Lec01 Introduction

The facts to be explained

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经济学院

For whom

- This course is aimed at intermediate or advanced undergraduate students.
  - 高年级本科生课程（2023 年春季为经济学院同学开设）
- Trying to make the basic growth paradigms fully accessible to students who have no more background than elementary notions of calculus and a very basic knowledge of economic principles.
  - 需要掌握基本的微积分和微观、宏观经济学基础
- It delves into the study of economic growth in greater detail than is found in intermediate macroeconomics course.
  - 中级宏观经济学中经济增长部分内容的深化和细化
- Graduate students may find it valuable as a companion to the advanced macroeconomics.
  - 向高级宏观经济学过渡的桥梁

Textbook

- The required textbook:
  - Charles I. Jones, Dietrich Vollrath:
    Introduction to Economic Growth (3^{rd} Edition)《经济增长导论》
- Reference, not required：
  1. Daron Acemoglu: *Introduction to Modern Economic Growth*
     达龙 · 阿西莫格鲁 (MIT):《现代经济增长导论》(上下册)，中信出版社，2019.
  2. Robert J. Barro, Xavier Sala-i-Martin: *Economic Growth*
     罗伯特 · 巴罗，夏威尔 · 萨拉-伊-马丁 (哈佛、哥伦比亚):《经济增长》(第二版)，格致出版社，2010.
  3. Philippe Aghion and Peter Howitt: *The Economics of Growth*.
     菲利普 · 阿格因，彼得 · 豪伊特 (哈佛、布朗):《增长经济学》，中国人民大学出版社，2011
  4. David N. Weil: *Economic Growth* (3^{rd} Edition)
     戴维 ·N· 韦尔 (布朗):《经济增长》(第三版)，中国人民大学出版社，2011.

Motivation

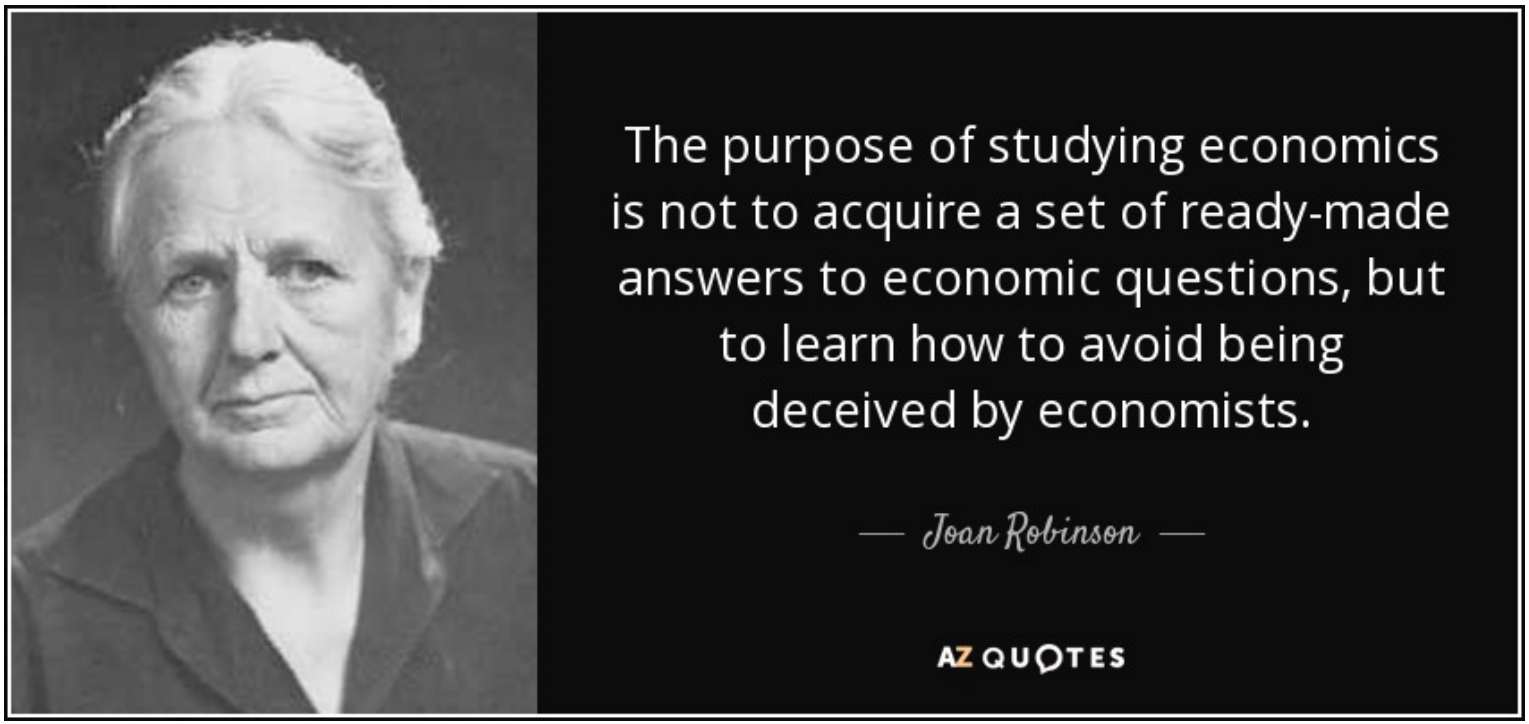
- 为什么要学习经济增长？或者说这门课程的教学目标是什么？学生的预期收获是什么？
  - 经济增长是中国目前最重要的话题，学会如何解释经济增长才有可能进一步促进经济增长。
    - 这可能只是流行话术而已。这么大的问题与我何干？肉食者谋之？
  - 学会思考：
    - the dispassionate development and testing of theories about how the world works. 冷静地建立并检验有关世界如何运行的各种理论
    - Models of reasoning, more than answers.
  - 减少被骗 (To learn how to avoid being deceived by economics -Joan Robinson)
    - “基建狂魔” 与 “招商引资”：技术进步了吗？ $Y = AF(K, L)$
- 凯恩斯 (Keynes)、罗宾逊 (Joan Robinson)

Way of thinking 经济学是个“装置”

John Maynard Keynes

- *The Theory of Economics does not furnish a body of settled conclusions immediately applicable to policy. It is a method rather than a doctrine, an apparatus of the mind, a technique of thinking which helps its possessor to draw correct conclusions.*
- 经济学理论并没有提供一套马上就可以应用于政策的现成的结论。它不是金科玉律，只是一种方法、一种心智的装置、一种思维的技巧，帮助拥有它的人得出正确结论。

Joan Robinson (1903-1983)'s warning



The most frequently quoted passage in the growth literature

Is there some action a government of India could take that would lead the Indian economy to grow like Indonesia's or Egypt's? If so, what, exactly? If not, what is it about the "nature of India" that makes it so? The consequences for human welfare involved in questions like these are simply staggering: Once one starts to think about them, it is hard to think about anything else.

人们一旦开始思考增长问题，就很难再去考虑别的问题了。

— *Robert Lucas, 1988 (1995 Nobel Prize winner)*

Name that country 猜猜这是哪个国家?

- Life expectancy is less than 50 years
  (平均寿命 35 岁)
- 2 out every 10 infants dies before the age of one
  (婴儿死亡率千分之二百)
- More than 90% of households have no electricity, refrigerator, telephone, or car
  (电力普及不到 10%)
- Fewer than 10% of adults have completed high school.
  (文盲率 80%)
- What country is it?

The power of economic growth

- In just 70 years, the Chinese economy has been completely transformed
  - Almost all households have electricity, refrigerators, cell phones, and cars
  - Overwhelming majority graduates from high school, many college
  - New goods: air-conditioning, jet planes, skyscrapers, home movie theaters, iPads.....
- Health: Life expectancy in 1949 = 35 years, today 77 years.

Economic growth

- The term **economic Growth** is defined as the process whereby the country's real national and per capita income increases over a long period of time.
  经济量（总量与人均量）的增长与能力的扩张
- 在人类历史上，尤其是近二百年来，经济是在不断增长的。经济持续增长的引擎是什么？
- 我们的下一代一定能有比我们更优越的生活吗？
- 为什么有些国家比其他国家的增长速度快？
- 中国自改革开放以来，一直保持着持续增长的势头，年均增长速度位于世界前列，是什么保证了中国经济的持续、快速增长？

Why growth matters

- We care about growth because we care about the standard of living.
  - *Economic growth raises living standards and reduces poverty. . .*
- Anything that affects the long-run rate of economic growth –even by a tiny amount –will have huge effects on living standards in the long run.
  - 政府政策或某些“冲击”对长期经济增长率产生哪怕是极小的影响，也会对长期的生活水平产出巨大的影响
  - Small differences in growth rates really matter over long horizons
- How do we measure living standards across countries / over time?
- GDP
  - what does it measure?
  - what does it fail to measure?
- One measure that is commonly used: **GDP per worker**, or **GDP per capita** (when data on workers is hard to get)

事实一：各经济体之间的人均收入有着巨大差异

Fact 1

There is enormous variation in per capita income across economies. The poorest countries have per capita incomes that are less than 5 percent of per capita income in the richest countries.

Notes:

- Income per capita (or GDP per capita) is not the sole measure of what is good: but it's a useful summary statistic
- Income per capita ignores distribution of income within a country
- Comparing income per capita across countries is not trivial
  - You have to convert between currencies
  - Countries have different relative prices for goods
  - What is the "right" way to value haircuts, apples, or cars across countries?

Rich Countries v.s. Poor Countries

- Rich Countries

Country	GDP per capita 2008	GDP per worker 2008	LF Part. Rate 2008	Avg. Growth 1960-2008	Years to Double
United States	$43,326	$84,771	0.51	1.6	43
Japan	33,735	64,778	0.52	3.4	21
France	31,980	69,910	0.46	2.2	30
United Kingdom	35,345	70,008	0.51	1.9	36
Spain	28,958	57,786	0.50	2.7	26

- Poor Countries

Country	GDP per capita 2008	GDP per worker 2008	LF Part. Rate 2008	Avg. Growth 1960-2008	Years to Double
China	6,415	10,938	0.59	5.6	13
India	3,078	7,801	0.39	3.0	24
Nigeria	1,963	6,106	0.32	0.6	114
Uganda	1,122	2,604	0.43	1.3	52

Growth Miracles v.s. Growth Disasters

- Growth Miracles

Country	GDP per capita 2008	GDP per worker 2008	LF Part. Rate 2008	Avg. Growth 1960-2008	Years to Double
Hong Kong	37,834	70,940	0.53	4.3	16
Singapore	49,987	92,634	0.54	4.1	17
Taiwan	29,645	62,610	0.47	5.1	14
South Korea	25,539	50,988	0.50	4.5	16

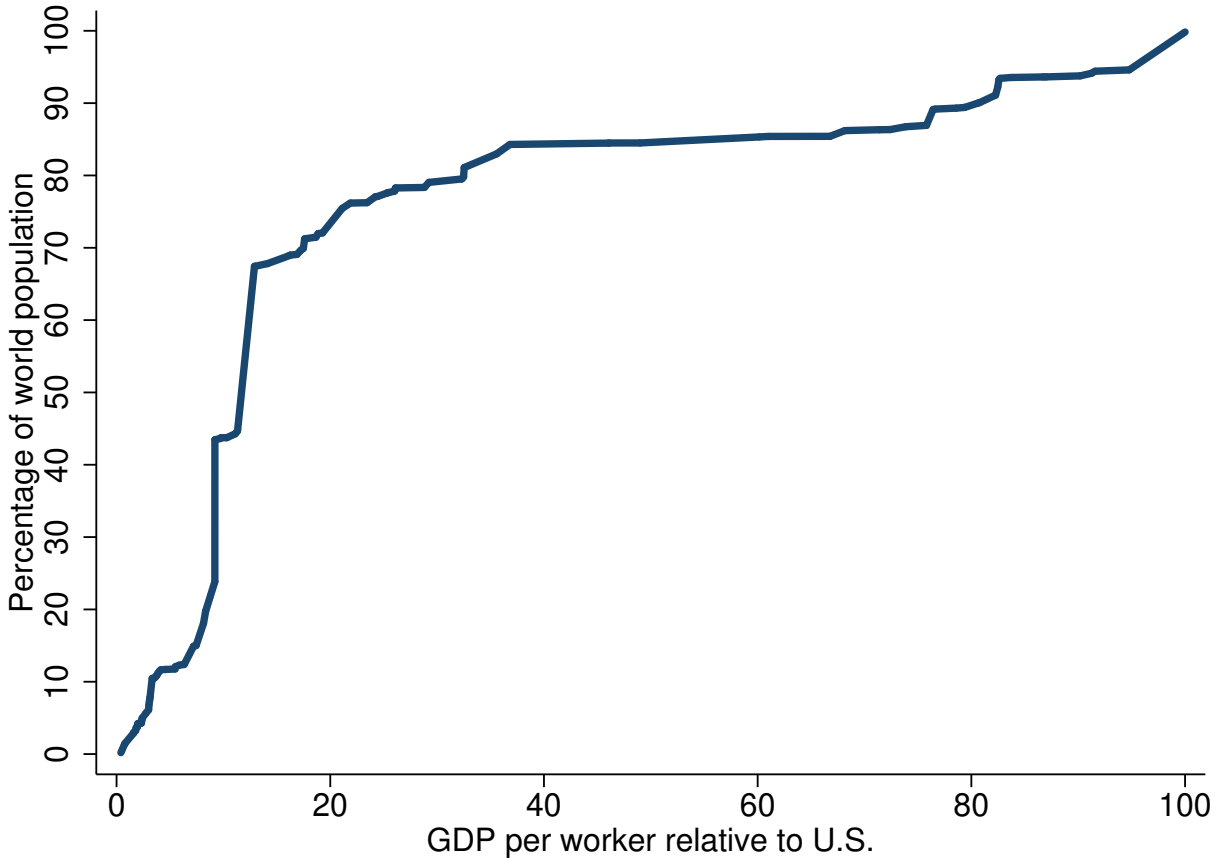
- Growth Disasters

Country	GDP per capita 2008	GDP per worker 2008	LF Part. Rate 2008	Avg. Growth 1960-2008	Years to Double
Venezuela	9,762	21,439	0.46	-0.1	-627
Haiti	1,403	3,164	0.44	-0.4	-168
Madagascar	810	1,656	0.49	-0.1	-488
Zimbabwe	135	343	0.40	-1.5	-47

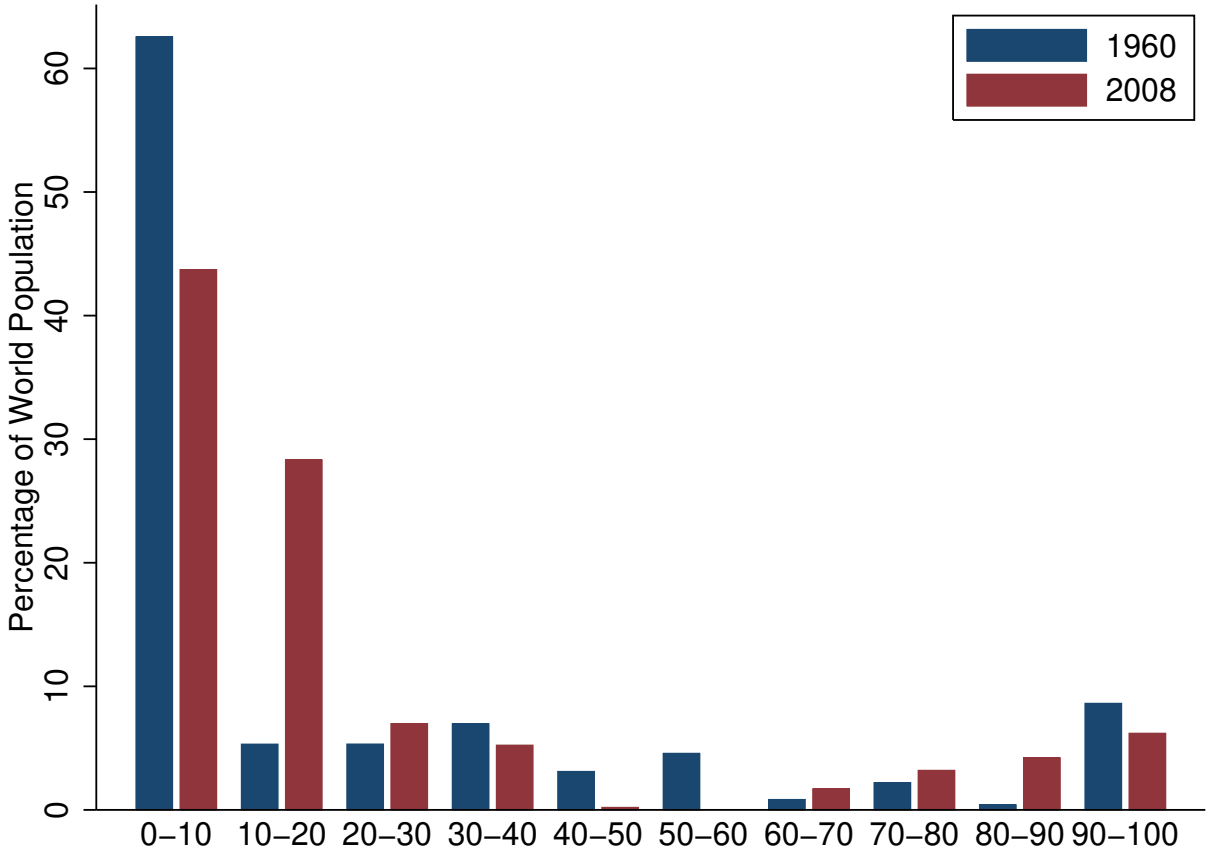
Top Eleven Countries in Year 2009 According to Three Different Measures

Rank	Highest GDP per Capita		Largest Economies		Most Populous Countries	
	Country	GDP per Capita ($)	Country	Total GDP ($ trillions)	Country	Population (millions)
1	Qatar	159,469	United States	12.62	China	1,320
2	Luxembourg	84,525	China	10.08	India	1,160
3	United Arab Emirates	52,946	Japan	3.81	United States	307
4	Bermuda	52,090	India	3.76	Indonesia	240
5	Macao	51,057	Germany	2.66	Brazil	199
6	Norway	49,945	United Kingdom	2.07	Pakistan	181
7	Singapore	47,373	Russia	2.05	Bangladesh	154
8	Kuwait	46,639	France	1.98	Nigeria	149
9	Brunei	46,229	Italy	1.68	Russia	140
10	Australia	41,304	Brazil	1.62	Japan	127
11	United States	41,099	Mexico	1.29	Mexico	111

Distribution of Population by GDP per Worker, 2008



World Population by GDP per Worker, 1960 and 2008



事实二：不同国家之间经济增长率有差巨大差异

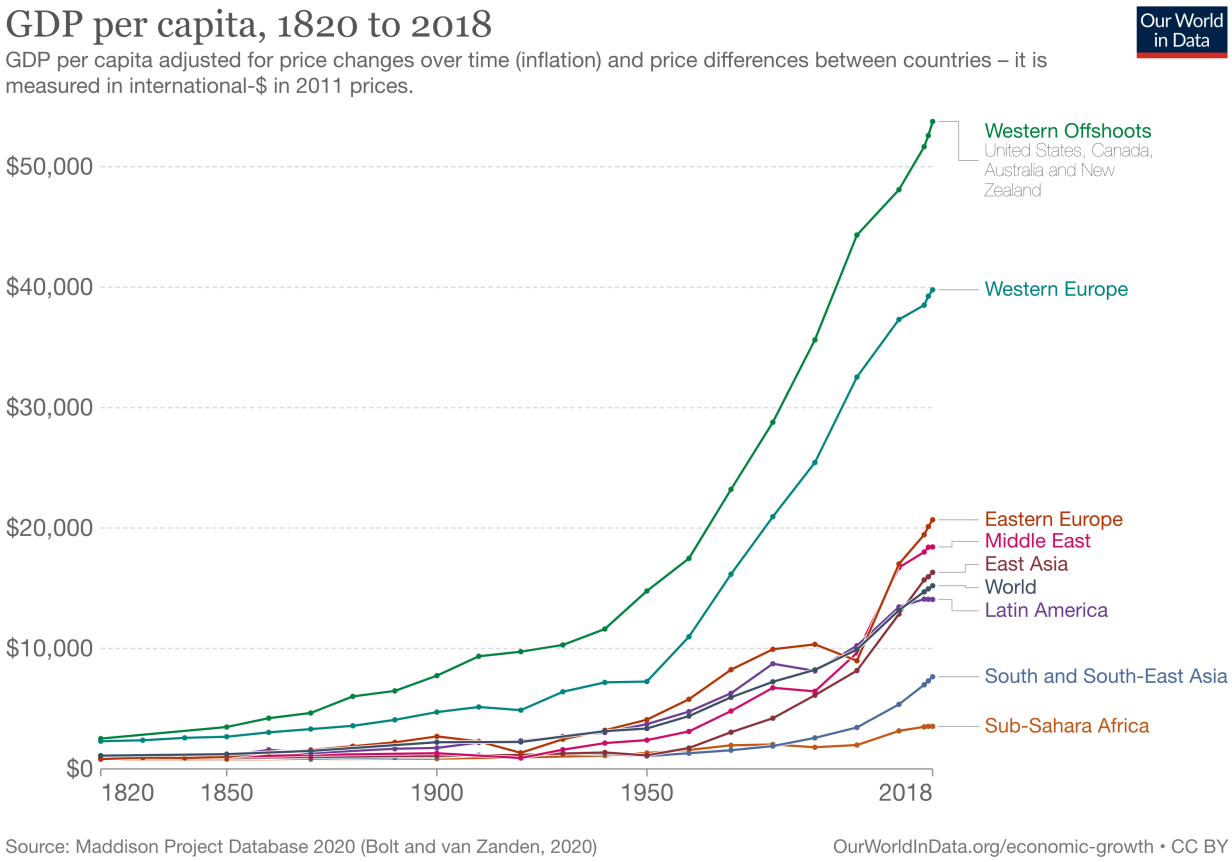
Fact 2

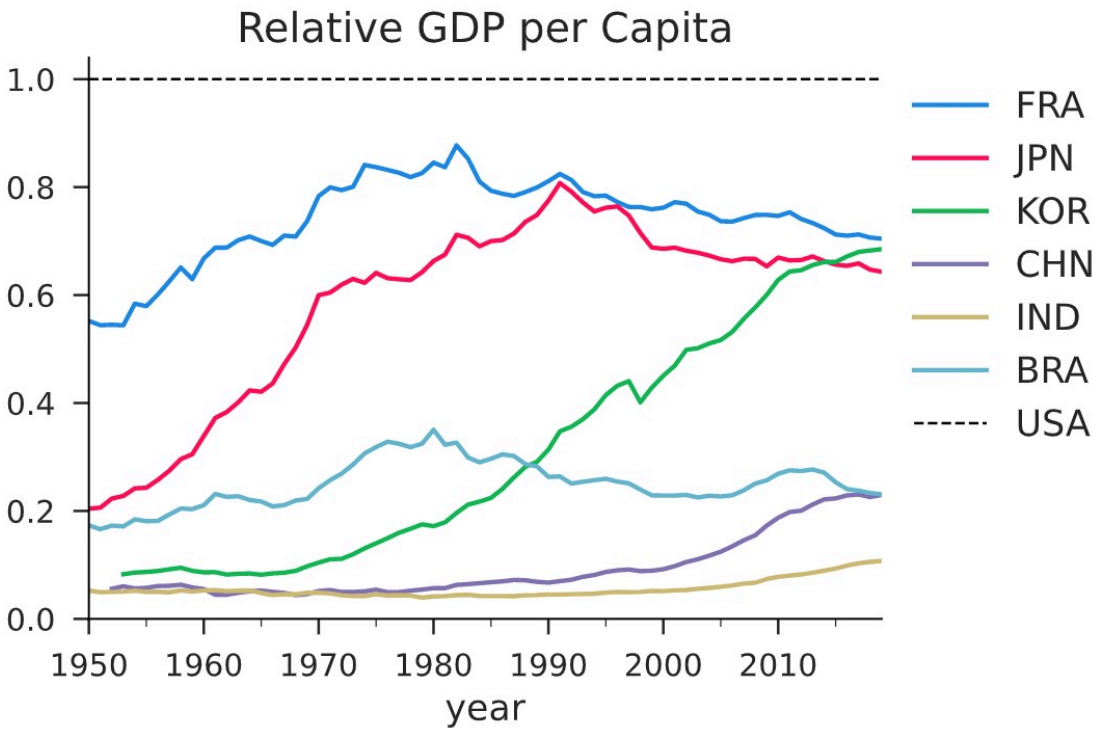
Rates of economic growth vary substantially across countries.

Notes:

- We will try to distinguish whether these are long-term differences or just transitional differences
- If they are long-term, then eventually some countries will be infinitely rich compared to others
- We think most differences are transitional

Inequality across the world historically: divergence





- 北大国家发展研究院院长姚洋在“2022 网易经济学家年会”上说，基于技术进步以及城市圈发展潜力，中国有望在 2028 年-2030 年间超越美国成为世界第一大经济体。
- 他还预计，到 2049 年，也就是第二个百年目标实现之际，中国人均收入至少是美国的 45%，经济总量超过美国的两倍。

事实三：增长率总体上并不是稳定不变的

Fact 3

- Growth rates are not generally constant over time.
- For the world as a whole, growth rates were close to zero over most of history but have increased sharply in the twentieth century. For individual countries, growth rates also change over time.
- long period of stagnation

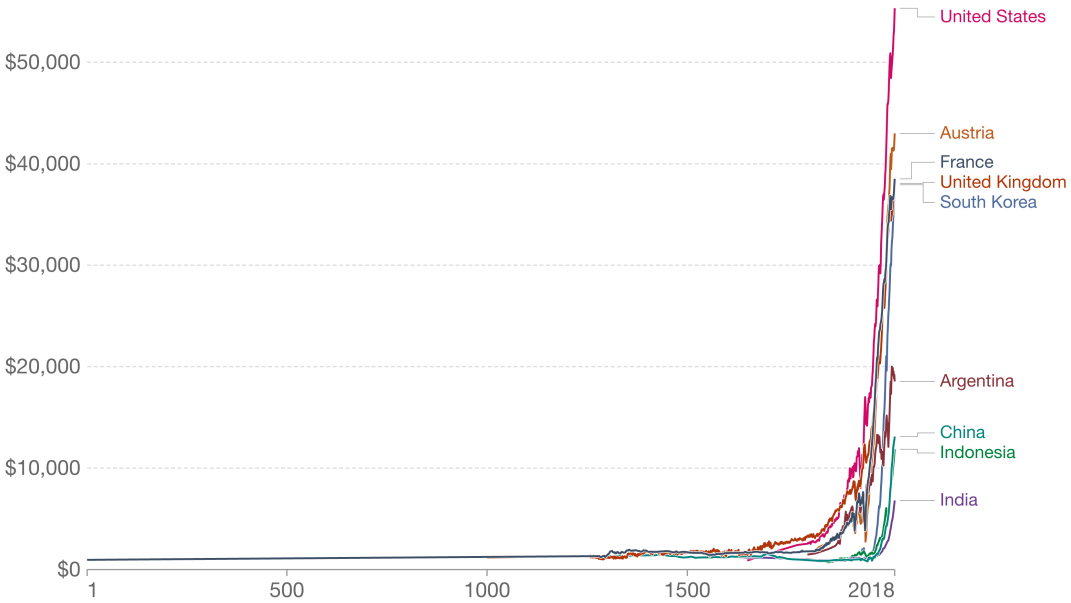
Note:

- The big changes in growth rates over history are from pre-Industrial Revolution (close to 0% growth) to modern times (roughly 1.85% growth per year for developed countries)
- The big changes in growth rates within countries tend to be as they transition from poor to rich (e.g. Japan or China), after which growth slows down.

GDP per capita, 1 to 2018

GDP per capita adjusted for price changes over time (inflation) and price differences between countries – it is measured in international-$ in 2011 prices.

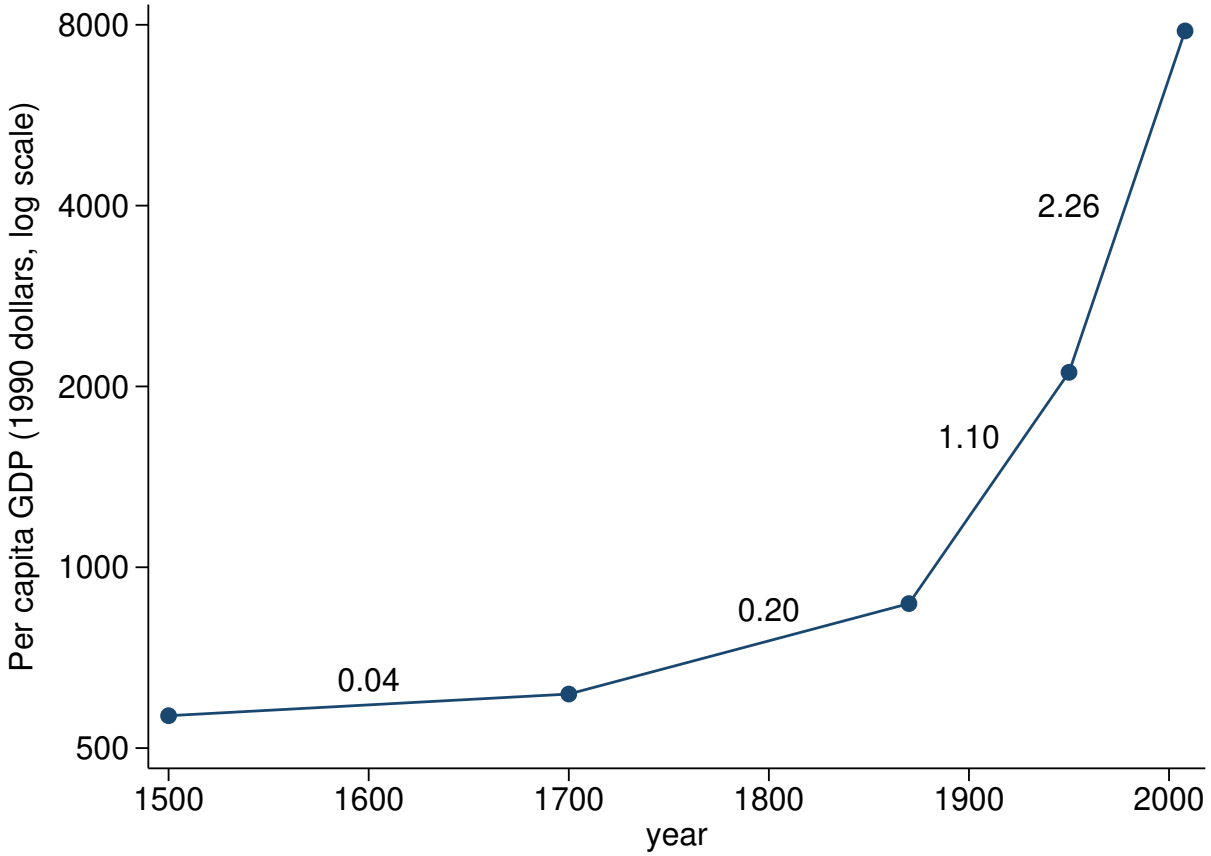
Our World in Data



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

OurWorldInData.org/economic-growth • CC BY

World GDP per Capita Growth Rates



事实四：一国在世界人均收入的分配中的相对地位并非不变的

Fact 4

A country's relative position in the world distribution of per capita incomes is not immutable.
Countries can go from being "poor" to being "rich", and vice versa.

Notes:

- The "growth disasters" in the table were all very well off in 1960 compared to East Asia. Now they are well behind
- The "growth miracles" in the table were though, in 1960, to be on the path to starvation and destitution.
- What are the sources of these movements in rankings?

事实五：卡尔多事实

Fact 5: The Kaldor Facts over the last century

- The real rate of return on capital, r, shows no trend upward or downward. 资本回报率几乎是一个常数
- The shares of income devoted to capital, rK/Y, and labor, wL/Y, show no trend; 资本对收入的贡献与劳动对收入的贡献也相对稳定，进而资本产出比也几乎是一个常数。
- The average growth rate of output per person has been positive and relatively constant over time - that is, the United States exhibits steady, sustained per capita income growth.
  人均产出增长率几乎是一个常数。

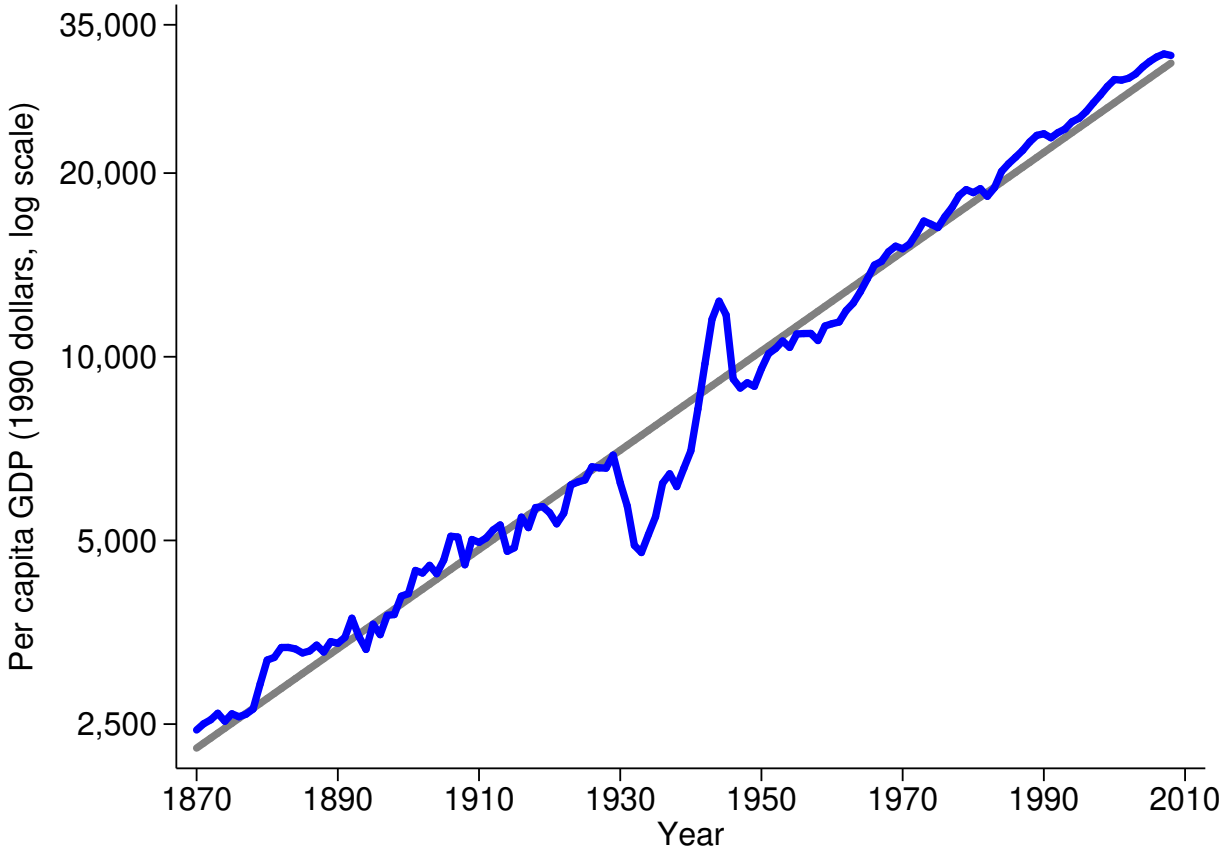
Notes:

- "Kaldor facts"（卡尔多事实的简化版）
- These facts will drive us to look at a specific pattern of growth - the *balanced growth path*

The Kaldor facts 卡尔多事实

- Stylized facts, originally due to Kaldor (1958/1961). Empirical regularities of the growth process for the US and for most other industrialized countries.(卡尔多事实)
  1. Output per worker grows at an approximately constant rate over long periods of time.
  2. Capital per worker grows at an approximately constant rate over long periods of time.(But what is capital?)
  3. The return to capital is roughly constant over long periods of time.(real interest rates are flat)
  4. The capital to output ratio is roughly constant over long periods of time.
  5. Labour and capital receive constant shares of total income.
  6. The growth rate of output per worker differs substantially across countries (and over time, we can add, miracles and disasters).
- 前五个事实已从研究论文逐渐成为标准教科书的内容。(The Solow model matches most of the Kaldor facts.)
- 如今经济学家正在努力解释第六个事实（即前面事实 1、2）

Growth in U.S. GDP per capita



事实六：产出的增长和国际贸易量的增长是紧密相关的

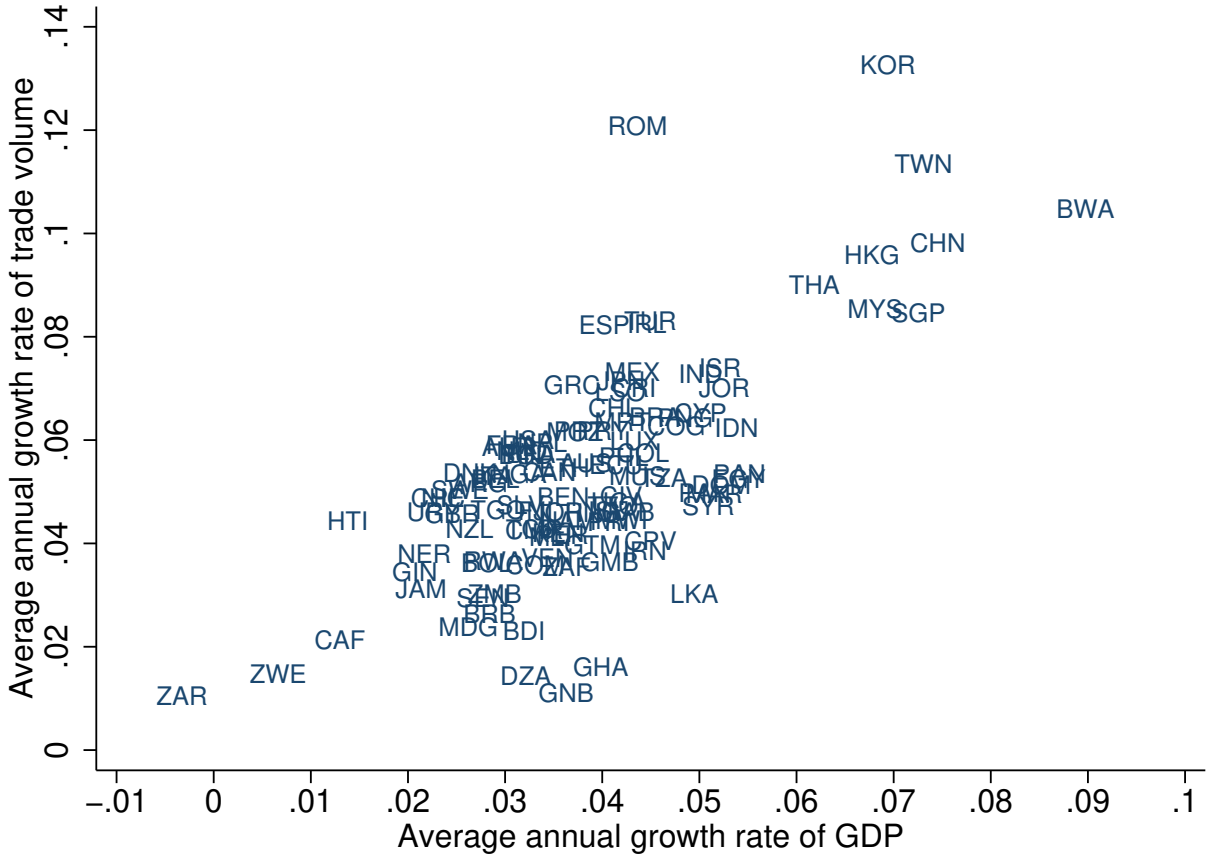
Fact 6

Growth in output and growth in the volume of international trade are closely related.

Notes:

- Growth in trade is associated with growth in output, but not necessarily level of trade (Japan does not actually trade much, but is rich)
- Rapid growth in trade is no necessarily just growth in exports from East Asia (China and Korea also import a lot more than they used to)

Growth in Trade and Growth in Output



事实七：熟练工人和非熟练工人都想从穷国向富国移民

Fact 7

Both skilled and unskilled workers tend to migrate from poor to rich countries or regions.

Notes:

- Implies that return to both kinds of labor is higher in developed countries
- Shouldn't scarcity in poor countries imply a large premium to skilled workers?

Big Questions

Why are some countries so rich and others so poor?

Answers?

- Level differences
- Different levels of human capital
- Different institutions supporting innovation/technology adoption/entrepreneurship

Big Questions

What is the engine of growth? What drives growth in the long-run?

Answers?

- Technological progress - new goods, or better versions of old goods
- Not accumulation of more physical or human capital - those cannot sustain growth
- Ultimately technological progress will rely on population - more people, more ideas

Big Questions

Why does anyone bother to innovate?

Answers?

Since innovation is so important to growth, we'll consider the economics behind innovation. This is going to generate a set of really intriguing findings.

- One is that the growth rate of productivity is driven by the growth rate of research effort (R&D spending and employing scientists and engineers) and that this is tied to the growth rate of population.
  - The innovation behind productivity depends on the scale of the market innovators sell to, and the faster population grows, the larger that scale.
- A second is that growth in productivity relies on the economy not being perfectly competitive.
  - There have to be some sort of market distortions at work in order to generate the economic profits necessary to compensate innovators for their work. Economic growth depends on imperfect competition.

Big Questions

What creates growth miracles in some countries?

Answers?

- Reversing what made them poor
- Changing institutions to foster technology adoption (copying?)
- Changing institutions to create larger markets (trade, internal markets) to support innovation/adoption

Proximate and fundamental sources of growth

- The **fundamental** causes of growth are those that explain what lay behind the accumulation of capital and the development of thchnology that have transformed human lives...
- Three broad explanations have been proposed:
  1. Role of Geography(location of tropical or temperate climate zones) (《枪炮、病菌与钢铁》)
  2. Culture(protestant or catholic Christianity, or Islam) (Webb 《新教伦理与资本主义精神》)
  3. Institution(such as property) （Acemoglu&Robinson: Why Nations Fail）
     - "inclusive" and "extractive"
     - experts cannot engineer prosperity by offering the rightadvice to rulers on policies or institutions, because rulers actually "get it wrong" on purpose, not by mistake.
- Before investigating the fundamental causes of growth, we focus on the proximate causes of growth: factor accumulation and technological progress. 要素积累与技术进步

The proximate sources of growth

Proximate or immediate sources of growth are:

1. **Growth in productivity**/the development and diffusion of new technology: we produce more output given the same inputs. 技术进步
2. **Factor accumulation**: more factors of production help us produce more stuff. 生产要素积累
   - Two key factors of production on which we focus are capital and labor.
   - Labor input per capita is roughly trendless –empirically not a source of growth in per capita output.
   - The key factor of production over the long run is capital: physical stuff that must itself be produced that in turn helps us produce more stuff (e.g. machines).

- What accounts for differences in standards of living across countries and over time?
  - Productivity or factor accumulation?
  - What are policy implications?

Questions?

Thank you

感谢聆听