

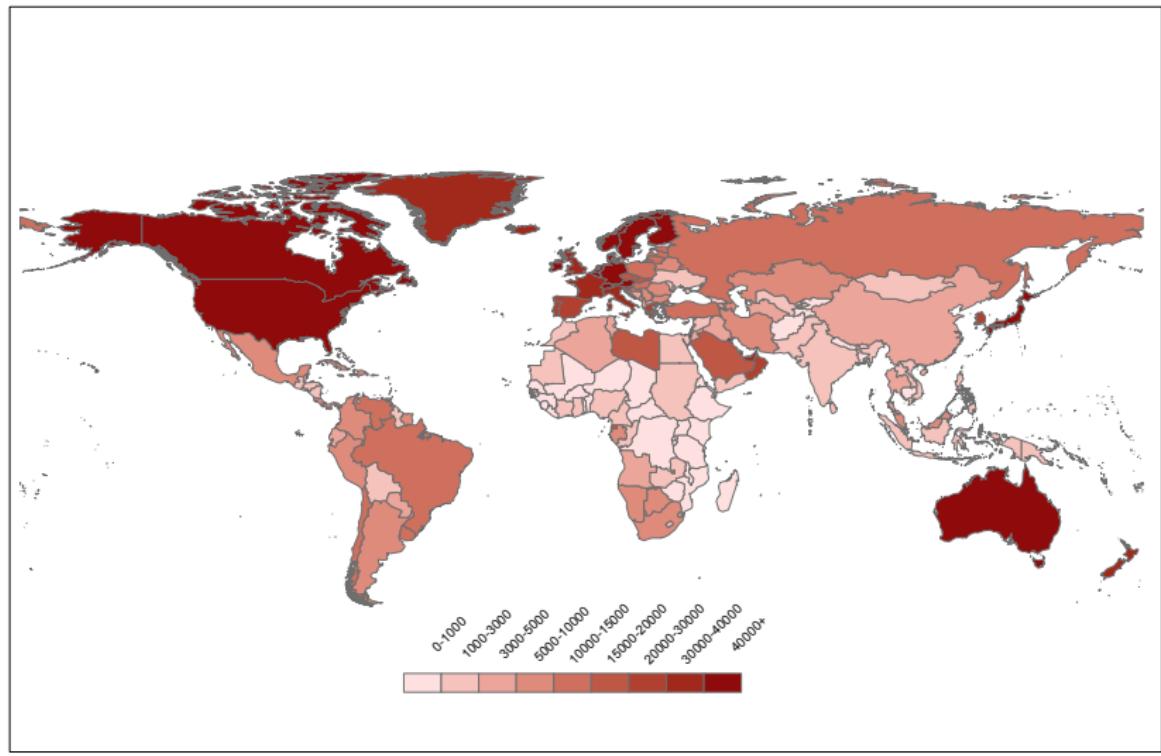
# Growth and Comparative Development: An Overview

Ömer Özak

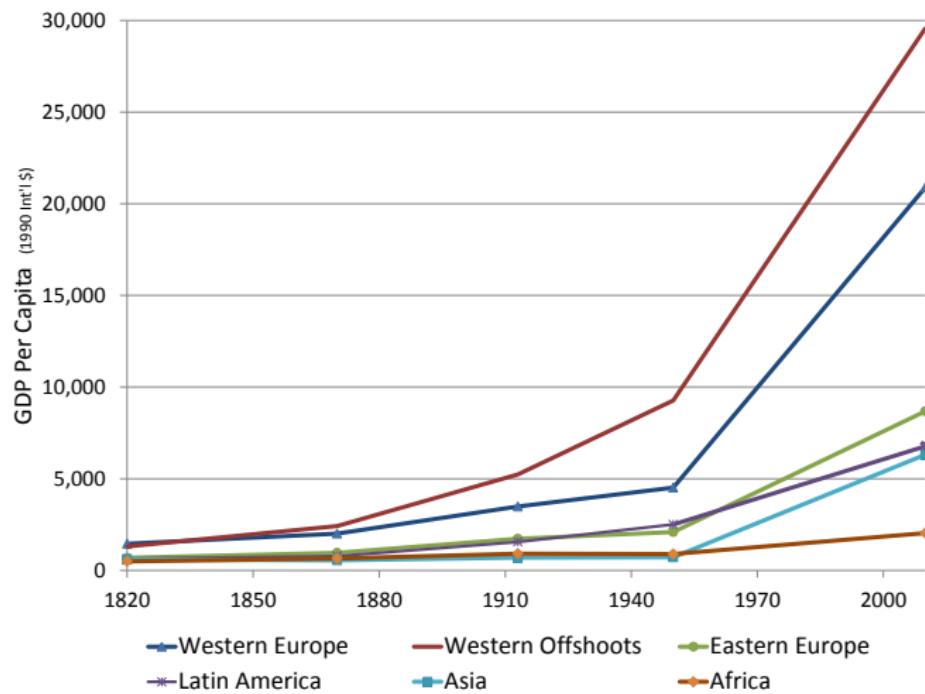
Department of Economics  
Southern Methodist University

Economic Growth and Comparative Development

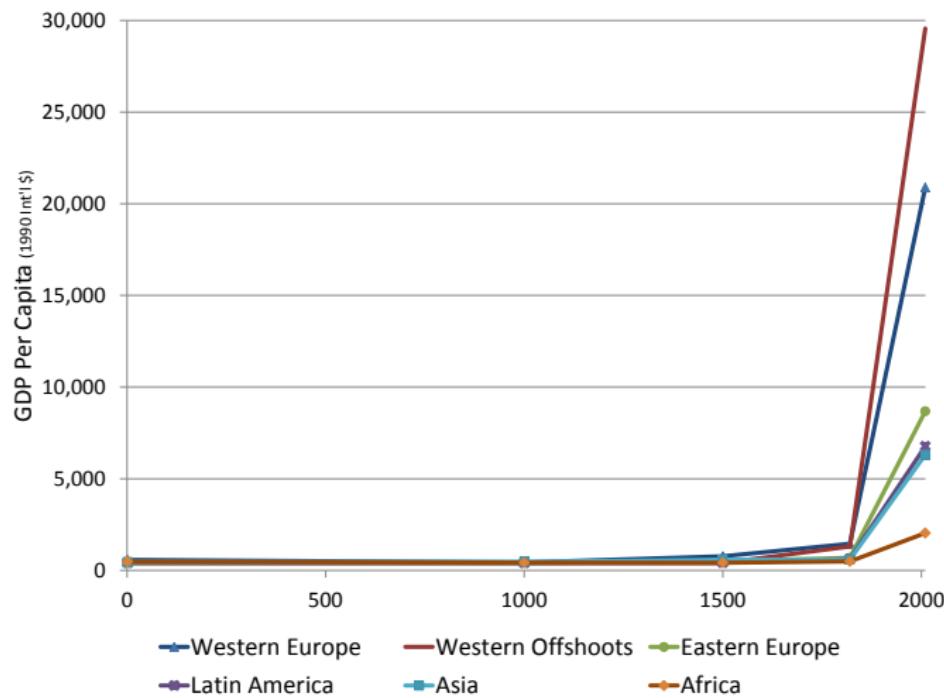
## Income per Capita across the Globe in 2010



## 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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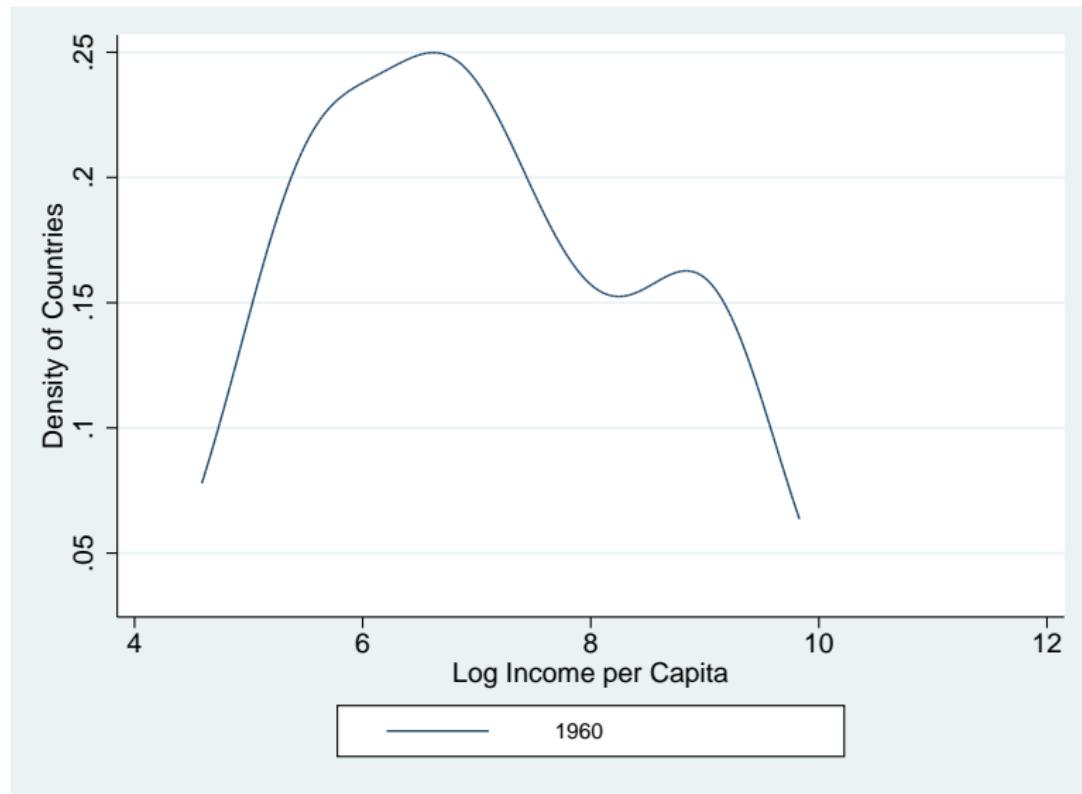
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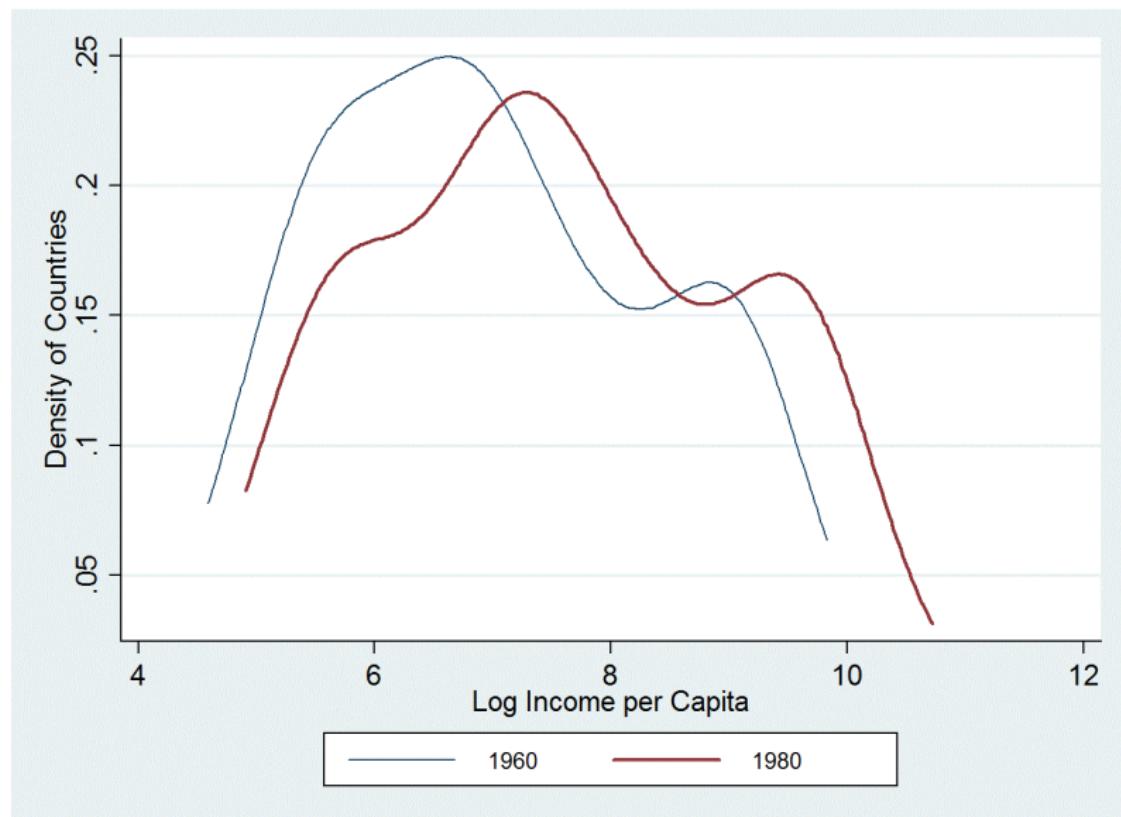
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## Income Distribution in 1960



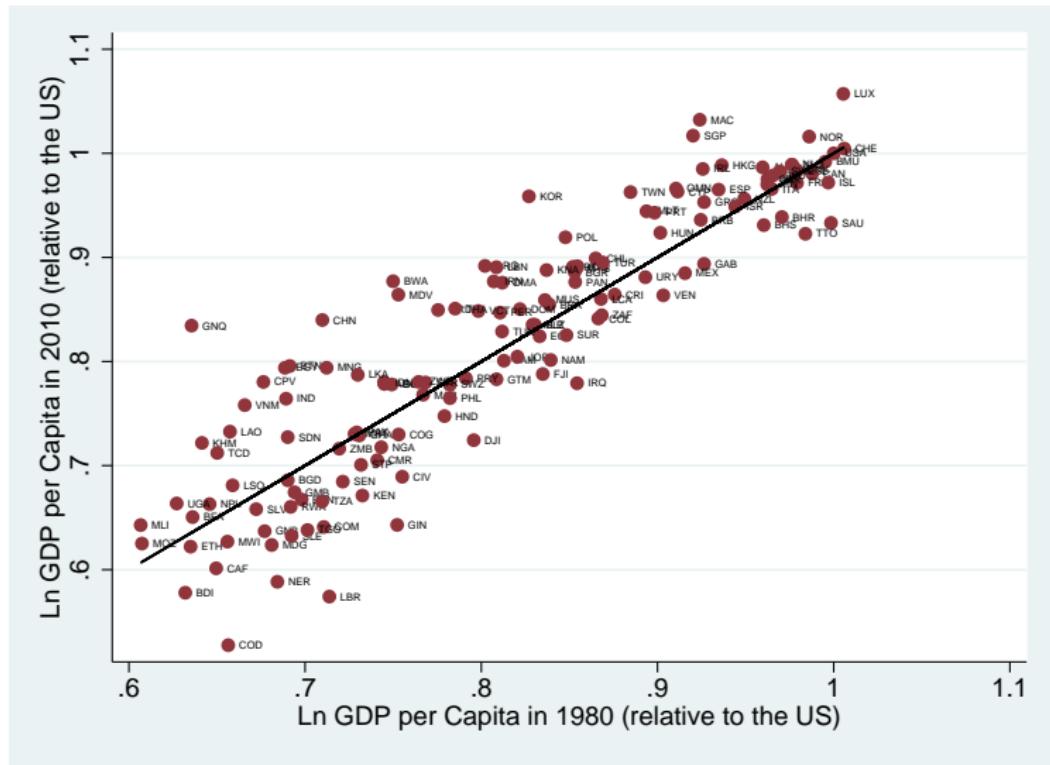
## Lack of Convergence across Nations: 1960–1980



## 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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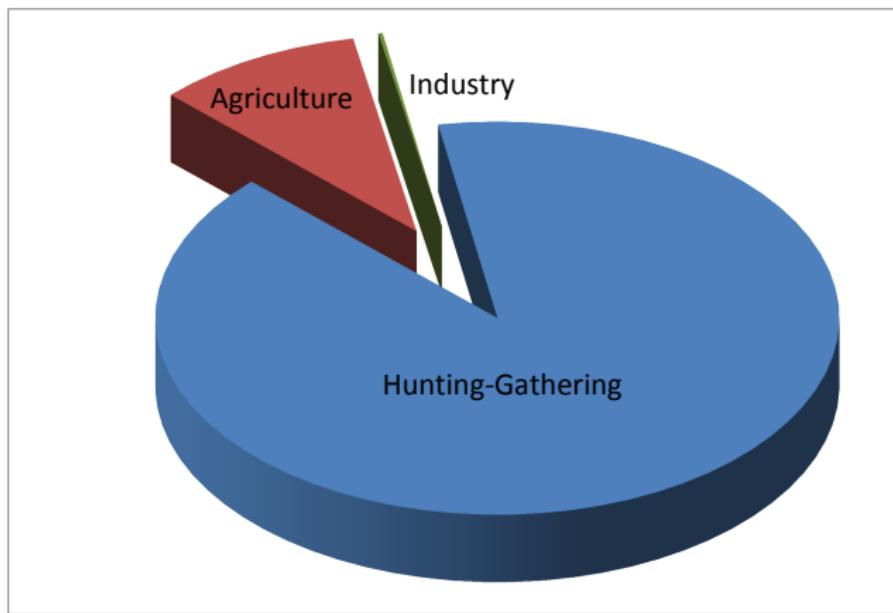
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## Phases of Development: Modes of Production



## Phases of Development: Standard of Living

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

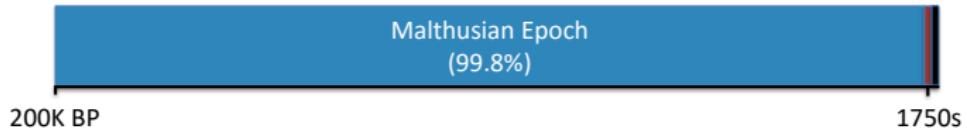
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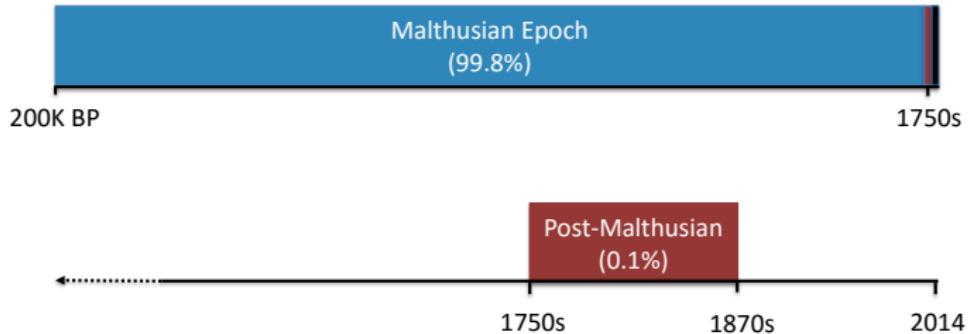
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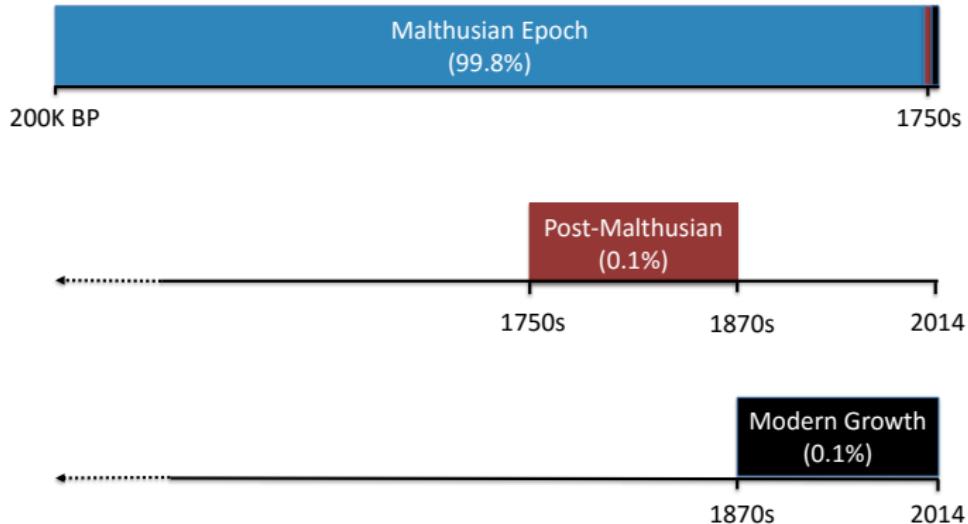
## Phases of Development: Timeline of the Most Developed Economies



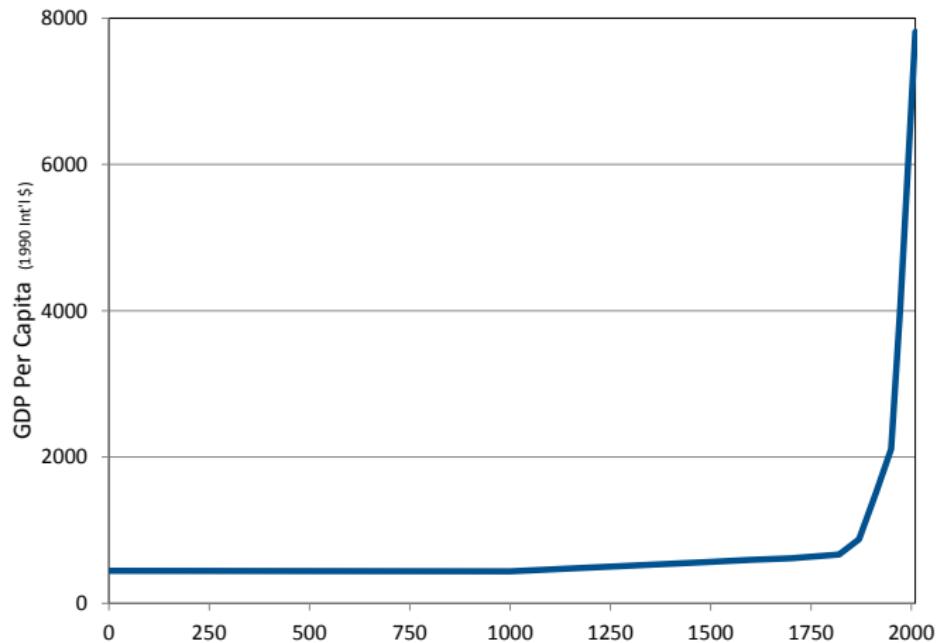
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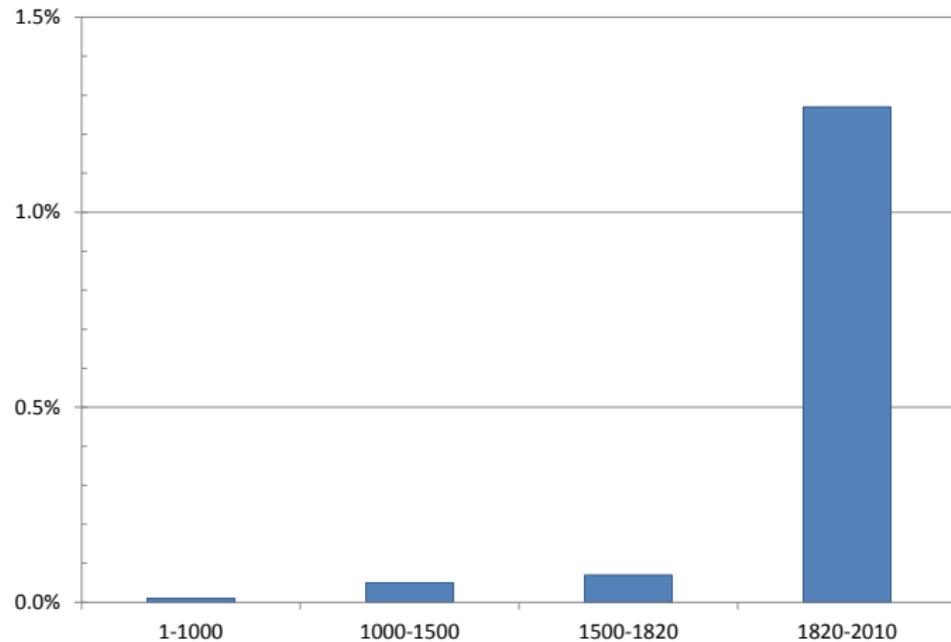
# Phases of Development: Timeline of the Most Developed Economies



## World Income per Capita: 1–2010



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



## The Malthusian Epoch

- Characterized by Malthusian dynamism 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
  - Similar levels of income per-capita in the long-run

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## Malthusian Dynamics - Prominent Examples

- 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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## Malthusian Dynamics - Ireland (1650 - 1850)

- The Colombian 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
    - (1M Famine death & 1M emigration to the New World)

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- Superior agricultural technology

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  - Share of China in world population to increase from 23% to 37%
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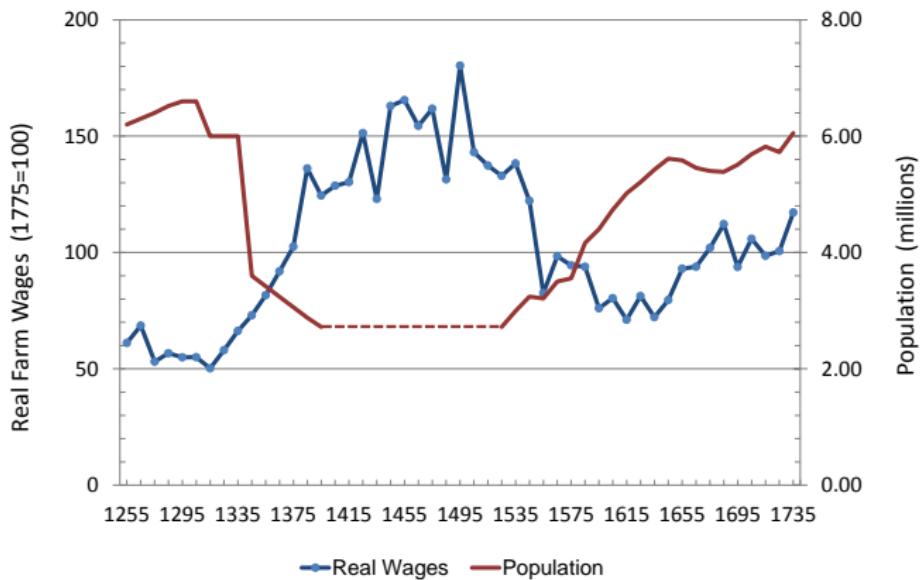
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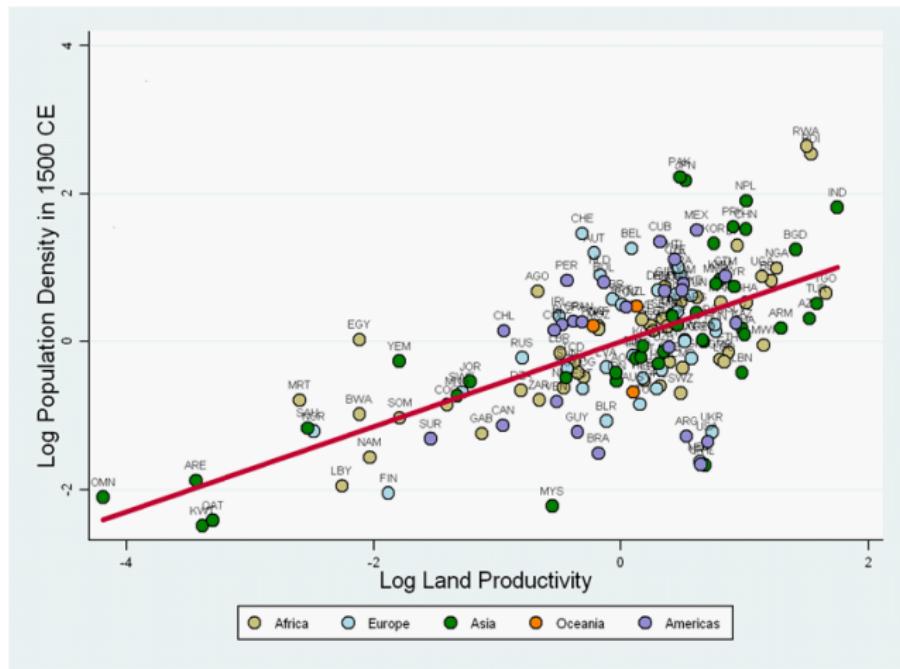
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## Malthusian Adjustments to the Black Death: England, 1348–1750



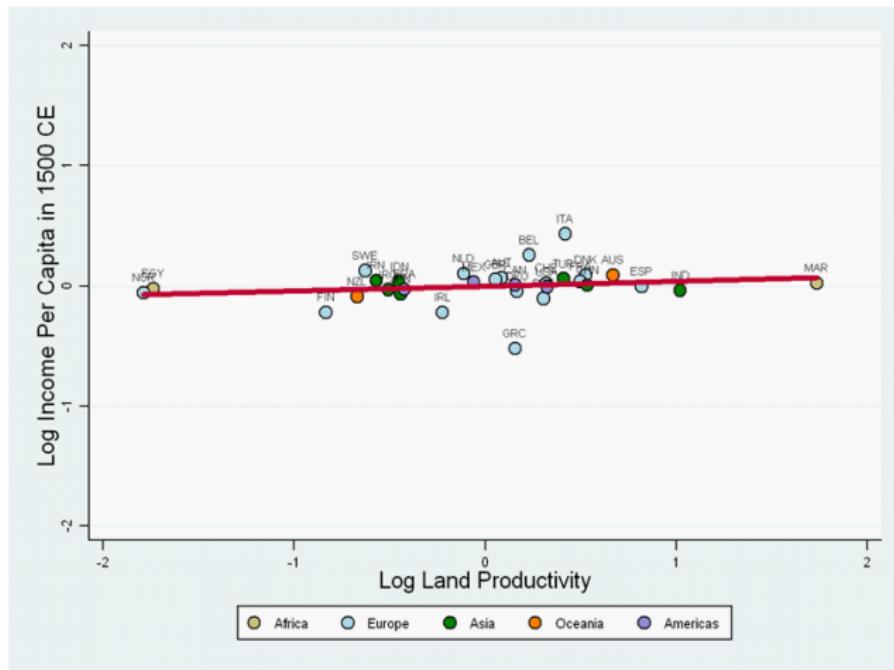
# Land Productivity and Population Density in 1500



Conditional on transition timing, geographical factors, and continental fixed effects.

Source: Ashraf-Galor (AER 2011)

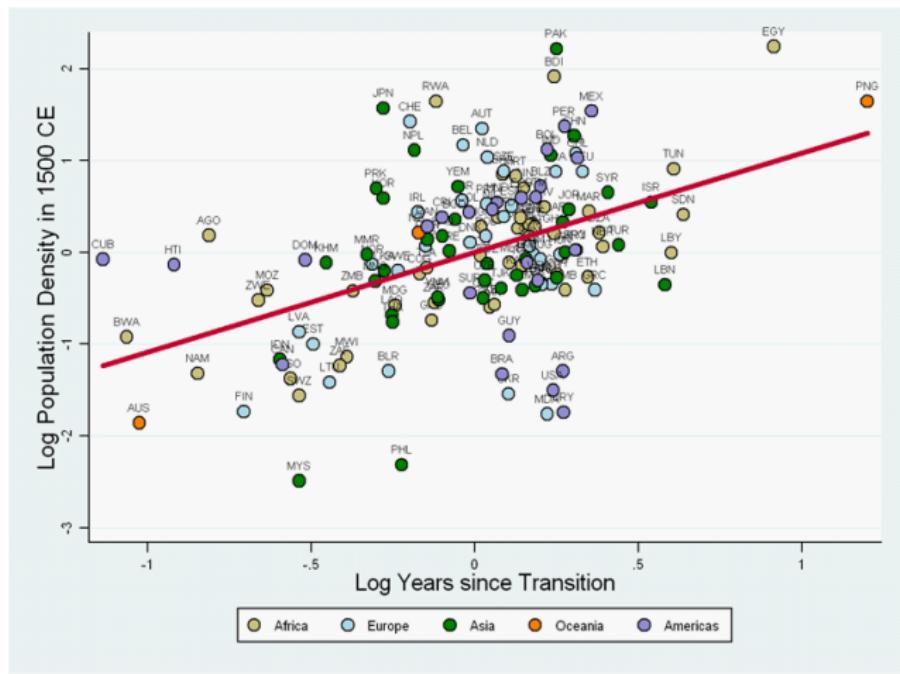
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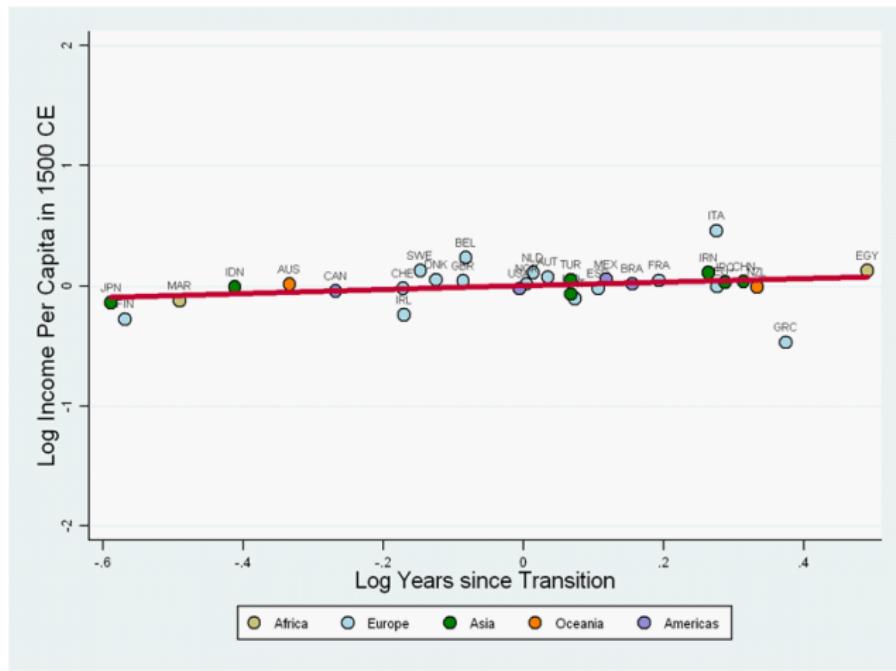
## Technology and Population Density in 1500



Years elapsed since the Neolithic Transition reflects the technological level in 1500.

Conditional on land productivity, geographical factors, and continental fixed effects.

## Technology and Income per Capita in 1500



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Conditional on land productivity, geographical factors, and continental fixed effects.

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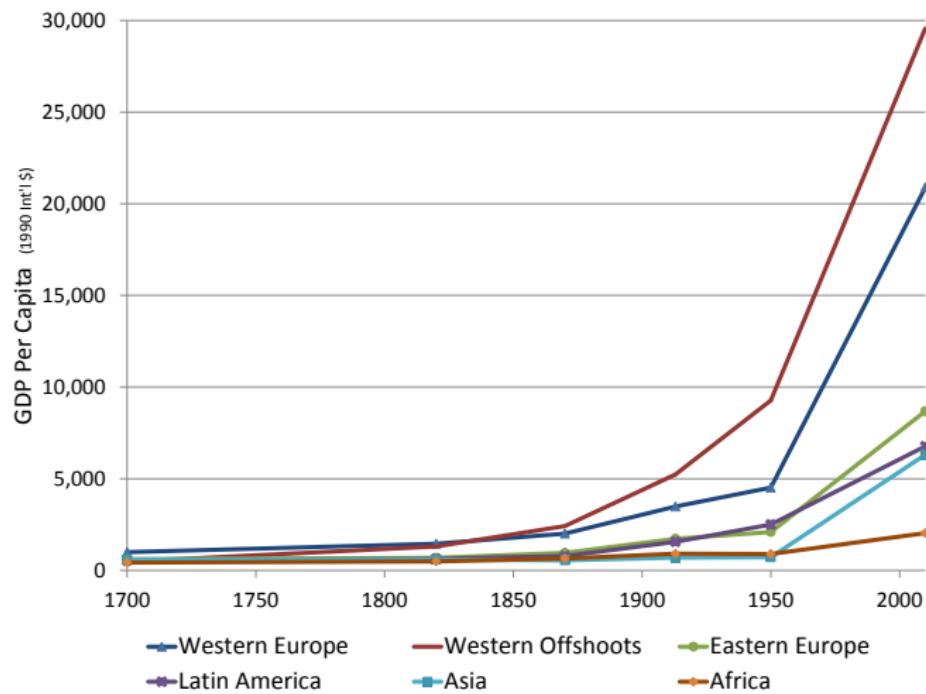
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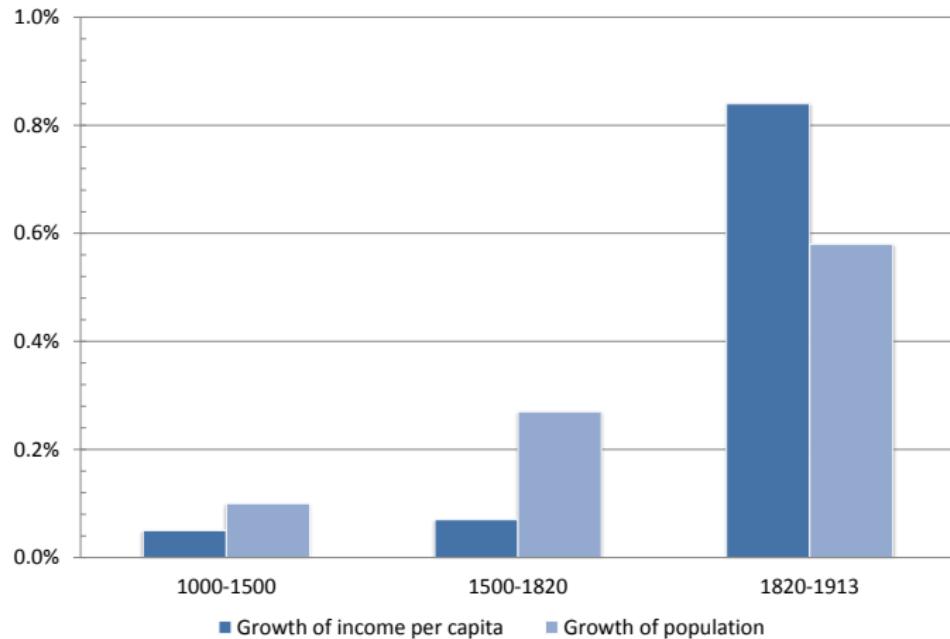
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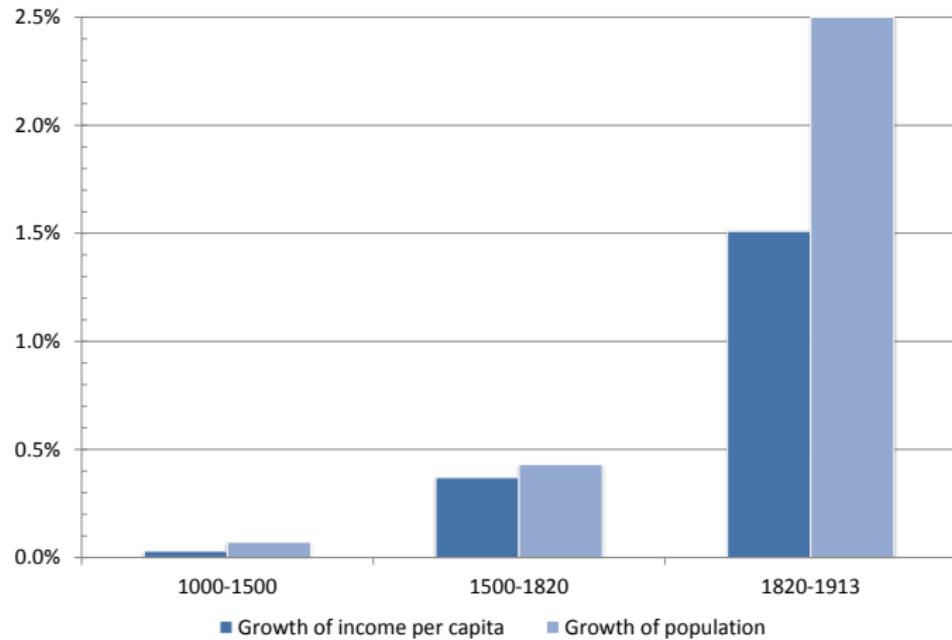
## Regional Variation in the Timing of the Take-off



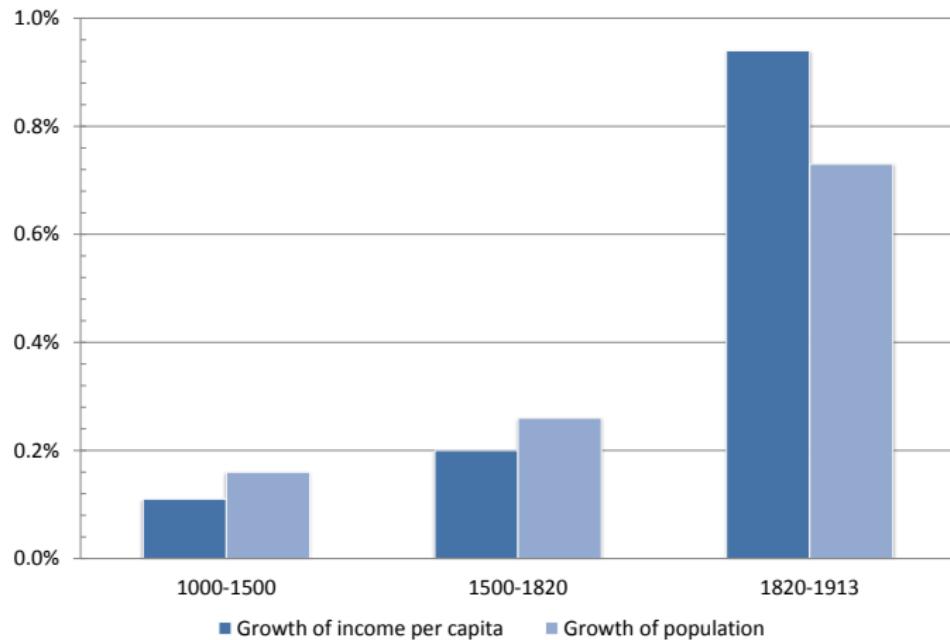
## Take-off: Growth of Population & Income per Capita – World



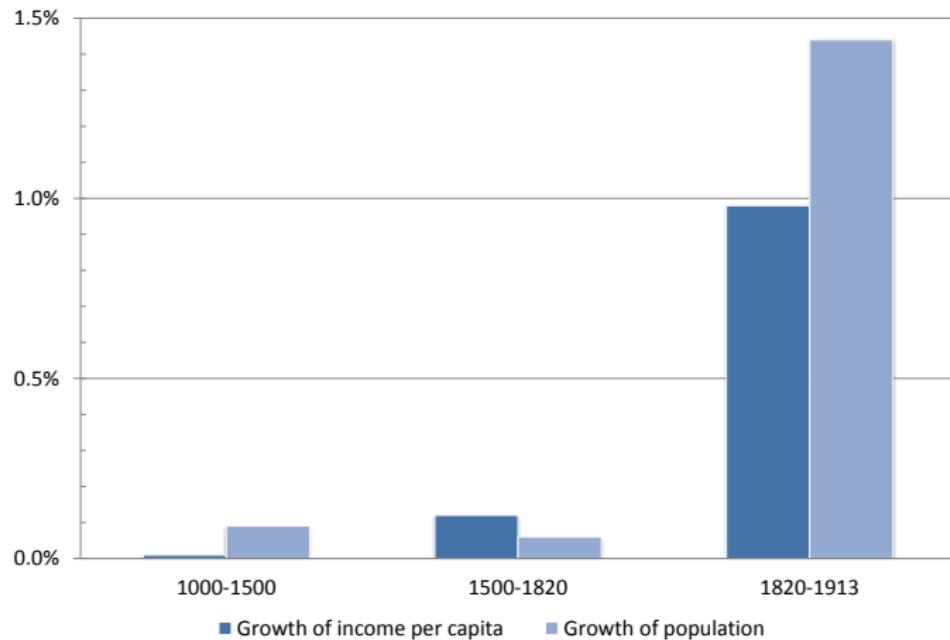
## Take-off: Growth of Population & Income per Capita – Western Offshoots



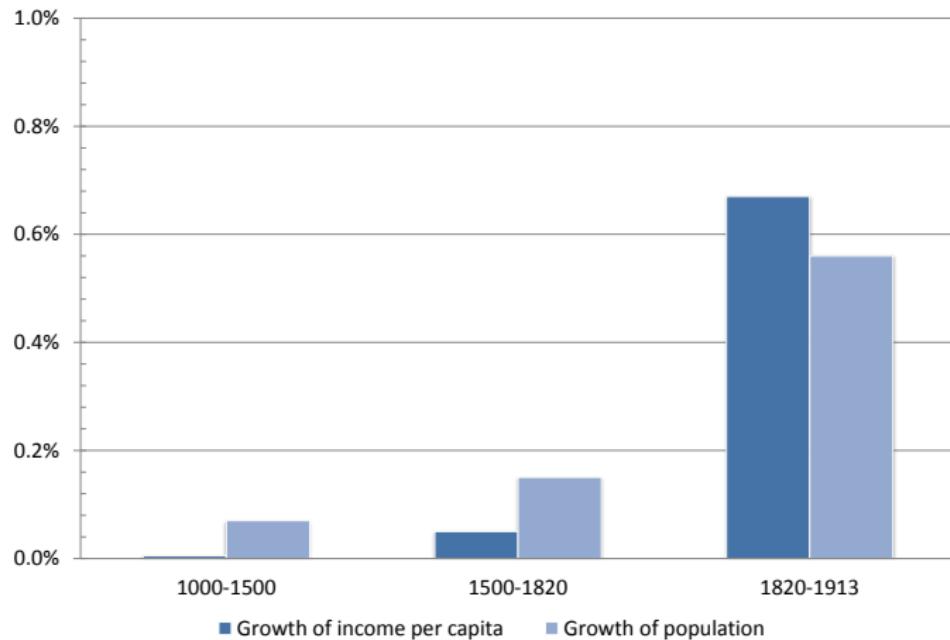
## Take-off: Growth of Population & Income per Capita – Western Europe



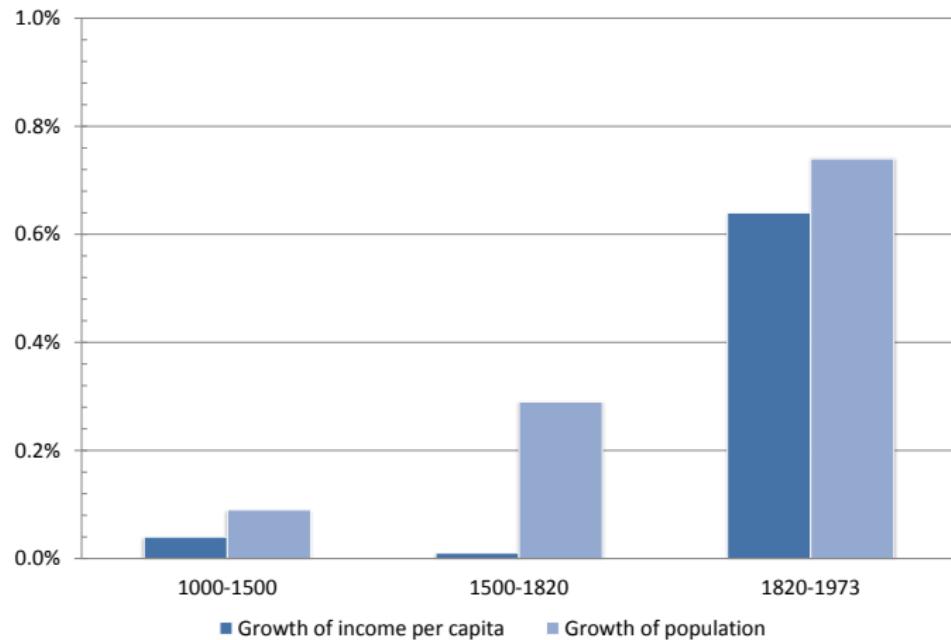
## Take-off: Growth of Population & Income per Capita – Latin America



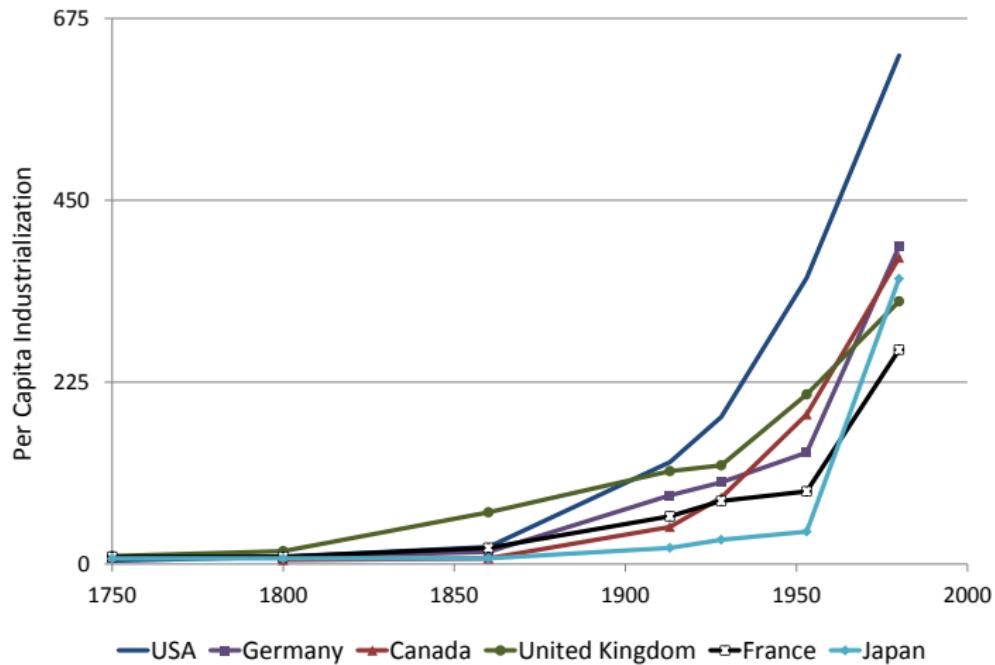
## Take-off: Growth of Population & Income per Capita – Africa



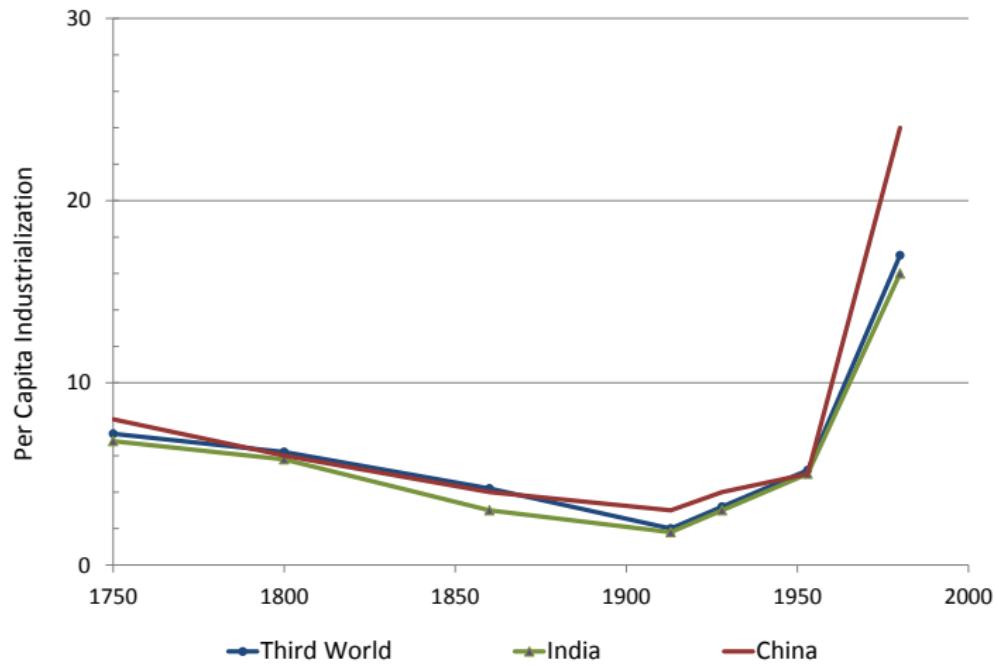
## Take-off: Growth of Population & Income per Capita – Asia



## 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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  - Acceleration in technological progress
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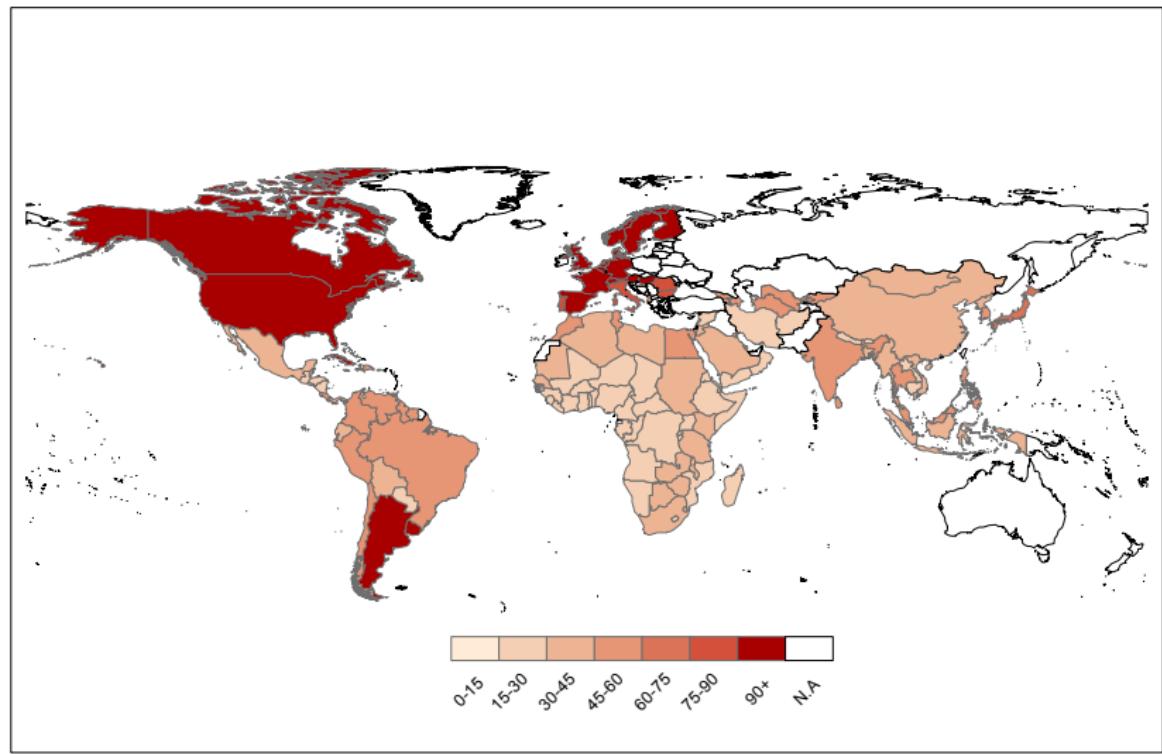
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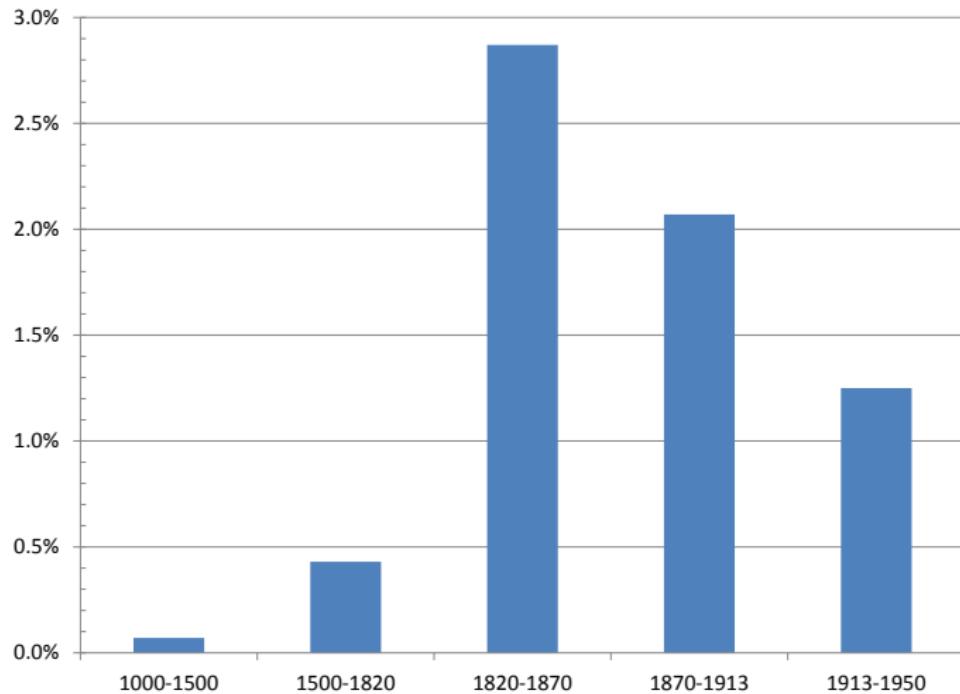
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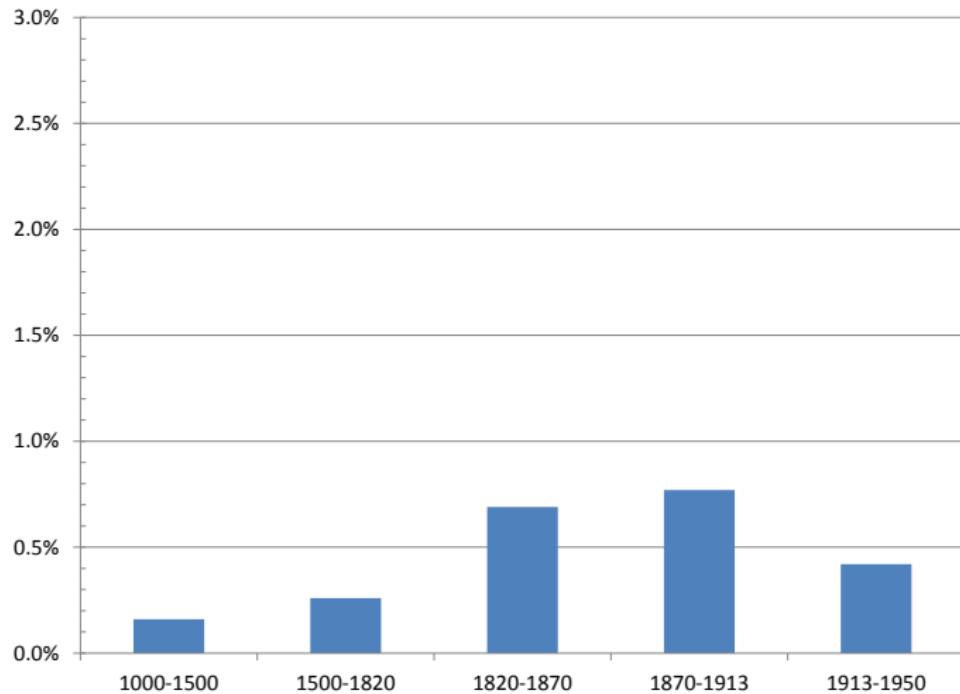
## Variation in years Elapsed since the Onset of the Fertility Decline



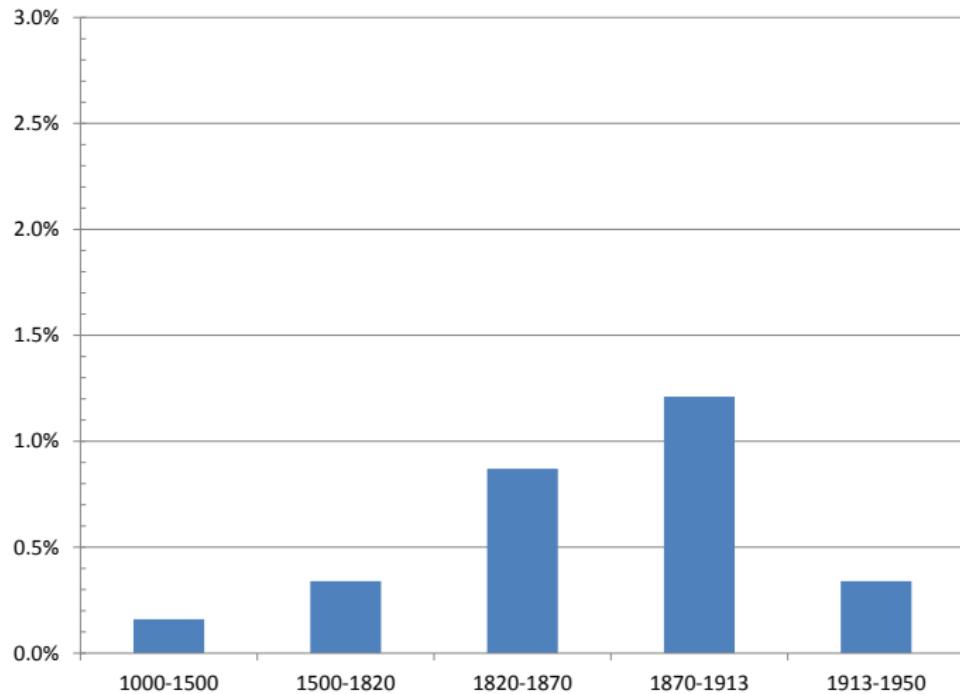
## Early Fertility Decline – Western Offshoots



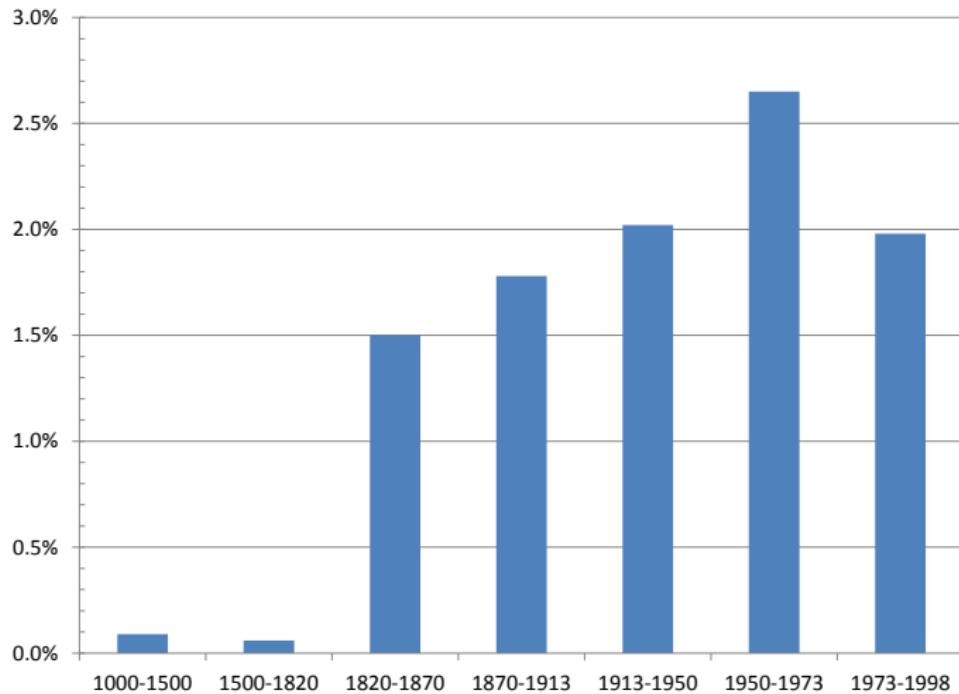
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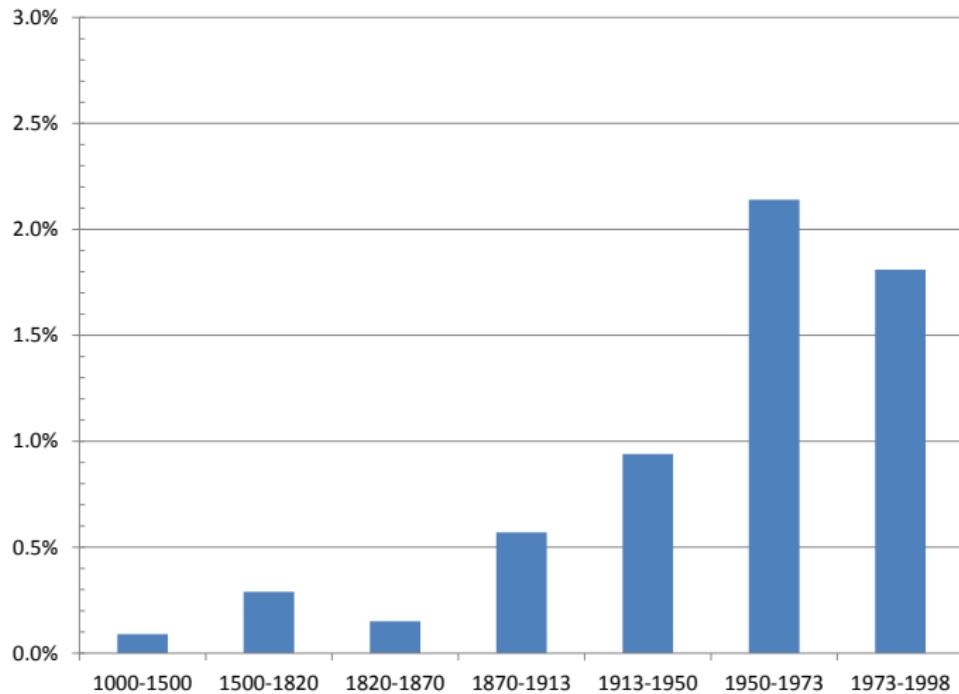
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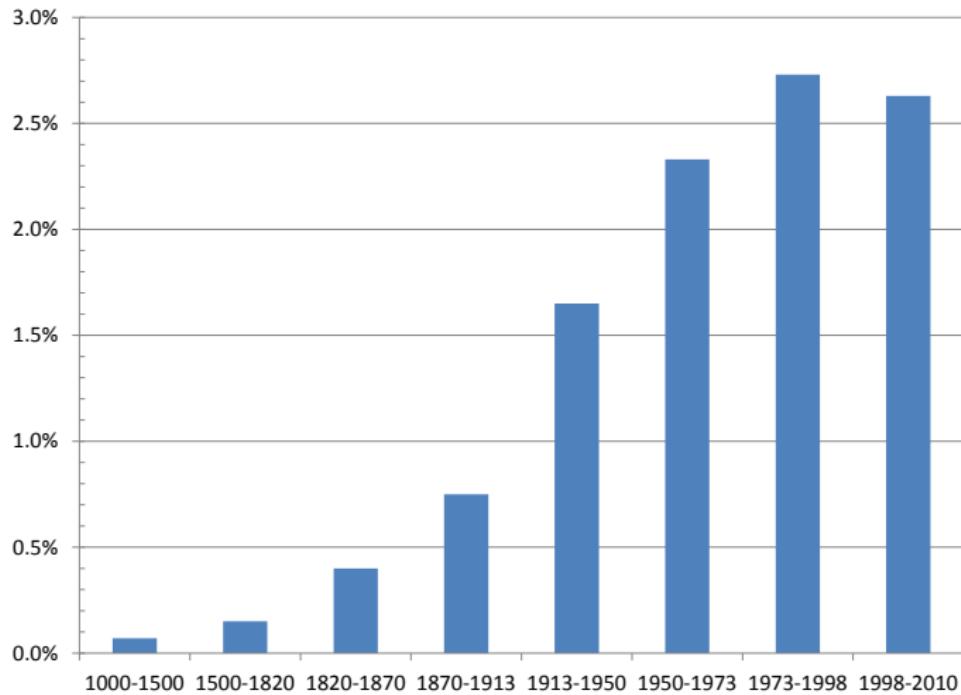
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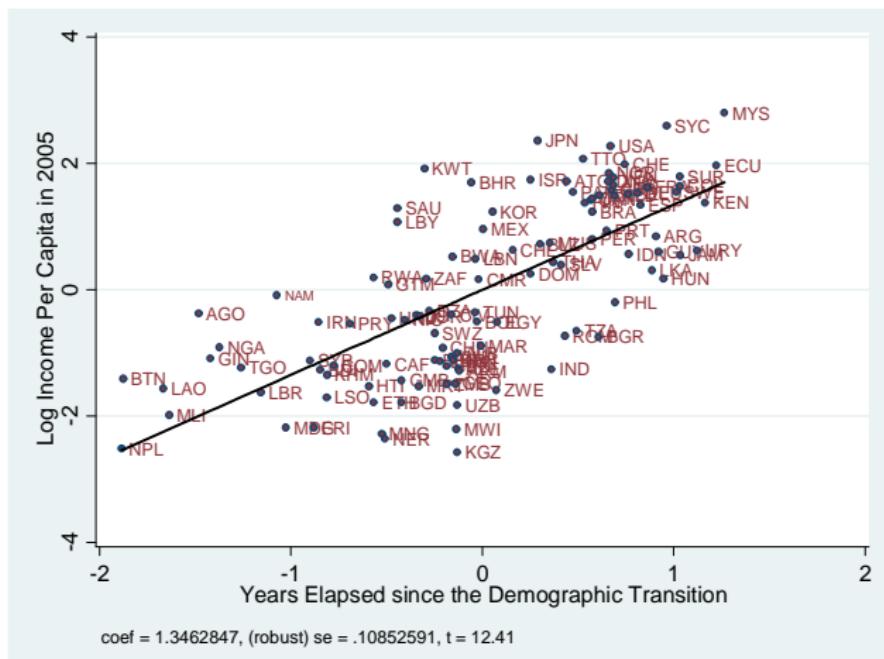
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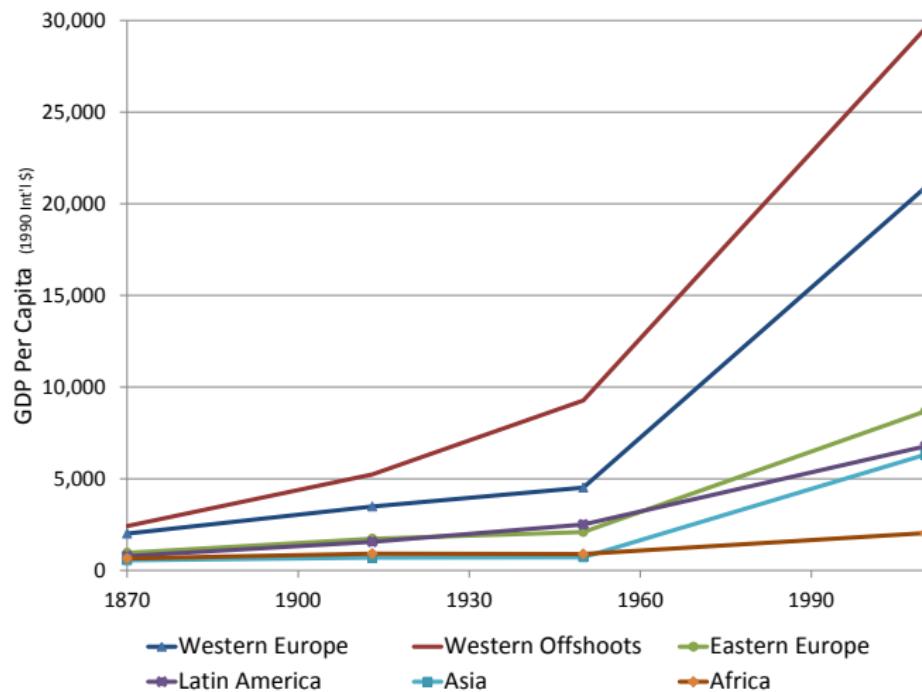


## Timing of the Demographic Transition and Current Income per Capita

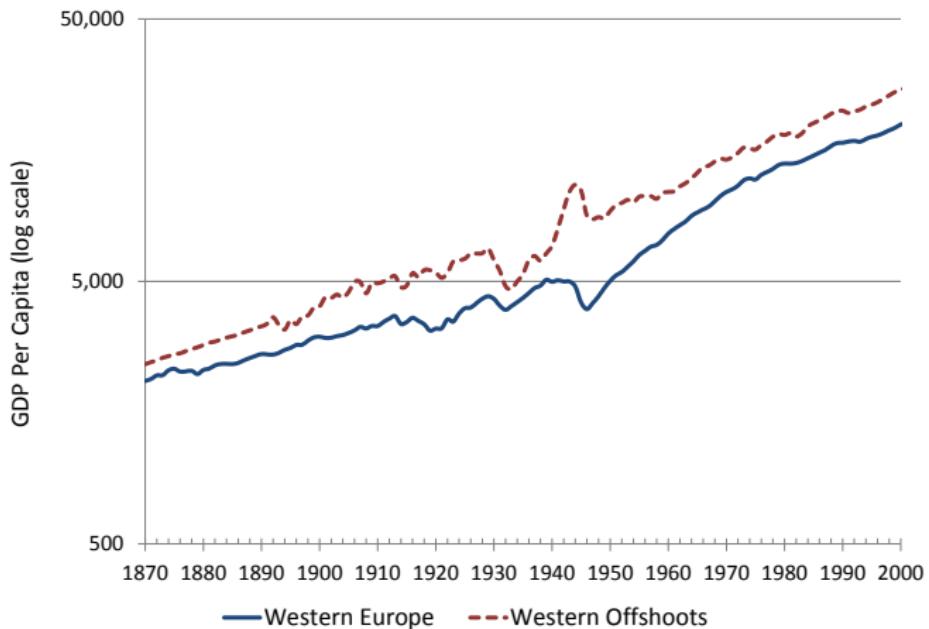


Conditional on absolute latitude.

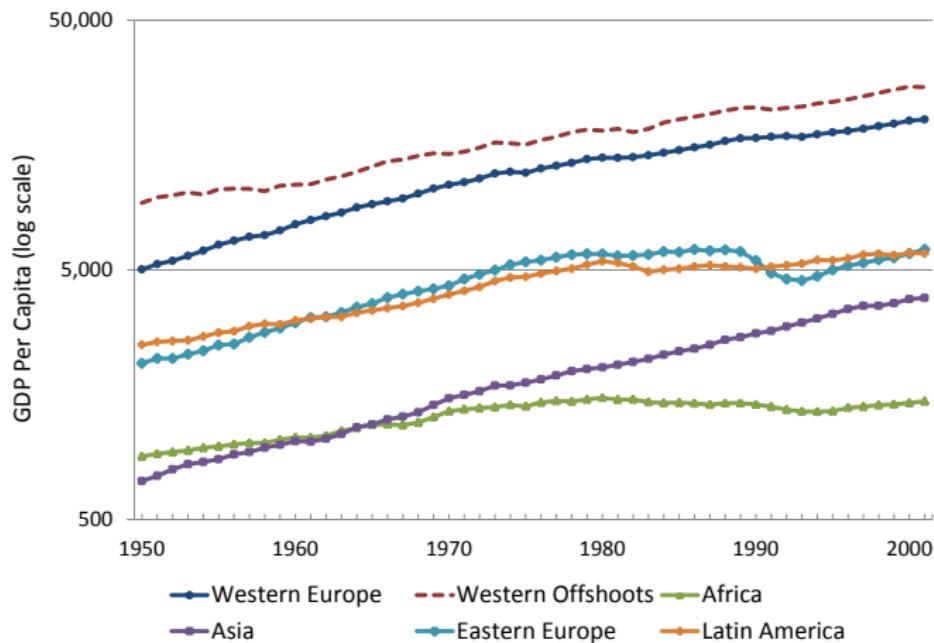
## Timing of the Demographic Transition and Divergence across Regions



## Sustained Economic Growth: 1870–2000



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



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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)

### ● Ethnic fractionalization

- Sociopolitical instability & Inefficient provision of public goods

→ ethnic fractionalization → political instability → inefficient institutions → low growth

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## Persistent Effects of Geographical Factors

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- Land suitable for large plantations
  - Inequality:
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  - 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 → more food → more population → more labor → 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 through their effects on institutions and factor prices.

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• Climate, soil, and topography are persistent factors that have shaped economic development over long periods of time.  
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Geographic factors can contribute to persistent effects on economic development by influencing the type of economic activities and the resulting institutional and technological developments.

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Geographical factors can have persistent effects on economic development 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
  - Determined fertility & income per capita in the Malthusian epoch and the timing of the take-off (Dalgard-Strulik, 2013)

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## Persistent Effects of Genetic Factors

- Natural selection of traits that are complementary to the growth process:
  - Preference for education (Galor-Moav, QJE 2002; Galor-Klemp, 2015)
  - Entrepreneurial spirit (Galor-Michalopoulos, JET 2012)
- Genetic distance between societies reduces:
  - Diffusion from the technological frontier (Spolaore-Wacziarg, QJE 2009)
  - Interstate wars (Spolaore-Wacziarg, 2013)
- Genetic diversity (GD) within a society:
  - Reduces cohesiveness:
    - Lower income in overly homogenous & diverse societies
  - Generates a wider range of complementarity traits conducive for innovations
  - Has a hump-shaped effect on productivity (Ashraf-Galor, AER 2013)
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