Lectures 1-2: Income, capital and growth in the long run: how did rich countries become rich?

(check online for updated versions)
Roadmap of lectures 1-2

- Introduction: three U-shaped curves
- Basic concepts: output, income, capital
- National accounts: the measurement of growth
- Facts and questions about long-run growth
- How did rich countries become rich?
- A quick roadmap of the literature on comparative development and property regimes: Braudel, Pomeranz, Polanyi, and others
- The standard growth model: output convergence, not income or wealth convergence
Introduction: three U-shaped curves

- **(1) Between-country income inequality 1700-2015**: divergence between Western and other countries during 19c & until mid 20c, convergence since 1980-1990 (reduction of inequality)

- **(2) Within-country income inequality**: in the US, income inequality rose since 1980 & is now back to the levels observed in early 20c: i.e. about 50% of national income for the top 10%

- **(3) Capital/income ratio**: in Europe & Japan, K/Y is almost back to the level observed in early 20c: i.e. about 500-600% for K/Y

These three evolutions are partly related (world wars, decolonization, end of communism, globalization), but also involve country specific mechanisms: (1) largely due to internal evolutions of emerging countries; (2) mostly US trend; (3) mostly Europe and Japan (postwar recovery, demography); (2) & (3) could well happen together everywhere in the future - or not

- One of the key objectives of this course is to better understand these long-run evolutions: how did rich countries get rich, and how do inequality, state formation & development interact?
Figure 1.3. Global inequality 1700-2012: divergence then convergence?

Per capita GDP in Asia-Africa went from 37% of world average in 1950 to 61% in 2012. Sources and series: see piketty.pse.ens.fr/capital21c.
The top decile share in U.S. national income dropped from 45-50% in the 1910s-1920s to less than 35% in the 1950s (this is the fall documented by Kuznets); it then rose from less than 35% in the 1970s to 45-50% in the 2000s-2010s.

Sources and series: see

Figure I.1. Income inequality in the United States, 1910-2012
Figure I.2. The capital/income ratio in Europe, 1870-2010

Aggregate private wealth was worth about 6-7 years of national income in Europe in 1910, between 2 and 3 years in 1950, and between 4 and 6 years in 2010. Sources and series: see piketty.pse.ens.fr/capital21c.
Basic concepts: output, income, capital

• National income \( Y \) = domestic output \( Y_d \) (NDP) + net foreign factor income

• Domestic output \( Y_d \) (NDP = Net domestic product) = GDP (Gross domestic product) – capital depreciation

• Typically \( Y \) and \( Y_d \) = about 85-90% GDP in rich countries today

• I.e. capital depreciation = about 10-15% GDP (but can be <5% in agrarian societies: low land depreciation rates as compared to buildings, equipment, computers, etc.)

• Net foreign factor income can be >0 (typically in countries with net foreign asset position > 0), or <0 (typically in countries with net foreign asset position < 0)
• Net foreign asset position (NFA) = gross foreign assets (gross assets owned by the residents of a country in the rest of world) – gross foreign liabilities (debt) (gross assets owned by rest of the world in the country)

• Net foreign capital income = close to 0% of \( Y_d \) in most rich countries (between +1-2% & -1-2% \( Y_d \)) : right now, rich countries own approximately as much foreign assets in rest of the world as rest of the world owns in home assets, so that national income \( \approx \) domestic output

• But this has not always been like this (colonial times); and it could change again: Germany and Japan – and China and oil producing countries – are currently accumulating large NFA, while NFA of Africa (or Greece) is v. negative >> see lecture 3

• At the world level, net foreign income flows cancel out, so that national income \( Y = \) domestic output \( Y_d \)
• National income $Y = Y_d + r \text{ NFA}$
• Private capital (or private wealth) $W = \text{non-financial assets (real estate, family firms,..)} + \text{financial assets (equity, bonds, life insurance, deposits, cash, pension funds,..)} - \text{financial liabilities (debt) held by private individuals (households) (+non-profit inst.)}$
• Public capital (or public wealth) $W_g = \text{non-fin + fin assets} - \text{liabilities held by the government (all levels)}$
• National capital (or national wealth) $W_n = W + W_g$
• National wealth $W_n = \text{domestic capital } K + \text{net foreign assets NFA}$
• Domestic capital $K = \text{agricultural land + housing + other domestic capital (=structures, equipment, patents,.. used by firms & govt)}$
• Note that firms are valued at market prices through equity
• Private wealth/national income ratio $\beta = W/Y$
• National wealth/national income ratio $\beta_n = W_n/Y$
• Domestic capital/output ratio $\beta_k = K/Y_d$
• At the world level, national wealth/national income ratio = domestic capital/output ratio; but at the country level, it can differ
• Basic orders of magnitude in rich countries today
  
  National wealth \( W_n \approx \) private wealth \( W \)  
  (i.e. public wealth \( W_g \approx 0 \) (or <0..))
  
  National wealth \( W_n \approx \text{domestic capital} \ K \)  
  (i.e. net foreign asset \( NFA \approx 0 \) (but large gross foreign positions))
  
  National wealth \( W_n \approx 500\text{-}600\% \text{ of national income} \ Y \)  
  \( \approx \text{residential housing} + \text{other domestic capital} \) (\( \approx 50\text{-}50\))
  
  Typically, in France, UK, Germany, Italy, US, Japan:  
  Per capita average income \( Y \approx 30\,000\)€ (= national income/population)  
  Per capita aver. wealth \( W \approx 150\,000\text{-}180\,000\)€ (=private wealth/pop)
  
  I.e. \( \beta = \frac{W}{Y} \approx 500\text{-}600\% \)
  
  \( Y_K = \text{capital income} = \text{rent, dividend, interest, profits,..} \)
  
  \( \alpha = \frac{Y_K}{Y} = \text{capital share in national income} \approx 25\text{-}30\% \)
  
  I.e. average rate of return \( r = \frac{\alpha}{\beta} = 4\text{-}5\% \)
  
  Basic accounting law: \( \alpha = r \times \beta \rightarrow \text{Lecture 3} \) on dynamics of \( \beta \) and \( \alpha \)
National accounts: the measurement of growth

- **Maddison 2008 database** = the most extensive compilation of historical national accounts (*The World Economy...* 2001, *appendix*)
- See this [excel file](#) for a combination of Maddison series and official UN population series and WB GDP series for recent decades; see also [Capital...](#), chap.1-2, & on-line appendix tables for [chapter 1](#)


- Since the 1930s-40s and until recently (≈ btw 1929 and 2008), national accounts were mostly about flows of output, income and consumption/invt, and not about stock of capital, assets & liabilities
- Maddison: no data on capital stock (only GDP and population)
- See [lecture 3](#) on the history of measurement of capital and wealth; recent return to stock measurement (back to 18c-19c and to an earlier tradition of national accounts)
Facts & questions about long-run growth

• **Fact 1: Convergence**
• Convergence between poor and rich countries now seems well under way; but not over yet (?)

• **Fact 2: Global growth slowdown in 21c**
• Productivity growth is always slow for countries at the world technological frontier; once global catch-up process is over, growth might be low everywhere (?)
• Population growth seems to be $\rightarrow 0$ (or $<0$) (?)
Fact 1. Convergence

- Between 1900 and 1980, Europe + America ≈ 70-80% world GDP
- In 2013: down to about 50% (as in 1860)
- At some point during 21^c: down to 20-30%, i.e. to the share of Europe + America in world population = convergence in per capita output and income
- But will convergence be over in 2030, 2060 or 2090? Nobody knows. Probably closer to 2040 in East Asia, and closer to 2090 in South Asia and Africa.
- Convergence occurred mostly through domestic investment (not so much through foreign investment: emerging countries are not owned by rich countries... except Africa)
- Economic openness had a critical impact on development via free trade (specialization effect) and via diffusion of technology and know-how; but maybe not so much via free capital flows
Figure 1.1. The distribution of world output 1700-2012

Europe's GDP made 47% of world GDP in 1913, down to 25% in 2012.

Sources and series: see piketty.pse.ens.fr/capital21c.
Europe's population made 26% of world population in 1913, down to 10% in 2012.
Sources and series: see piketty.pse.ens.fr/capital21c.
Figure 1.3. Global inequality 1700-2012: divergence then convergence?

Per capita GDP in Asia-Africa went from 37% of world average in 1950 to 61% in 2012. Sources and series: see piketty.pse.ens.fr/capital21c.
Figure S1.3. Global inequality 0-2012: divergence then convergence?

Per capita GDP in Asia-Africa went from 37% of world average in 1950 to 61% in 2012.
Sources and series: see piketty.pse.ens.fr/capital21c.
Figure S1.2. The distribution of world population 0-2012

Europe's population made 26% of world population in 1913, down to 10% in 2012.

Sources and series: see piketty.pse.ens.fr/capital21c.
Figure S1.1. The distribution of world output, 0-2012

Europe's GDP made 47% of world GDP in 1913, down to 25% in 2012.

Sources and series: see piketty.pse.ens.fr/capital21c.
Basic orders of magnitude to remember:

- World GDP 2012 = about 70 trillions €
  (i.e. 70 000 billions €)
- World population = about 7 billions
- Per capital GDP = about 10 000€
- Per capital income = about 800€/month
- Rich countries = about 2000-3000€/month
- Poor countries = about 200-300€/month
- More inequality in income than in output, and in market exchange rates than in PPP
Table 1.1: Distribution of world GDP, 2012

<table>
<thead>
<tr>
<th>Region</th>
<th>Population (millions inhabitants)</th>
<th>GDP (billions euros 2012)</th>
<th>Per capita GDP</th>
<th>Equivalent per capita monthly income (euros 2012)</th>
</tr>
</thead>
<tbody>
<tr>
<td>World</td>
<td>7 050</td>
<td>71 200</td>
<td>10 100 €</td>
<td>760 €</td>
</tr>
<tr>
<td>Europe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>incl. European Union</td>
<td>540</td>
<td>17 800</td>
<td>24 000 €</td>
<td>1 800 €</td>
</tr>
<tr>
<td>incl. Russia/Ukraine</td>
<td>200</td>
<td>3 100</td>
<td>15 400 €</td>
<td>1 150 €</td>
</tr>
<tr>
<td>America</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>incl. United States/Canada</td>
<td>350</td>
<td>14 700</td>
<td>27 300 €</td>
<td>2 040 €</td>
</tr>
<tr>
<td>incl. Latin America</td>
<td>600</td>
<td>6 300</td>
<td>10 400 €</td>
<td>780 €</td>
</tr>
<tr>
<td>Africa</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>incl. North Africa</td>
<td>170</td>
<td>1 000</td>
<td>5 700 €</td>
<td>430 €</td>
</tr>
<tr>
<td>incl. Subsaharan Africa</td>
<td>900</td>
<td>1 800</td>
<td>2 000 €</td>
<td>150 €</td>
</tr>
<tr>
<td>Asia</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>incl. China</td>
<td>1 350</td>
<td>10 400</td>
<td>7 700 €</td>
<td>580 €</td>
</tr>
<tr>
<td>incl. India</td>
<td>1 260</td>
<td>4 000</td>
<td>3 200 €</td>
<td>240 €</td>
</tr>
<tr>
<td>incl. Japan</td>
<td>130</td>
<td>3 800</td>
<td>30 000 €</td>
<td>2 250 €</td>
</tr>
<tr>
<td>incl. Other</td>
<td>1 550</td>
<td>11 800</td>
<td>7 600 €</td>
<td>570 €</td>
</tr>
</tbody>
</table>

World GDP, estimated in purchasing power parity, was about 71 200 billions euros in 2012. World population was about 7.050 billions inhabitants, hence a per capital GDP of 10 100€ (equivalent to a monthly income of about 760€ per month). All numbers were rounded to the closed dozen or hundred.

Sources: see piketty.pse.ens.fr/capital21c.
In 2012, 1 euro was worth 1.30 dollars according to current exchange rate, but 1.20 dollars in purchasing power parity. Sources and series: see piketty.pse.ens.fr/capital21c.
In 2012, 1 euro was worth 8 yuan according to current exchange rate, but 5 yuan in purchasing power parity. Sources and series: see piketty.pse.ens.fr/capital21c.
Fact 2. Growth slowdown

• Productivity growth is always slow for countries at the world technological frontier; once global catch-up process is over, growth might be low everywhere
• Population growth seems to be $\rightarrow 0$ (or $<0$)
• Average world growth 1700-2012: $g=1.6\%$, including $n=0.8\%$ for population and $h=0.8\%$ for per capita output
• But 0.8% per year was enough to multiply world population (and average income) by a factor of 10
• $g = n + h$ with $n =$ population growth
  and $h =$ productivity growth
• In the very long run, maybe $n \approx 0\%$ and $h \approx 1-1.5\%$, so that $g=n+h\approx 1-1.5\%$
• Some economists are even less optimistic: long-run $g<1\%$ according to Gordon 2012 and secular stagnation debate
Table 2.1: World growth since the industrial revolution

<table>
<thead>
<tr>
<th>Average annual growth rate</th>
<th>World output</th>
<th>World population</th>
<th>Per capita output</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1700</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.0%</td>
</tr>
<tr>
<td>1700-2012</td>
<td>1.6%</td>
<td>0.8%</td>
<td>0.8%</td>
</tr>
<tr>
<td>incl.: 1700-1820</td>
<td>0.5%</td>
<td>0.4%</td>
<td>0.1%</td>
</tr>
<tr>
<td>1820-1913</td>
<td>1.5%</td>
<td>0.6%</td>
<td>0.9%</td>
</tr>
<tr>
<td>1913-2012</td>
<td>3.0%</td>
<td>1.4%</td>
<td>1.6%</td>
</tr>
</tbody>
</table>

Between 1913 and 2012, the growth rate of world GDP was 3.0% per year on average. This growth rate can be broken down between 1.4% for world population and 1.6% for per capita GDP.

Sources: see piketty.pse.ens.fr/capital21c.
Table 2.2. The law of cumulated growth

<table>
<thead>
<tr>
<th>An annual growth rate equal to...</th>
<th>...is equivalent to a generational growth rate (30 years) of...</th>
<th>...i.e. a multiplication by a coefficient equal to...</th>
<th>...and a multiplication after 100 years by a coefficient equal to...</th>
<th>...and a multiplication after 1000 years by a coefficient equal to...</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1%</td>
<td>3%</td>
<td>1.03</td>
<td>1.11</td>
<td>2.72</td>
</tr>
<tr>
<td>0.2%</td>
<td>6%</td>
<td>1.06</td>
<td>1.22</td>
<td>7.37</td>
</tr>
<tr>
<td>0.5%</td>
<td>16%</td>
<td>1.16</td>
<td>1.65</td>
<td>147</td>
</tr>
<tr>
<td>1.0%</td>
<td>35%</td>
<td>1.35</td>
<td>2.70</td>
<td>20 959</td>
</tr>
<tr>
<td>1.5%</td>
<td>56%</td>
<td>1.56</td>
<td>4.43</td>
<td>2 924 437</td>
</tr>
<tr>
<td>2.0%</td>
<td>81%</td>
<td>1.81</td>
<td>7.24</td>
<td>398 264 652</td>
</tr>
<tr>
<td>2.5%</td>
<td>110%</td>
<td>2.10</td>
<td>11.8</td>
<td>52 949 930 179</td>
</tr>
<tr>
<td>3.5%</td>
<td>181%</td>
<td>2.81</td>
<td>31.2</td>
<td>...</td>
</tr>
<tr>
<td>5.0%</td>
<td>332%</td>
<td>4.32</td>
<td>131.5</td>
<td>...</td>
</tr>
</tbody>
</table>

An annual growth rate of 1% is equivalent to an annual growth rate of 35% per generation (30 years), a multiplication by 2.7 every 100 years, and by over 20 000 every 1000 years.
Figure 2.1. The growth of world population 1700-2012

World population rose from 600 millions inhabitants in 1700 to 7 billions in 2012.
Sources ans series: see piketty.pse.ens.fr/capital21c.
Figure 2.2. The growth rate of world population from Antiquity to 2100

The growth rate of world population was above 1% per year from 1950 to 2012 and should return toward 0% by the end of the 21st century. Sources and series: see piketty.pse.ens.fr/capital21c.
### Table 2.3: Demographic growth since the industrial revolution

<table>
<thead>
<tr>
<th>Average annual growth rate</th>
<th>World population</th>
<th>Europe</th>
<th>America</th>
<th>Africa</th>
<th>Asia</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1700</td>
<td>0.1%</td>
<td>0.1%</td>
<td>0.0%</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
<tr>
<td>1700-2012</td>
<td>0.8%</td>
<td>0.6%</td>
<td>1.4%</td>
<td>0.9%</td>
<td>0.8%</td>
</tr>
<tr>
<td>incl: 1700-1820</td>
<td>0.4%</td>
<td>0.5%</td>
<td>0.7%</td>
<td>0.2%</td>
<td>0.5%</td>
</tr>
<tr>
<td>1820-1913</td>
<td>0.6%</td>
<td>0.8%</td>
<td>1.9%</td>
<td>0.6%</td>
<td>0.4%</td>
</tr>
<tr>
<td>1913-2012</td>
<td>1.4%</td>
<td>0.4%</td>
<td>1.7%</td>
<td>2.2%</td>
<td>1.5%</td>
</tr>
<tr>
<td>Projections 2012-2050</td>
<td>0.7%</td>
<td>-0.1%</td>
<td>0.6%</td>
<td>1.9%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Projections 2050-2100</td>
<td>0.2%</td>
<td>-0.1%</td>
<td>0.0%</td>
<td>1.0%</td>
<td>-0.2%</td>
</tr>
</tbody>
</table>

Between 1913 and 2012, the growth rate of world population was 1.4% per year, including 0.4% for Europe, 1.7% for America, etc.

Sources: see piketty.pse.ens.fr/capital21c. Projections for 2012-2100 correspond to the UN central scenario.
• Per capita (per inhabitant) growth was exceptionally high in Europe and Japan in the 1950-1980 period (h=4-5% per year) because of a catch-up process with the US; but since 1980, per capital growth rates have been low in all rich countries

• In the very long, h=1% is already quite fast and requires permanent reallocation of labor (about one third of the economy is being renewed at each generation)
<table>
<thead>
<tr>
<th>Average annual growth rate</th>
<th>Per capita world output</th>
<th>Europe</th>
<th>America</th>
<th>Africa</th>
<th>Asia</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1700</td>
<td>0,0%</td>
<td>0,0%</td>
<td>0,0%</td>
<td>0,0%</td>
<td>0,0%</td>
</tr>
<tr>
<td>1700-2012</td>
<td>0,8%</td>
<td>1,0%</td>
<td>1,1%</td>
<td>0,5%</td>
<td>0,7%</td>
</tr>
<tr>
<td>incl.: 1700-1820</td>
<td>0,1%</td>
<td>0,1%</td>
<td>0,4%</td>
<td>0,0%</td>
<td>0,0%</td>
</tr>
<tr>
<td>1820-1913</td>
<td>0,9%</td>
<td>1,0%</td>
<td>1,5%</td>
<td>0,4%</td>
<td>0,2%</td>
</tr>
<tr>
<td>1913-2012</td>
<td>1,6%</td>
<td>1,9%</td>
<td>1,5%</td>
<td>1,1%</td>
<td>2,0%</td>
</tr>
<tr>
<td>1913-1950</td>
<td>0,9%</td>
<td>0,9%</td>
<td>1,4%</td>
<td>0,9%</td>
<td>0,2%</td>
</tr>
<tr>
<td>1950-1970</td>
<td>2,8%</td>
<td>3,8%</td>
<td>1,9%</td>
<td>2,1%</td>
<td>3,5%</td>
</tr>
<tr>
<td>1970-1990</td>
<td>1,3%</td>
<td>1,9%</td>
<td>1,6%</td>
<td>0,3%</td>
<td>2,1%</td>
</tr>
<tr>
<td>1990-2012</td>
<td>2,1%</td>
<td>1,9%</td>
<td>1,5%</td>
<td>1,4%</td>
<td>3,8%</td>
</tr>
<tr>
<td>1950-1980</td>
<td>2,5%</td>
<td>3,4%</td>
<td>2,0%</td>
<td>1,8%</td>
<td>3,2%</td>
</tr>
<tr>
<td>1980-2012</td>
<td>1,7%</td>
<td>1,8%</td>
<td>1,3%</td>
<td>0,8%</td>
<td>3,1%</td>
</tr>
</tbody>
</table>

Between 1910 and 2012, the growth rate of per capita output was 1,7% per year on average at the world level, including 1,9% in Europe, 1,6% in America, etc.

Sources: voir piketty.pse.ens.fr/capital21c
Figure 2.3. The growth rate of per capita output since the industrial revolution

The growth rate of per capita output surpassed 4% per year in Europe between 1950 and 1970, before returning to American levels. Sources and series: see piketty.pse.ens.fr/capital21c
Figure 2.4. The growth rate of world per capita output since Antiquity until 2100

The growth rate of per capita output surpassed 2% from 1950 to 2012. If the convergence process goes on, it will surpass 2.5% from 2012 to 2050, and then will drop below 1.5%.

Sources and series: see piketty.pse.ens.fr/capital21c.
The growth rate of world output surpassed 4% from 1950 to 1990. If the convergence process goes on it will drop below 2% by 2050. Sources and series: see piketty.pse.ens.fr/capital21c.
<table>
<thead>
<tr>
<th>Year</th>
<th>France</th>
<th></th>
<th>United States</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agriculture</td>
<td>Manufacturing</td>
<td>Services</td>
<td>Agriculture</td>
</tr>
<tr>
<td>1800</td>
<td>64%</td>
<td>22%</td>
<td>14%</td>
<td>68%</td>
</tr>
<tr>
<td>1900</td>
<td>43%</td>
<td>29%</td>
<td>28%</td>
<td>41%</td>
</tr>
<tr>
<td>1950</td>
<td>32%</td>
<td>33%</td>
<td>35%</td>
<td>14%</td>
</tr>
<tr>
<td>2012</td>
<td>3%</td>
<td>21%</td>
<td>76%</td>
<td>2%</td>
</tr>
</tbody>
</table>

In 2012, agriculture made 3% of total employment in France, vs. 21% in manufacturing and 76% in the services. Construction - 7% of employment in France and the U.S. in 2012 - was included in manufacturing.

Sources: see piketty.pse.ens.fr/capital21c.
How did rich countries become rich, and how did convergence happen?

- (0) One possible view: with free markets and private property, everybody should become rich. The West first adopted these « institutions » (rule of law, well-protected property rights,..., freedom, democracy,...) and became rich. If the rest of the world follows this strategy, then everybody will become rich & happy.

- A bit simplistic & western-centric:
- (1) Rise of the West over 1500-1900 period came with a lot of violence: key role of armed trade, slavery, colonization, military domination. Not really peaceful institutions and the rule of law.
- (2) Rising living standards in 20c came with the rise of government (tax revenues: 10% Y before WW1; 30-50% Y in all developed countries today). In order to understand development, one needs a broader view of institutions : public infrastructures, education, social welfare, economic and political democracy. Not just property rights.
(3) Free markets and private property sacralization during 19c and early 20c led to extreme inequality and social tensions. Nationalism, wars, communism led the elites finally to accept public regulation, welfare state, progressive taxation. Reduction of inequality is the « Great Transformation » of the 1914-1945 period.

But the complex legacy of 20c shocks: different memories of the post-WW2 exceptional period:

- High-growth egalitarian ideal in western Europe (Trente glorieuses).
- Mixed memory in US/UK (relative decline; Reagan-Thatcher reaction).
- Negative memory for ex-communist countries (Russia/China/East.Eur.).

Pro-market reaction, back to private property sacralization.

Third world: decolonization period, mixed experience with state intervention; European colonial power replaced by US power system until today and the rise of China (pluto-communism?).

Interaction between domestic inequality, international power relations, national identities and development narratives plays a key role.
(4) Rise of emerging countries certainly benefited from market openness, but did not come simply from market forces; in particular, foreign investment played a relatively minor role: convergence came from domestic saving and investment, public infrastructures and education, the diffusion of knowledge and state formation; e.g. bigger govt and public spend. in China than India, & higher growth; there are different ways to organize economic & political institutions

- The standard growth model predicts output convergence, not income and convergence; if we simply rely on market forces (rather than investment in productivity, knowledge and education), we can end up with permanent wealth inequality, foreign-owned countries, political instability and redistribution cycles (Africa, South America)
- International property relations are particularly complicated to regulate peacefully
- Learning to live with inequality, collective learning about the ideal compromise & institutions: the dimensions of political conflict
A quick roadmap of the global history/comparative development literature

• Hundreds of authors have written about comparative development (why some countries develop and not others) since 18c: Montesquieu 1748 (climate), Smith 1776 (markets), Marx 1867 (primitive accumulation, colonial extraction), Weber 1904 (protestant ethic), etc.

• Impossible to summarize everything; here I give a very quick overview and introduction; I will return to several themes later

• Braudel 1979 *Civilisation and capitalism* (3 vol.): the first global, multidimensional history of capitalism 1500-1800; much broader than Weber; enormous influence on subsequent research and the rise of «world history»

• Pomeranz 2000 *The Great Divergence: China and Europe in the Making of the Modern World Economy* (see also AHR 2002) = possibly the most important book in global history since Braudel
• **K. Pomeranz 2000**: btw 1500 and 1750-1800, (the most advanced regions of) China/Japan and Europe followed more or less the same devt path: slow but positive population growth, agriculture/textile domestic proto-industrialisation

• If anything, China/Japan had more « Smithian » market institutions than Europe until 1800: more unified land and grain markets (less church property, more political unity, fewer wars), more labor mobility (less serfdom & labor control)

• The Great Divergence only begins with armed trade & military domination of the West around 1750-1850; in effect, this allowed the West to escape the proto-industrialization « ecological constraint » (massive deforestation in 18c): coal, slaves, New World

• National accounts of colonial extraction are highly uncertain (Williams 1944 vs O’Brien 1982); Pomeranz innovation is to use land accounts: btw 1500 & 1800, share of forested land goes from 30-40% to 5-10% in Europe; by 1830, British imports of cotton/timber/sugar ≈ 1.5-2 additional Britain in arable land
• S. Beckert 2014, *Empire of Cotton – A Global History*: until 1500-1600, cotton and textiles had always been produced locally; things started to change with the Great Discoveries and the military expansion of Europe: the West appropriated land in America, sent slaves from Africa in order to produce raw cotton, and finally banned Indian textiles → by 1750-1850, Europe controlled global textile manufacturing (= complementary to Pomeranz 2000)

• Key role of slavery: half of all slaves transported over 1492-1887 period were transported after 1780; huge acceleration 1780-1860; it is only after US Civil War that Indian cotton rises again

• « 18c-19c were the age of barbarity and catastrophe; one has to be v. eurocentric to view 20c as the age of catastrophe: it is the age of independance and end of slavery; global capitalism today is still shaped by the struggles for independance, and for a fair empire of cotton »
• **Rosenthal-Wong 2011, Before and Beyond Divergence: The Politics of Economic Change in China and Europe**: stress on size of political communities (polities); Europe = smaller polities → more competition between small nation-states, more military innovation (and war-&-public-debt-incuded financial innovation) → rise of the West; but also self-destruction of Europe during 20c, and major coordination problems today within EU...; China = larger polity, less military innovation during 17c-19c, but probably better in the long run

• During 17c-18c, China not only had more Smithian market institutions than Europe, but also more Smithian government: no war, low taxes, development-friendly spending, no public debt... until Western indemnities and war tributes imposed by the West during 19c (key role of public debt in colonial coercion: China, Turkey, Morocco,...)
• See also P. Hoffman, « Prices, the military revolution, and western Europe’s comparative advantage in violence », *EHR 2011*; “Why Was It Europeans Who Conquered the World?”, *JEH 2012*

• J. Goody 2006, *The Theft of History* : analysis of Western-centric bias in some of the main writings in modern social sciences

• R. Allen 2007, *The British Industrial Revolution in Global Perspective*
World systems, power and ideology

- K. Polanyi, *The Great Transformation, 1944*: 19th century capitalist system was inherently unstable, which led to its own destruction in 1914-1945
- Sacralization of private property + generalized competition between individuals and nations = very unequal & unstable system, both within and between countries → wars, monetary chaos, revolutions, fascism
- Key pb = myth of self-regulated markets for labor, land and money
- Over-optimistic view of pre-industrial restrictions on labor mobility?
- Compare with H. Arendt 1951: same premises, different conclusions
- See also I. Wallerstein, *The Modern World System, 1974-1989*
- On core-periphery growth models: see Krugman-Venables *QJE 1995*: a decline in transport costs can make big parts of the world worst off
- Arrighi: power = military dominance + moral/ideological leadership; “power = the grey zone between coercion and consent”
State formation and the rise of government

• P. Lindert, *Growing Public- Social Spending and Economic Growth since the 18th Century*, Oxford UP 2004

• Very interesting and detailed history of the rise of modern government and social spendings (tax revenues: 10% Y during 18c-19c and pretty much until WW1; 30-50% Y in all developed countries today)

• Rising living standards during 20c came with the rise of government

• Rise of fiscal and social state was not bad for growth and development because public spendings were for the most part growth-enhancing: public infrastructures, education, health, etc.

• Up to a point, there is no equity/efficiency trade-off
Long run impact of inequality on development

- Sokoloff- Engerman, “Institutions, Factor Endowments, and Paths of Development in the New World”, 1997; JEP 2000: more initial inequality in South America than in North America (colonial extraction vs settlers colonies) → more instability, less development

- J.S. You, “Land reform, inequality and corruption: a comparative historical study of Korea, Taiwan and the Philippines”, 2014: less inequality in Korea/Taiwan than in the Philippines (particularly due to more ambitious land reform in 1950 and more egalitarian social and education services) → more growth in Korea/Taiwan in 1950-2000 than in the Philippines, although the starting points were not very different in terms of per capita GDP (see also China vs India)

→ extreme inequality is not good for growth & development, both because of inequality-induced political instability, and because high inequality tends to come with low mobility (high mobility and inclusive investment in social and educational services are good for growth)
• **Capital in the 21st century**: an attempt to put the study of inequality, beliefs systems and institutions at the center of economics/economic history/political economy; key role of 1914-1945 shocks in historical reduction of inequality; risk of returning to extreme inequality (r vs g); but many other evolutions are possible

• Basic idea = how each country deals with inequality & property relations is central for the construction of a legitimate government, state formation, and the development process; pb = each country tends to be self-centered + power of self-serving ideology

• This book is a very incomplete attempt to move in this direction, particularly regarding the study of beliefs systems and politics

The property-rights/western-centric viewpoint

- **North-Weingast**, « Constitutions and commitment », *EHR 1989*: British 1688 parliamentary miracle → financial & industrial development

- **Acemoglu-Robinson**, *Why nations fail*, 2012; *AER 2001*; etc.: « if property rights are well protected (small risk of expropriation, nationalization, etc) & small government, then development occurs »

- Very interesting, but (in my view):
  - Somewhat narrow approach to « institutions »: too much centered on the protection of private property rights
  - Somewhat too vague and ahistorical: AR also refer to « inclusive vs extractive institutions », but they are often not very precise; v. little on specific institutions/policies such as education systems, welfare state, fiscal systems, etc. ; almost nothing on 20c state formation
  - Somewhat too Western-centered (or US-centered): « if western settlers impose the right institutions, then development occurs »
  - Read them & make your own mind !
Figure 2. OLS relationship between expropriation risk and income

From: AJR, “The Colonial Origins of Comparative Development”
Figure 3. First-Stage Relationship Between Settler Mortality and Expropriation Risk

From: AJR, “The Colonial Origins of Comparative Development”
The standard growth model: output convergence, not income & wealth cv

- The standard (neoclassical) growth model has many limitations: one-good model (no relative asset price), perfectly competitive markets with full information, little attention to inequality, etc.
- But it is a useful starting point to think about growth mechanics
- Output $Y = F(K,L) =$ production function
  with $K =$ capital input (= non-human capital: land, buildings, equipment, robots, patents, etc.)
  and $L =$ labor input (= human capital: efficient labor units = active population x labor productivity)
- Exemple: Cobb-Douglas production function: $F(K,L)=K^\alpha L^{1-\alpha}$
  → one needs capital $K$ and labor $L$ to grow at the same rate in order to have balanced long-run growth of $Y$
  (also true with more general production functions: see lecture 3)
Basic logic of the convergence model: if capital can freely flow from rich to poor countries, and if labor productivity is the same everywhere, then per capita output will be the same everywhere = « convergence »

This result requires strong assumptions: perfect competition, one-good model, no specialization effect (core/periphery models), no colonial extraction, etc.

But even if these strong assumptions are all satisfied, the point is that the standard growth model predicts output cv, not income or wealth cv: one can end up with permanent wealth inequality, foreign-owned countries, political instability and redistribution cycles (Africa, South America)

Asian miracles were induced by domestic saving, diffusion of knowledge and education, pro-development policies and public investment, not by capital flowing from rich to poor countries
• More on standard growth models: see Solow *QJE* 1956, Barro-Sala-i-Martin *2004 Chap.1-2*, Jones-Romer *AEJ 2010*

• Most important steady-state formula to remember: modified Golden rule formula $r = \theta + \gamma g \ (>g)$

($\theta =$ rate of time preference, $\gamma =$ curvature of utility function)

• $r > g$ does not mean ever-rising inequality: it simply means that ownership makes sense, i.e. that capital owners only need to reinvest a fraction $g/r (<1)$ of their capital income to ensure that their wealth rises as fast as the size of the economy

• I.e. if $r=5\%, \ g=1\%$, capital owners only need to reinvest 20% of their capital income and can consume 80%

• $r<g$ would imply that they need to reinvest more than 100% of capital income (« dynamic inefficiency »: too much capital)

• See also *course notes on wealth models* (particularly on the relation between equilibrium wealth inequality and $r – g$)

• Here I only provide simple numerical examples
Two countries A and B with same population & labor productivity \( L_A = L_B \)

**Exemple 1:** A and B have same per capita wealth \( W_A = W_B = 200 \, 000 \text{€} \)

No need for capital flows between countries A and B: each country has the same per capita domestic capital \( K_A = K_B = 200 \, 000 \text{€} \)

Assume \( Y = F(K, L) \) is such that per capita output \( Y_A = Y_B = 25 \, 000 \text{€} \), i.e. capital-output ratio \( \beta = K/Y = \text{wealth-output ratio } W/Y = 800\% \)

No net foreign wealth: per capita income = per capital output = 25 000€

Assume growth rate \( g = 1\% \) (population + productivity growth) and rate of return to capital \( r = 5\% \) (marginal product of capital + preferences)

Capital share \( \alpha = Y_K/Y = rK/Y = r \times \beta = 40\% \): in both count., labor income \( Y_{LA} = Y_{LB} = 15 \, 000 \text{€} \), capital income \( Y_{KA} = Y_{KB} = 10 \, 000 \text{€} \) (=5% x 200 000€)

Balanced (steady-state) growth: K must rise at same speed as Y and L

If \( g = 1\% \), \( r = 5\% \), one needs to reinvest a fraction \( g/r = 20\% \) of \( Y_K \) (2 000€), and one can consume a fraction \( 1-g/r = 80\% \) (8 000€)

\[ Y = 25 \, 000 \text{€} = S + C = 2 \, 000 \text{€} (8\%) + 23 \, 000 \text{€} (92\%) \]

With \( g = 2\% \), \( r = 5\% \), one needs to reinvest a fraction \( g/r = 40\% \) of \( Y_K \), etc.
• With full equality (within & between countries), the fact that $r > g$ is not a pb at all: it simply means that everybody needs to save and reinvest a fraction $g/r$ of $Y_K$ so that $K$ rises at the same speed as $Y$ and $L$ (steady-state growth), & can consume a fraction $1 - g/r$ of capital income = this is the purpose of $K$ accumulation and ownership: one can consume more than without $K$ accumulation

• $r < g$ would be a pb: one would need to reinvest more than $Y_K$ in order to keep $K$ rising at same speed as $Y$ and $L$, which makes no sense: « dynamic inefficiency », i.e. over-accumulation of $K$ ($r < g$ impossible in infinite-horizon models; possible in OLG models)

• But with inequality between individuals (shocks to rates of return, labor incomes, demographics, etc.), a higher gap between $r$ & $g$ tends to amplify shocks and wealth concentration (see lecture 3)

• What about impact of $r - g$ on inequality between countries?
Exemple 2 (unequal countries): $W_A = 400\,000\,€$, $W_B = 0\,€$

With free capital flows, half of country A’s wealth is invested in country B, so that each country still has the same per capita domestic capital $K_A = K_B = 200\,000\,€$ and the same per capita output $Y_A = Y_B = 25\,000\,€$

The difference is that now country B’s capital is owned by country A: income $Y_B^* \text{ in country B} = \text{ labor income } Y_{LB} = 15\,000\,€$, while income $Y_A^* \text{ in country A} = Y_{LA} + Y_{KA} + Y_{KB} = 35\,000\,€$

Balanced growth: country B doesn’t save (& consumes 15 000€), while country A saves a fraction $g/r$ of $Y_{KA} + Y_{KB}$ (& consumes the rest)

If $g=1\%$, $r=5\%$, $Y_A^* = 35\,000\,€ = S + C = 4\,000\,€ (8\%) + 31\,000\,€ (92\%)$

Market forces can lead to output convergence (under certain conditions), but not to convergence of wealth, income & welfare: in standard models, any initial level of wealth inequality is self-sustaining

Higher gap between $g$ & $r$ implies higher steady-state inequality of consumption and welfare (if $g \approx r$, then all $Y_K$ needs to be reinvested)

Only solution: country B needs to save more (not easy since country B is poorer than country A → more natural to accumulate debt)

...or to expropriate country A! (→large foreign assets often come with political and military domination, so as to avoid expropriation: colonies)
Exemple 3 (v. unequal countries): $W_A=600\,000\,€$, $W_B=-200\,000\,€$ (debt)

With free capital flows, half of country A’s wealth is again invested in country B, so that each country still has same domestic capital $K_A=K_B=200\,000\,€$ and the same per capita output $Y_A=Y_B=\,25\,000\,€$

The difference is that now country B’s capital is owned by country A, and that in addition count.B needs to repay interest payments of its foreign debt ($r \times D_B = 10\,000\,€$ if $r=5\%$ and $D_B=200\,000\,€$)

Income $Y_B^*$ in country B = labor income $Y_{LB} - rD_B = 5\,000\,€$,
while income $Y_A^*$ in country A = $Y_{LA} + Y_{KA} + Y_{KB} + rD_B = 45\,000\,€$

Balanced growth: count. B doesn’t save (& consumes a frac. g/r of $rD_B$), while count. A saves fraction g/r of $Y_{KA}+Y_{KB}+rD_B$ (& consumes the rest)

If $g=1\%$, $r=5\%$, $Y_B^* = 5\,000\,€ = S + C = -2\,000\,€ + 7\,000\,€$ ,
while $Y_A^* = 45\,000\,€ = S + C = 6\,000\,€ + 39\,000\,€$

There’s nothing in standard economic models that prevents extreme inequality to persist forever, especially if $g << r$: possibility of permanent inequality between countries (or dynasties), with some countries (or dynasties) working for ever for others >> difficult to justify and regulate