

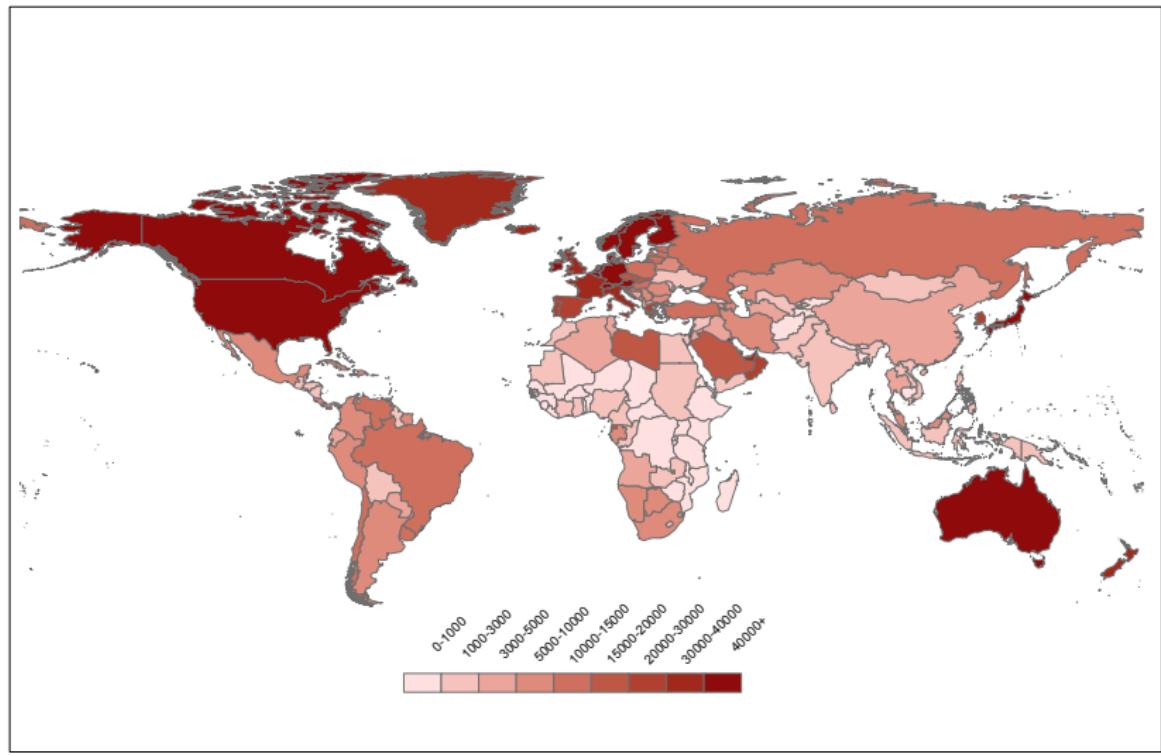
# Growth and Comparative Development: An Overview

Ömer Özak

Department of Economics  
Southern Methodist University

Economic Growth and Comparative Development

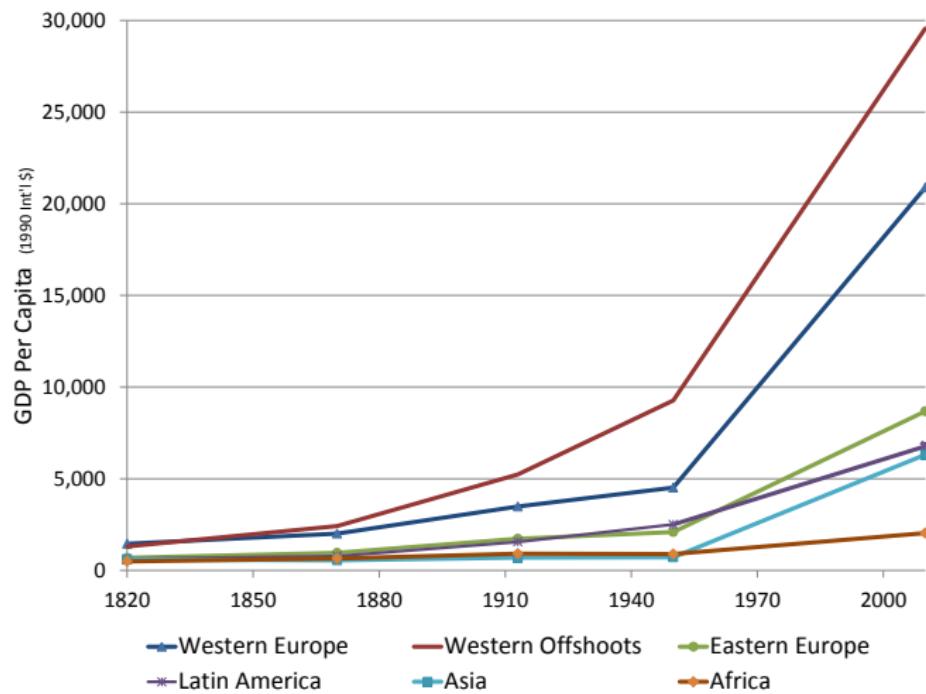
## Income per Capita across the Globe in 2010



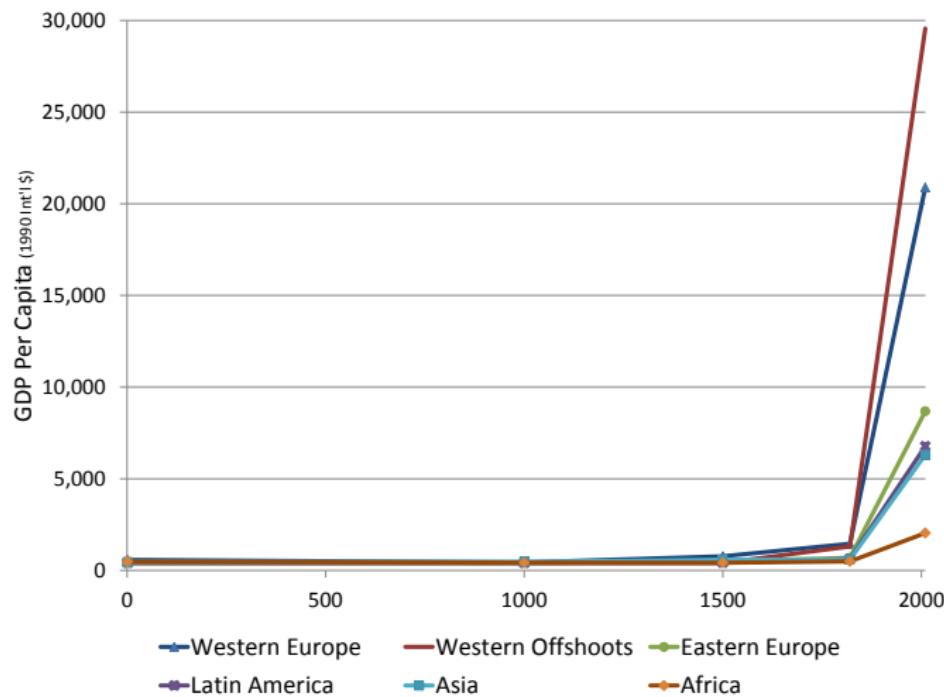
# Night Lights across the Globe in 2016



## Divergence across Regions: 1820–2010



## Regional Income per Capita: 1–2010



## Evolution of Inequality across Regions: 1–2010

	Income per Capita (1990 Int'l \$)				
	1	1000	1500	1820	2010
Western Offshoots	400	400	400	1,302	29,564
Western Europe	576	427	771	1,455	20,889
Latin America	400	400	416	628	6,767
Asia	456	470	568	591	6,307
Africa	472	425	414	486	2,034
Richest-Poorest Ratio	1.4	1.2	2	3	15

Western Offshoots: USA, Canada, Australia, New Zealand.

## Inferences from Growth Theory

- Diminishing returns to physical and human capital accumulation
- Diminishing effect of technological progress on productivity
  - $\Rightarrow$  Reduction in inequality
  - $\Rightarrow$  Convergence

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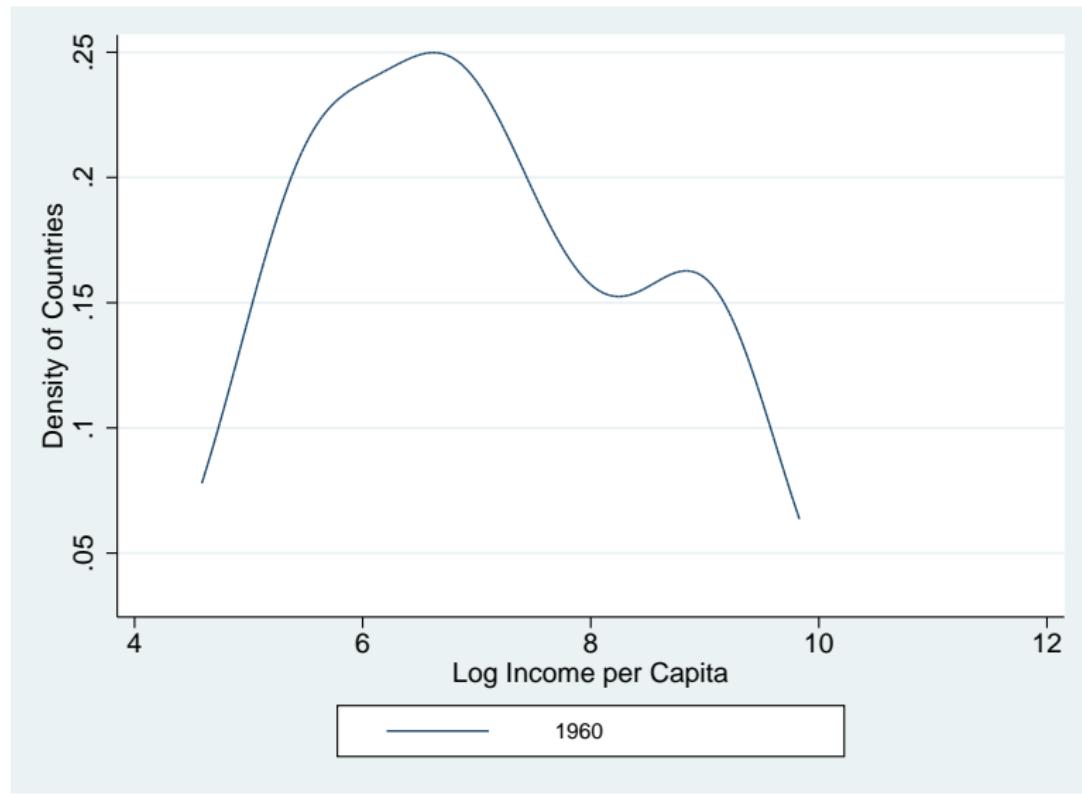
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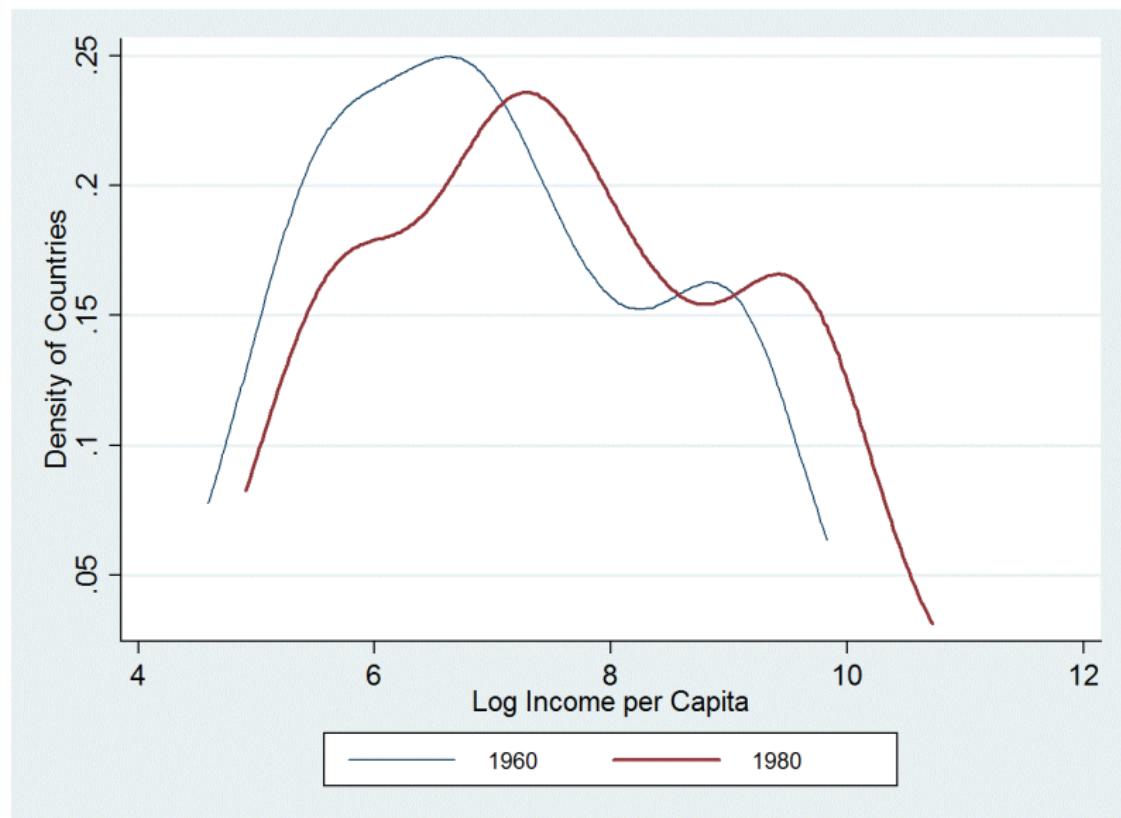
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## Income Distribution in 1960



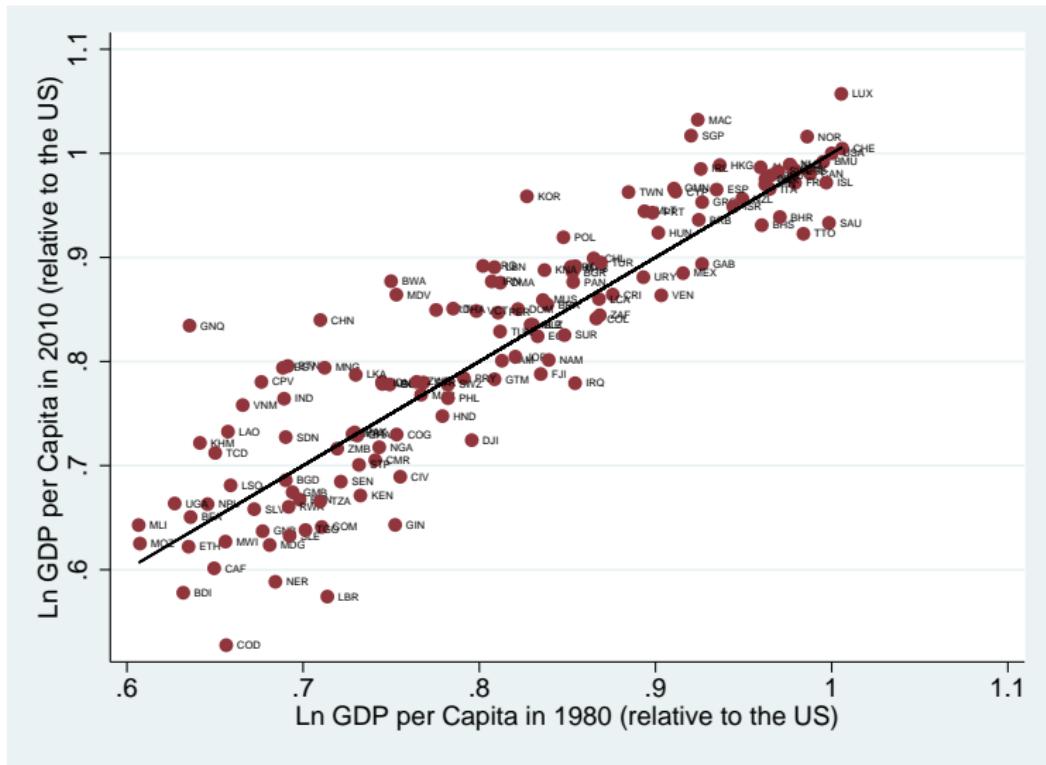
## Lack of Convergence across Nations: 1960–1980



## Lack of Convergence across Nations: 1960–2000



# Persistent Inequality across Nations: 1980–2010



## Fundamental Research Questions

- What is the origin of the vast inequality in income per capita across countries and regions?
- What accounts for the divergence in per-capita income across countries in the past two centuries?
- What are the factors that inhibited the convergence of poor economies toward richer ones in the past decades?
- What is the role of deep-rooted factors in explaining the observed patterns of comparative development?

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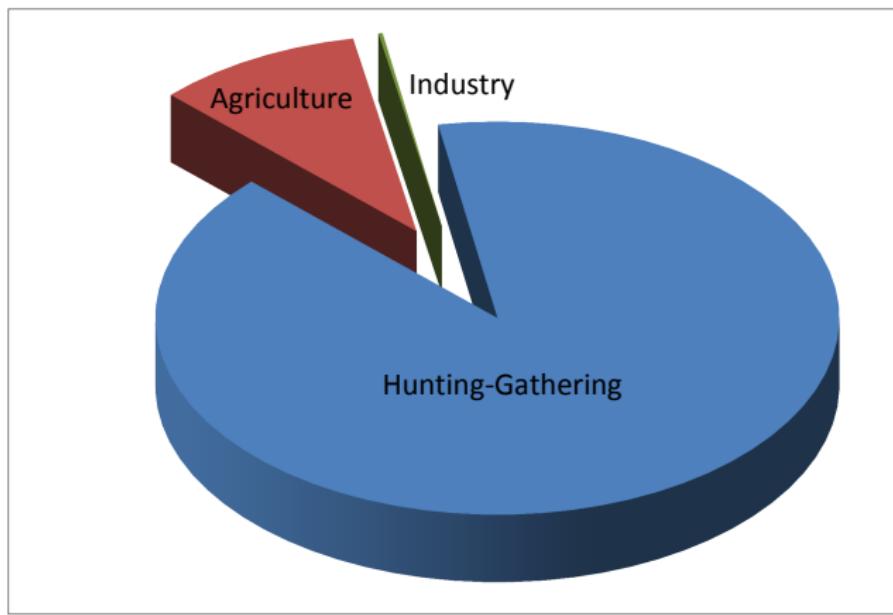
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## Phases of Development: Modes of Production



## Phases of Development: Standard of Living

- The Malthusian Epoch
- The Post-Malthusian Regime
- The Modern Growth Regime

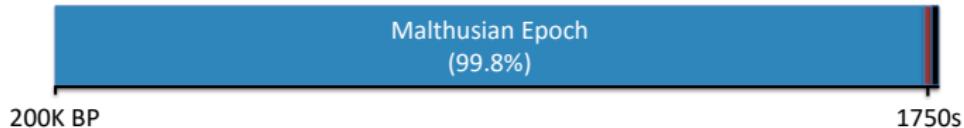
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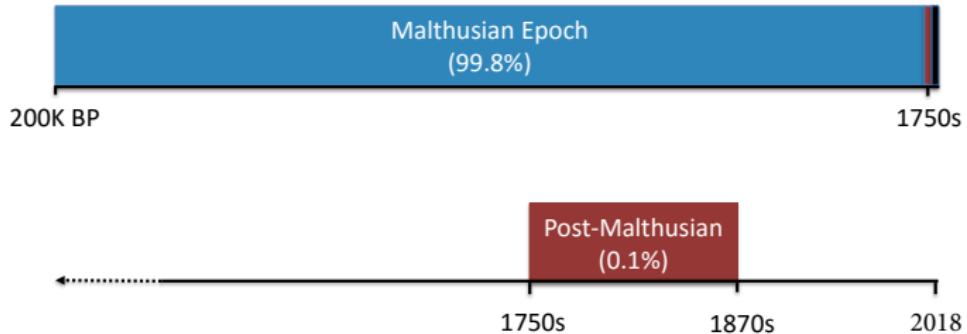
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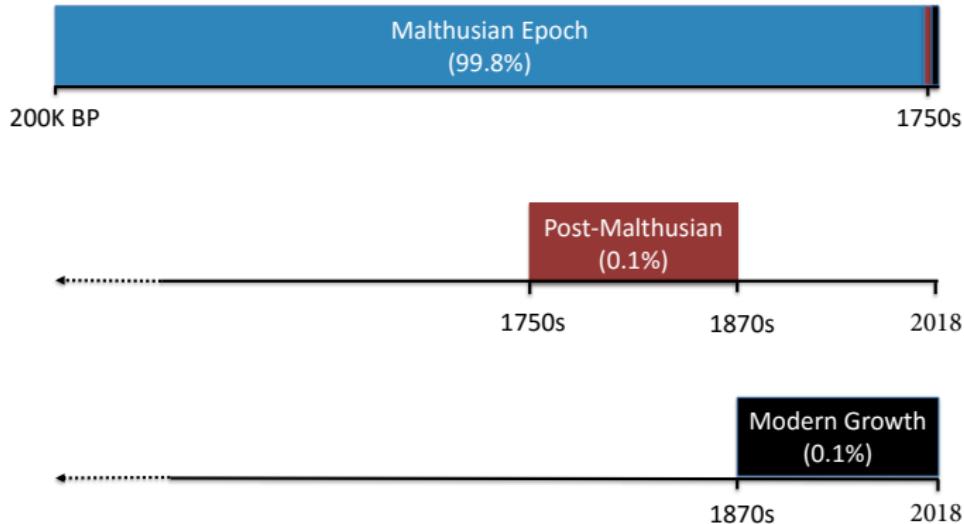
# Phases of Development: Timeline of the Most Developed Economies



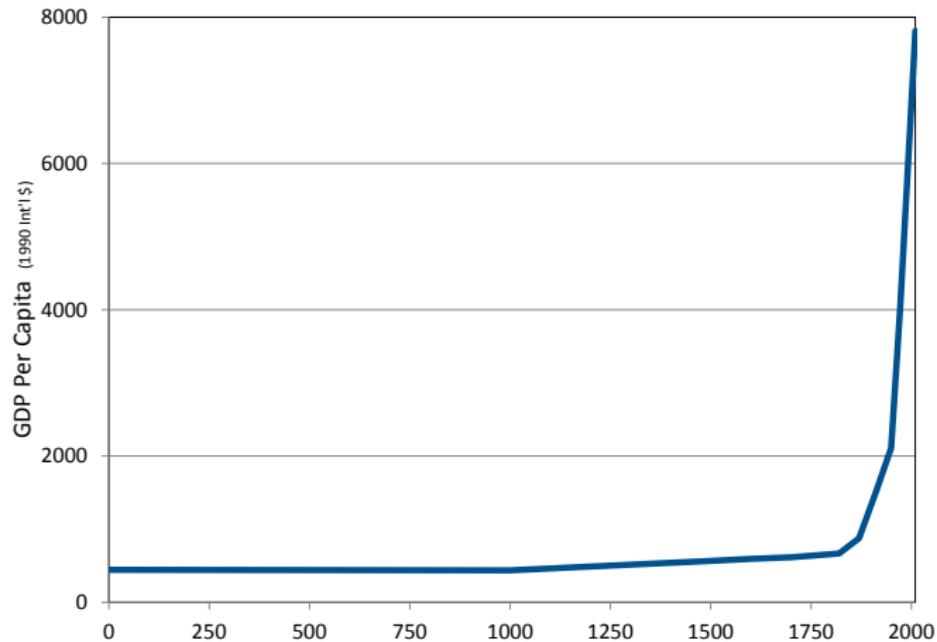
## Phases of Development: Timeline of the Most Developed Economies



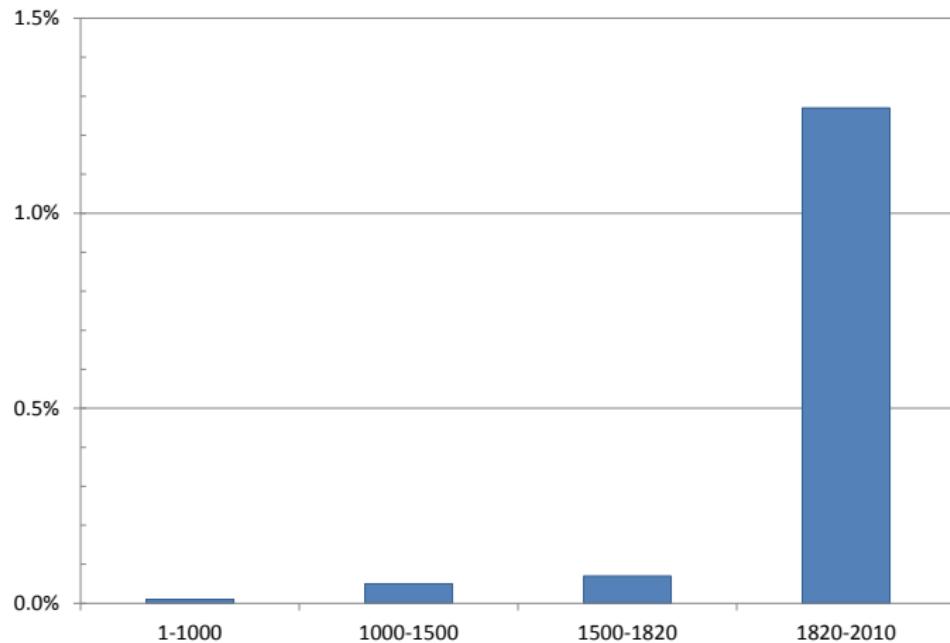
# Phases of Development: Timeline of the Most Developed Economies



## World Income per Capita: 1–2010



## Growth of World Income per Capita: 1–2010



## The Malthusian Epoch

- Characterized by Malthusian dynamics and the absence of economic growth
- Central characteristics of the period:
  - Positive effect of income on population growth
  - Diminishing returns to labor (reflecting the existence of fixed factor)
- Technological progress over this period
  - Increases income per capita in the short-run
  - Population adjust, as long as income remains above subsistence
  - Income per capita ultimately returns to its long-run level
- Technologically advanced & land-rich economies:
  - Higher population density
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- The dynamics of Irish economy (1650 - 1850)
  - Triggered by the cultivation of a new world crop – potato
- The dynamics of the Chinese Economy (1500 - 1800)
  - Triggered by superior agricultural technology
- The dynamics of the English economy (1348 - 1700)
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- The Columbian Exchange  $\implies$  massive cultivation of potato post-1650
  - 1650-1840s
    - Population increases from 2 to 6 million
    - Income per capita increases only very modestly
  - 1845-1852 Potato blight destroys crops  $\implies$  Great Famine
    - Population decreases by about 2 million
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- Superior agricultural technology

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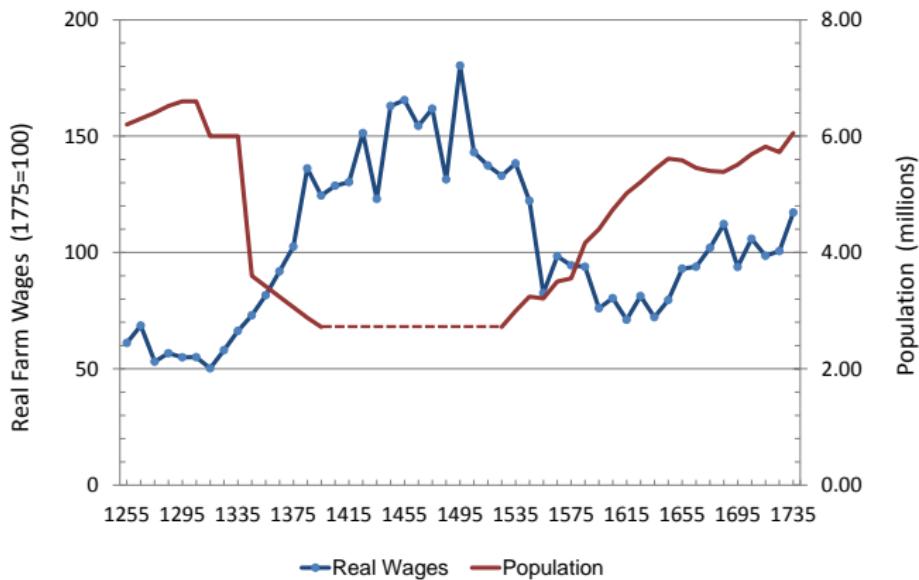
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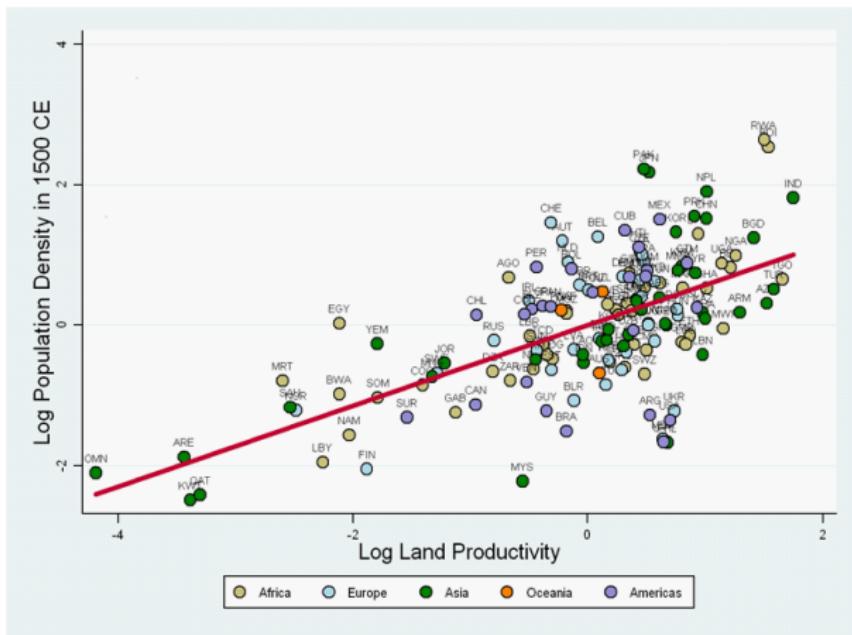
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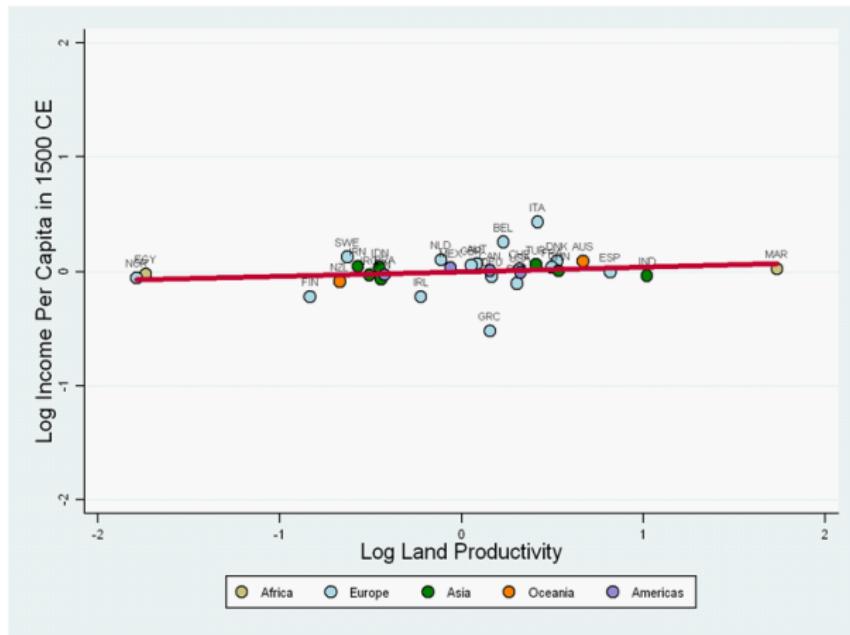
## Malthusian Adjustments to the Black Death: England, 1348–1750



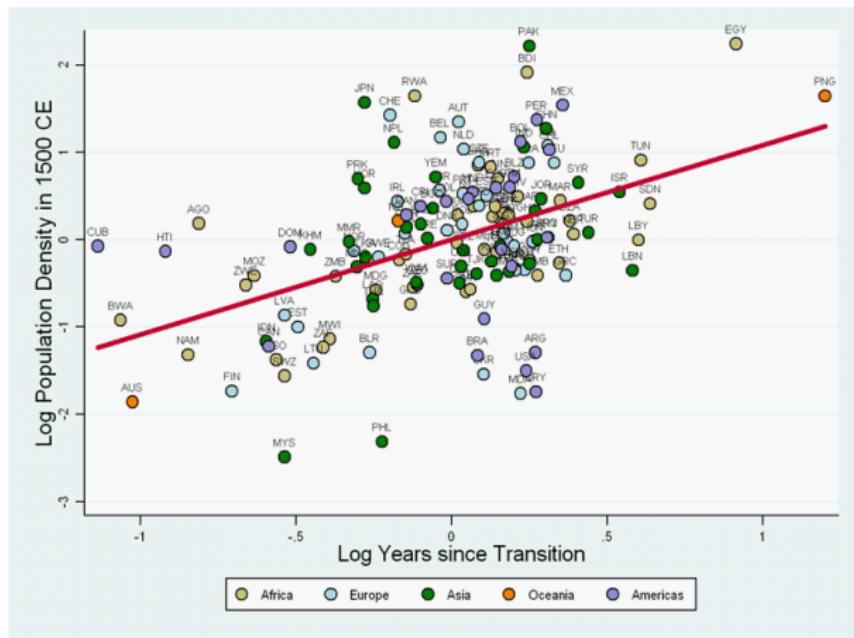
## Land Productivity and Population Density in 1500



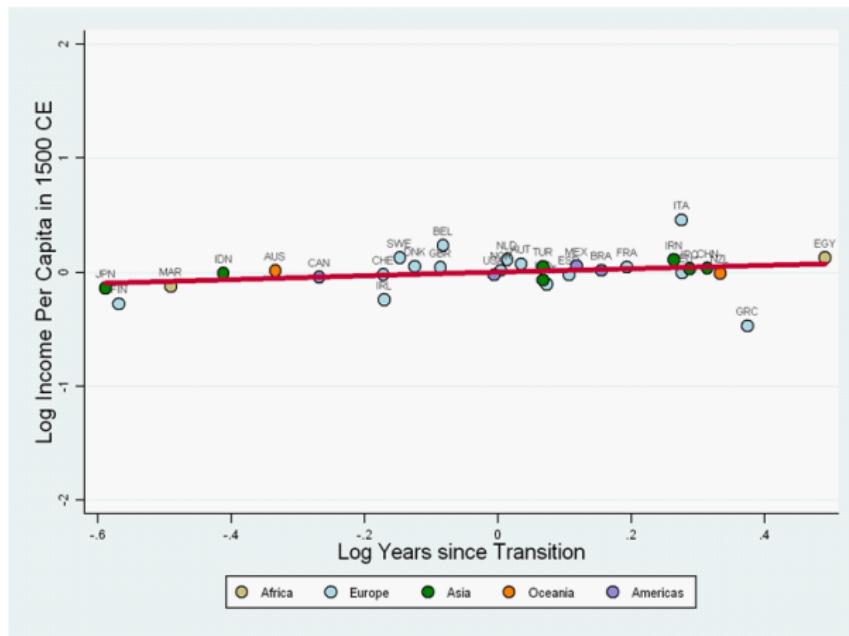
# Land Productivity and Income per Capita in 1500



## Technology and Population Density in 1500



## Technology and Income per Capita in 1500



## The Post-Malthusian Regime

- Characterized by the onset of economic growth:
  - Technological progress accelerates
  - Income per capita still has a positive effect on population growth
  - Technological progress:
    - Increases output more than population
    - $\implies$  growth in income per capita

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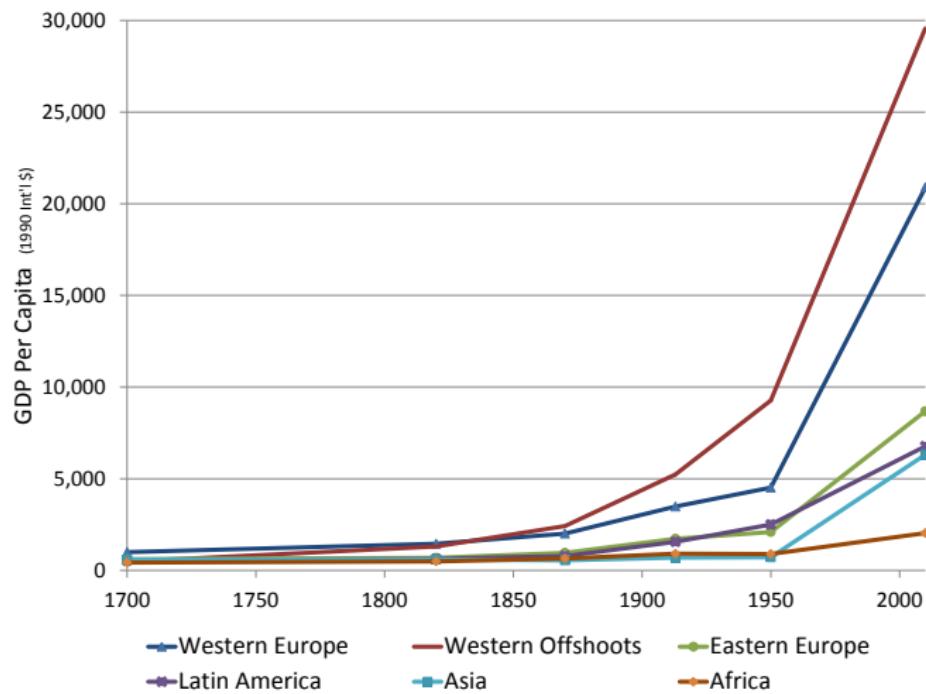
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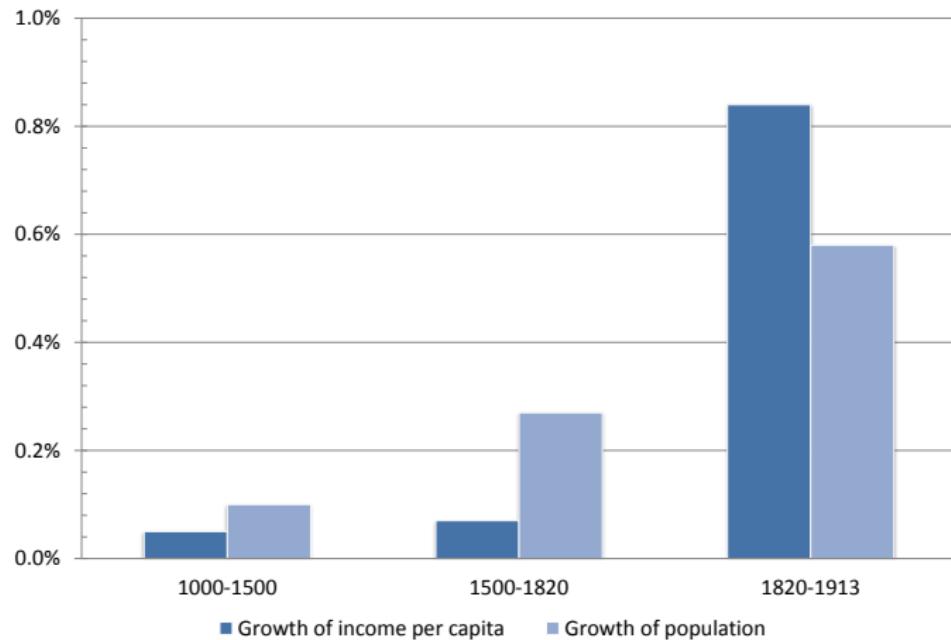
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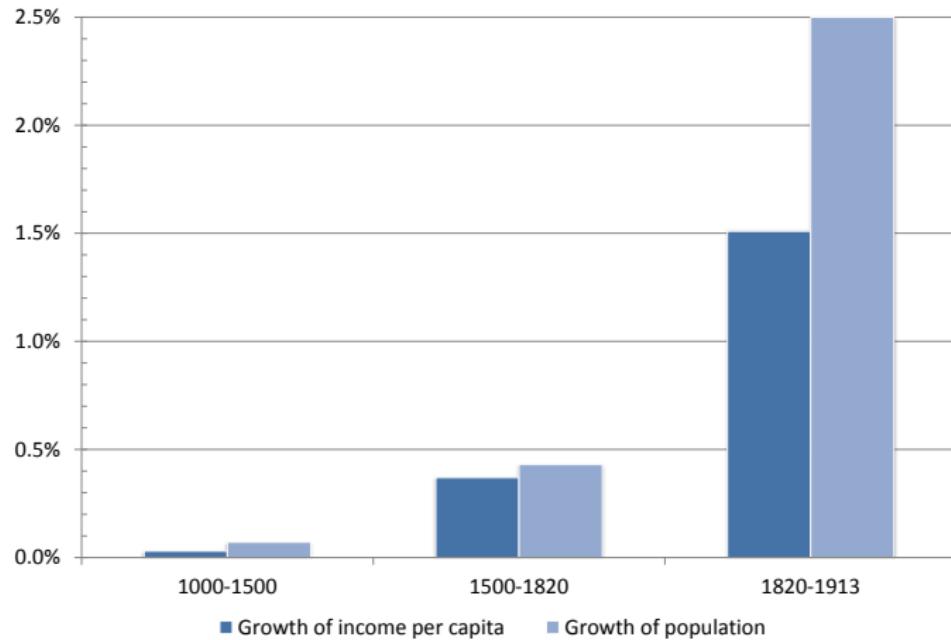
## Regional Variation in the Timing of the Take-off



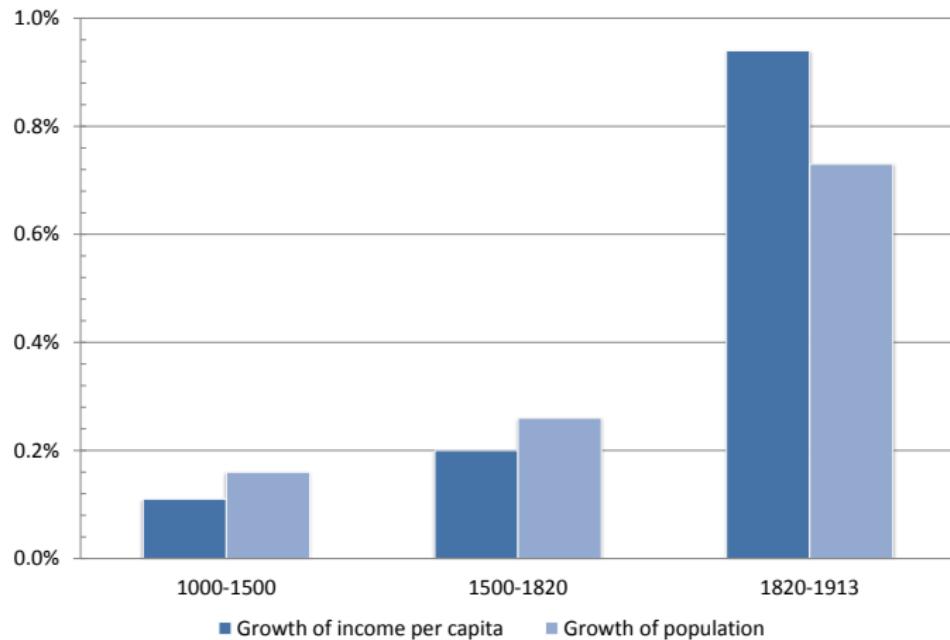
## Take-off: Growth of Population & Income per Capita – World



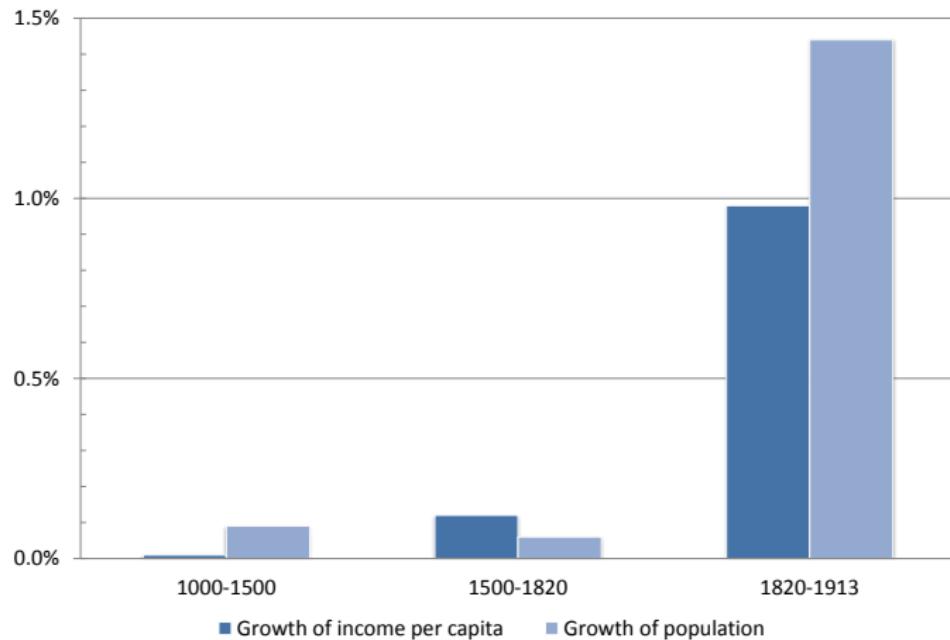
## Take-off: Growth of Population & Income per Capita – Western Offshoots



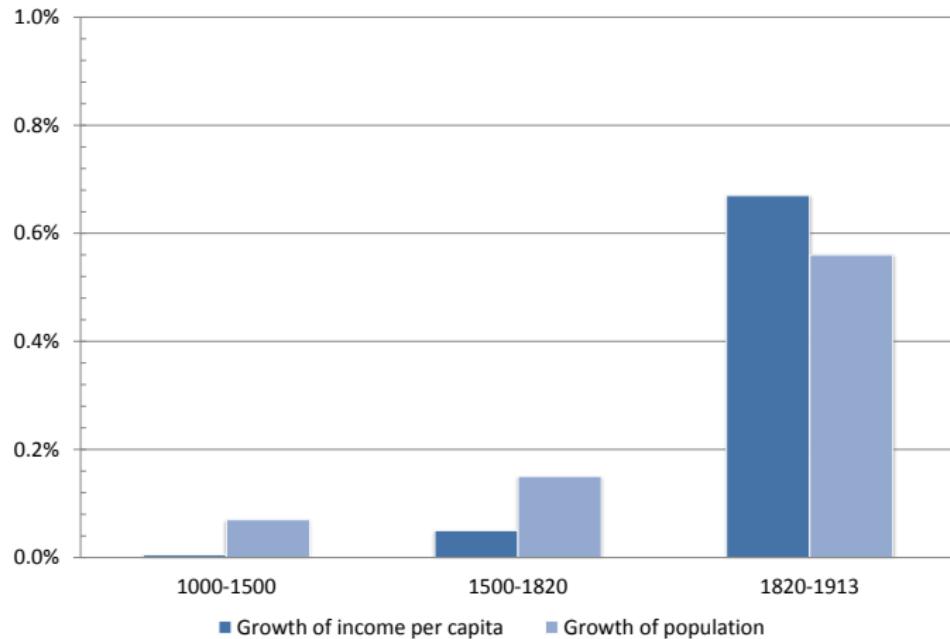
## Take-off: Growth of Population & Income per Capita – Western Europe



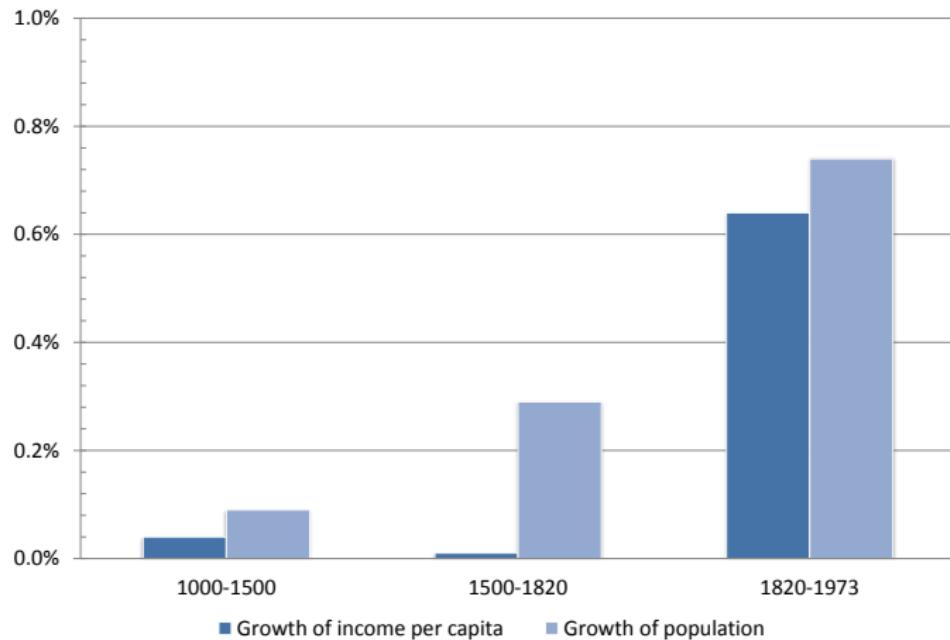
## Take-off: Growth of Population & Income per Capita – Latin America



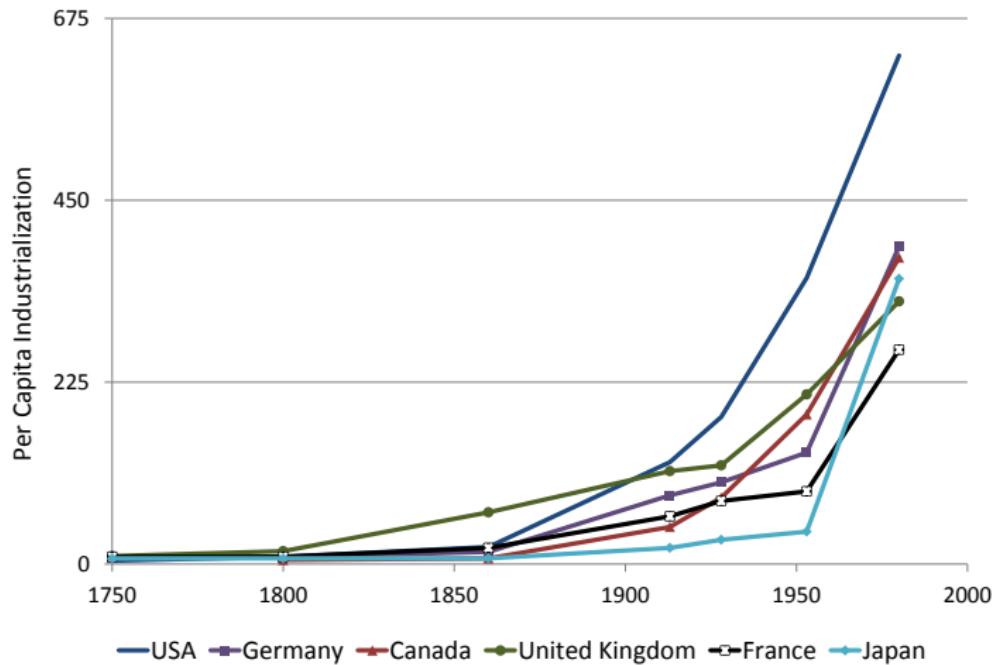
## Take-off: Growth of Population & Income per Capita – Africa



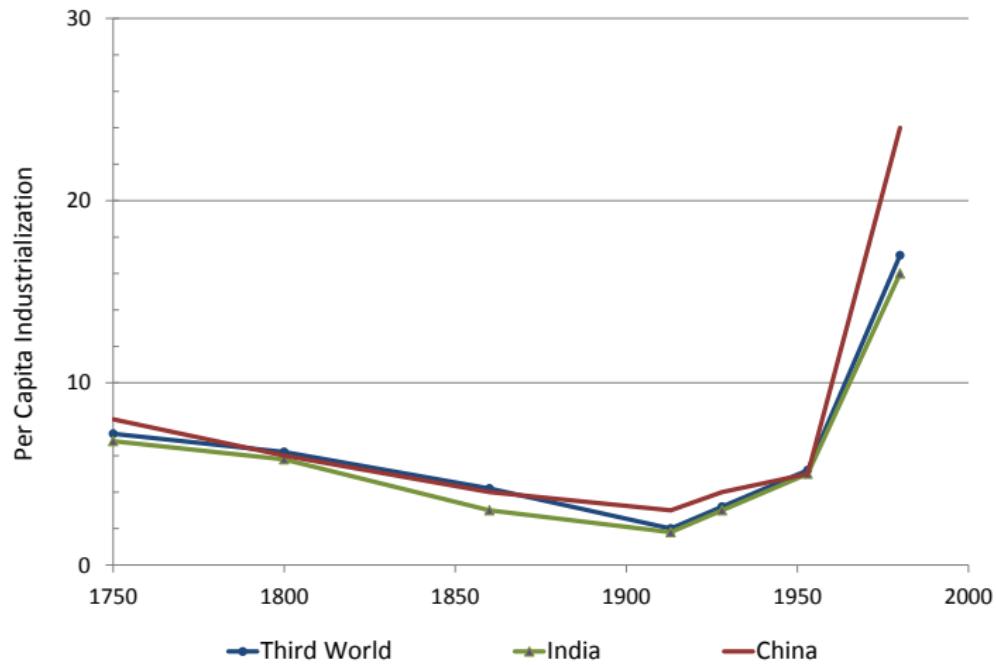
## Take-off: Growth of Population & Income per Capita – Asia



## Take-off & Increased Industrialization per Capita



## Take-off in Developed Economies & Decline in Industrialization in LDCs



## The Modern Growth Regime

- Sustained economic growth
  - Acceleration in technological progress
    - → Industrial demand for human capital
  - Human capital formation
    - → Decline in fertility rates (substitution of quantity by quality)
  - The decline in population growth
    - → Freed the growth process from counterbalancing effects of population growth
  - Technological progress, human capital formation & decline in population growth
    - → Sustained economic growth

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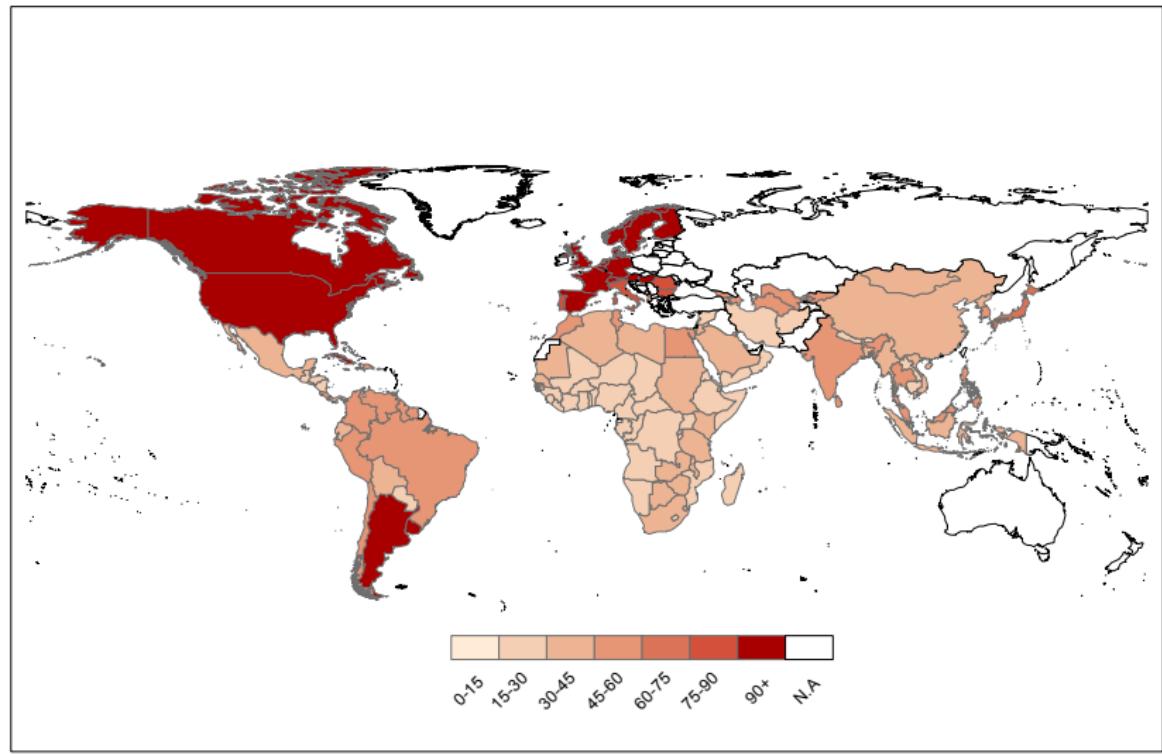
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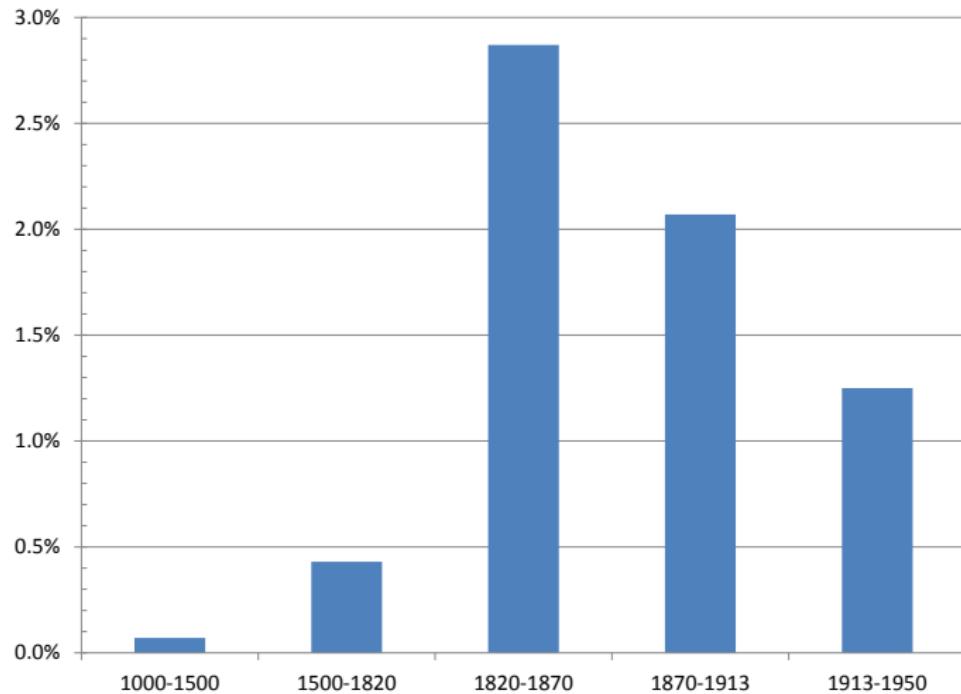
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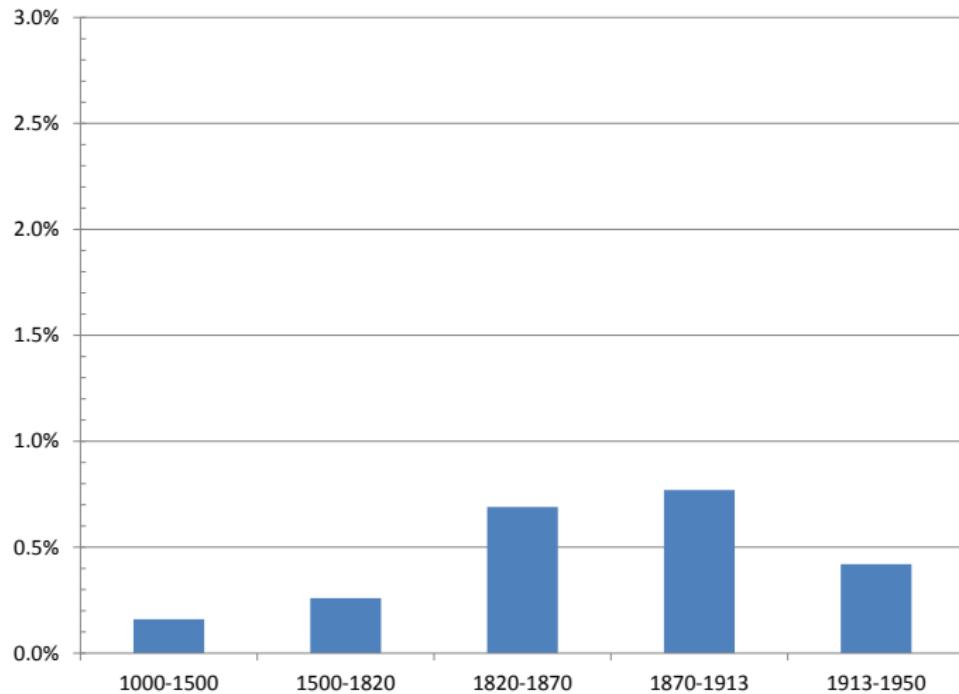
## Variation in Years Elapsed since the Onset of the Fertility Decline



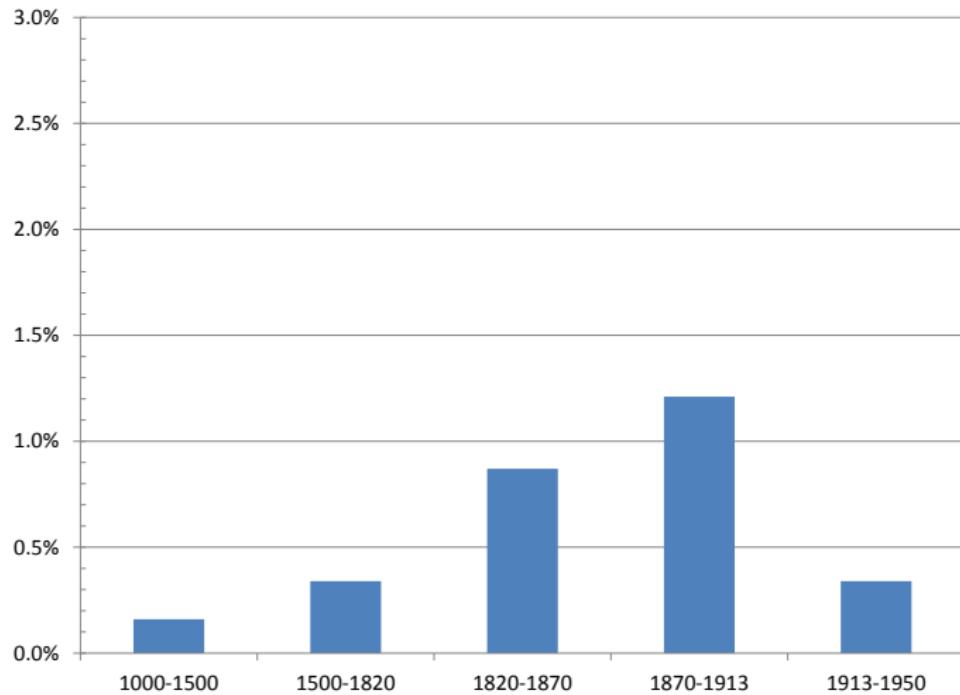
## Early Fertility Decline – Western Offshoots



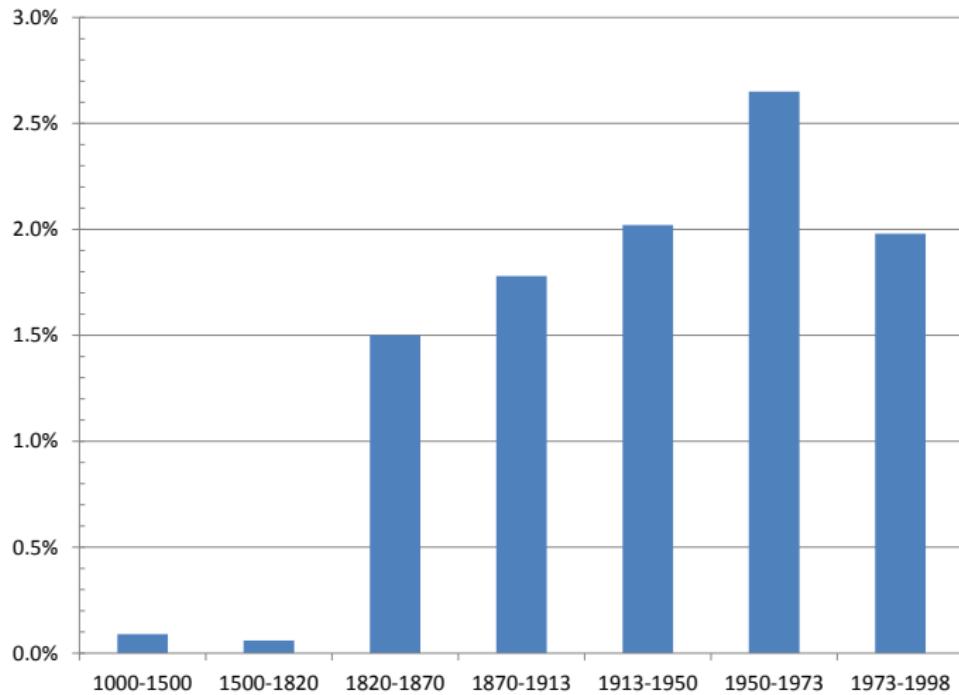
## Early Fertility Decline – Western Europe



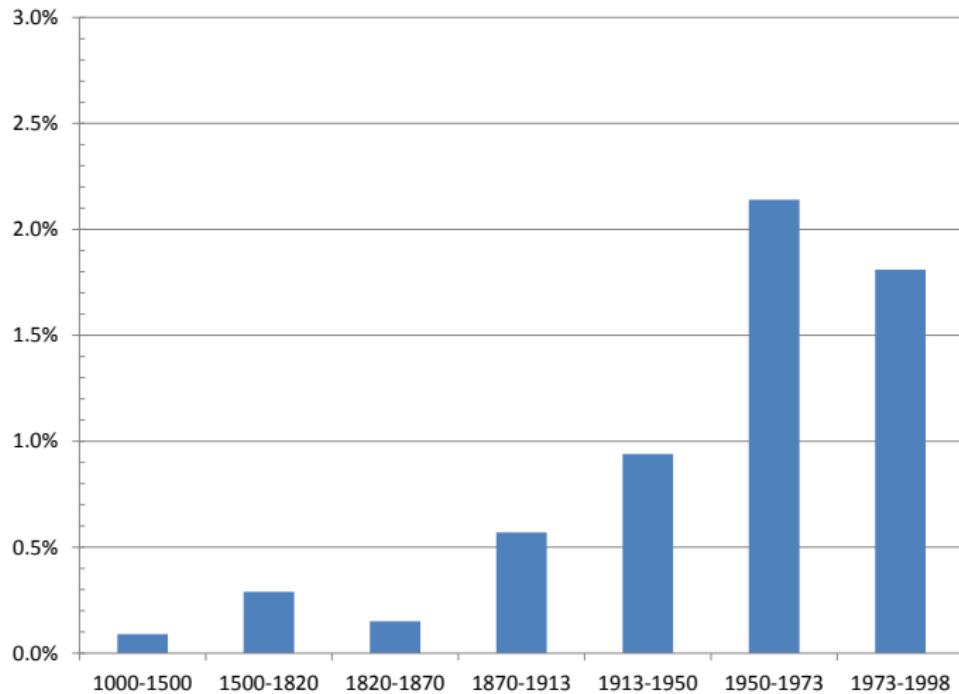
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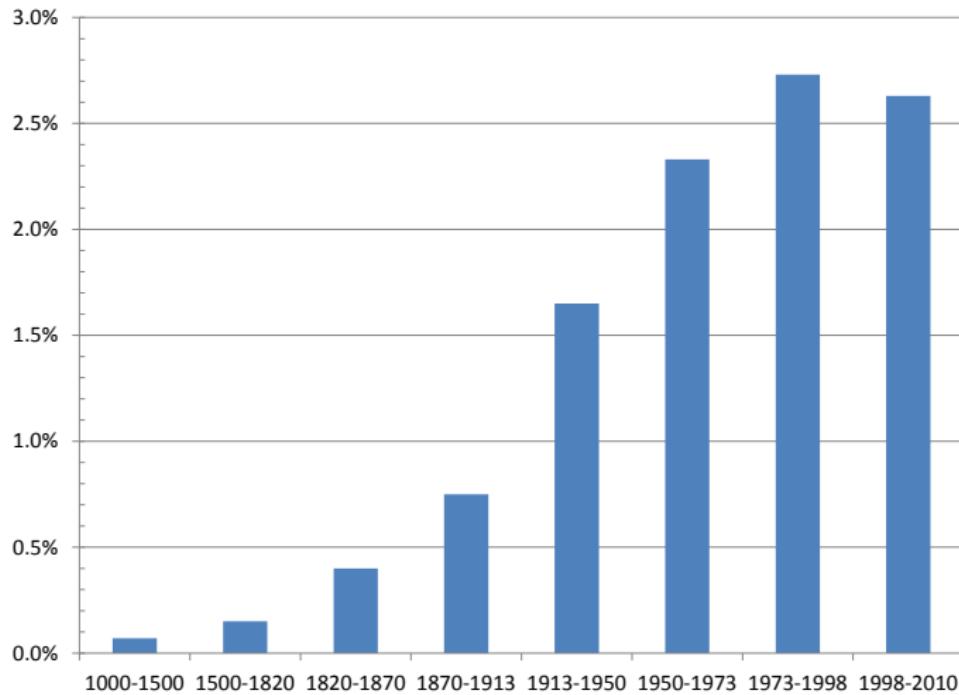
## Late Fertility Decline – Latin America



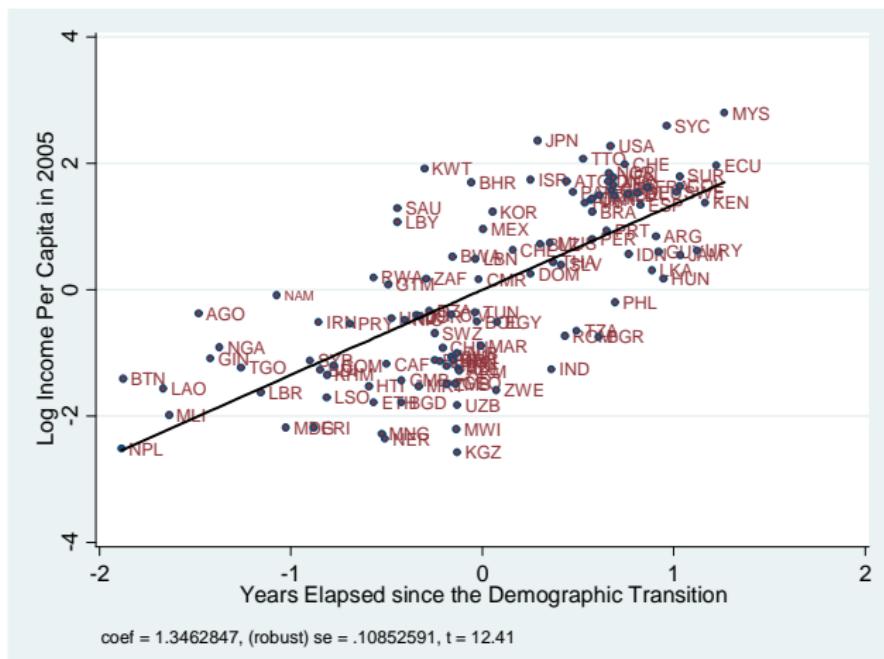
## Late Fertility Decline – Asia



## Late Fertility Decline – Africa

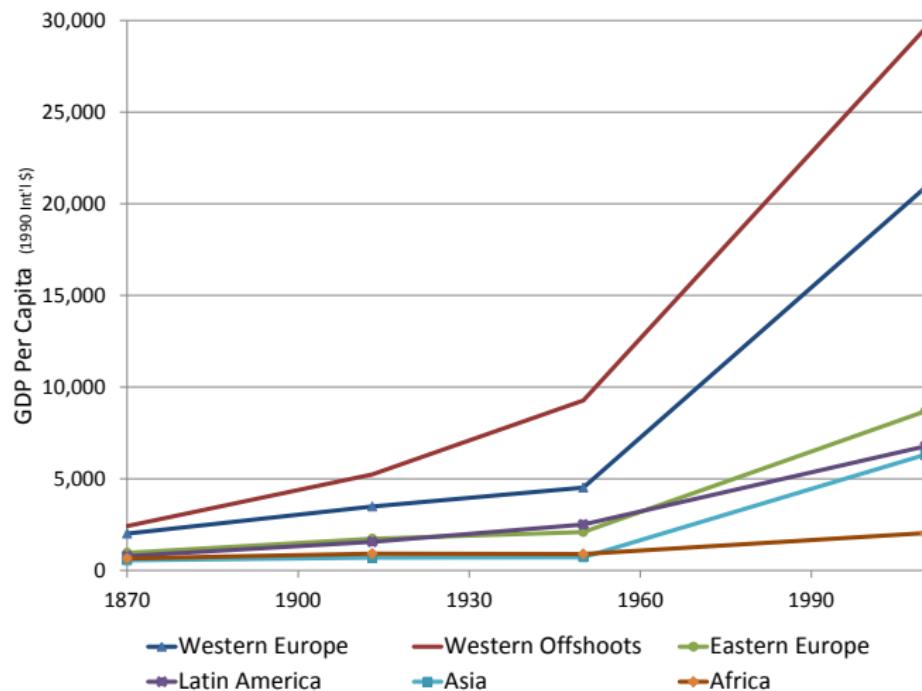


# Timing of the Demographic Transition and Current Income per Capita

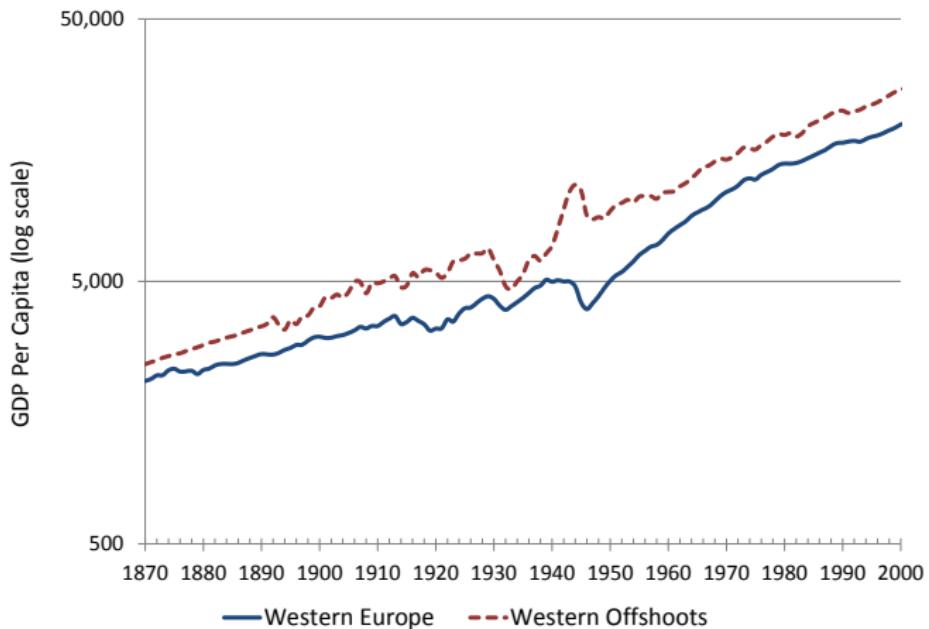


Conditional on absolute latitude.

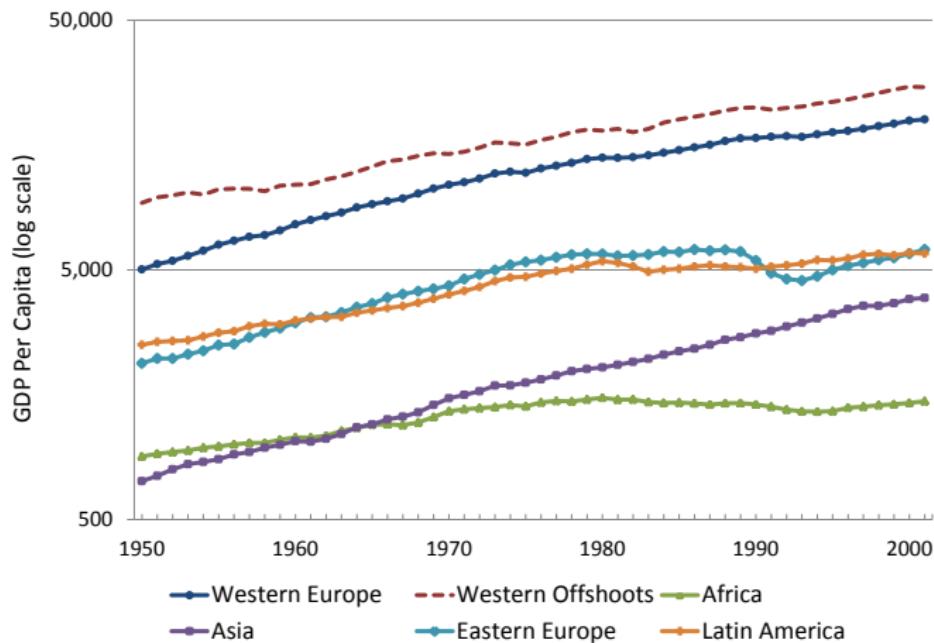
## Timing of the Demographic Transition and Divergence across Regions



## Sustained Economic Growth: 1870–2000



## Regional Variation in Growth of Income per Capita: 1950–2000



## Fundamental Research Questions: The Malthusian Epoch

- What accounts for the epoch of stagnation that characterized most of human history?
  - Why did episodes of technological progress in the pre-industrialization era fail to generate sustained economic growth?
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- Physical capital accumulation (Solow, QJE 1956)
- Human capital accumulation (Lucas, JME 1988)

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  - Openness to international capital markets
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### ● Inefficient Institutions (limited protection of property rights & rule of law)

- Reduced incentive to accumulate/innovate (North, 1981; Acemoglu-Robinson, 2012)

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## Persistent Effects of Geographical Factors

- Biogeographical conditions that triggered the Neolithic Revolution
  - Technological head-start: (Diamond, 1997; Olsson-Hibbs, EER, 2005)
    - Persistent effect on population density (1-1500) (Ashraf-Galor, AER 2011)
    - No effect on contemporary income per capita (Ashraf-Galor, AER 2013)
  - Persistent effect on life expectancy (Galor-Moav, 2009; Franck-Galor-Özak, 2019)
- Disease environment
  - Persistent effect on labor productivity & investment in human capital (Gallup-Sachs, 2001; Andersen-Dalgard-Selays, REStud 2012; Alsan AER 2015)
- Geographical isolation
  - Reduced trade and technological diffusion (Gallup-Meissner-Sachs, 1999)
  - Persistence of culture conducive for innovations (Ashraf-Galor-Özak, JEEA 2010; Özak, JOEG 2018)

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- Land suitable for large plantations
  - Inequality:
    - Extractive institutions (Engerman-Sokoloff, 1997)
  - Concentration of landownership:
    - Suboptimal investment in public education (Galar-Moav-Voth, RES 2009)
- Soil quality conducive for agriculture
  - Specialization in unskilled-intensive goods
    - Fertile soil can support more people per acre, leading to higher population density and more specialization in agriculture.

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Geographic factors are often considered to be exogenous to economic development. However, they can also be endogenous, as they can influence the evolution of institutions and technological choices.

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Geographic factors can contribute to persistent effects on growth through their influence on institutions, land ownership patterns, and agricultural specialization.

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- Range of soil quality
  - Emergence of geographical specific human capital  $\implies$  reduced mobility  $\implies$  ethnic fractionalization (Michalopoulos, AER 2012)
    - Persistent effect of ethnic fractionalization (Easterly-Levine, QJE 1997)
- Ecological diversity & storable crops
  - Emergence & persistence of state capacity (Fenske, JEEA 2014; Mayshar-Moav-Neeman, 2013)
- Geographical determinants of body size
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## Persistent Effects of Intergenerationally Transmitted Traits

- Natural selection of traits that are complementary to the growth process:
  - Preference for education (Galor-Moav, QJE 2002; Galor-Klemp, 2018)
  - Entrepreneurial spirit (Galor-Michalopoulos, JET 2012)
  - Time Preference (Galor-Özak, AER 2016)
- Cultural distance between societies reduces:
  - Diffusion from the technological frontier (Spolaore-Wacziarg, QJE 2009)
  - Conflict (Spolaore-Wacziarg, REStat 2016; Depetris-Özak, 2019)
- Cultural diversity within a society:
  - Reduces cohesiveness:
    - Reduces social capital (Acemoglu-Dixit, 2012)
    - Reduces social trust (Acemoglu-Dixit, 2012)
  - Generates a wider range of complementary traits conducive for specialization & innovations (Ashraf-Galor, AER 2013; Depetris-Özak, 2015, 2016)
    - Specialization & innovation leads to higher productivity (Acemoglu-Dixit, 2012)
    - Specialization & innovation leads to higher income (Acemoglu-Dixit, 2012)
  - Has a hump-shaped effect on productivity (Ashraf-Galor, AER 2013)
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    - Reduces social capital & trust
    - Reduces social norms & values
    - Reduces social stability & order
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    - Specialization & innovation leads to higher productivity
    - Higher productivity leads to higher income
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    - Increased mistrust & prevalence of civil conflict (Arbati-Ashraf-Galor, 2018)
  - Generates a wider range of complementary traits conducive for specialization & innovations (Ashraf-Galor, AER 2013; Depetris-Özak, 2015, 2016)
    - Emergence of states & autocracy (Depetris-Özak, 2015; Galor-Klemp, 2015)
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  - Time Preference (Galor-Özak, AER 2016)
- Cultural distance between societies reduces:
  - Diffusion from the technological frontier (Spolaore-Wacziarg, QJE 2009)
  - Conflict (Spolaore-Wacziarg, REStat 2016; Depetris-Özak, 2019)
- Cultural diversity within a society:
  - Reduces cohesiveness:
    - Higher cultural fragmentation (Ashraf-Galor, AER-PP 2013)
    - Increased mistrust & prevalence of civil conflict (Arbatli-Ashraf-Galor, 2018)
  - Generates a wider range of complementary traits conducive for specialization & innovations (Ashraf-Galor, AER 2013; Depetris-Özak, 2015, 2016)
    - Emergence of states & autocracy (Depetris-Özak, 2015; Galor-Klemp, 2015)
  - Has a hump-shaped effect on productivity (Ashraf-Galor, AER 2013)
    - Lower income in overly homogenous & diverse societies

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