

Econ 133 – Global Inequality and Growth

Income growth in the long run

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Roadmap

1. Income growth = demographic growth + productivity growth
2. Why is there demographic growth?
3. Why is there productivity growth?

1 Growth in the long run

1.1 Long-run growth = population + productivity growth

- Growth always = population growth + per capita growth
- Per capita growth = productivity growth + growth caused by changes in capital intensity K/L + business cycle
- In long-run steady-state, K/L is constant so per capita growth = productivity growth

1.2 Data sources on long-run population and output

- Maddison project database: <http://www.ggdc.net/maddison/>
- Recent decades: World Bank World Development Indicators: <http://data.worldbank.org>
- Population projections: United Nations World Population Prospects: esa.un.org/wpp

1.3 Growth since Antiquity

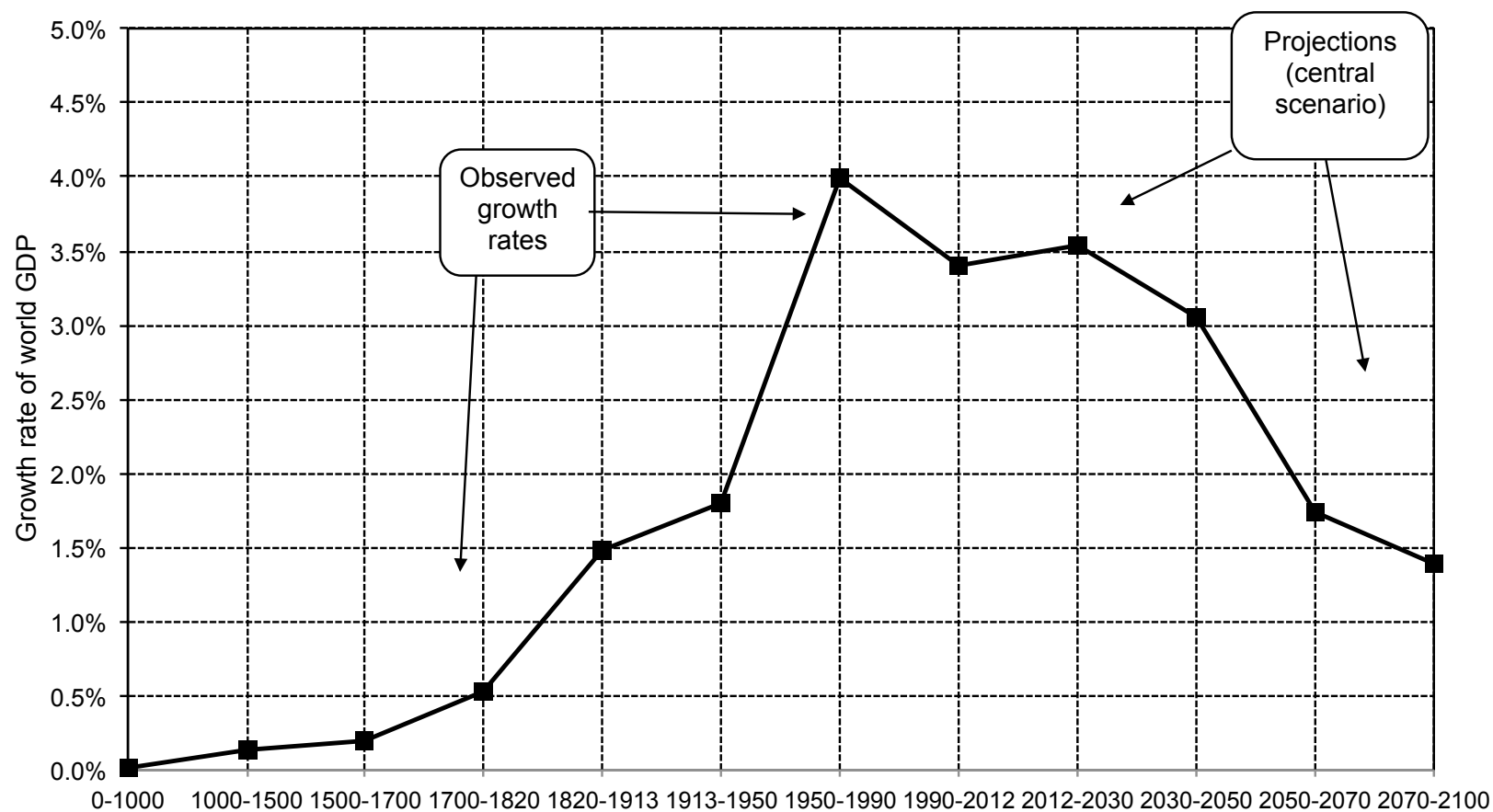
- From 0 to 1700 the world barely grew (Malthus)
- 18th century: end of Malthusian dynamics; beginning of demographic growth
- 19th century: industrial revolution; beginning of productivity growth
- Growth in the 21st century?

Table 2.1: World growth since the industrial revolution			
Average annual growth rate	World output	World population	Per capita output
0-1700	0.1%	0.1%	0.0%
1700-2012	1.6%	0.8%	0.8%
<i>incl.: 1700-1820</i>	0.5%	<i>0.4%</i>	<i>0.1%</i>
<i>1820-1913</i>	1.5%	<i>0.6%</i>	<i>0.9%</i>
<i>1913-2012</i>	3.0%	<i>1.4%</i>	<i>1.6%</i>

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: Piketty (2014), see piketty.pse.ens.fr/capital21c.

The growth rate of world output from Antiquity until 2100



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: Piketty (2014), see piketty.pse.ens.fr/capital21c.

2 Population growth

2.1 The stages of world population growth

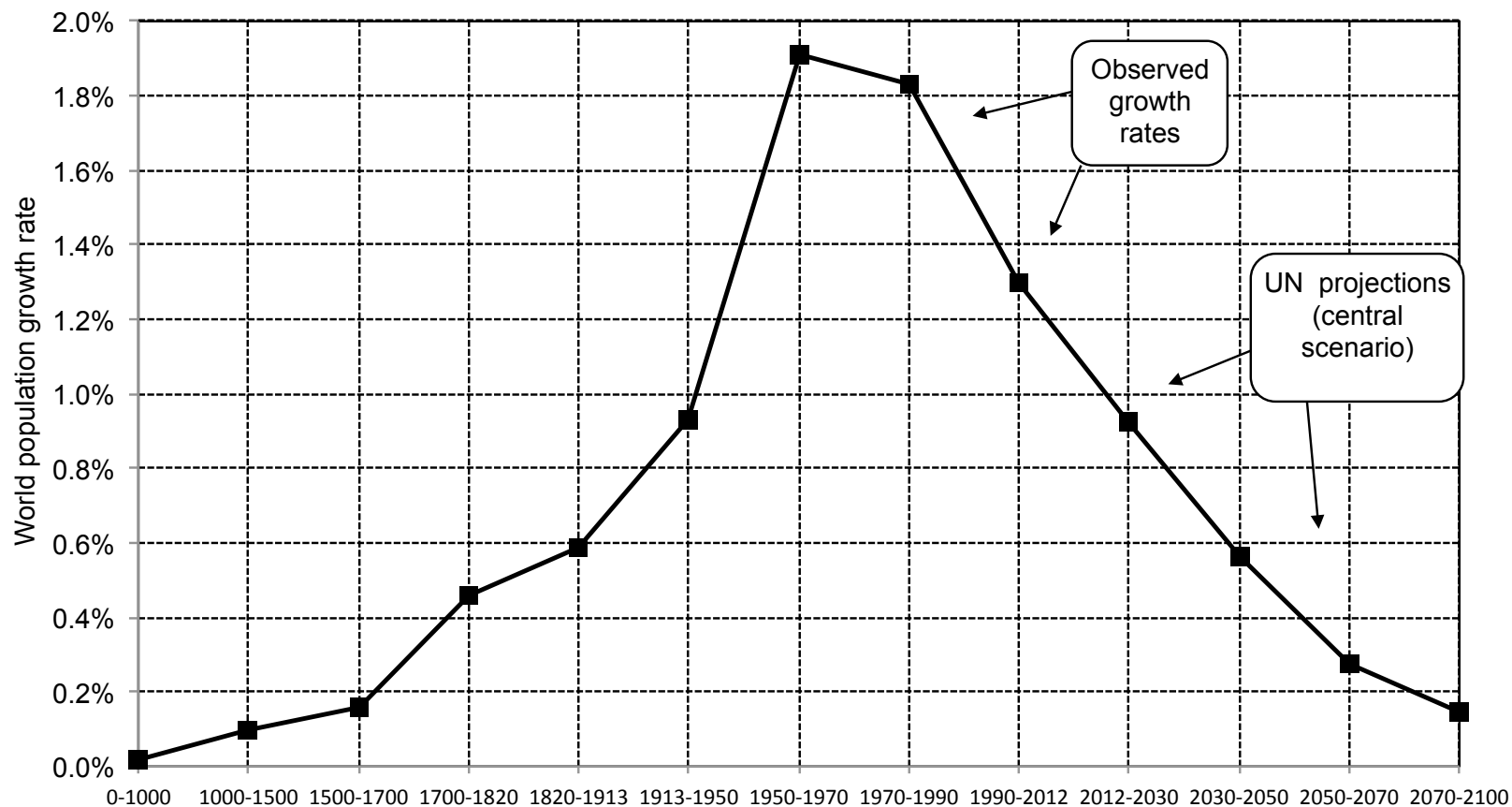
- 3 stages of world pop. growth 1700-2100: low growth — high growth — low growth
- This is what is known as the demographic transition
- **0-1700**: small & chaotic pop growth, but positive: 0.1% a year
- World pop. rose from 210 millions in year 0 to 250m in 1000, 450m in 1500, 600m in 1700

- **1700-2050:** very large population growth: 0.8% a year
- World pop. rose from 600m in 1700 to 7b in 2012 & nearly 10b by 2050
- **2050-2100:** back to limited pop. growth (0.2%), but with large variations: < 0 in Europe-Asia, $>>0$ in Africa
- Examples: Japan 120m today, projected to 42m in 2110
- Niger 20m today, 200m in 2100

2.2 Why is there population growth?

- Population growth rate = fertility rate – mortality rate + net migration rate
- Population growth = outcome of race between mortality and fertility
 - Mortality: Improvements in living conditions and hygiene
 - Fertility: contraception, beliefs, costs of childbearing, quantity/quality trade-off; pension system

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: Piketty (2014), see piketty.pse.ens.fr/capital21c.

3 Why is there productivity growth?

3.1 Innovation, ideas, education, institutions

- Innovation: discovering better and better ways to use the finite resources available to us
 - Add one computer → make one worker more productive
 - Add one new idea → make everyone better off
- Population growth:
 - Kremer (1993): pop growth → more ideas produced → growth

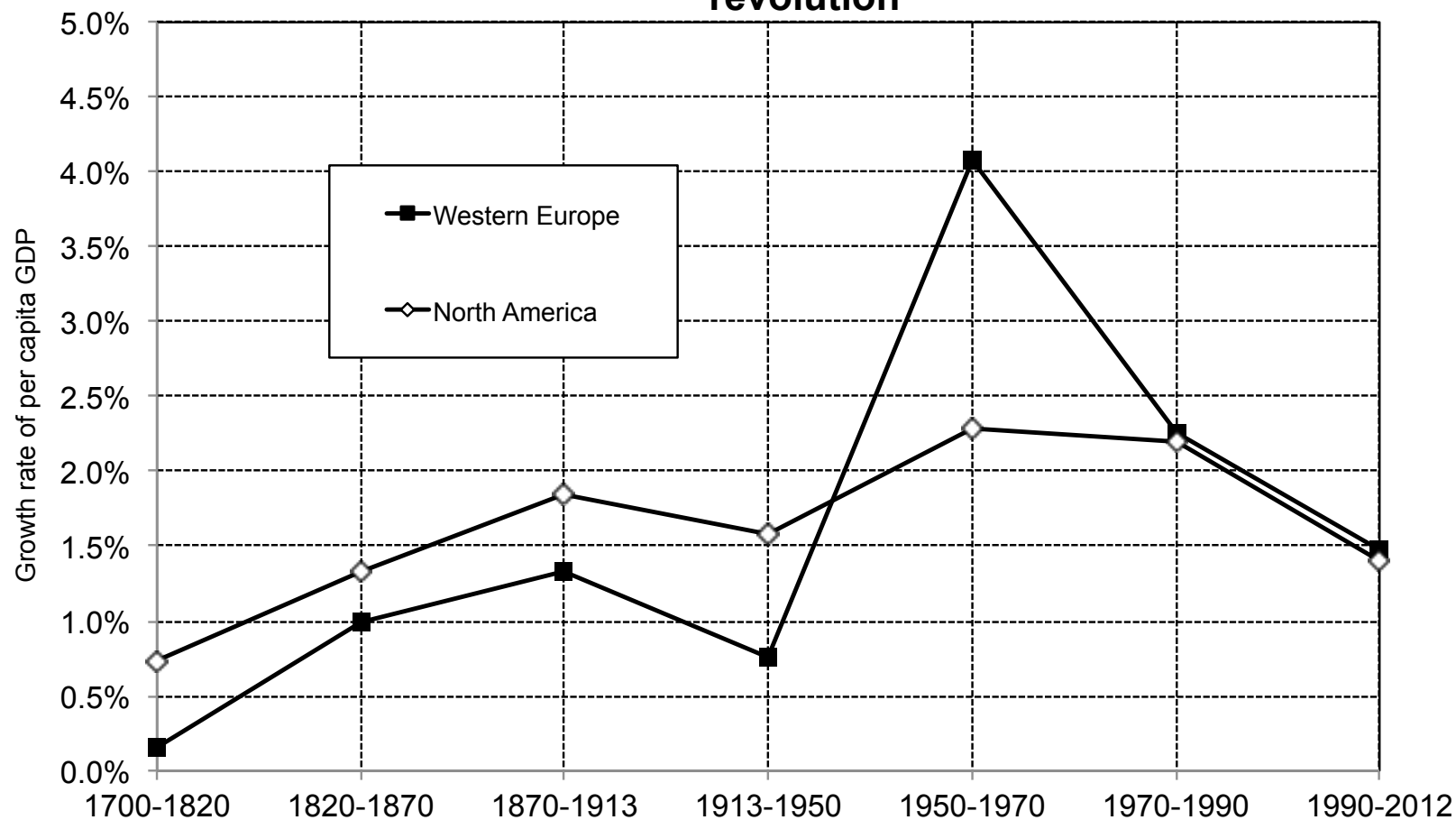
- \neq Malthus: pop growth \rightarrow falling wages \rightarrow misery, revolution
- Education, research
 - Discovering new ideas might get more difficult
 - Growing human resources devoted to R&D offsets this
- Institutions that support markets and innovation:
 - Stable legal framework; legitimate and efficient gov

3.2 Catch-up with the frontier

Catch-up explain episodes of exceptionally high growth:

- 4%-5% per capita annual growth in Europe and Japan in 1950-1980
- 8% growth in China today
- But at the frontier, the norm is 1%-2%

The growth rate of per capita output since the industrial revolution

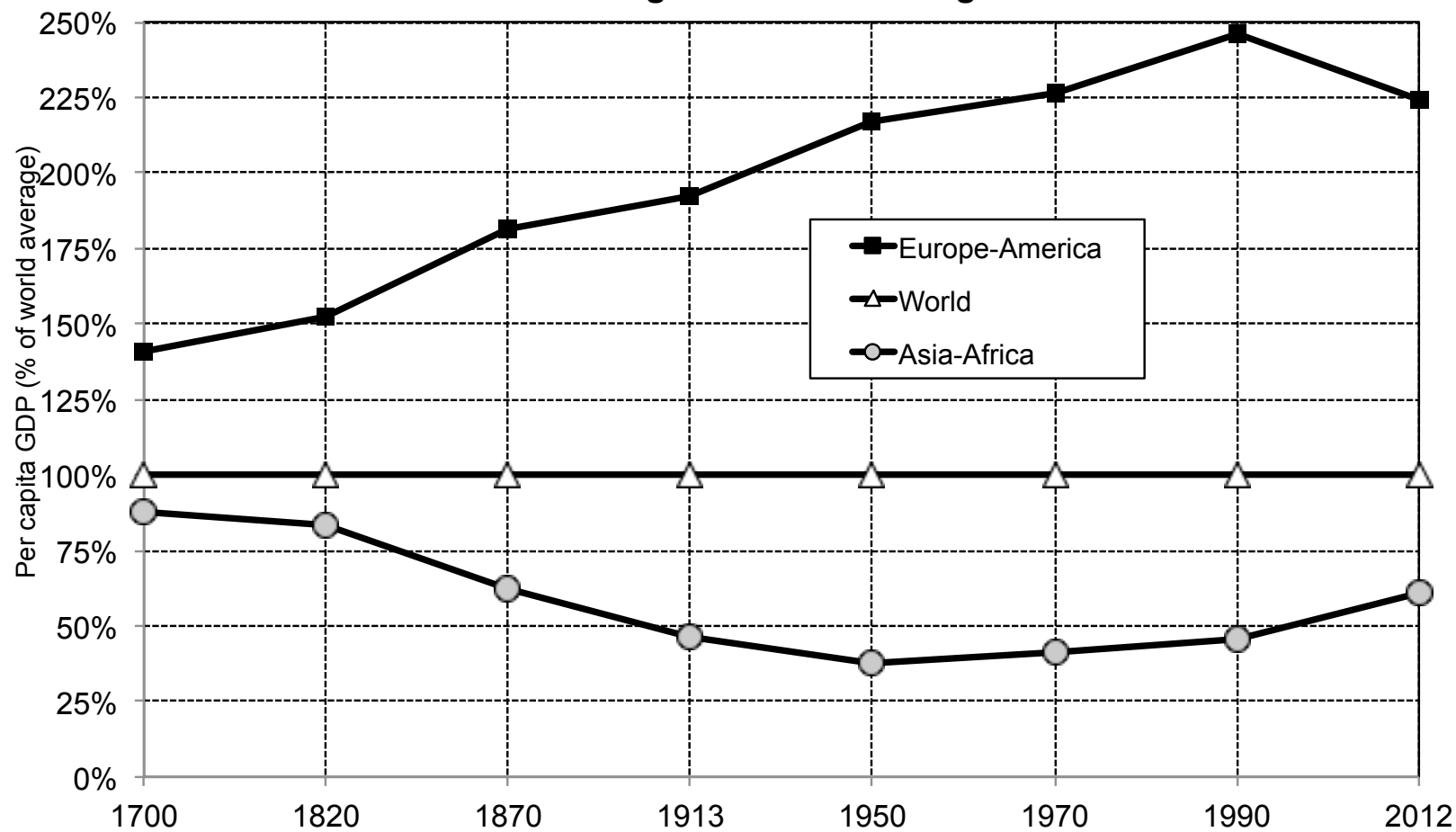


The growth rate of per capita output surpassed 4% per year in Europe between 1950 and 1970, before returning to American levels. Sources: Piketty (2014) see piketty.pse.ens.fr/capital21c

What makes catching-up possible?

- Key convergence force: diffusion of technology and know-how
- Role of free-trade: autarky prevents technological transfers
- Limited evidence for role of foreign capital flows
 - Helps convergence in output but not income
 - Most growth success stories rely on dom. rather than foreign inv

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: Piketty (2014) see piketty.pse.ens.fr/capital21c.

