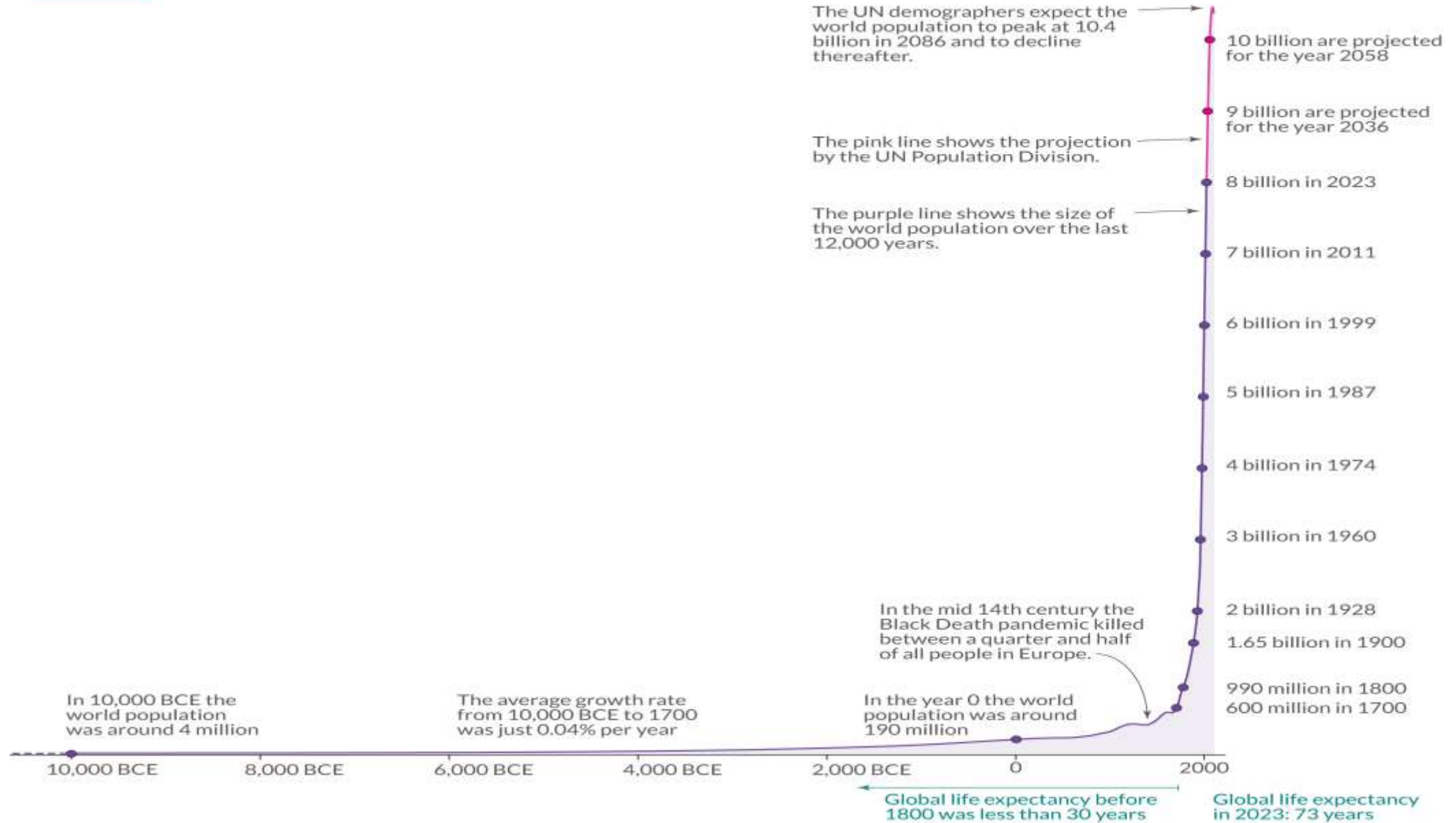


Economic Growth

Who, What, When, Where, How, and Why

The size of the world population over the long-run



Based on estimates by the History Database of the Global Environment (HYDE) and the United Nations.

This is a visualization from [OurWorldinData.org](https://www.ourworldindata.org).

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One Planet, Two Worlds

The Malthusian World

~10,000 BCE – Present



- Growth in real productivity (real GDP) leads to larger populations.
- Larger populations exhaust real productivity increases.
- Therefore, real GDP per capita stays the same.
- Productivity produces people, not prosperity.

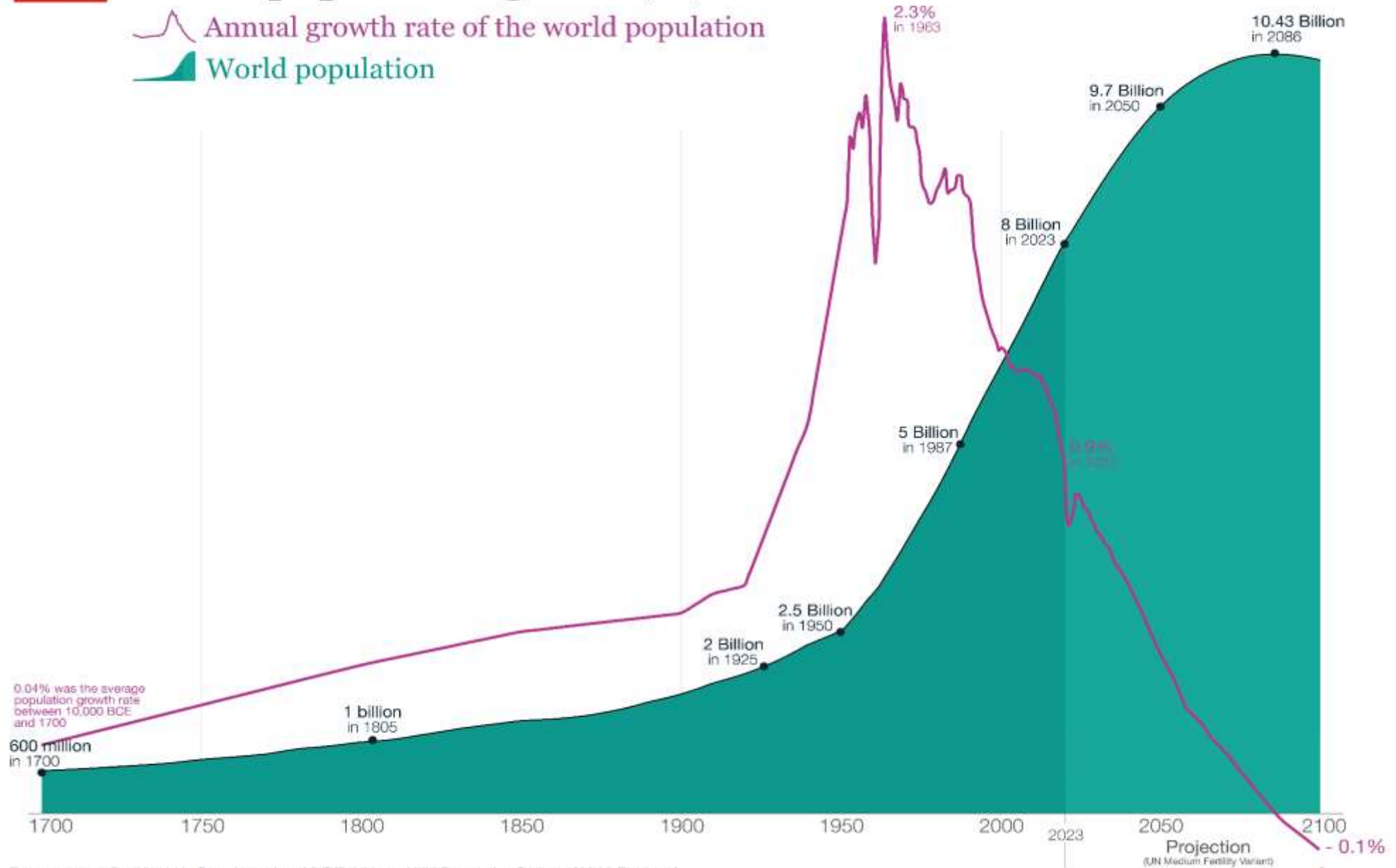
The Smithian World

~1600 CE – Present

- Growth in real productivity (real GDP) leads to larger populations.
- Larger populations mean more opportunities for even more productivity increases.
- Therefore, real GDP per capita rises with population.
- Productivity produces people AND prosperity.

World population growth, 1700-2100

 Annual growth rate of the world population
 World population



Data sources: Our World in Data based on HYDE, UN, and UN Population Division (2022 Revision)
This is a visualization from [OurWorldinData.org](https://ourworldindata.org), where you find data and research on how the world is changing.

Population Growth Dynamics

Why population growth rates peaked in the early 1960s

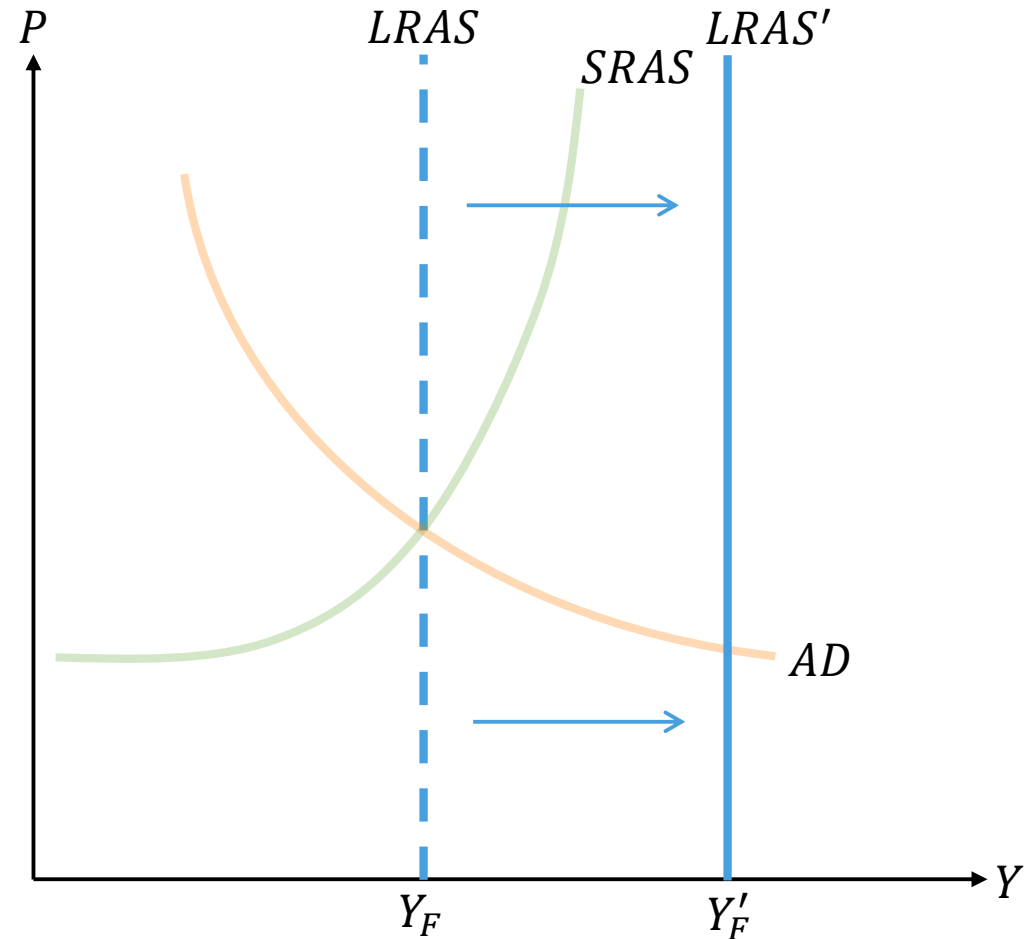
- Medical advances have increased longevity, prevented death common before
- Medicine and neonatal care have reduced infant mortality
- Green Revolution brought modern, western farming to the world after WWII

Why population growth rates have fallen since the 1960s

- Women's liberation means women are marrying and starting families later
- Lower infant mortality rates have also reduced fertility rates
- Parents choose to have fewer children with more investment in each

What is economic growth?

- Economic growth shows itself most obviously and most forcefully in the expansion of an economy's **productive capacity**.
- In our AD/AS model of the macroeconomy, this is represented by the **long-run aggregate supply curve (LRAS)**.
- The *LRAS* shifts outward when an economy's **access to resources**, **technological capabilities**, or **institutional environment** improve.



Economic growth or economic development?

Economists measure **growth** in terms of changes in **real GDP** over time.

But economic **development**, a much broader concept, includes improvements in quality of life, which could be measured across a number of facets—physical, mental, emotional, spiritual, etc. So how do we sum it up?

Economists rely on **real GDP per capita** as a **proxy** for economic **development**, even though the measure is highly imperfect.

Top 10 Countries: GDP and GDP/capita

Rank	Country	GDP	GDP per capita	Per capita Rank
1	China	35.3 T	25.0 K	73
2	United States	28.8 T	85.4 K	8
3	India	14.6 T	10.1 K	125
4	Japan	6.7 T	54.2 K	32
5	Germany	5.7 T	67.2 K	21
6	Russia	5.5 T	38.3 K	55
7	Indonesia	4.7 T	16.9 K	96
8	Brazil	4.2 T	20.9 K	79
9	United Kingdom	4.0 T	58.9 K	28
10	France	4.0 T	60.3 K	26

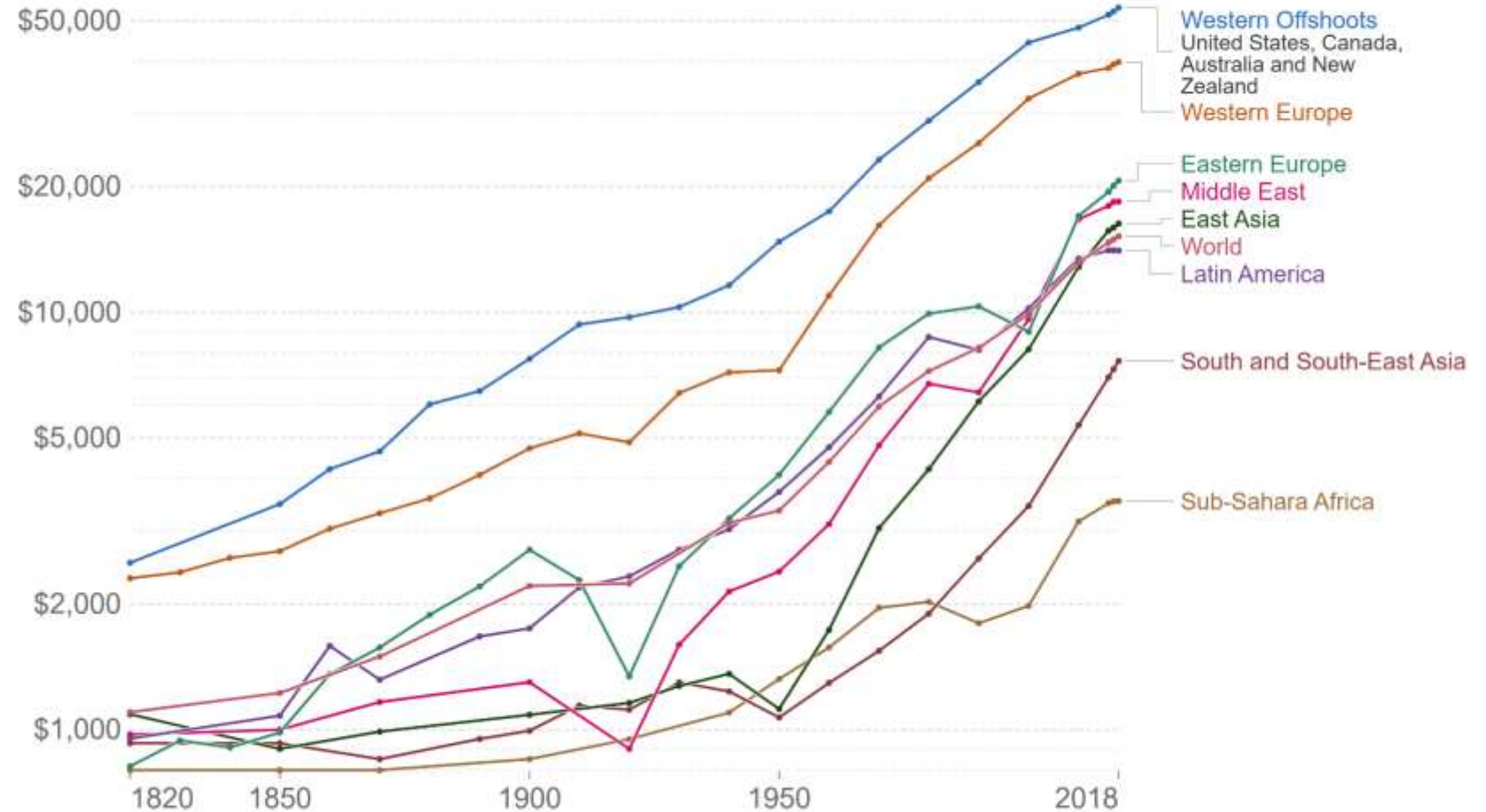
Rank	Country	GDP per capita	Population	GDP Rank
1	Luxembourg	143 K	650 K	100
2	Ireland	134 K	5,149 K	41
3	Singapore	134 K	5,917 K	38
4	Qatar	112 K	3,000 K	60
5	United Arab Emirates	96.8 K	9,970 K	34
6	Switzerland	91.9 K	8,637 K	36
7	San Marino	87.0 K	34 K	180
8	United States	85.4 K	340,332 K	2
9	Norway	82.9 K	5,368 K	52
10	Guyana	80.1 K	792 K	116

Real GDP per capita

WO:	21.39x
WE:	17.25x
EE:	25.29x
ME:	18.92x
World:	13.80x
EA:	14.99x
LA:	14.77x
SSEA:	8.23x
SSA:	4.42x

GDP per capita, 1820 to 2018

This data is adjusted for differences in the cost of living between countries; and for inflation. It is measured in constant 2011 international-\$.
Our World in Data



Source: Maddison Project Database 2020 (Bolt and van Zanden, 2020)

OurWorldInData.org/economic-growth • CC BY

What is economic growth?

Sub-Saharan Africa has had the **lowest** real GDP per capita growth rate of any part of the world over the last 200 years

Yet their 4.42x increase means a 342% growth rate, which works out to an average of 0.7506% per year, **less than 1% a year**

Slow and steady growth over **long periods** produces HUGE gains

Compound Growth

Periodic Compounding

$$F = P(1 + r)^t$$

F = future value

P = present value

r = rate of growth

t = number of periods of growth

Continuous compounding

$$F = Pe^{rt}$$

F = future value

P = present value

e = Euler's number (≈ 2.7182)

r = rate of growth

t = number of periods

Compound Growth

For periodic compounding, if $F = 2P$, then

$$\begin{aligned}2P &= P(1 + r)^t \\2 &= (1 + r)^t \\ \ln 2 &= t \cdot \ln(1 + r) \\0.69315 &= \ln(1 + r)\end{aligned}$$

If you don't want to mess with calculating that logarithm, **72** is a good approximation. At least, 72 does really well for $r \approx 8\%$; for every 3% above (below) 8%, add (subtract) 1. So for 5%, use 71, for 11%, use 73.

For continuous compounding, if $F = 2P$, then

$$\begin{aligned}2P &= Pe^{rt} \\2 &= e^{rt} \\ \ln 2 &= rt \\0.69315 &= rt\end{aligned}$$

This calculation will always be accurate, but **69.3** isn't divisible by much! For this reason we use **70** for continuously compounded growth. It's a good approximation.

What is economic growth?

By 2018, Sub-Saharan Africa had grown its real GDP per capita by more than **four times its 1820 level** with an **average of less than 1% annual growth**.

Over the period 1982 to 2022, China's **average** real GDP per capita growth was 8.29%; India, 4.13%; Upper-and-middle income countries, 3.60%; and the United States, 1.70%.

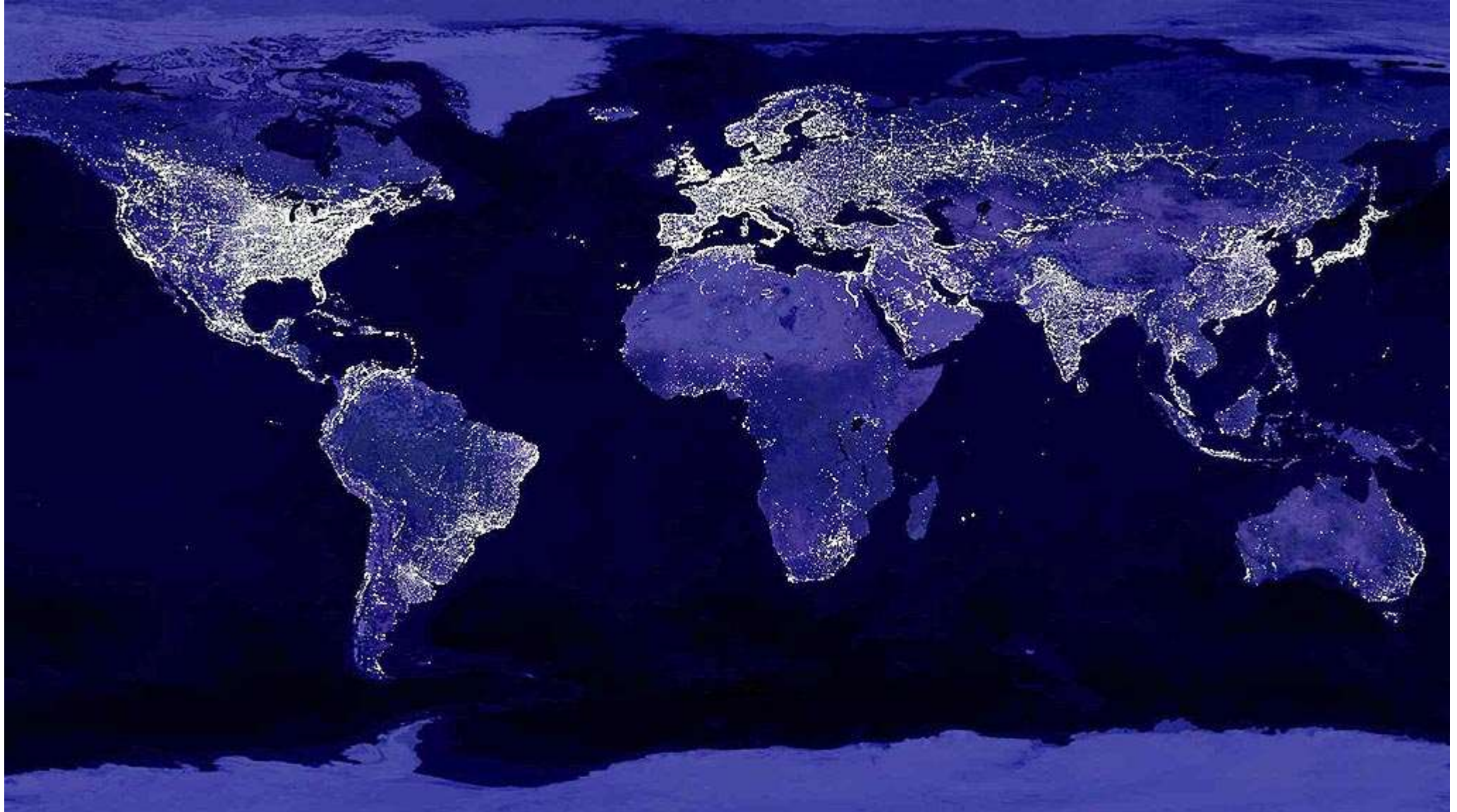
When did economic growth begin?

Modern economic growth begins with what we now call the Industrial Revolution in the middle-late 18th century

There had, of course, been spikes of real GDP per capita growth before that time, but they were all Malthusian growth

Traces of this transformation come from England and Holland in the 17th century, but much of NW Europe is growing by 1800

Where has economic growth happened?



How does economic growth happen?

Is economic growth (changes in real GDP per capita and concomitant shifts in quality of life) an automatic process?

Will it eventually come to everyone?

Can it be sped up or slowed down?

How?

Little else is requisite to carry a state to the **highest degree of opulence** from the **lowest barbarism** but *peace, easy taxes, and a tolerable administration of justice*: all the rest being brought about by **the natural course of things**.

Adam Smith in an early draft of
*An Inquiry into the Nature and Causes
of the Wealth of Nations*

How? The Natural Course of Things

Gains from trade, specialization, comparative advantage, PPF

Capital accumulation (physical, human, and information)

Entrepreneurship

- Arbitrage, Innovation, Imitation
- Productive, Nonproductive, Destructive

How? Role of Government

What about Peace, Easy Taxes, and a Tolerable Administration of Justice?

Economic Freedom of the World Index

<http://www.freetheworld.com/>

How? Role of Government

Economic Freedom of the World Index

1. Size of government (tax rates, G/Y , etc.)
2. Legal Structure and Property Rights
3. Sound Money
4. Access to International Trade
5. Regulatory Environment (banking, labor, capital flows)

How?

Adam Smith was right.

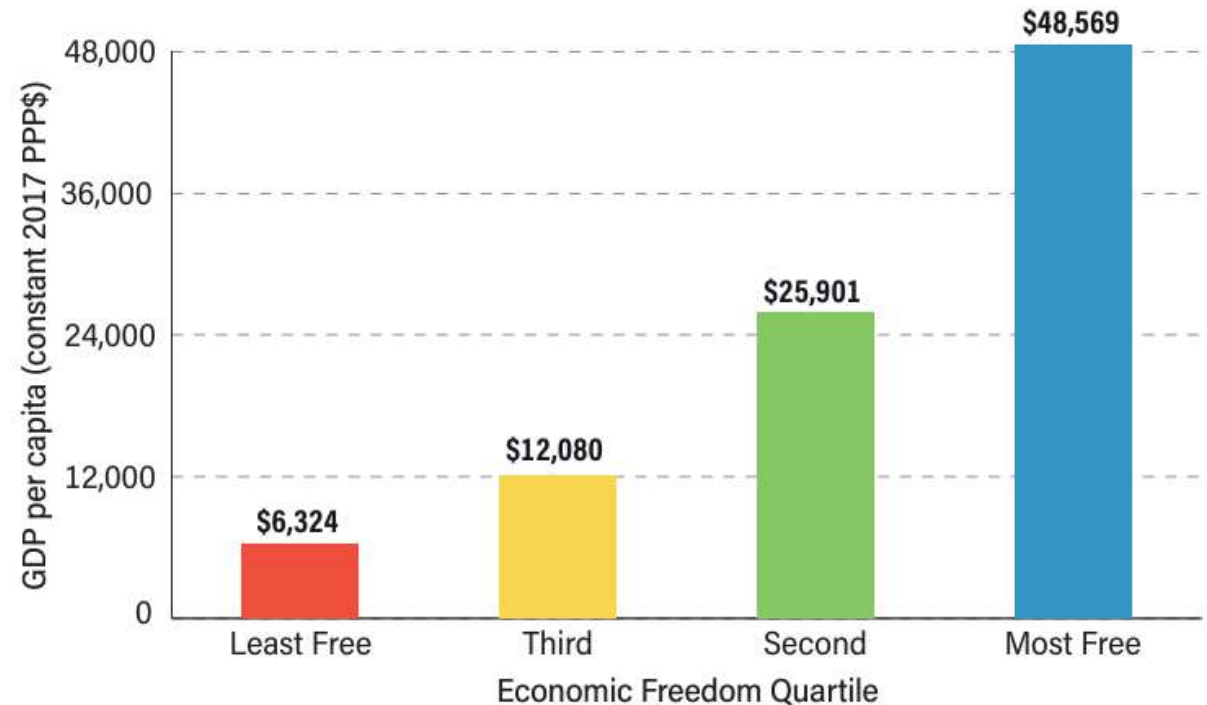
If countries **get the institutions right...**

Fruits of Economic Freedom

Higher GDP/capita

Exhibit 1.5: Economic Freedom and Income per Capita

Countries with greater economic freedom have substantially higher per-capita incomes.



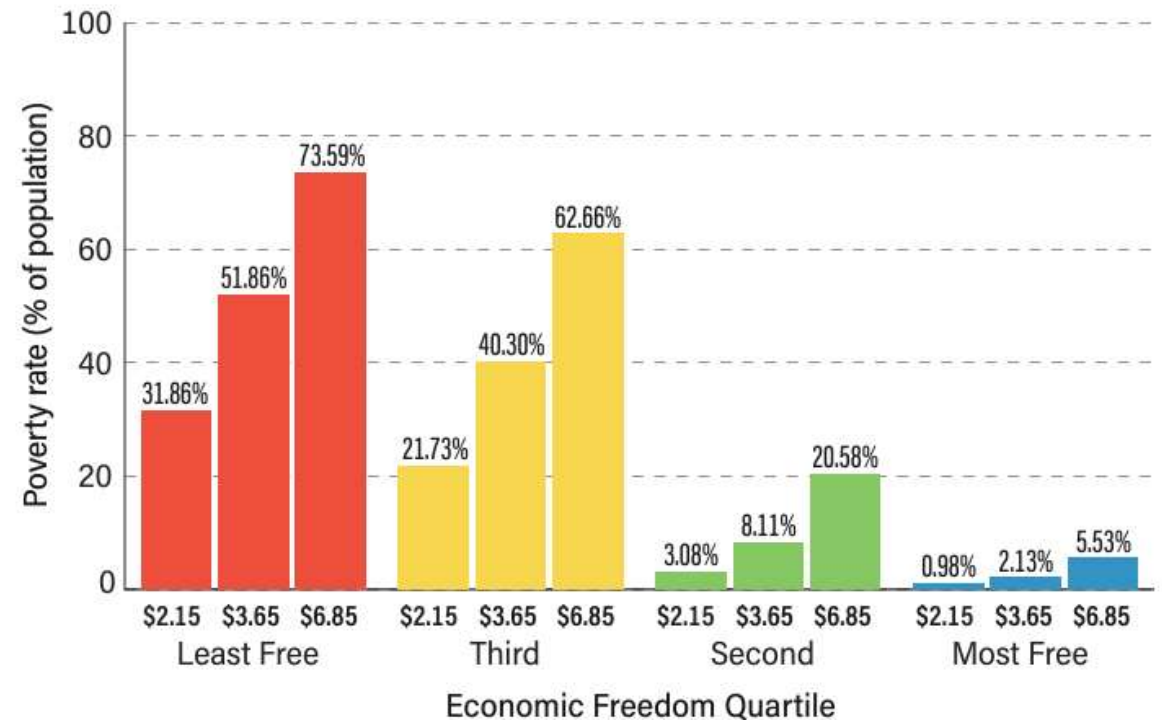
Sources: *Economic Freedom of the World: 2023 Annual Report*; World Bank, 2023, *World Development Indicators* [on-line database].

Fruits of Economic Freedom

Lower poverty rates

Exhibit 1.10: The Effect of Economic Freedom on Poverty Rates

Poverty rates are lower in countries with more economic freedom.



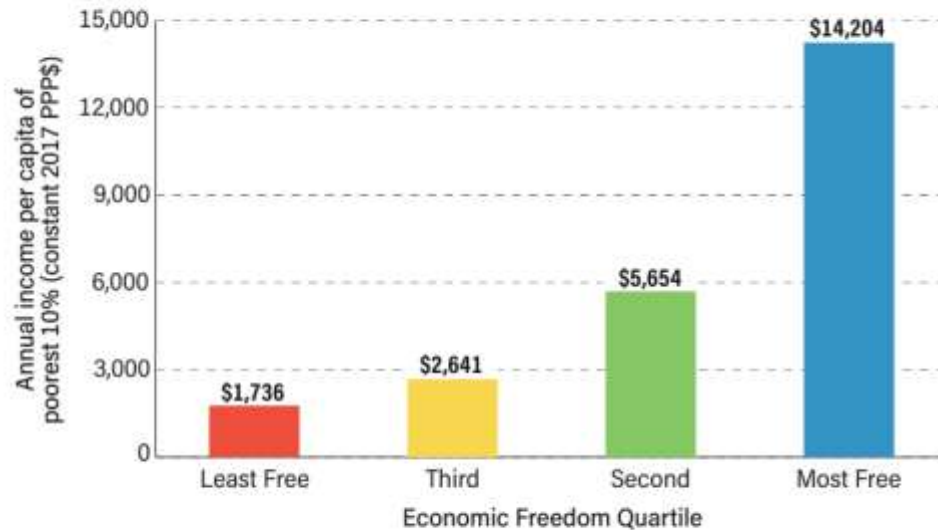
Note: The columns show, for each quartile, the percentage of a country's population that lives on \$2.15 per day, \$3.65 per day, or \$6.85 per day, in 2017 constant PPP-adjusted dollars. Sources: *Economic Freedom of the World: 2023 Annual Report*; World Bank, 2023, *World Development Indicators* [on-line database].

Fruits of Economic Freedom

A larger share of income and a higher standard of living for the poor

Exhibit 1.7: Economic Freedom and the Income Earned by the Poorest 10%

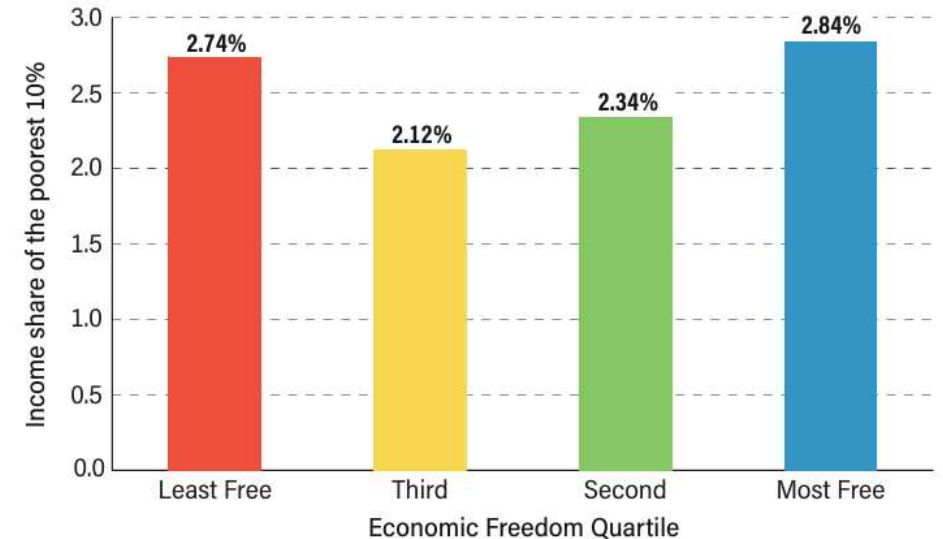
The amount of income, as opposed to the share, earned by the poorest 10% of the population is much higher in countries with higher economic freedom.



Sources: *Economic Freedom of the World: 2023 Annual Report*; World Bank, 2023, *World Development Indicators* [on-line database].

Exhibit 1.6: Economic Freedom and the Income Share of the Poorest 10%

The share of income earned by the poorest 10% of the population is unrelated to economic freedom.



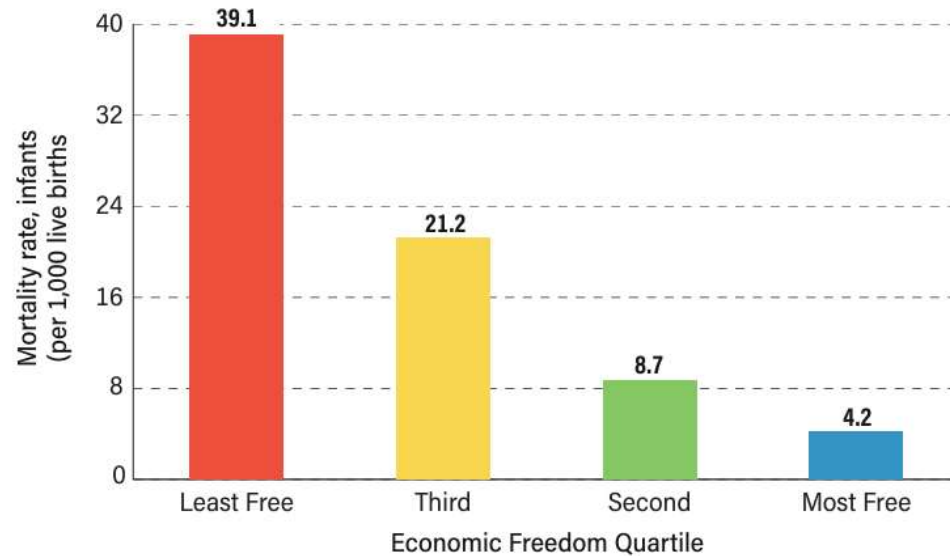
Sources: *Economic Freedom of the World: 2023 Annual Report*; World Bank, 2023, *World Development Indicators* [on-line database].

Fruits of Economic Freedom

Longer lives and lower infant mortality

Exhibit 1.9: Economic Freedom and Infant Mortality Rate

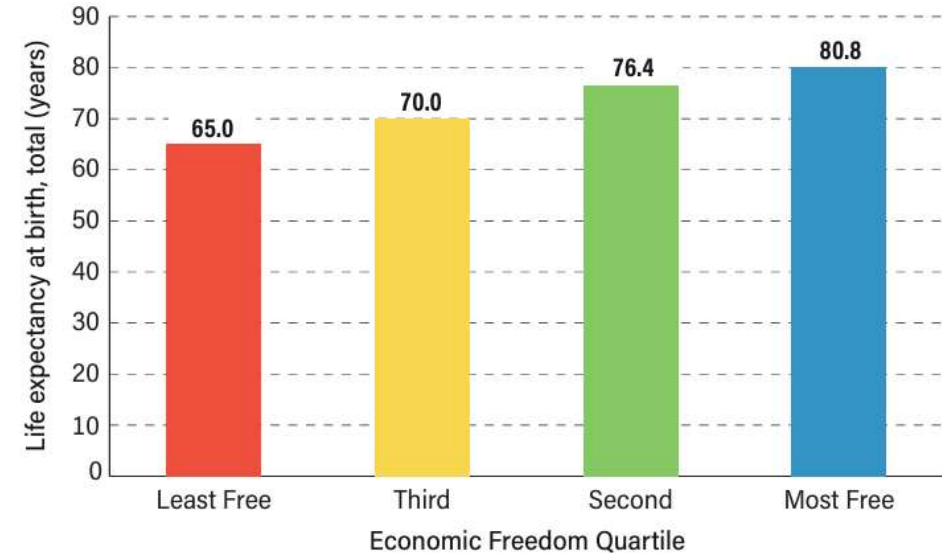
The infant mortality rate is almost ten times higher in nations in the lowest quartile of economic freedom than it is in nations in the highest quartile.



Sources: *Economic Freedom of the World: 2023 Annual Report*; World Bank, 2023, *World Development Indicators* [on-line database].

Exhibit 1.8: Economic Freedom and Life Expectancy

Life expectancy is almost 16 years longer in countries with the most economic freedom than it is in countries with the least.



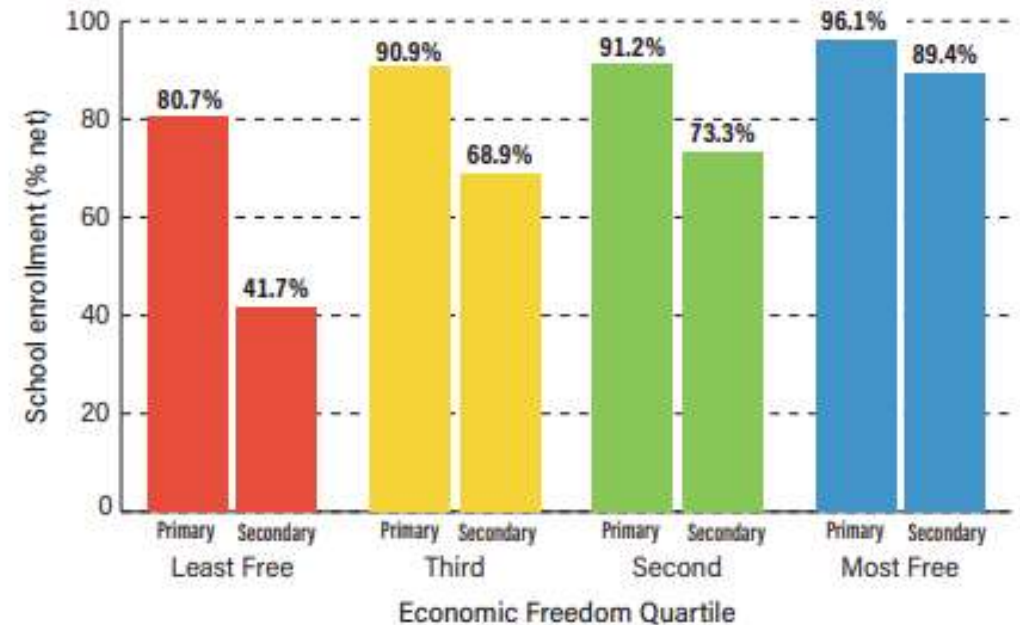
Sources: *Economic Freedom of the World: 2023 Annual Report*; World Bank, 2023, *World Development Indicators* [on-line database].

Fruits of Economic Freedom

Higher school enrollment

Exhibit 1.11: Economic Freedom and School Enrollment

School enrollment is higher in countries with greater economic freedom.

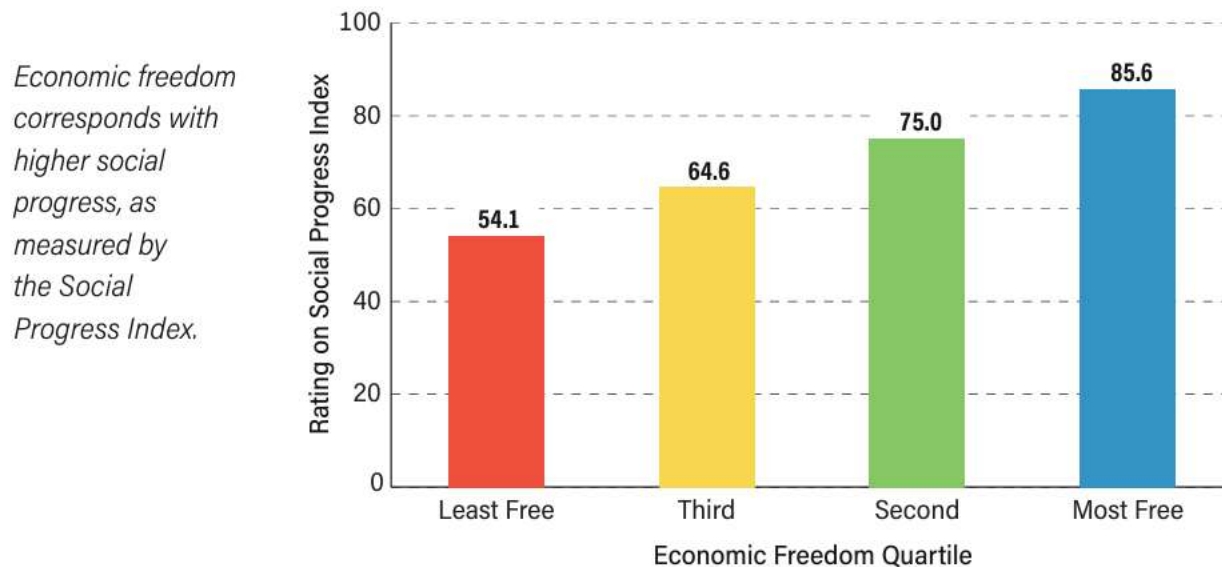


Sources: *Economic Freedom of the World: 2022 Report*; World Bank, 2022, *World Development Indicators* [on-line database].

Fruits of Economic Freedom

More personal freedom and social progress

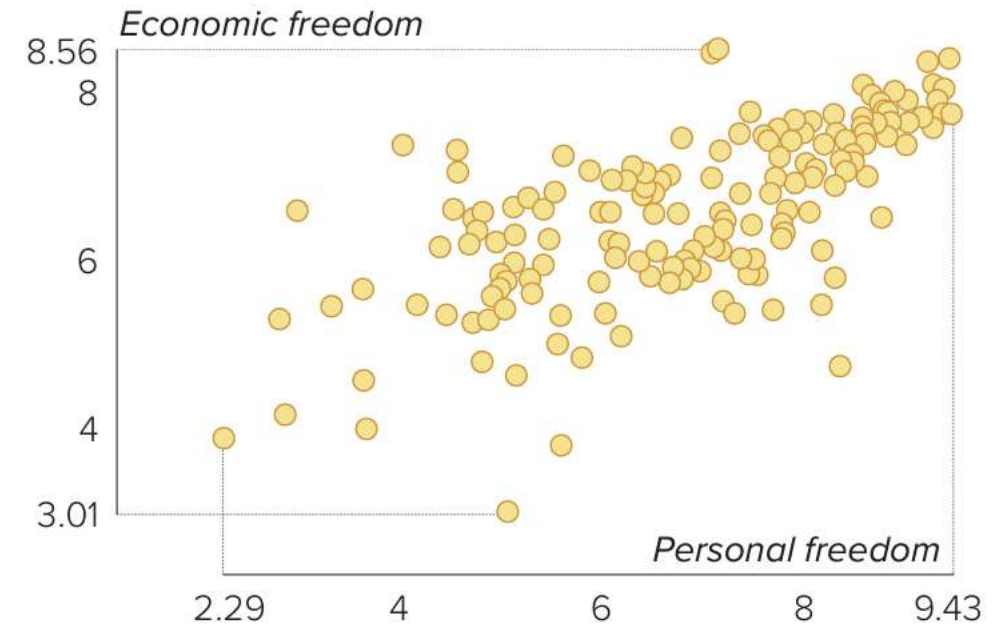
Exhibit 1.11: Economic Freedom and Social Progress



Sources: *Economic Freedom of the World: 2023 Annual Report*; Social Progress Imperative, 2022, *2022 Social Progress Index*.

Figure 3

Personal freedom and economic freedom, 2021



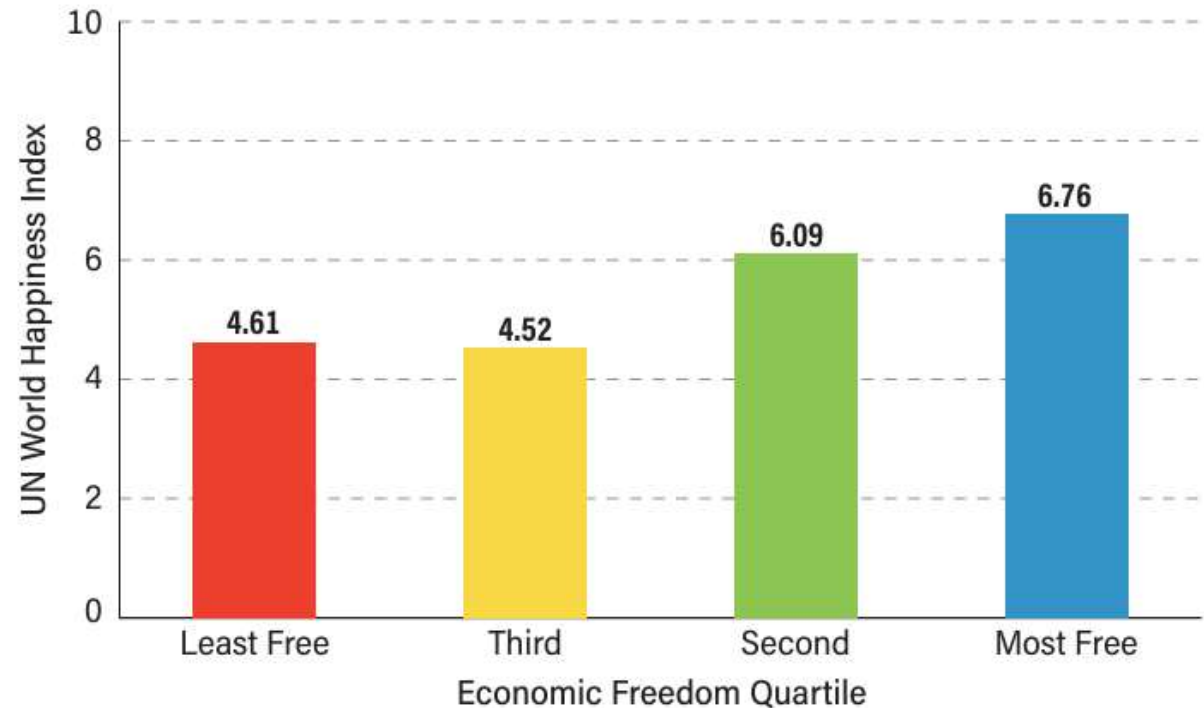
Sources: Authors' calculations; James Gwartney et al., *Economic Freedom of the World: 2023 Annual Report* (Vancouver: Fraser Institute, 2023).

Fruits of Economic Freedom

And higher reported happiness

Exhibit 1.12: Economic Freedom and the UN World Happiness Index

People report that they are happier in countries with greater economic freedom.



Sources: *Economic Freedom of the World: 2023 Annual Report*; United Nations, *World Happiness Report 2023*.

How?

Economics is **simple**, but it's **not easy**.

We know that if a people can enjoy peace, easy taxes, and a tolerable administration of justice, they will get richer and richer.

But it's **shockingly** difficult to bring peace, easy taxes, and a tolerable administration of justice to places that do not **already** enjoy those blessings.

Now we have to ask: Why?

We've looked at Who, What, When, Where, and How economic growth (permanent rising real GDP per capita) has happened.

But we have not answered **why** it happened to whom, when, where, and how it has happened.

This is **surprisingly difficult** and not something economics is particularly well-equipped to do.

Why?

“Constants cannot explain change.”

Things that have always been the case cannot explain why things aren't the way they always have been.

This insight limits our explanations of why economic growth took off when and where it did.

Why?

Standard “Materialist” Explanations Don’t Work

- Thrift
- Pure capital accumulation
- “Greed” and expropriation
- Slavery and exploitation
- Geography
- Natural Resource richness
- Foreign trade

Why?

It's hard to explain the takeoff of permanent real GDP per capita in the 1800s with bare facts about **things**.

So maybe it's about **people**?

Racialist theories

Cultural theories

Social Darwinism

Why?

It's probably **not things**, though things matter. And it's probably **not people**, though people are the ones who cause economic growth to happen.

Maybe it's the way we organize society? It's **institutions**?

Maybe. But institutions, like things, and people, are more in the **How** category than the **Why** category.

Why?

Language. Rhetoric. **Attitudes.**

What changed in the mid 17th century in Northwestern Europe and rippled throughout the world?

The way we talk about the everyday business of making a buck.

Why?

“Leave me alone, and I’ll make you rich.” – the bourgeois deal

For the first time in all of human history, it was OK—and not just OK, *respectable* even—to work hard for a living.

Neither “the noble peasant” nor *noblesse oblige*, the humble merchant, a middleman, is the hero of our story.

The End of Economic Growth?

Reneging on “the bourgeois deal.” Loss of esteem for hard work, entrepreneurship, business.

Sustainability – “running out” of resources; Julian Simon v Paul Ehrlich bet, population bomb, and Neo-Malthusians

Anti-growth policies