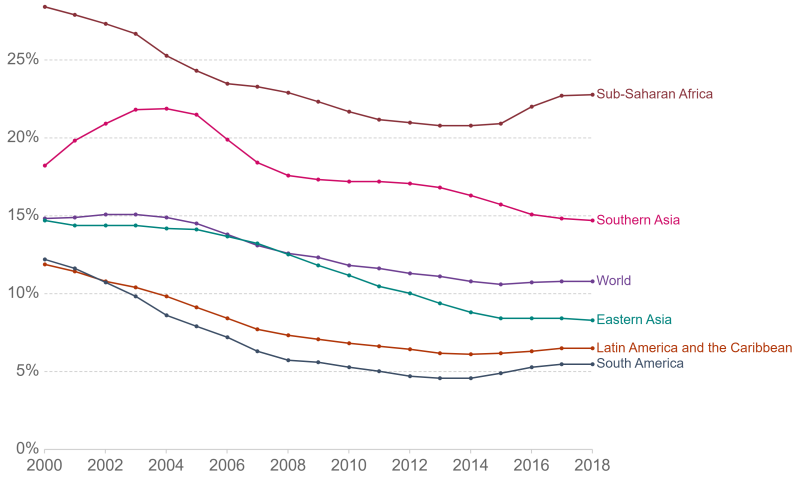
# Hunger


Global number of people who are undernourished
Total number of people who are defined as undernourished. An individual is considered to be undernourished when dietary energy consumption is less than a pre-determined threshold. This threshold is country specific and is measured in terms of the number of kilocalories required to conduct sedentary or light activities.
Our World in Data
1 billion
800 million
600 million
400 million
200 million
0
1991
1995
2000
2005
2010
2015
2017
World
Source: UN FAO (2018); UN FAO (2017); World Bank (2017)
OurWorldInData.org/hunger-and-undernourishment/ • CC BY

# Hunger

## Share of people who are undernourished, 2000 to 2018

Undernourishment measures the share of the population that has a caloric intake which is insufficient to meet the minimum energy requirements necessary for a given individual.



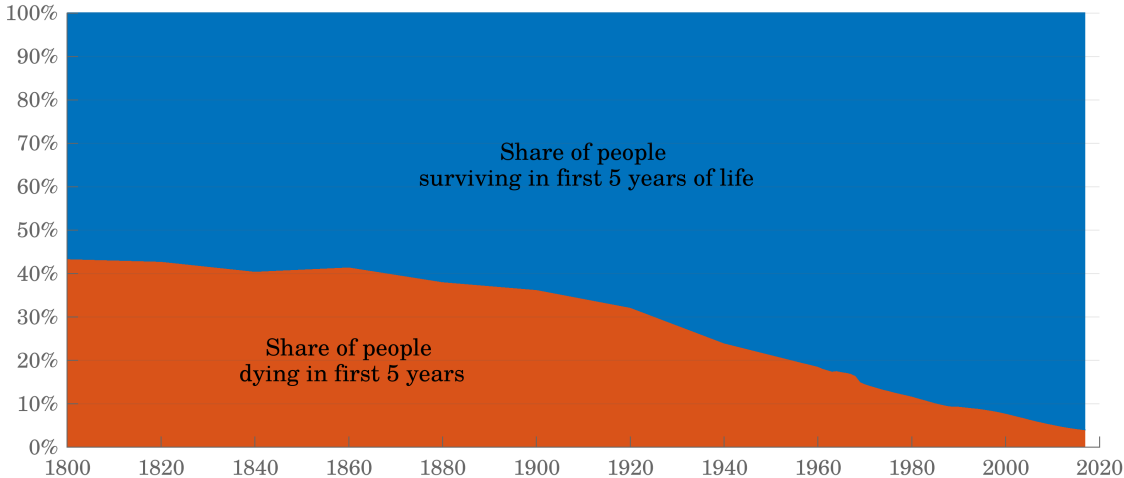

Source: UN Food and Agriculture Organization (FAO)

OurWorldInData.org/hunger-and-undernourishment • CC BY

# Nutrition

- Hunger has declined everywhere
- Still hundreds of millions of people are undernourished
- Many countries now face an opposite problem: obesity

# Global Child Mortality

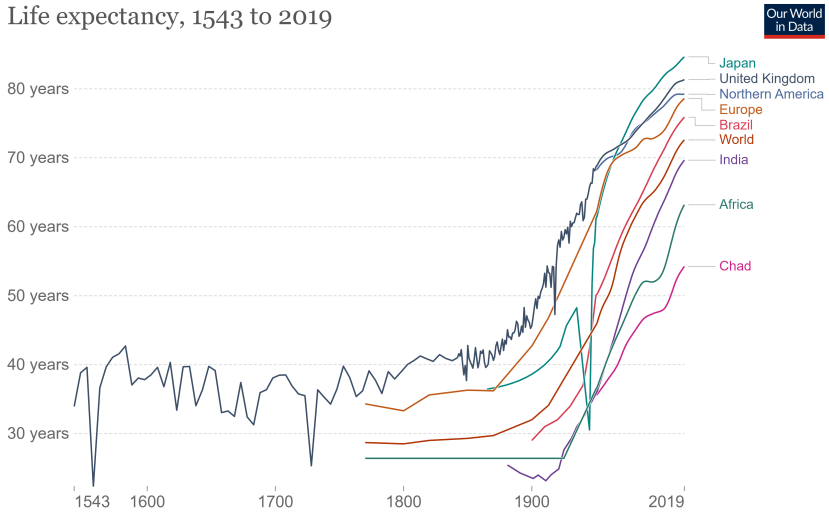



Source: Gapminder and World Bank

# Child Mortality

- Child mortality used to be very high, between one third and one half of children would die before five years old
- Today less than five percent of children die before five
- This number is falling rather fast
- Maternal mortality has also collapsed

# Life Expectancy



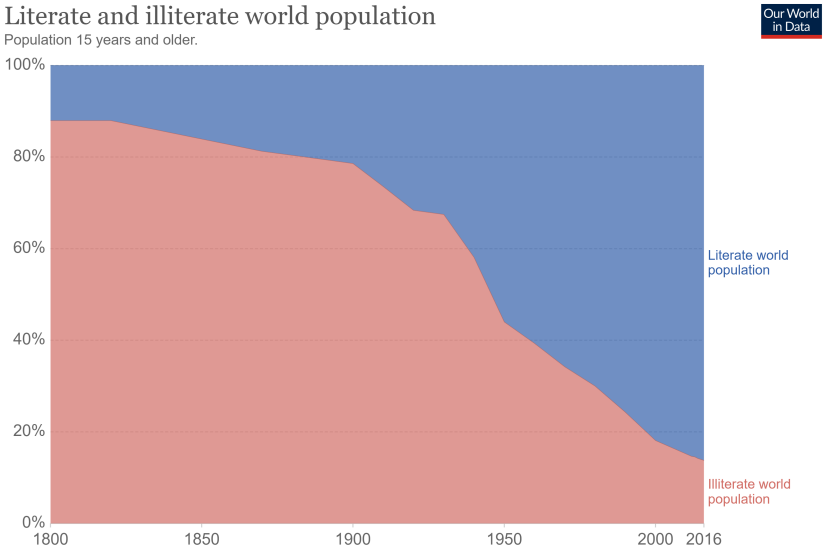

Source: Riley (2005), Clio Infra (2015), and UN Population Division (2019)
Note: Shown is period life expectancy at birth, the average number of years a newborn would live if the pattern of mortality in the given year were to stay the same throughout its life.

OurWorldInData.org/life-expectancy • CC BY

# Health

- Life expectancy has doubled worldwide, to 71 years old
- It is increasing virtually everywhere
- We are much healthier than we used to be
- There are still huge disparities across countries

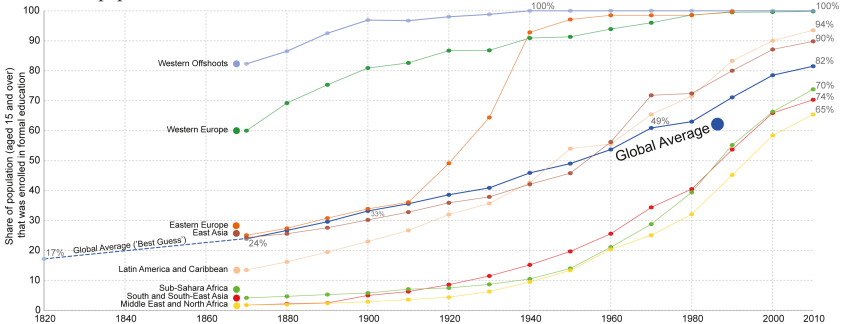
# Literacy


Literate and illiterate world population
Population 15 years and older.
Our World in Data
100%
80%
60%
40%
20%
0%
1800
1850
1900
1950
2000
2016
Literate world population
Illiterate world population
Source: Our World in Data based on OECD and UNESCO (2016)
OurWorldInData.org/global-rise-of-education • CC BY

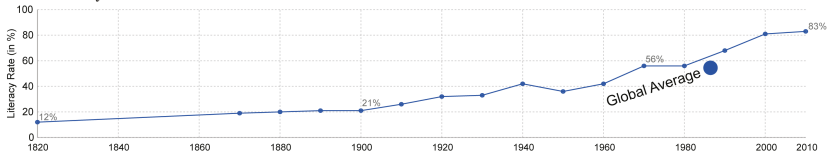
# Education

## Rising education around the world, 1820-2010

Share of the population enrolled in education



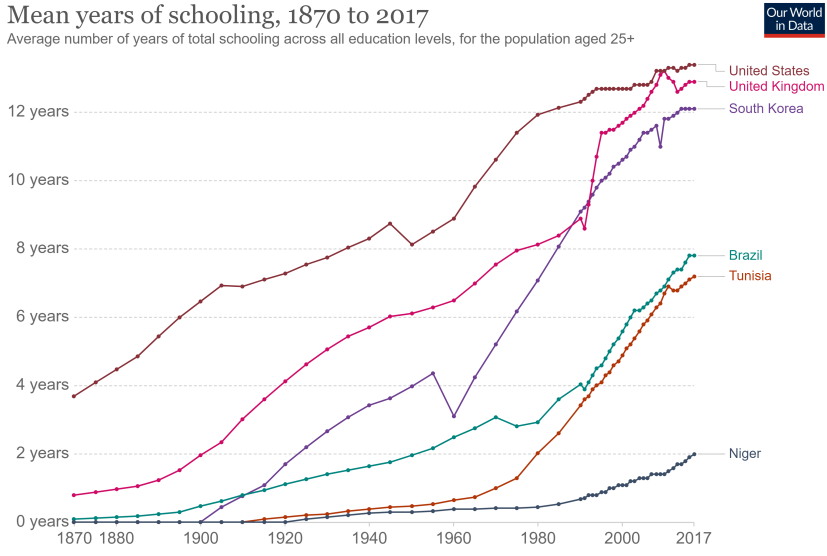

World literacy rate




Data source: Van Zanden et al. (eds.) (2014), How Was Life?: Global Well-being since 1820, OECD.

The interactive data visualisation is available at OurWorldinData.org. There you find the raw data and more visualisations on this topic.

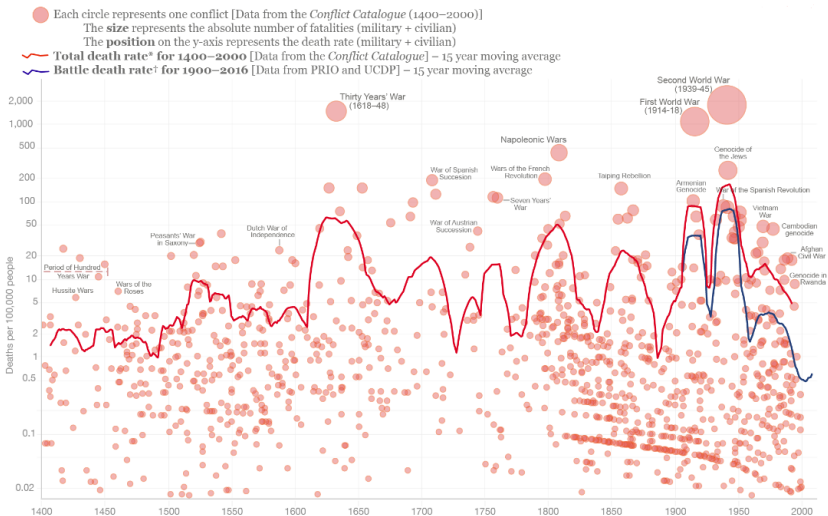
# Schooling


Mean years of schooling, 1870 to 2017
Average number of years of total schooling across all education levels, for the population aged 25+
Our World in Data
12 years
10 years
8 years
6 years
4 years
2 years
0 years
1870
1880
1900
1920
1940
1960
1980
2000
2017
United States
United Kingdom
South Korea
Brazil
Tunisia
Niger
Source: Lee-Lee (2016), Barro-Lee (2018) and UNDP, HDR (2018)
OurWorldInData.org/global-rise-of-education • CC BY

# Education

- Education has improved virtually everywhere on earth
- The world was illiterate, it is now mostly literate
- But there remain huge disparities across countries

# Global Deaths in Conflict Since 1400




Data sources: Conflict Catalogue by Peter Brecke, PRIO Battle Deaths Dataset (v3.1 after 1945 and v2.0 prior), and UCDP v17.2. World population data from HYDE and UN.

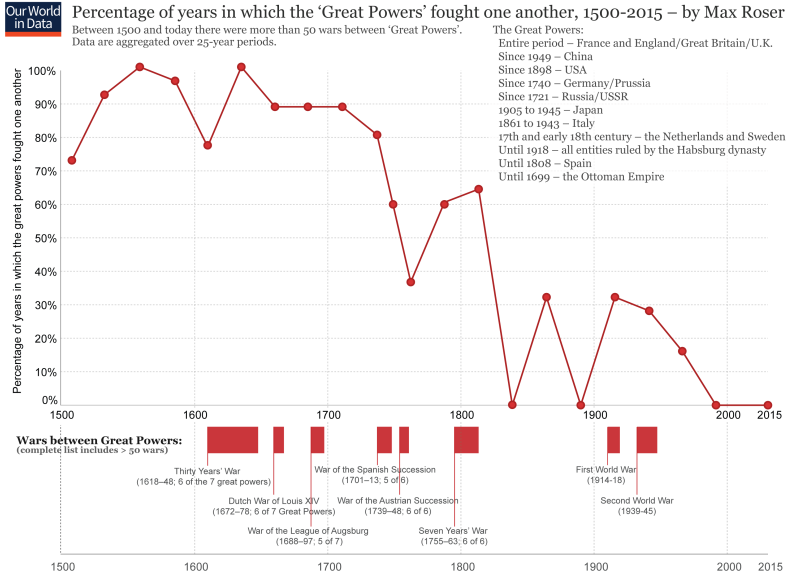
Notes: All death rates are calculated as the number of deaths relative to world population at the time (deaths per 100,000)

* The Conflict Catalogue figures includes civilian and military deaths. In many instances it counts deaths occuring indirectly – from starvation, disease etc. However, the extent to which these are included will vary significantly between conflicts, due to uncertainty in the underlying historical sources.

† The PRIO/UCDP definition of battle deaths refers to those caused directly by armed violent conflict (they exclude deaths from disease, starvation, and also executions of prisoners). The figures include civilian deaths occuring in battles, but not where civilian populations were intentionally and specifically targeted (i.e. deaths of civilians caught in crossfire are included, but deaths in genocides are excluded).

This visualization is available at OurWorldinData.org. There you find more research and visualizations on conflict and global development.

# War




Data source: Steven Pinker (2011) – The Better Angels of Our Nature: Why Violence Has Declined. Based on data from Levy, J. S., & Thompson, W. R. (2011) – The Arc of War

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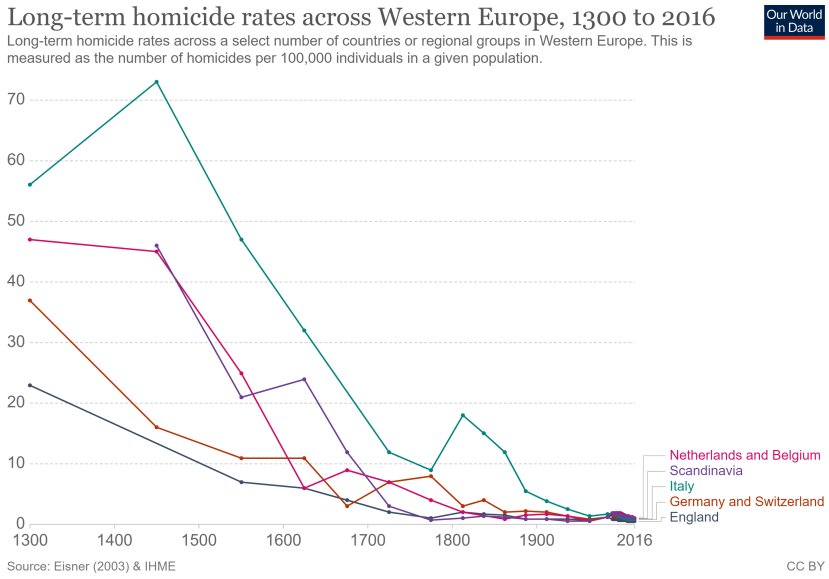
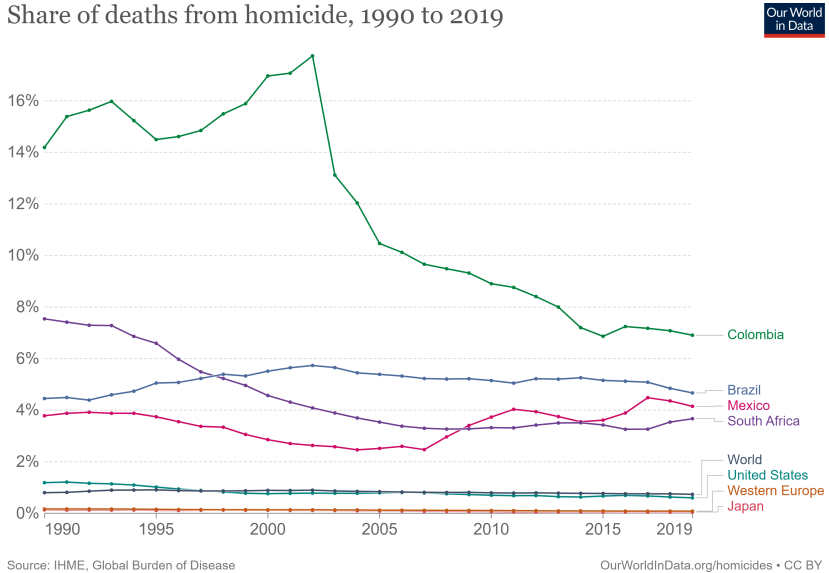
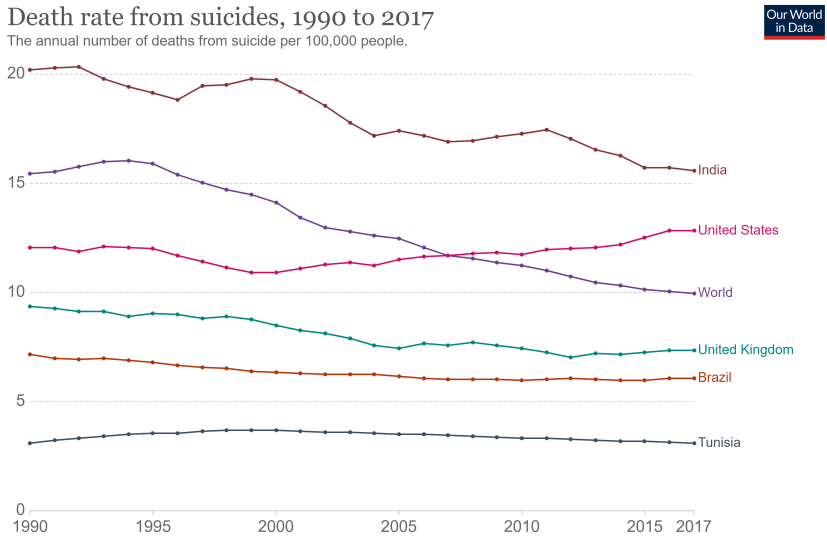
# Homicide Rate in Western Europe



# Homicides in the World



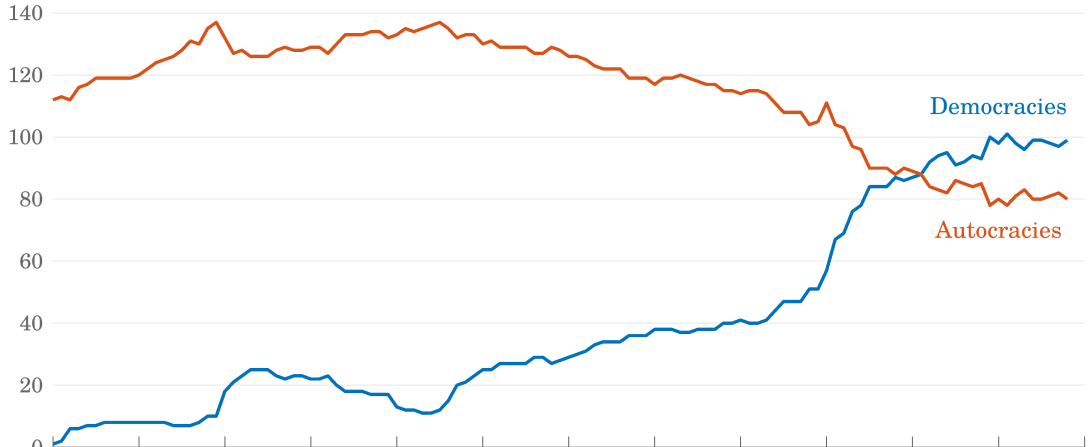
# Suicides


Death rate from suicides, 1990 to 2017
The annual number of deaths from suicide per 100,000 people.
Our World in Data
20
15
10
5
0
1990
1995
2000
2005
2010
2015
2017
India
United States
World
United Kingdom
Brazil
Tunisia
Source: IHME, Global Burden of Disease (GBD)
Note: To allow comparisons between countries and over time this metric is age-standardized.
OurWorldInData.org/suicide • CC BY

# Violence

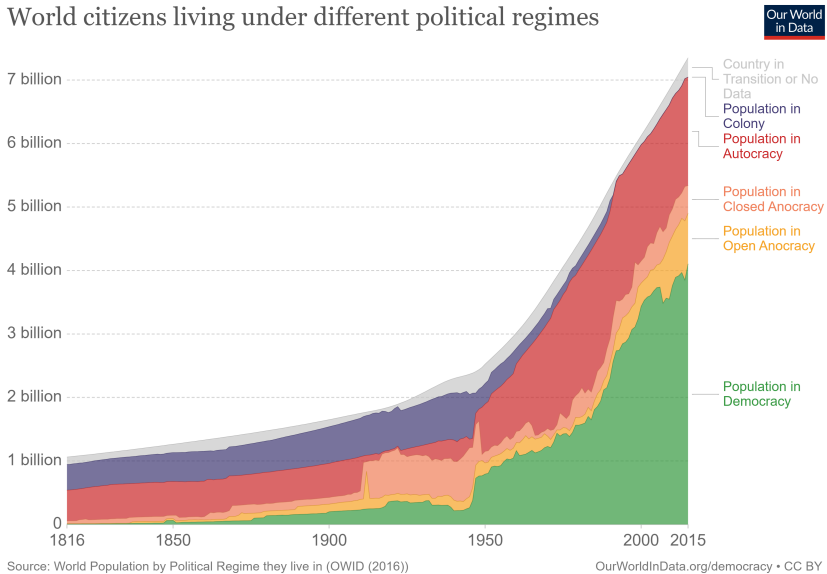
- There are fewer wars and wars are much less deadly than in the past
- The global homicide rate has fallen substantially
- The suicide rate is also falling globally
- Society is much less violent than it used to be

# Number of Democracies and Autocracies in the World




Source: Varieties of Democracy Project

# Citizens Living Under Different Political Regimes



# Democracy

- Two centuries ago virtually no one was living in a democracy
- Today more than half of the world population lives in a democracy

# Summary

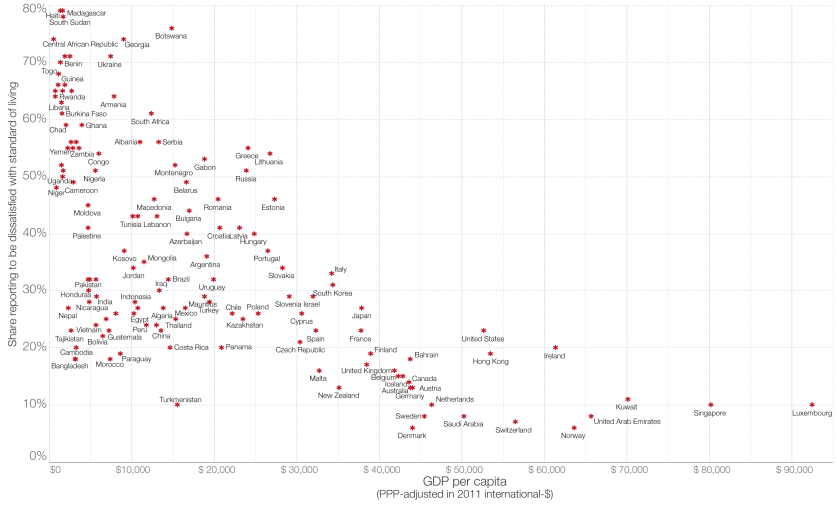
- For centuries the world did not improve much
- Since the Industrial Revolution the world has become a much better place
- Today we are richer, healthier, more educated, safer, freer, and happier?

# Life Satisfaction

## Dissatisfaction with standard of living vs GDP per capita

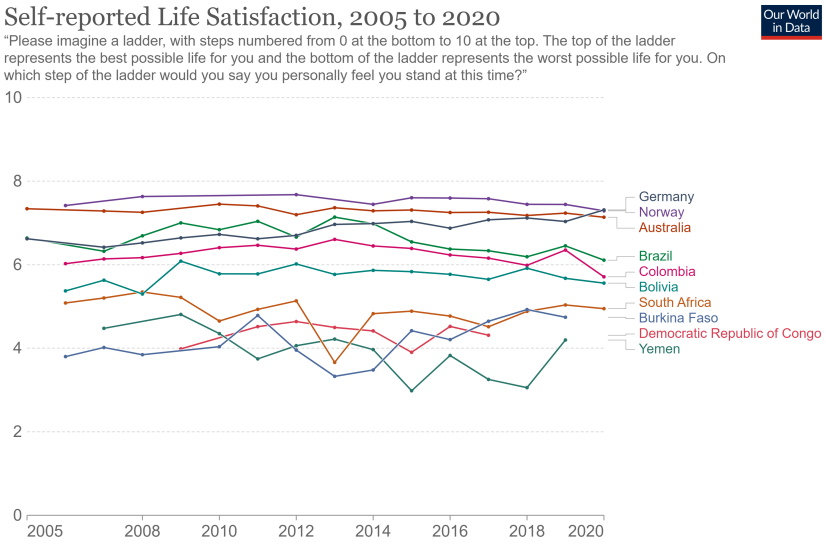
Shown on the y-axis is the share that answered 'dissatisfied' to the question "Are you satisfied or dissatisfied with your standard of living, all the things you can buy and do?".

Our World in Data




Data source: GDP per capita data from the World Bank; survey data on the satisfaction with living standards from the Gallup World Poll.
The visualization is available at OurWorldinData.org where you find more visualizations and research on global development.

# Self-Reported Life Satisfaction



# Two Major Issues

- There are two main problems with economic growth

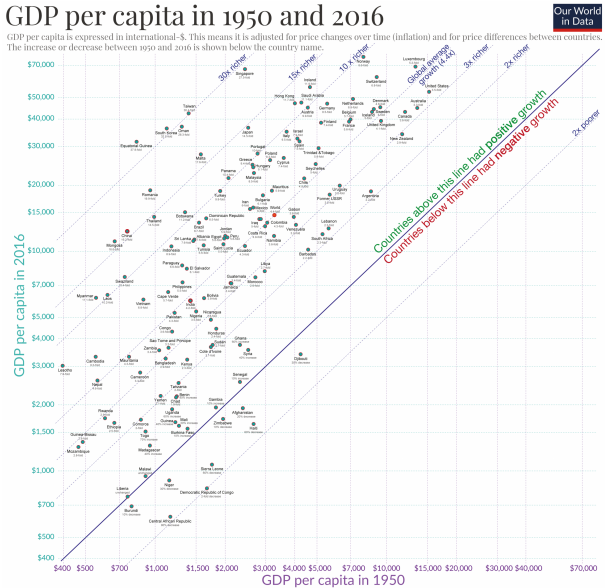
1. It has not benefited everyone: the world is terribly unequal
2. We are destroying our environment in the process

# Unequal Income

| Country | GDP per capita in 2021 PPP, 2021 dollars |
|---|---|
| Luxembourg | 122,740 |
| Singapore | 102,742 |
| United States | 68,309 |
| Germany | 56,956 |
| France | 49,492 |
| Japan | 44,585 |
| Chile | 24,928 |
| Argentina | 22,141 |
| China | 18,931 |
| World | 18,381 |
| Brazil | 15,643 |
| India | 7,333 |
| Somalia | 941 |
| South Sudan | 825 |
| Burundi | 772 |

Source: International Monetary Fund (2021)

# Unequal Growth

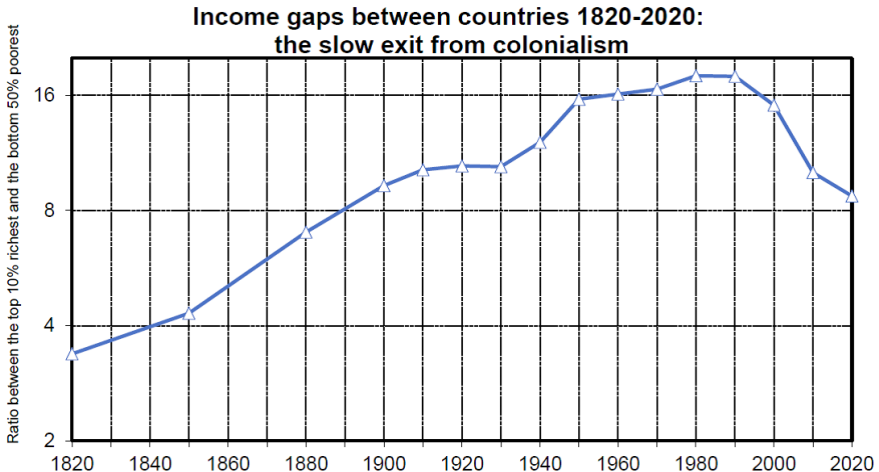



Data: Maddison Project Database (2018). All countries for which data is available in 1950 and 2016 are shown.
The visualization is available at OurWorldInData.org where you find more visualizations and research on global development.

# Global Inequality

- The poorest countries are 100 times poorer than the richest countries
- While most countries have grown, some have declined in absolute terms over the past 50 years

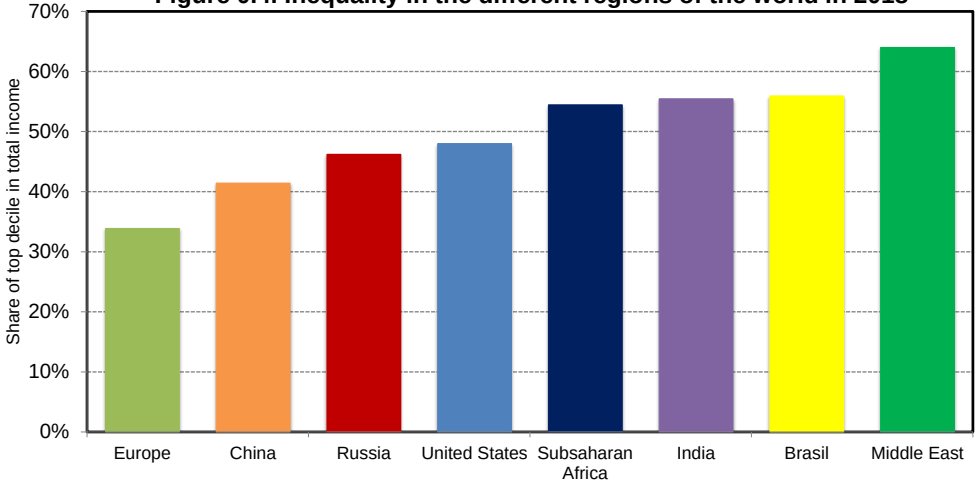
# Global Inequality




**Lecture**. Income gaps between countries, as measured by the ration between the average income of the top 10% of the world population living in the richest countries and the bottom 50% of the population living in the poorest countries, have increased significantly between 1820 and 1960-1980, before beginning a period of reduction. **Note**. For the computation of this ration, the population of overlapping countries has been divided between deciles as if they were multiple countries. **Sources and series**: see piketty.pse.ens.fr/equality (figure 36)

# Inequality Within Countries

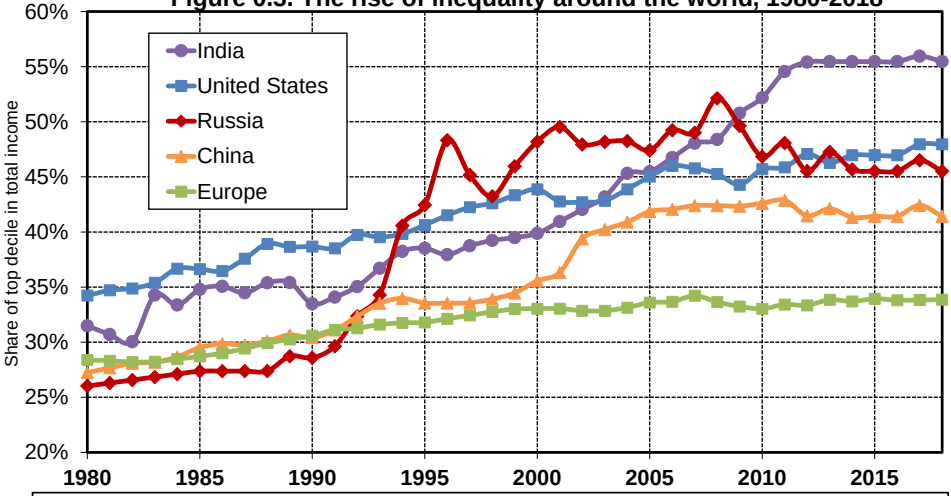
**Figure 0.4. Inequality in the different regions of the world in 2018**




**Interpretation**. In 2018, the share of the top decile (the 10% highest incomes) in national income was 34% in Europe (EU+), 41% in China, 46% in Russia, 48% in the United States, 54% in Subsaharan Africa, 55% in India, 56% in Brasil and 64% in the Middle East.
Sources and series: see piketty.pse.ens.fr/ideology.

# Rising Inequality Within Countries

**Figure 0.3. The rise of inequality around the world, 1980-2018**

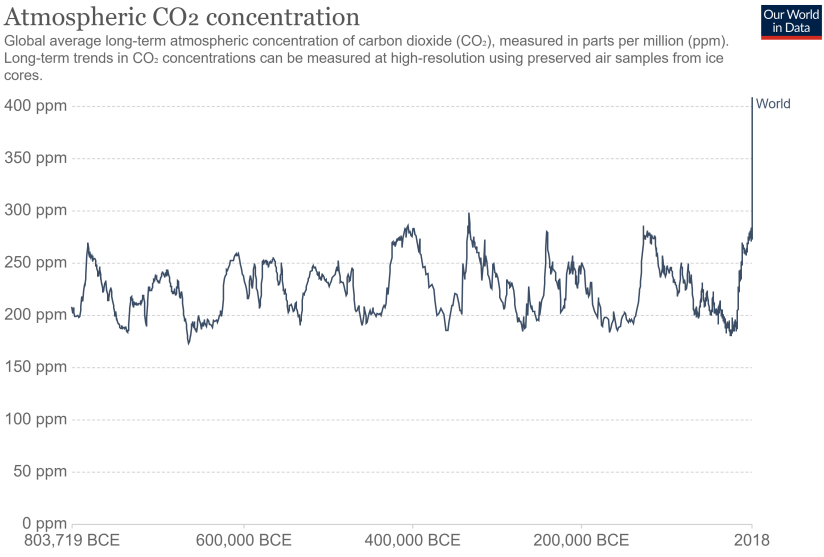



**Interpretation**. The share of the top decile (the 10% highest incomes) in total national income ranged between 26% and 34% in 1980 in the different parts of the world and from 34% and 56% in 2018. Inequality increased everywhere, but the size of the increase varies greatly from country to country, at all levels of development. For exemple it was greater in the United States than in Europe (enlarged EU, 540 millions inhabitants), and greater in India than in China. Sources and series: see piketty.pse.ens.fr/ideology.

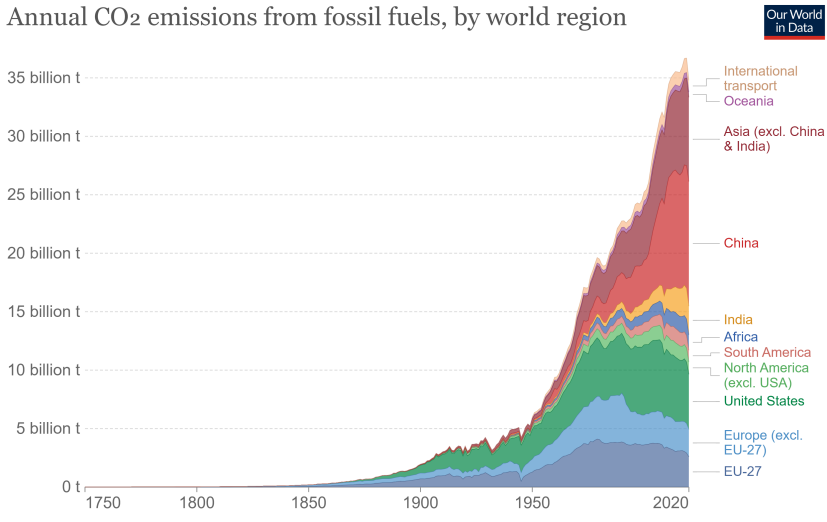
# Inequality

- For those who live in the poorest countries, life is pretty much like it was for the rest of humanity prior to 1800
- The world's poor live in rural areas or slums, don't eat enough, lack access to safe water, live short lives, are in poor health, lack education
- On top of that, many live in autocracies or failed states, suffer from violence, and as result are not satisfied with life

# Atmospheric $CO_2$ Concentration



# $CO_2$ Emissions

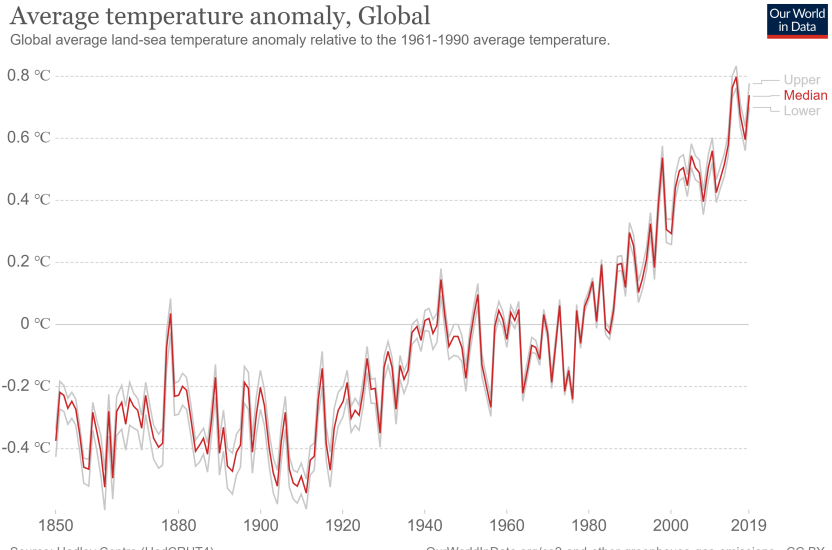



Source: Global Carbon Project

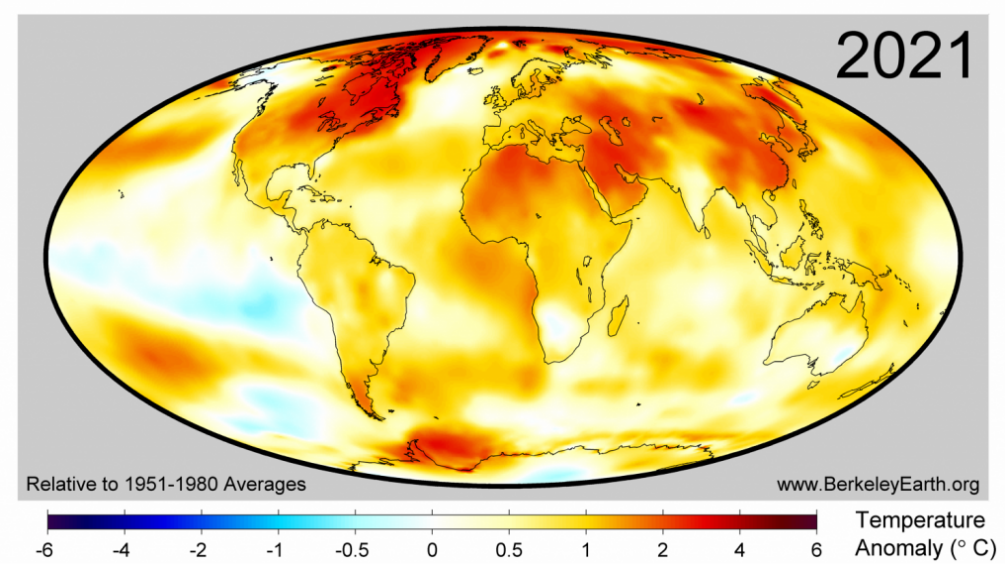
OurWorldInData.org/co2-and-other-greenhouse-gas-emissions • CC BY

Note: This measures $CO_2$ emissions from fossil fuels and cement production only – land use change is not included. 'Statistical differences' (included in the GCP dataset) are not included here.

# Global Temperature

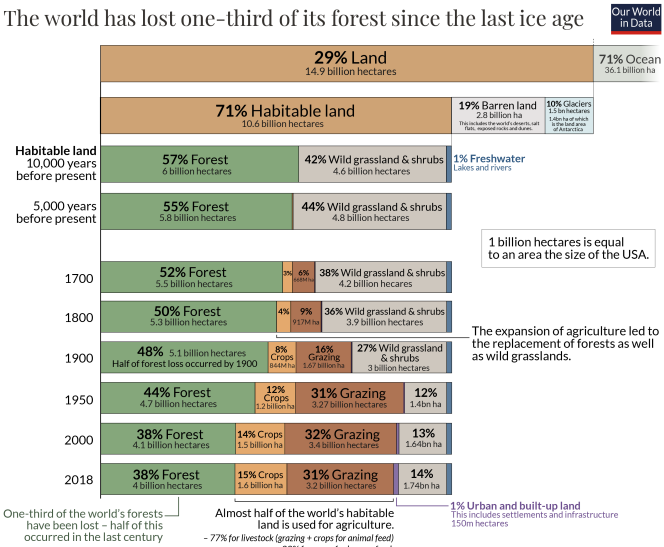


# Temperature Anomaly



# Shrinking Forest

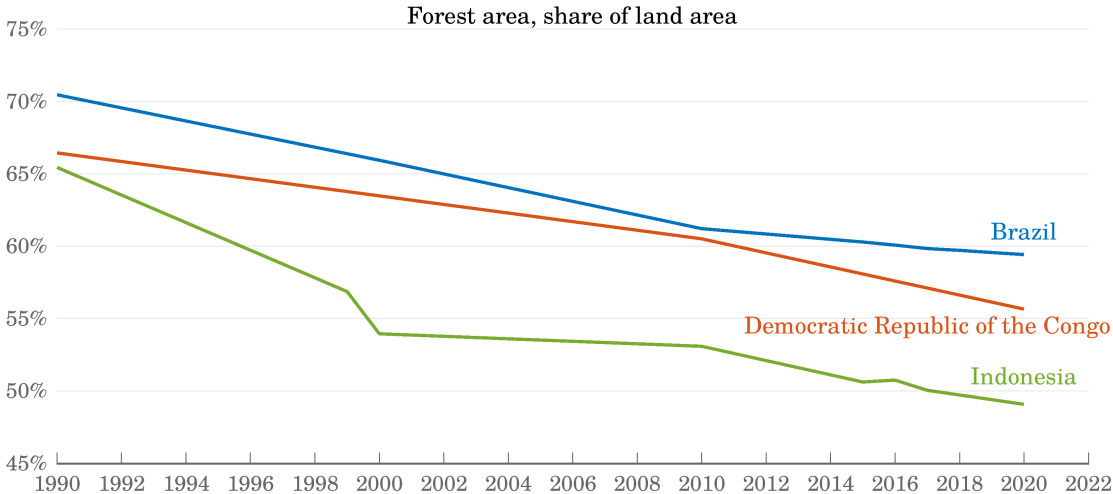
The world has lost one-third of its forest since the last ice age




Data sources: Forests data from UN Food and Agriculture Organization (FAO); and Williams, M. (2003). Deforesting the earth: from prehistory to global crisis. Agriculture data post-1950 from UN FAO; pre-1950 data from The History Database of the Global Environment (HYDE

OurWorldinData.org – Research and data to make progress against the world's largest problems.

# Shrinking Rainforest



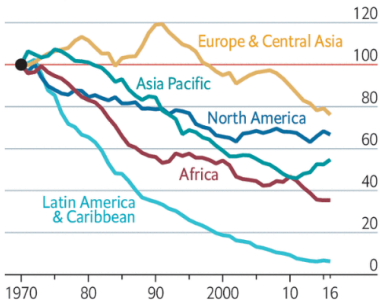

Source: Food and Agriculture Organization

# Animals vs Humans

## Invasive species

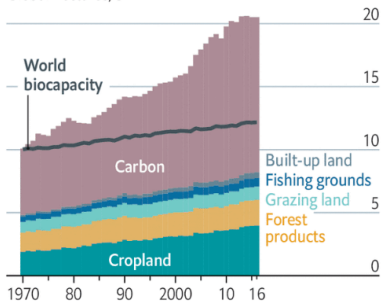
### Living Planet Index, species populations

1970=100




### Humanity's ecological footprint

Global hectares, bn




Sources: WWW International; Zoological Society of London

The Economist

# The Environment

- The world has lost one third of its forests
- The size of vertebrate animal populations has declined by 60% in 50 years
- Economic growth has nefarious effects on the environment: air, oceans, soil, plants, animals, fresh water
- Movie recommendation: *Cowspiracy* (2014) and *Seaspiracy* (2021)
- We are destroying our planet at a worrying rate

# The Ultimate Goal

- Lifting all countries out of poverty and sharing the world's wealth more equally among all individuals is arguably the biggest challenge we face
- And doing this in a sustainable way is crucial
- Economists can play a role by identifying the sources of sustainable economic growth and promoting the right policies and institutions
- So what are the determinants of economic growth?

# Sources of Economic Growth

- There is no consensus as to what causes economic growth
- Economists generally distinguish between two levels of causes

1. Proximate causes
2. Fundamental causes

# Proximate Causes

- At a basic level, output $Y_t$ in an economy grows thanks to three factors

$$Y_t = F(K_t, H_t, A_t)$$

1. Accumulation in physical capital $K_t$, generated by investments in infrastructure, buildings, machinery, tools
2. Accumulation in human capital $H_t$, generated by population growth, labor force participation, and education
3. Increases in productivity $A_t$, due to innovation and technological progress

# Proximate Causes

"The factors we have listed (innovation, economies of scale, education, capital accumulation. etc.) are not causes of growth; they are growth."

North and Thomas, 1973, *The Rise of the Western World: A New Economic History*

# Fundamental Causes

- But why don't poor societies accumulate physical and human capital and improve their technology?
- At a deeper level, the fundamental causes of growth are still debated
- Four leading theories are

1. Luck
2. Geography
3. Culture
4. Institutions

- See Chapter 4 in Acemoglu (2009) for a discussion

# Conundrum

"No country has ever ended human deprivation without a growing economy. And no country has ever ended ecological degradation with one."

Kate Raworth, 2017, *Doughnut Economics*

# Economic Growth as a Field

- Economic growth is one of the most studied topics in economics
- The issue is so broad and crucial that it is being tackled by different fields
  - Growth theory started as part of macroeconomics
  - The study of poor countries is the focus of development economics
  - Institutions, inclusive vs exclusive, are the subject of political economy
  - Productivity growth has to do with industrial organization
  - How developed countries became rich is economic history

# This Course

- We are going to study the foundational theories developed by economists to study economic growth and other long-run phenomena

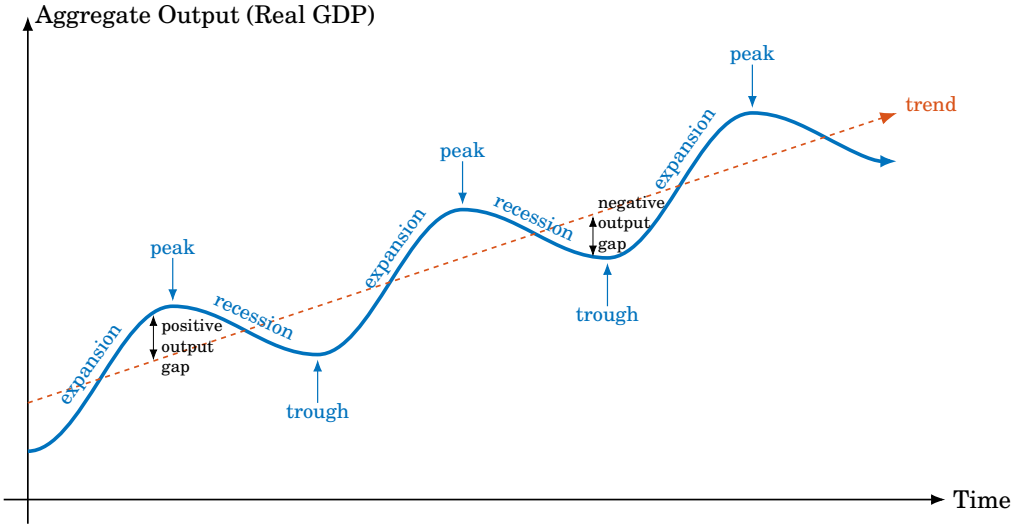
1. Neoclassical growth theory
2. Overlapping generations models
3. Endogenous growth theory

# 2. The Short Run: Business Cycles

# What Is a Business Cycle?

- A business cycle is a fluctuation in a country's aggregate economic activity
- It is broad and affect many sectors of the economy
- It consists typically of an expansion and a recession
- It is recurrent but not periodic
- It varies in duration and amplitude

# Anatomy of Business Cycles



# Characteristics of Business Cycles

- We usually define the cycle as detrended GDP
- Every other (detrended) macroeconomic variable can be

1. Procyclical, countercyclical, or acyclical
2. More volatile, less volatile, or as volatile
3. Coincident, leading, or lagging

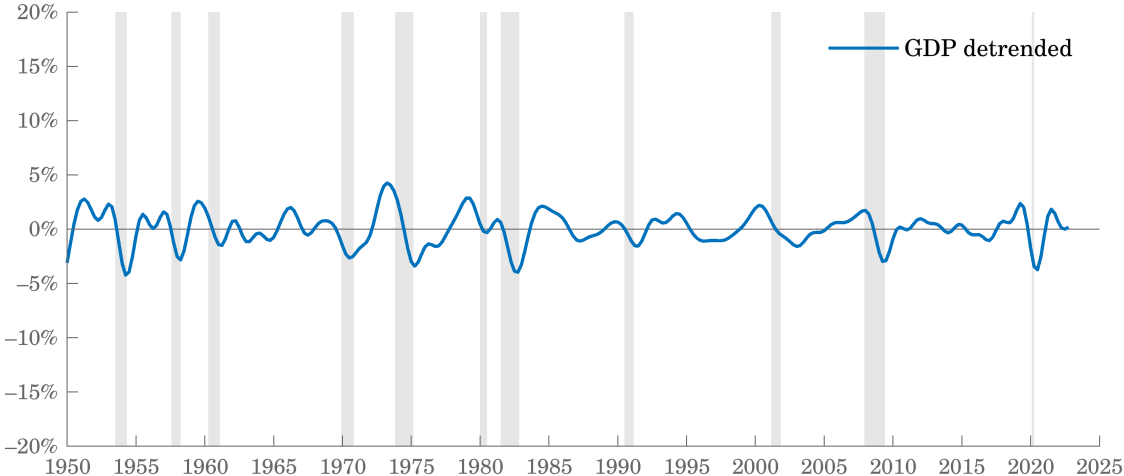
# National Accounting

- The five components of GDP are (numbers are for the US in 2022Q4)

$$\underbrace{Y_t}_{100\%} = \underbrace{C_t}_{60\%} + \underbrace{I_t}_{27\%} + \underbrace{G_t}_{17\%} + \overbrace{\underbrace{X_t}_{12\%} - \underbrace{M_t}_{15\%}}^{-3\%}$$

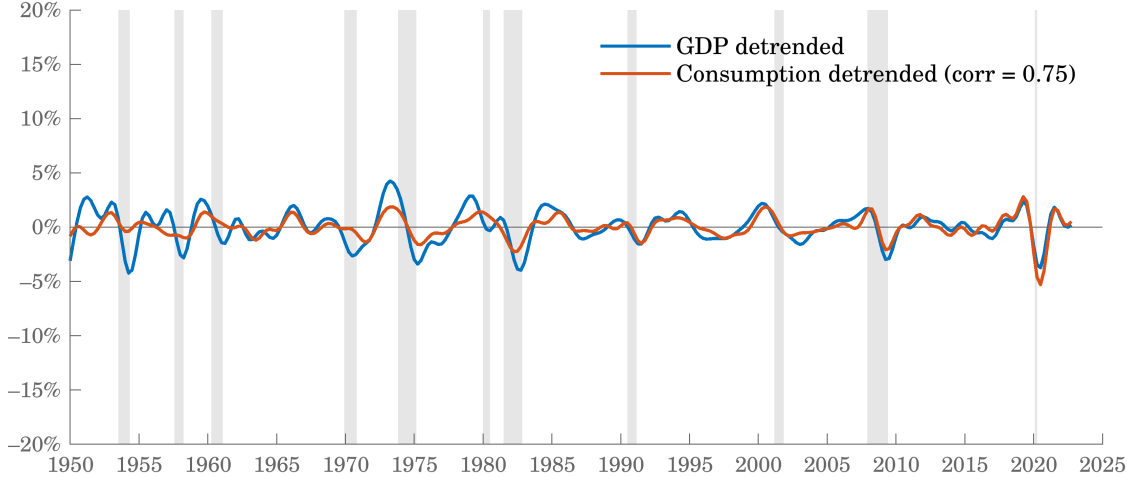
- The biggest component of output by far is household consumption
- Let's look at the cyclical properties of these key macroeconomic variables

# GDP



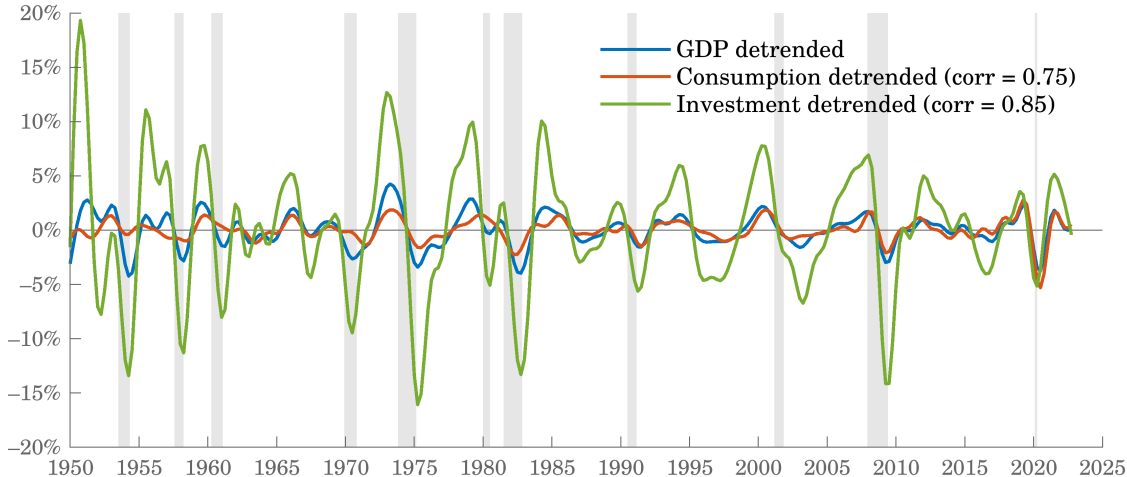

Source: US Bureau of Economic Analysis

# GDP and Consumption



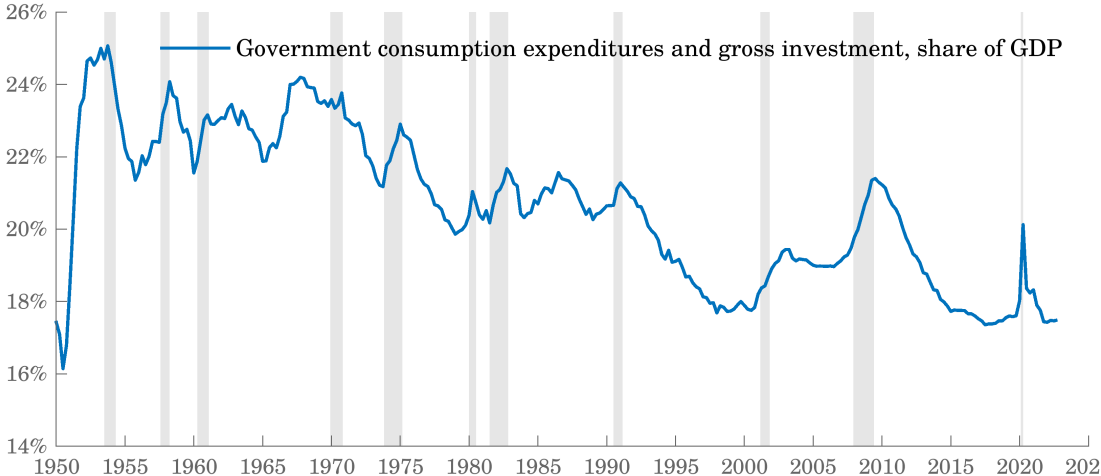

Source: US Bureau of Economic Analysis

# GDP, Consumption, and Investment



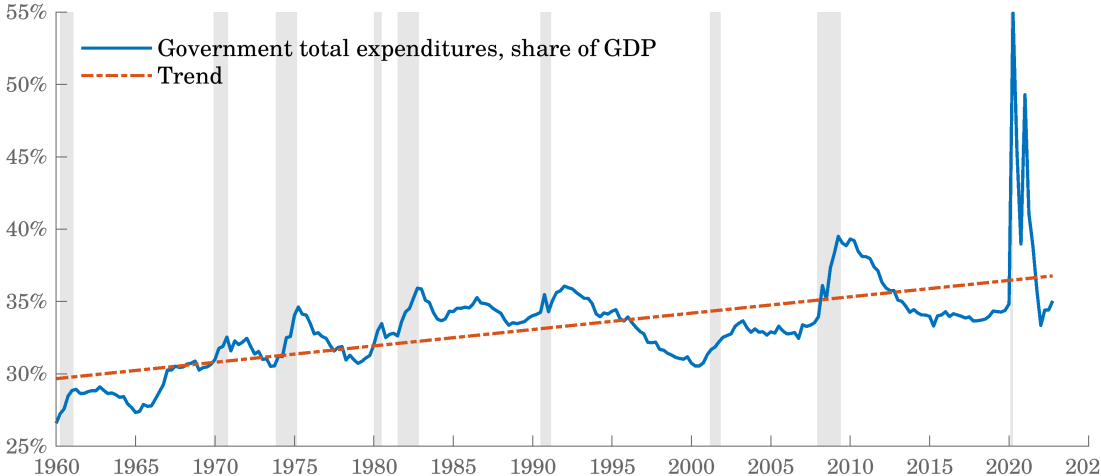

Source: US Bureau of Economic Analysis

# Government Contribution to GDP



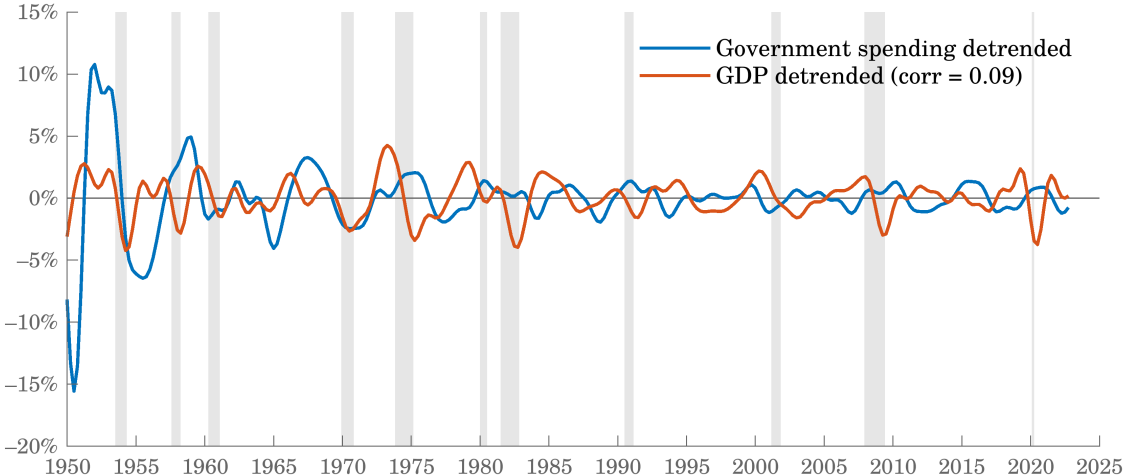

Source: US Bureau of Economic Analysis

# Total Government Expenditure



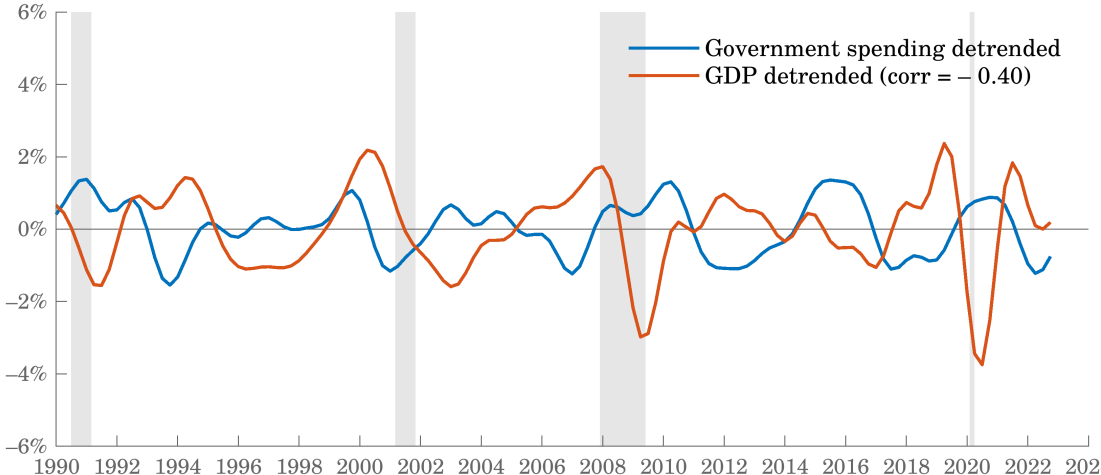

Source: US Bureau of Economic Analysis

# Government Spending and GDP



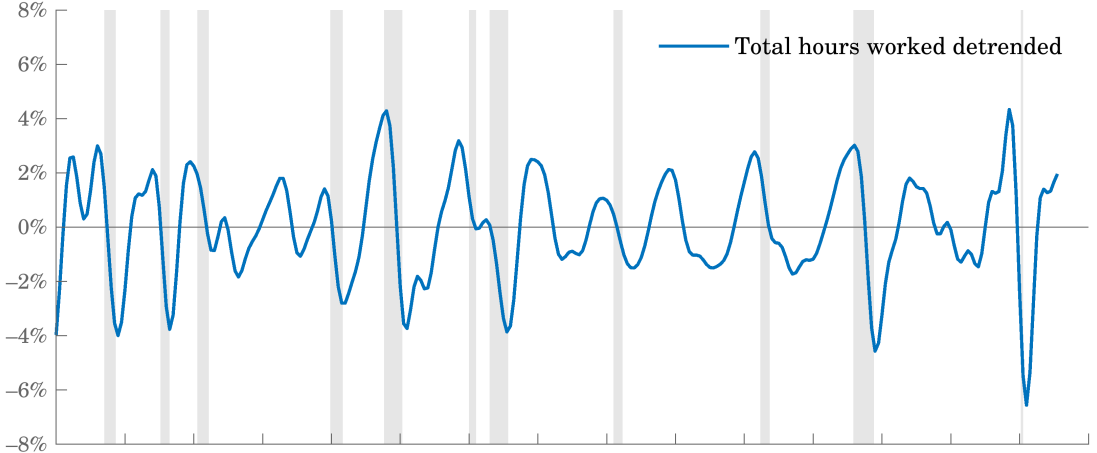

Source: US Bureau of Economic Analysis

# Government Spending and GDP, More Recent Period



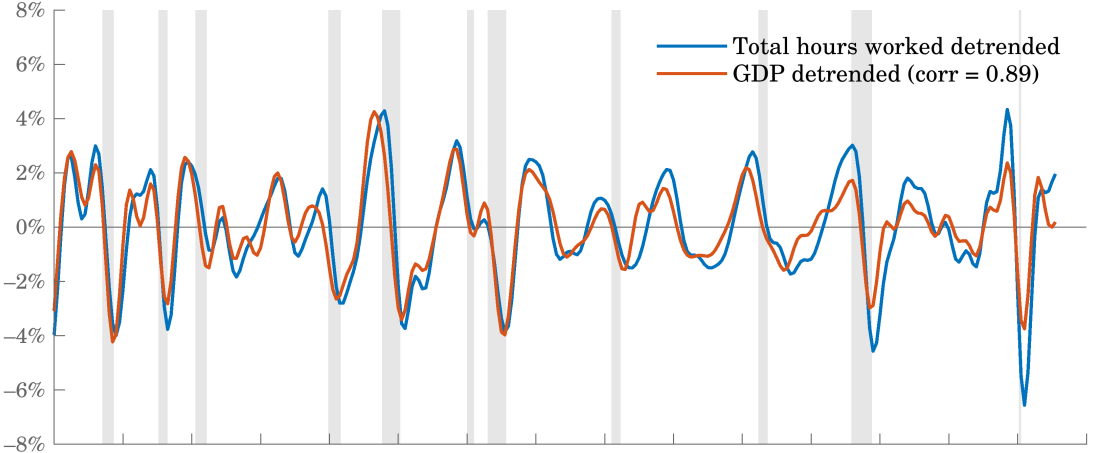

Source: US Bureau of Economic Analysis

# Employment




Source: US Bureau of Labor Statistics

# Employment

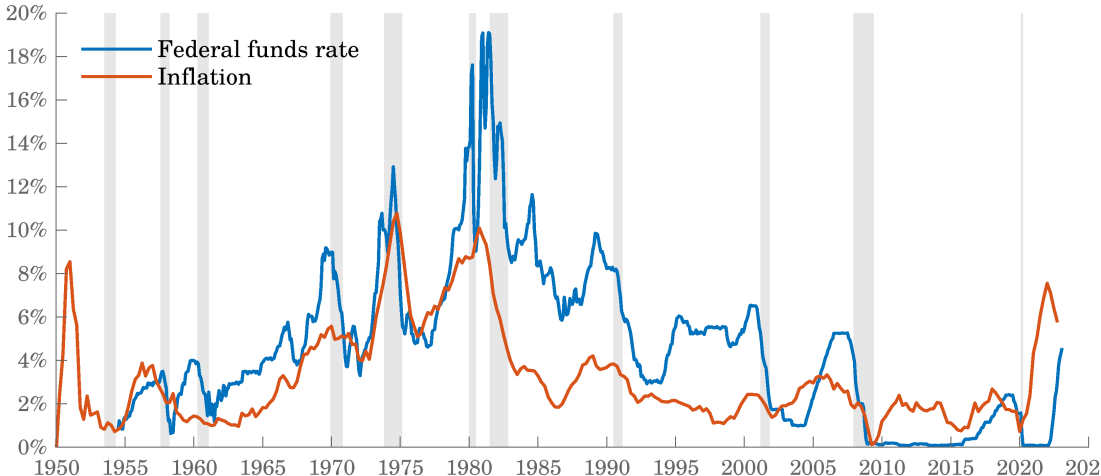



Sources: US Bureau of Labor Statistics and US Bureau of Economic Analysis

# Unemployment

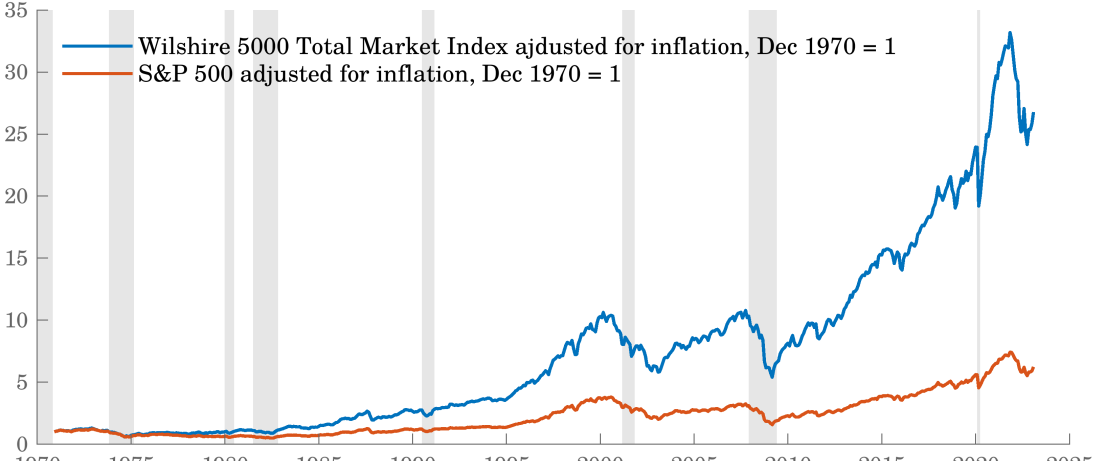

Source: US Bureau of Labor Statistics

# Nominal Interest Rate and Inflation



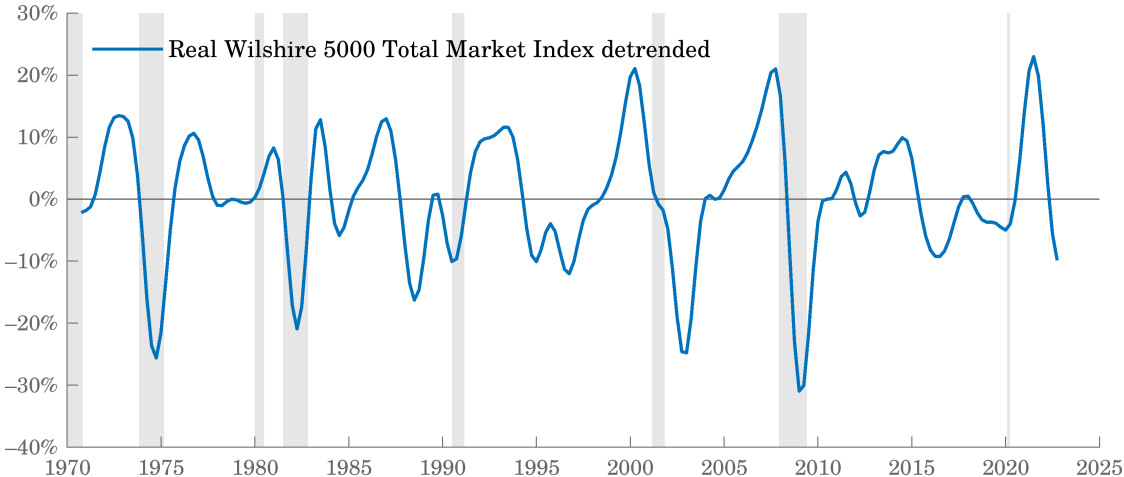

Sources: Federal Reserve Board and US Bureau of Economic Analysis

# Stock Market



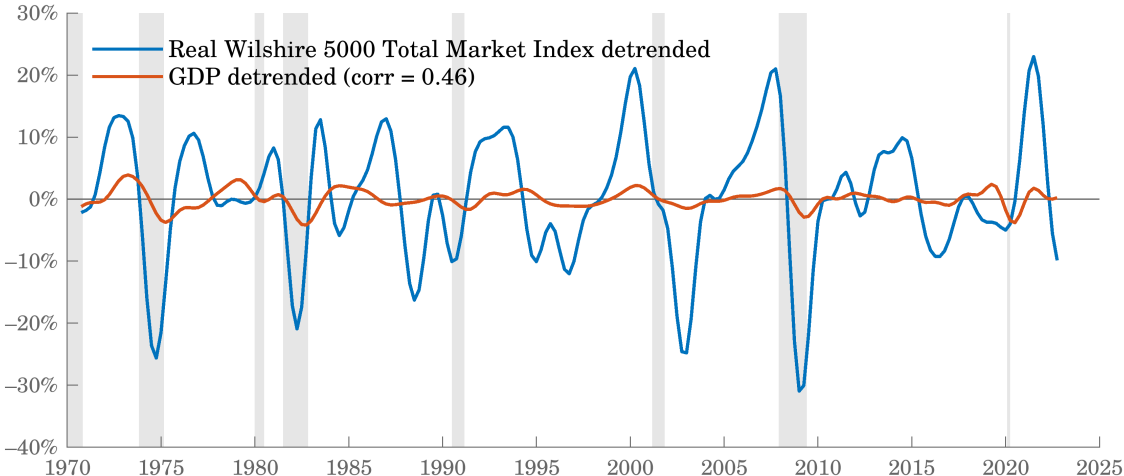

Sources: Wilshire Associates and Robert Shiller

# Stock Market, Detrended




Source: Wilshire Associates

# Stock Market and GDP




Sources: Wilshire Associates and US Bureau of Economic Analysis

# Comovements

- Most macroeconomic and financial aggregates are positively correlated with GDP, ie they are procyclical
- This is what macroeconomists refer to as the comovements
- Examples of countercyclical variables include government spending (in rich countries only), unemployment, credit spreads

# Volatility

- Some variables such as hours worked are as volatile as GDP
- Some variables such as investment and the stock market are much more volatile than GDP
- Some variables such as consumption are less volatile than GDP (this is not always true in developing economies)

# Timing

- Most variables are coincident with GDP
- Some variables such as the stock market lead the cycle
- Some variables such as unemployment lag the cycle

# Summary – US Cyclical Behavior, 1975Q1–2022Q1

| Variable | Std. Dev. | Corr. with GDP | Direction | Timing |
|---|---|---|---|---|
| GDP | 1.00 | 1.00 | Reference | Reference |
| Consumption | 0.81 | 0.84 | Procyclical | Coincident |
| Investment | 3.62 | 0.90 | Procyclical | Coincident |
| Government spending | 1.67 | −0.47 | Countercyclical | Coincident |
| Exports | 3.85 | 0.58 | Procyclical | Lagging |
| Imports | 4.35 | 0.78 | Procyclical | Leading |
| Net exports | 11.51 | −0.49 | Countercyclical | Coincident |
| Hours worked | 1.30 | 0.91 | Procyclical | Coincident |
| Unemployment | — | −0.89 | Countercyclical | Lagging |
| Wage | 0.80 | −0.09 | Acyclical | Coincident |
| Output per hour | 0.57 | 0.50 | Procyclical | Coincident |
| Inflation | — | 0.50 | Procyclical | Lagging |
| Nominal interest rate | — | 0.61 | Procyclical | Coincident |
| Real interest rate | — | 0.21 | Procyclical | Coincident |
| House prices | 1.20 | 0.47 | Procyclical | Leading |
| Stock prices | 7.22 | 0.42 | Procyclical | Leading |
| Credit | 1.16 | 0.35 | Procyclical | Lagging |

All variables are detrended using a bandpass filter

# This Course

- We are going to study the foundational theories developed by economists to study short-run fluctuations

1. Complete markets theory and rudiments of asset pricing
2. Real business cycle theory
3. Theories of the labor market: search, search and matching
4. Monetary theory and nominal rigidities (Macro II, Macro III)

# 3. Plan of the Course

# Methods

- In order to understand, criticize, and perhaps contribute to macroeconomic theory, we need to learn the tools of modern macroeconomics
- These tools are mathematical, analytical, and numerical methods designed to set up and solve dynamic models
- In this course we will study these methods, including

1. Some time series basics
2. Dynamic programming
3. Optimal control

# Concepts

- In the process of learning methods and theories we will go over key concepts that are the bedrock of macroeconomic theory

1. State: exogenous vs endogenous, deterministic vs stochastic, steady
2. Market: complete vs incomplete, frictionless vs market failures
3. Equilibrium: competitive vs centralized, partial vs general, recursive

# Policy

- Why do we study economics?
- First to understand how the world functions, ie a positive approach
- But ultimately to change and improve the world, ie a normative approach
- Thus economics is intrinsically linked to policy; in macroeconomics the two broad areas of policy are fiscal policy and monetary policy
- We will study important fiscal policy questions such as government spending, taxation, public debt, social security

# Course Outline

1. Introduction (today)
2. Time Series Basics
3. Dynamic Programming
4. Search
5. The Neoclassical Growth Model
6. Complete Markets 1
7. Complete Markets 2
8. Recursive Competitive Equilibrium
9. The Stochastic Growth Model
10. Real Business Cycles
11. Fiscal Policy in the Growth Model
12. Optimal Taxation 1
13. Optimal Taxation 2
14. Overlapping Generations 1
15. Overlapping Generations 2
16. Overlapping Generations 3
17. Search and Matching 1
18. Search and Matching 2
19. Optimal Control 1
20. Optimal Control 2
21. Endogenous Growth 1
22. Endogenous Growth 2
23. Endogenous Growth 3

# Main Reference

- The slides are the main reference for the course and are available at

  `https://sites.google.com/view/yvanbecard`

- You can email me at any time at

  `yvan.becard@econ.puc-rio.br`

# Monitoria

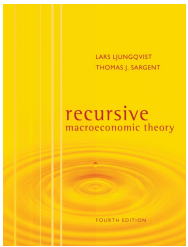
- Guilherme Luz will be your TA this semester
- He is here to help you with problem sets and other questions you may have
- At the end of each set of slides you will find exercises
- I highly recommend you to try and solve them at home

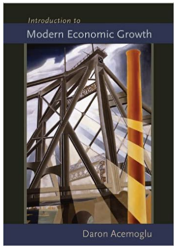
# Grading

- There will be two exams: P1 on Tuesday, May 2; P2 on Wednesday, July 5
- Each exam accounts for 45 percent of the final grade
- The remaining 10 percent consists of problem sets you must hand in
- If you study the slides carefully each week and do all the suggested exercises, you will do well this at the exams!

# Main Textbook References

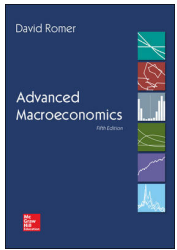
- Lars Ljungqvist and Thomas Sargent, 2018, *Recursive Macroeconomic Theory*, Fourth Edition, The MIT Press
- Daron Acemoglu, 2009, *Introduction to Modern Economic Growth*, First Edition, Princeton University Press



# Additional Reference

- The two main reference textbooks will help us master the concepts and methods needed to understand and conduct macroeconomic research
- This won't leave much time to cover the latest issues debated by economists
- For a good overview on a wide range of current macro questions, read David Romer, 2019, *Advanced Macroeconomics*, Fifth Edition, McGraw-Hill



# Good Books

| Field | Author(s) | Year | Title |
|---|---|---|---|
| Macroeconomics, development, inequality | Joseph Stiglitz | 2002 | *Globalization and Its Discontents* |
| | Abhijit Banerjee & Esther Duflo | 2011 | *Poor Economics* |
| | Daron Acemoglu & James Robinson | 2012 | *Why Nations Fail* |
| | Kate Raworth | 2017 | *Doughnut Economics* |
| | Thomas Piketty | 2019 | *Capital and Ideology* |
| Financial economics | Carmen Reinhart & Kenneth Rogoff | 2009 | *This Time Is Different* |
| | Atif Mian & Amir Sufi | 2014 | *House of Debt* |
| | Jeremy Siegel | 2014 | *Stocks for the Long Run* |
| | Robert Shiller | 2015 | *Irrational Exuberance* |
| | Burton Malkiel | 2019 | *A Random Walk Down Wall Street* |
| Microeconomics, behavioral | Stephen Dubner & Steven Levitt | 2005 | *Freakonomics* |
| | Richard Thaler & Cass Sunstein | 2008 | *Nudge* |
| | Daniel Kahneman | 2011 | *Thinking Fast and Slow* |
| | Robert Shiller | 2019 | *Narrative Economics* |

# Macroeconomics Is Cool

"Among economists more generally, a lot of the criticism seems to amount to the view that macroeconomics is bunk, and that we should stick to microeconomics, which is the real, solid stuff. As I'll explain in a moment, that's all wrong. In fact, in an important sense the past decade has been a huge validation for textbook macroeconomics; meanwhile, the exaltation of micro as the only 'real' economics both gives microeconomics too much credit and is largely responsible for the ways macroeconomic theory has gone wrong."

Paul Krugman, 2018, "What Do We Actually Know About the Economy?"

# Be Critical

"Study economics, but study it with skepticism
and study it within the broader concept."

Joseph Stiglitz, 2012, "Questioning the value of economics"