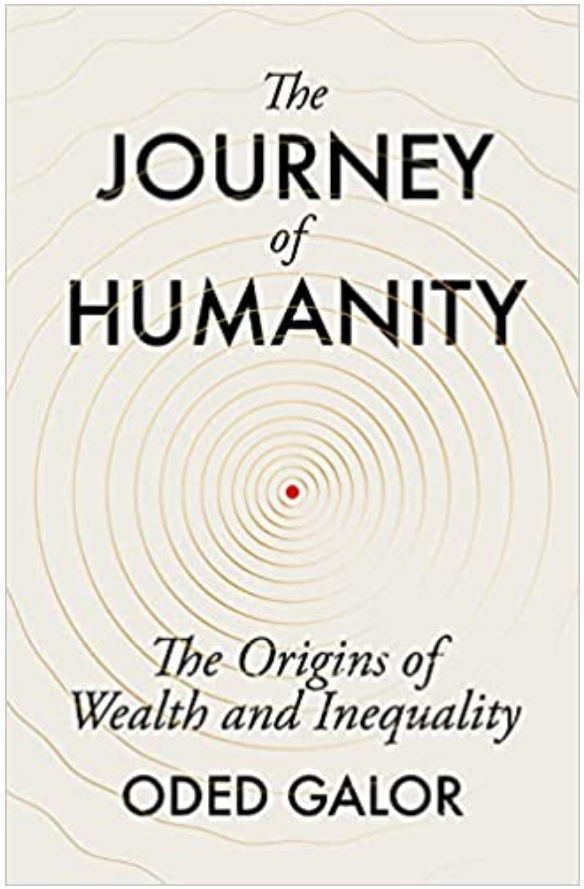
The Journey of Humanity

Roots of Wealth and Inequality

Oded Galor

January 30, 2024



Penguin Random House

Origins of Wealth and Inequality

- What are the roots of wealth?
  - The 14-fold increase in income per capita in the past 2 centuries?
- What is the origin of the vast inequality in the wealth of nations?
  - Why some countries are rich & others are poor?
  - Why has inequality across nations magnified in the past 2 centuries?

Main Hypothesis

- Forces that operated in the distant past
  - Contributed greatly to contemporary inequality?
  - Accounting for 90% of the variation in the wealth of nations today
- The understanding of the journey of humanity
  - Critical for design of growth-enhancing & inequality-mitigating policies

The Journey of Humanity

- The evolution of societies since the emergence of Homo sapiens
  - The transition from an epoch of stagnation to an era of sustained growth
  - The divergence in living standards across the globe

Mysteries of the Journey of Humanity

- The Mystery of Growth
  - What are the roots of the dramatic transformation in living standards in the past centuries, after hundreds of thousands of years of stagnation?
- The Mystery of Inequality
  - What is the origin of the vast inequality in the wealth of nations?

The Journey of Humanity

Over most of human existence

- Human life was "*Nasty, Brutish & Short*" (Hobbes, 1651)
  - Remarkably similar to that of other species:
    - Living standards were near subsistence
    - Humans were preoccupied by survival & reproduction
    - Minor differences in living conditions across time & space

Living Standards Few Centuries Ago

- 1/4 of new born died before reaching their first birthday
- Numerous women perished during childbirth
- Life expectancy rarely exceeded 40
- 'Economic Crisis' $\not\Rightarrow$ 'belt-tightening'
  - $\Rightarrow$ mass starvation & extinction

Metamorphosis

- Over the past two centuries
  - Dramatic transformation in living standard within & across societies
    - World's income per capita has increased 14-fold
    - Life expectancy has more than doubled
    - Great divergence in income per capita across countries

Manifestations of this Metamorphosis

Humans whisked in a time machine:

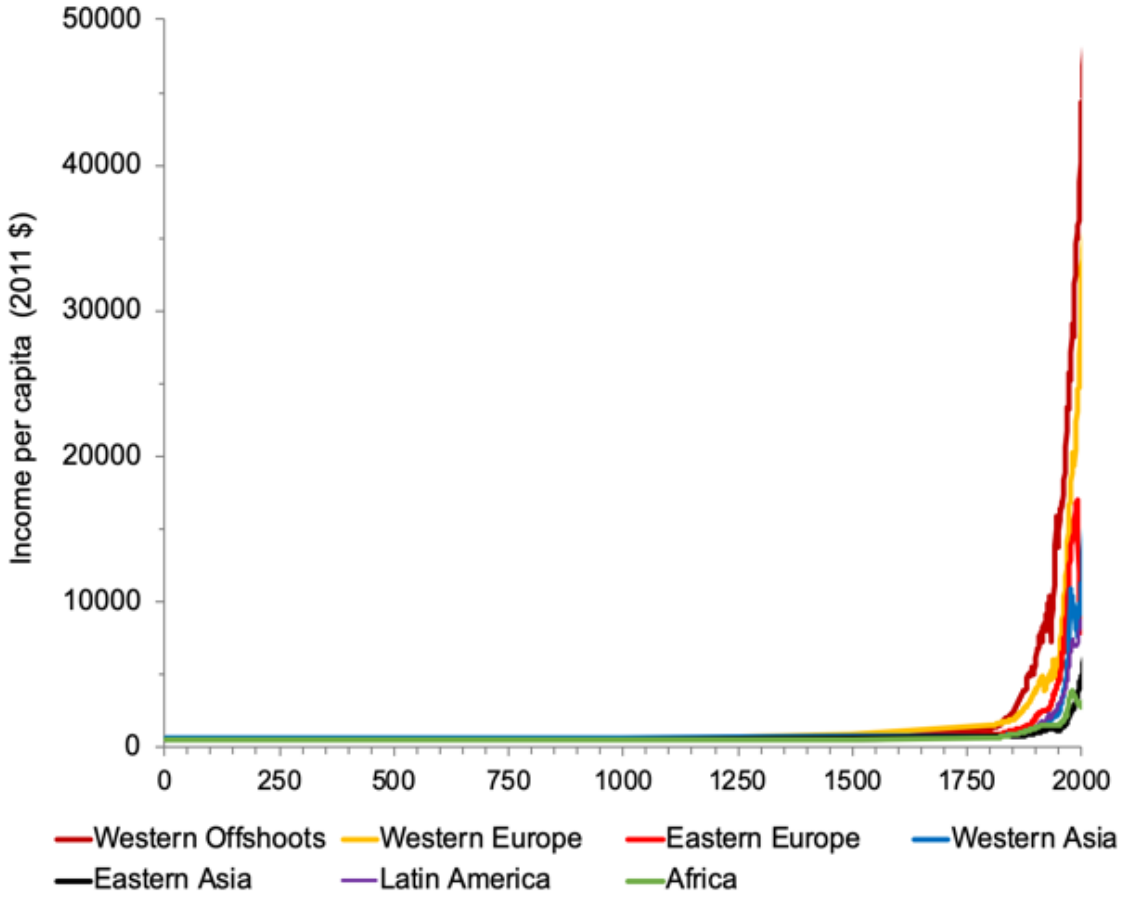
- From Jerusalem of Jesus (1st century) to Ottoman Jerusalem (19th century)
  - Instantaneous adaptation
    - Past knowledge would be largely applicable
    - Technological improvements would be merely incremental
    - Occupations would require similar skills
    - Life expectancy would remain low & unchanged
- From Jerusalem in the 19th century to Jerusalem today
  - Shocking experience
    - Past knowledge would be largely obsolete
    - Modern technologies would appear as a witchcraft
    - Occupations would require incomprehensible skills
    - Life expectancy would double & require future-oriented mindset

Evolution of Living Standards across the Globe

In contrast to popular views

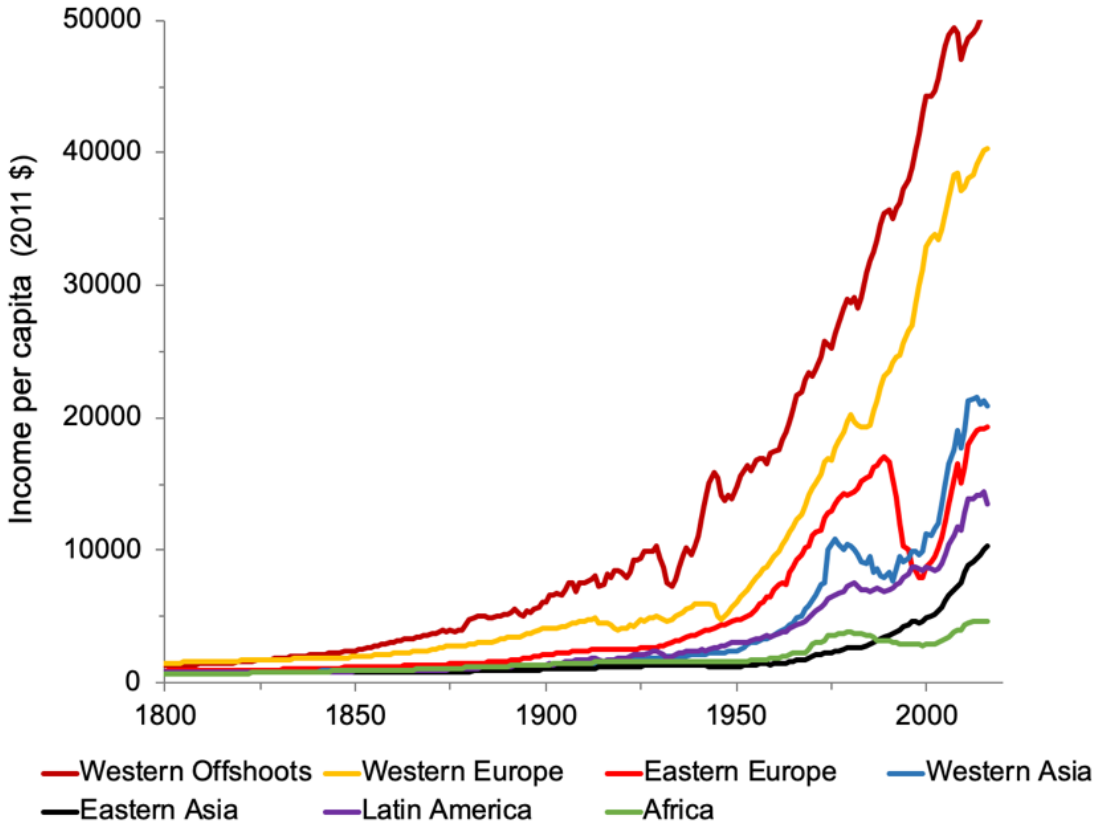
- Living standards had *not* increased *gradually* in the course of history
  - Technological progress had accelerated *gradually* over time, but
    - It had contributed mostly to the explosion of the world's population
    - It had a negligible impact on living standards over most of history
  - The recent rise in living standards reflects a *phase transition*
    - Abrupt transformation, once a tipping point has been reached

Metamorphosis: Income per Capita: 1–2020



Data Source: Maddison Project (2020)

Great Divergence: 1800–2018



Data Source: Maddison Project (2020)

Fundamental Mysteries

- The Mystery of Growth:
  - What are the underlying causes of the economic ice age?
  - What triggered the metamorphosis in the past two centuries?
- The Mystery of Inequality
  - 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 historical and pre-historical factors in the observed patterns of comparative development?

Resolution of these Mysteries

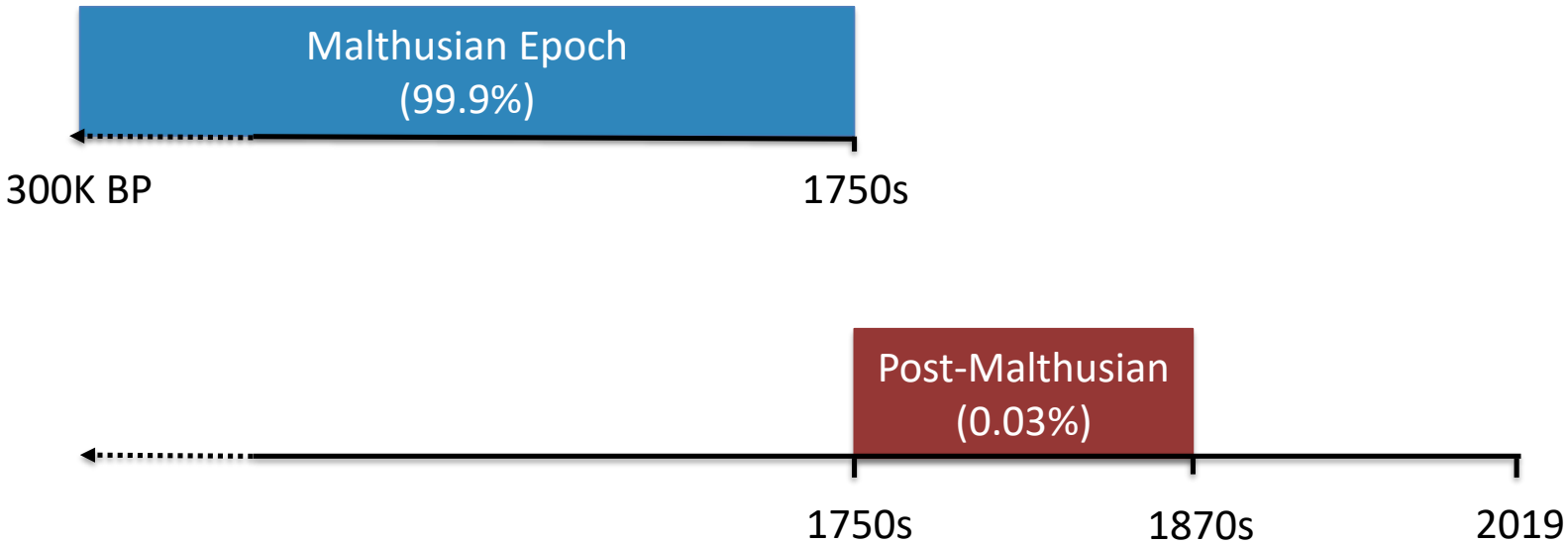
- Provides important insights about:
  - Design of strategies to mitigate inequality across the globe
- Requires the identification of the historical & pre-historical forces that:
  - Permitted the transition from stagnation to growth
  - Dictated the differential timing of the transition across the globe

Phases of Development

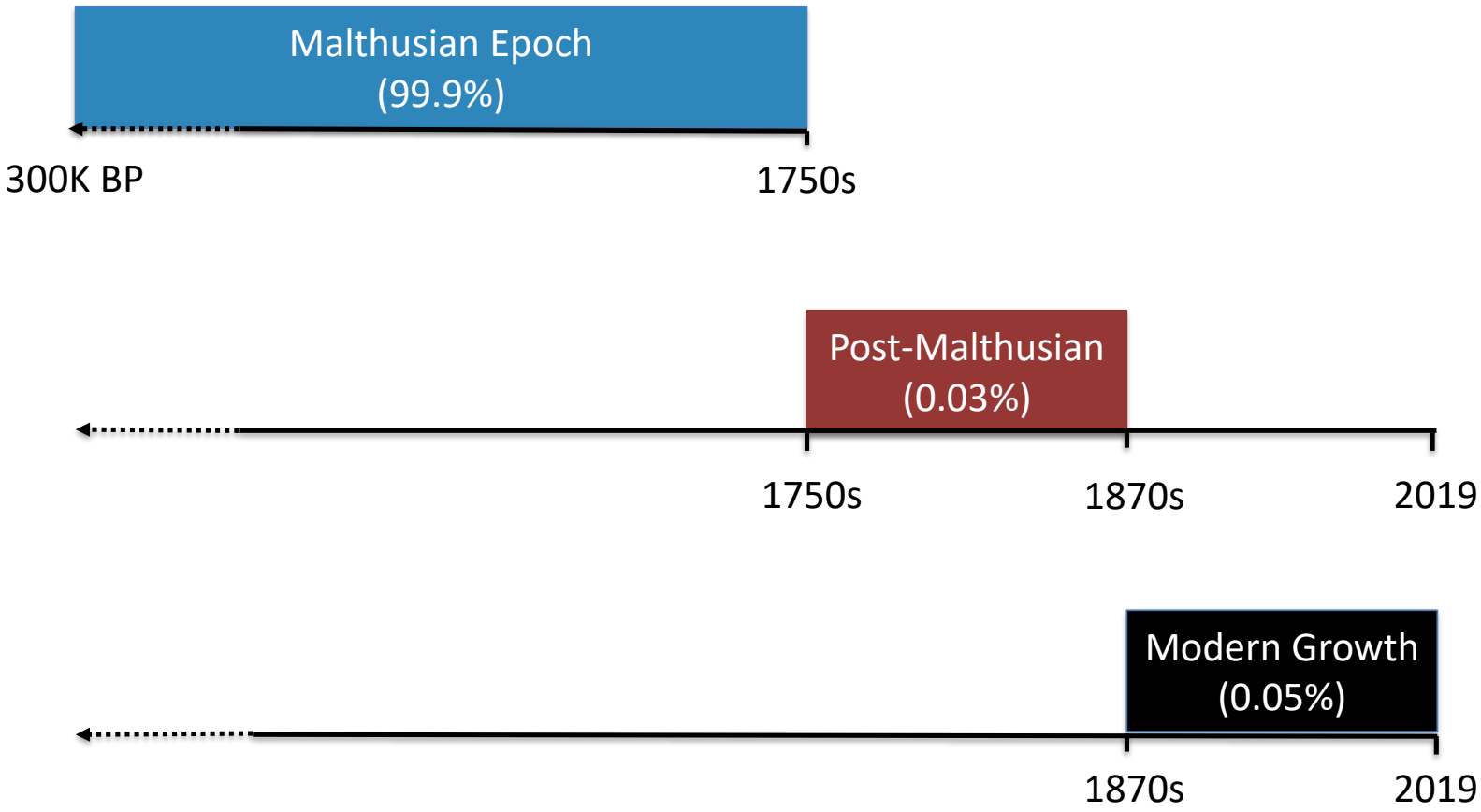
- The Malthusian Epoch
- The Post-Malthusian Regime
- The Modern Growth Regime

Phases of Development: Timeline in the Most Developed Economies

Phases of Development: Timeline of the Most Developed Economies



Phases of Development: Timeline of the Most Developed Economies



The Mysteries of the Malthusian Epoch

- What accounts for the economic ice age?
- Which forces permitted the escape from the arms of the Malthusian octopus?

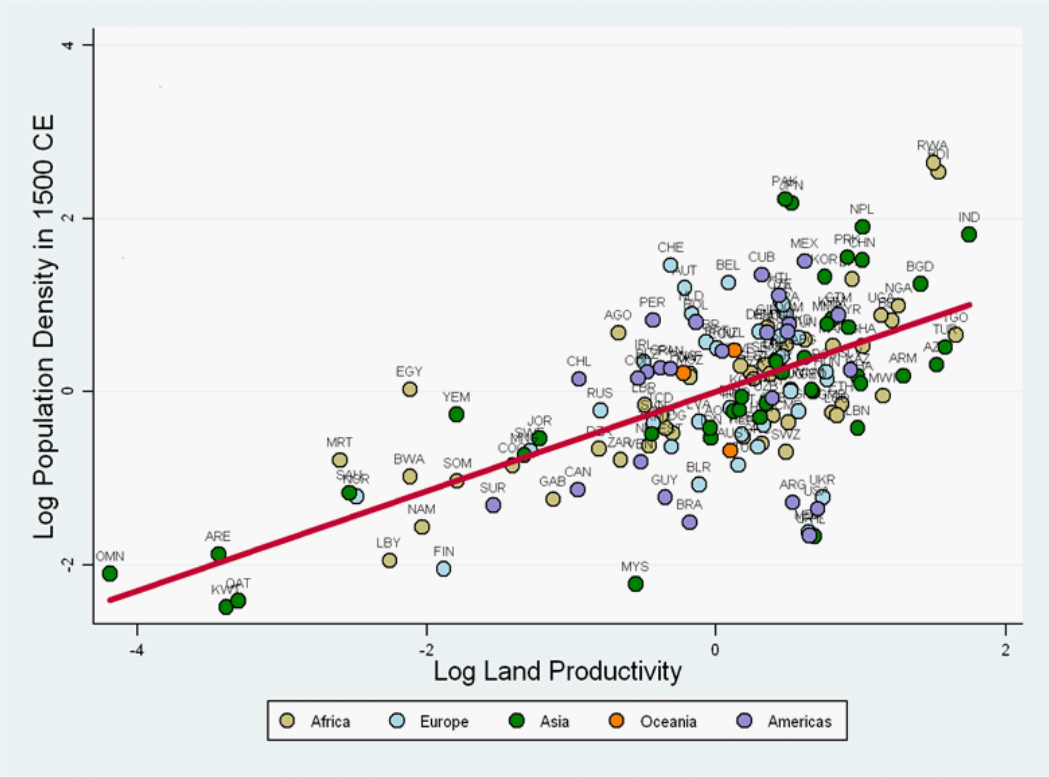
The Malthusian Epoch

- Dualism: Stagnation & Dynamism:
  - Stagnation in living standards:
    - Income per capita: fluctuated near the subsistence level
    - Life expectancy: fluctuated in the range of 25-40 years
  - Dynamism (Slow but sizable over 300,000-year period):
    - Technological progress
    - Population growth
    - Adaptation
  - Malthusian dynamism
    - Ultimately triggered the transition from stagnation to growth

Impact of Technological Progress on Population Growth

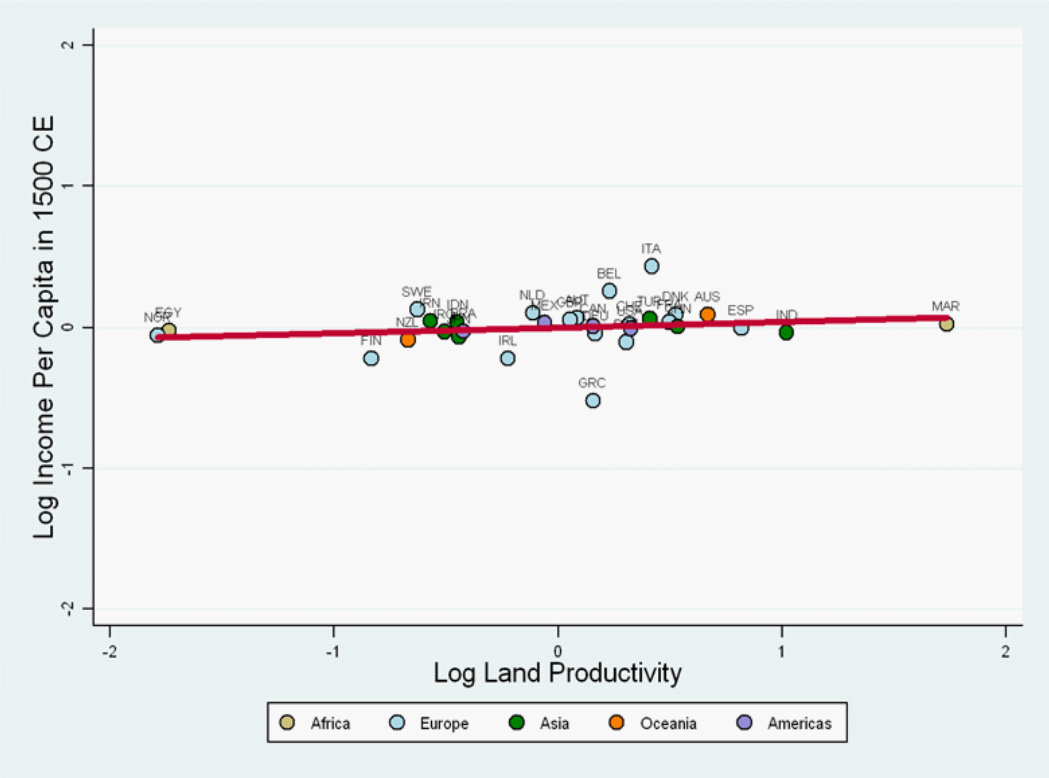
- Technological progress
  - $\Rightarrow$ Increased income per capita in the short-run
  - $\Rightarrow$ Population growth: Mortality declined & fertility increased (as long as income ¿ subsistence)
  - $\Rightarrow$ Income per capita inevitably reverted back to its long-run level
- Technologically advanced & land-rich economies had:
  - Higher population density
  - But similar levels of income per-capita in the long-run

Land Productivity and Population Density in 1500



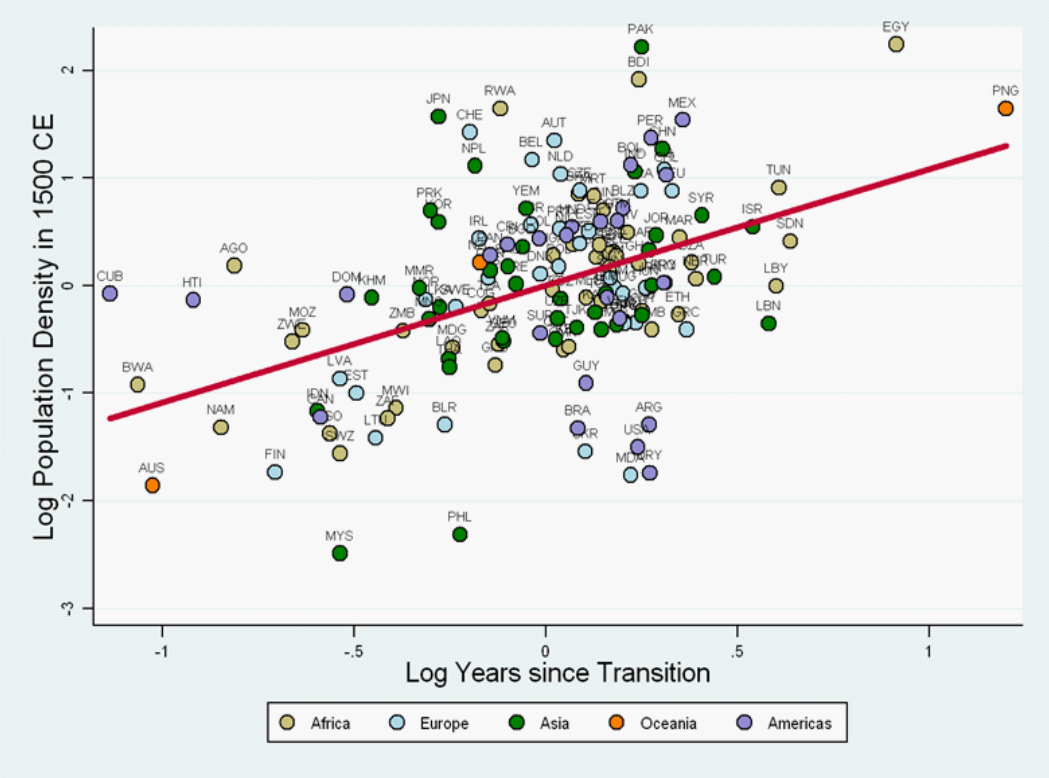
Source: Ashraf-Galor (AER 2011)

Land Productivity and Income per Capita in 1500



Source: Ashraf-Galor (AER 2011)

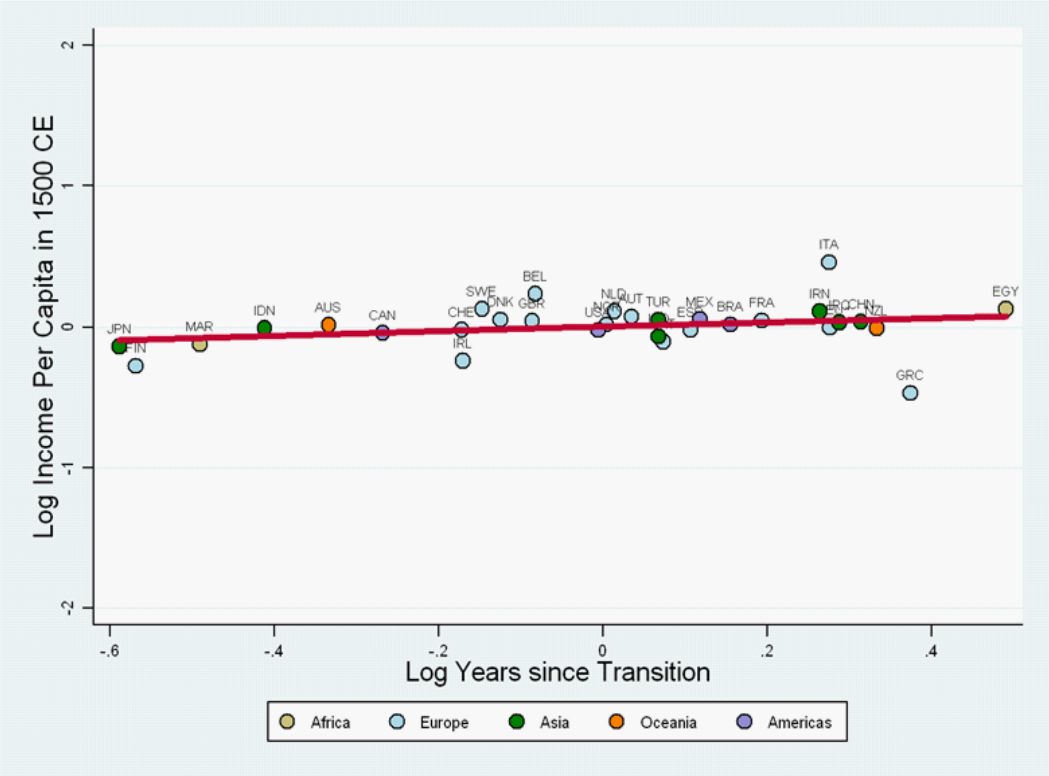
Technology and Population Density in 1500



Years elapsed since the Neolithic Transition is a proxy for technological levels in 1500.

Source: Ashraf-Galor (AER 2011)

Technology and Income per Capita in 1500



Years elapsed since the Neolithic Transition is a proxy for technological levels in 1500.

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Malthusian Dynamics - Prominent Examples

- The dynamics of Irish economy (1600 - 1850)
  - Triggered by the adoption of a new world crop – potato
- The dynamics of the Chinese Economy (1500 - 1910)
  - Triggered by superior agricultural technology & adoption of maize
- The dynamics of the English economy (1348 - 1635)
  - Triggered by the Black Death

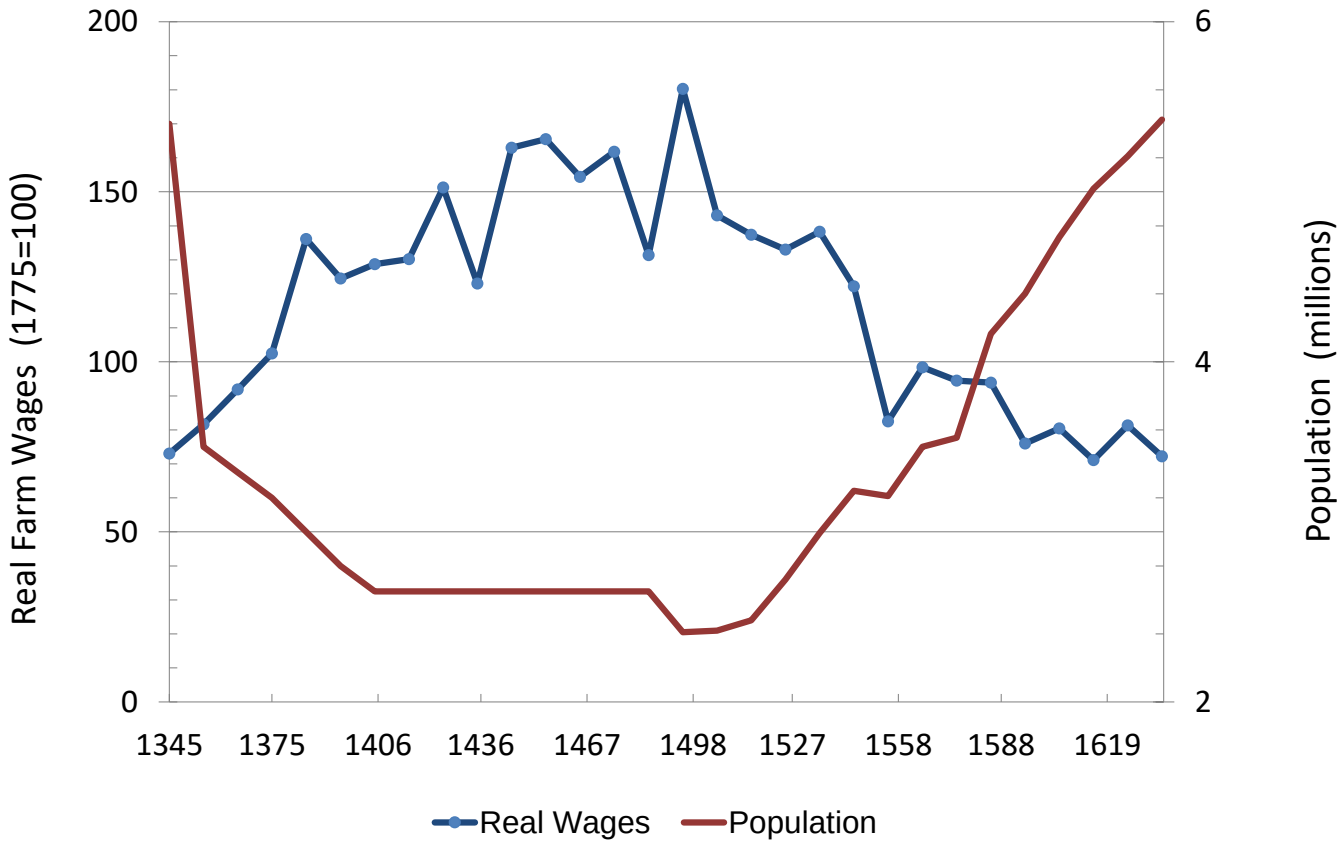
Malthusian Dynamics - Ireland (1600 - 1850)

- The Colombian Exchange $\Longrightarrow$ massive cultivation of potato post-1650
  - 1600-1841
    - Population grew from 1.4 to 8.2 million
    - Income per capita increased only very modestly
  - 1845-1852 Potato blight destroys crops $\Longrightarrow$ Great Famine
    - Population declined by about 2 million (Death & Emigration)
    - Income per capita remained nearly unchanged

Malthusian Dynamics - China (1500 - 1910)

- Superior agricultural technology
  - 1500-1820
    - Population increased from 103 to 381 million
    - Share of China in world population increased from 23% to 37%
    - Income per capita was steady at $600
- Adoption of Maize
  - 1776-1910
    - Contributed to 1/5 of China's population growth over the period
    - No impact on income per capita

Malthusian Adjustments to the Black Death: England, 1348–1635



Malthusian Dynamism – Adaptation

- The Malthusian pressure affected
  - The size of the population
  - The composition of the population
- Traits that were complementary to the growth process
  - Generated higher income
    - $\Rightarrow$ Higher reproductive success (Vertical transmission from parent to child)
    - $\Rightarrow$ Imitation [Horizontal (cultural) transmission]
    - $\Rightarrow$ Became more prevalent in the population
- Adaptation processes
  - Raised the prevalence of complementary traits to the growth process
  - Reinforced the process & the ultimate take-off

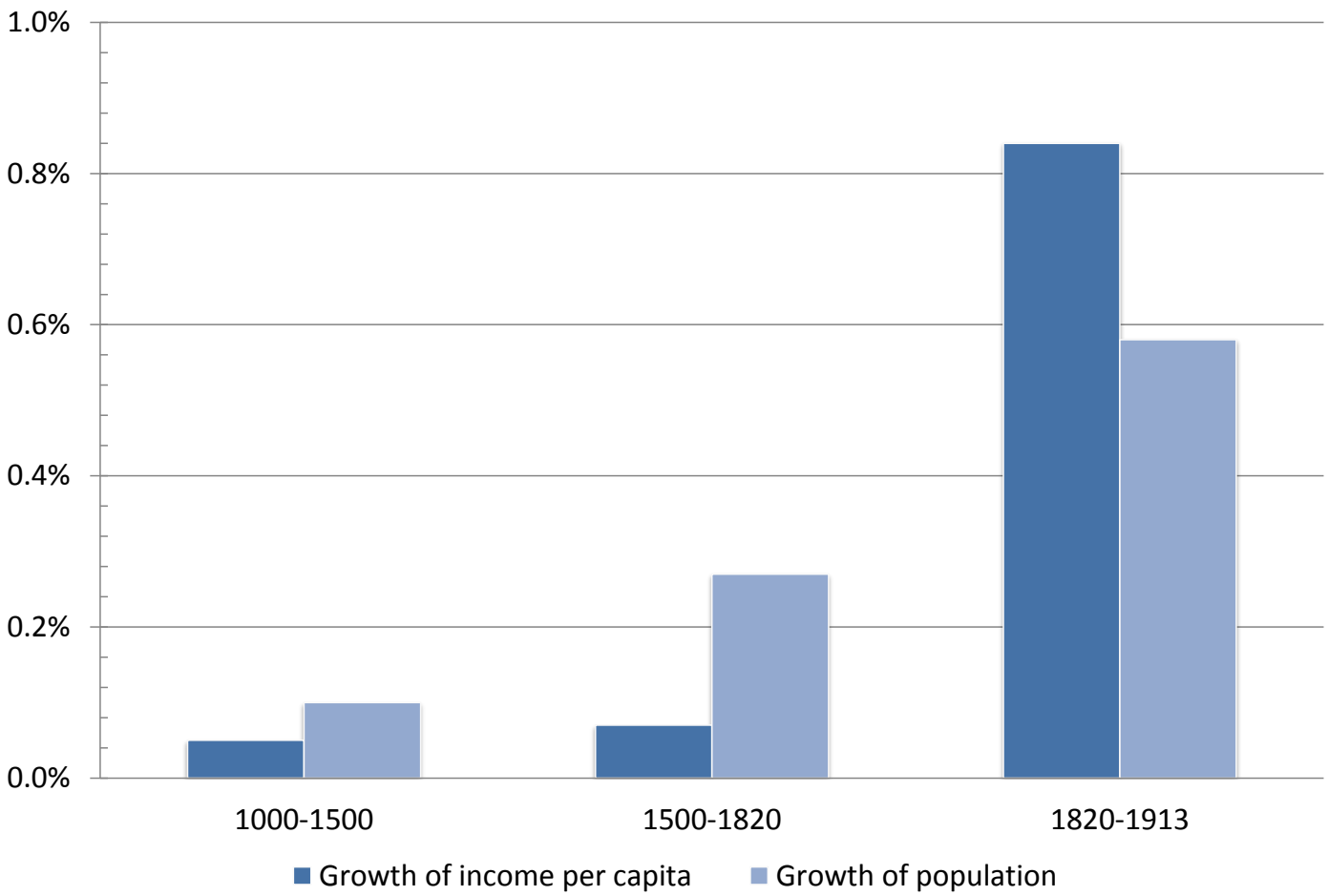
Malthusian Dynamism – Origins of Technological Progress

- The size & composition of the population fostered technological progress via:
  - Supply of innovations
  - Demand for innovations
  - Diffusion of knowledge
  - Division of labor
  - Extent of trade

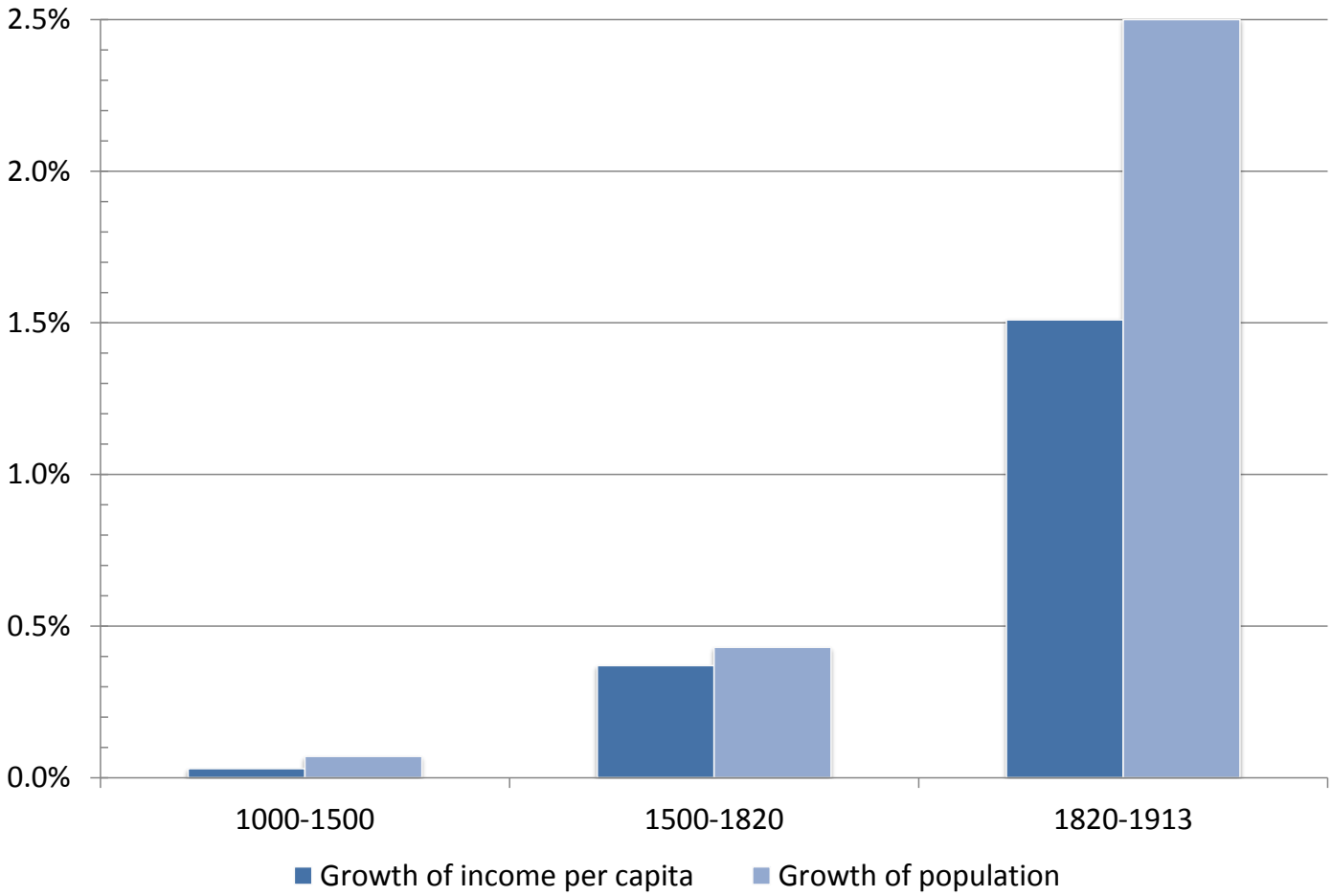
The Emergence of the Post-Malthusian Regime

- During the Malthusian epoch:
  - Population size & composition $\Rightarrow$ Technological progress
  - Technological progress $\Rightarrow$ Population size & composition
- Technological progress accelerated till ultimately
  - Technological progress outpaced biological reproduction
    - $\Rightarrow$ Growth in income per capita
    - $\Rightarrow$ Intensification of population growth

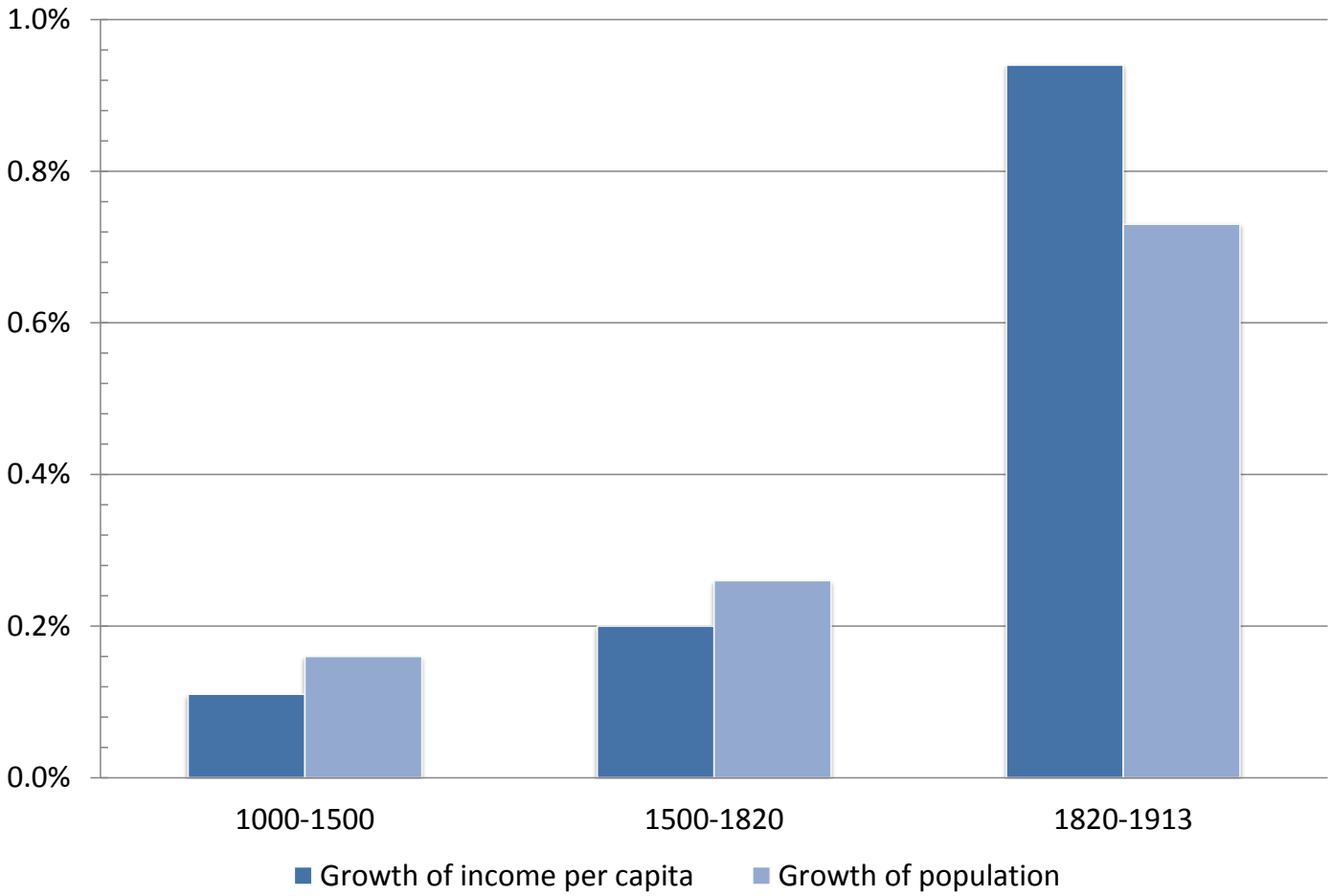
Take-off: Growth of Population & Income per Capita – World



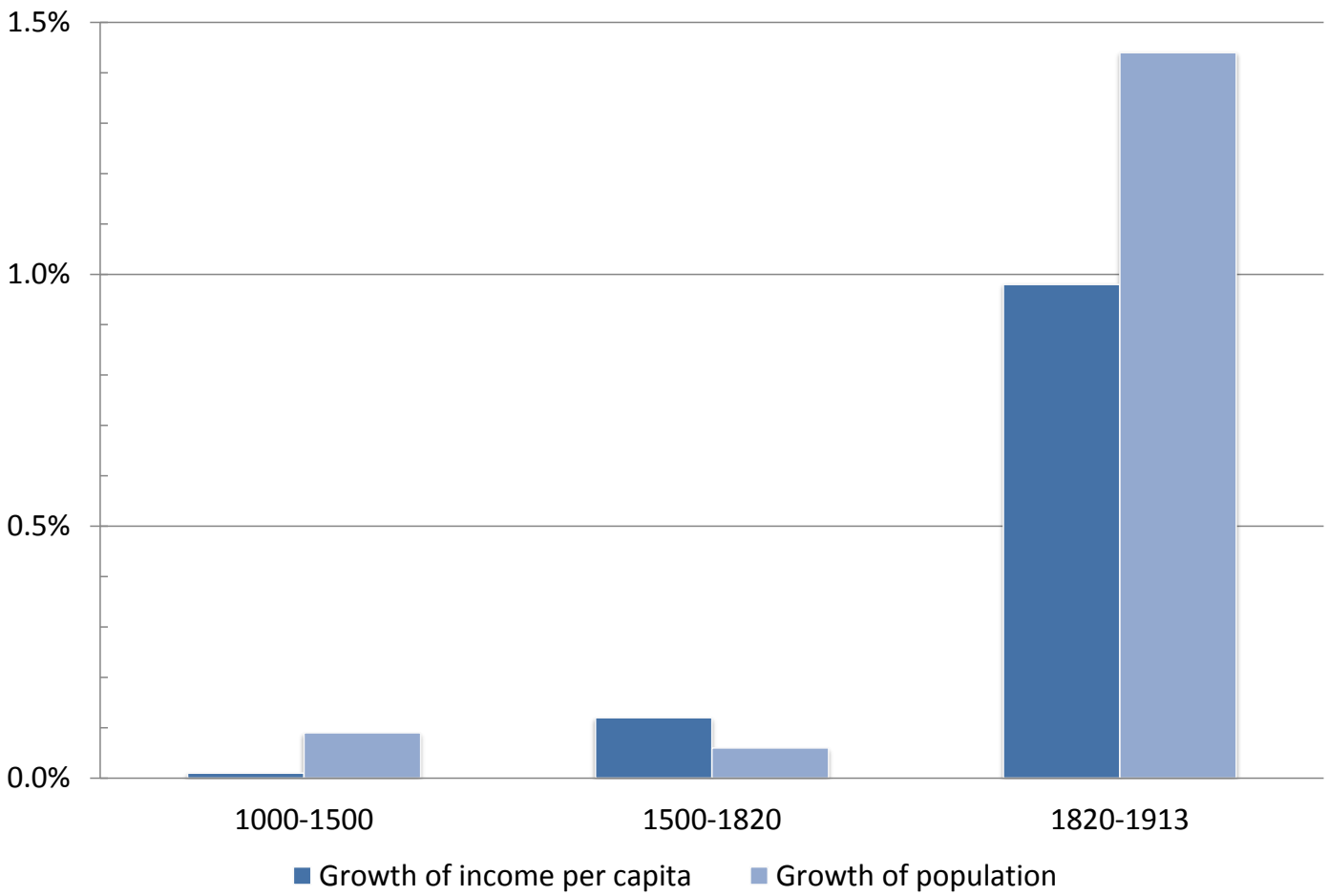
Take-off: Growth of Population & Income per Capita – Western Offshoots



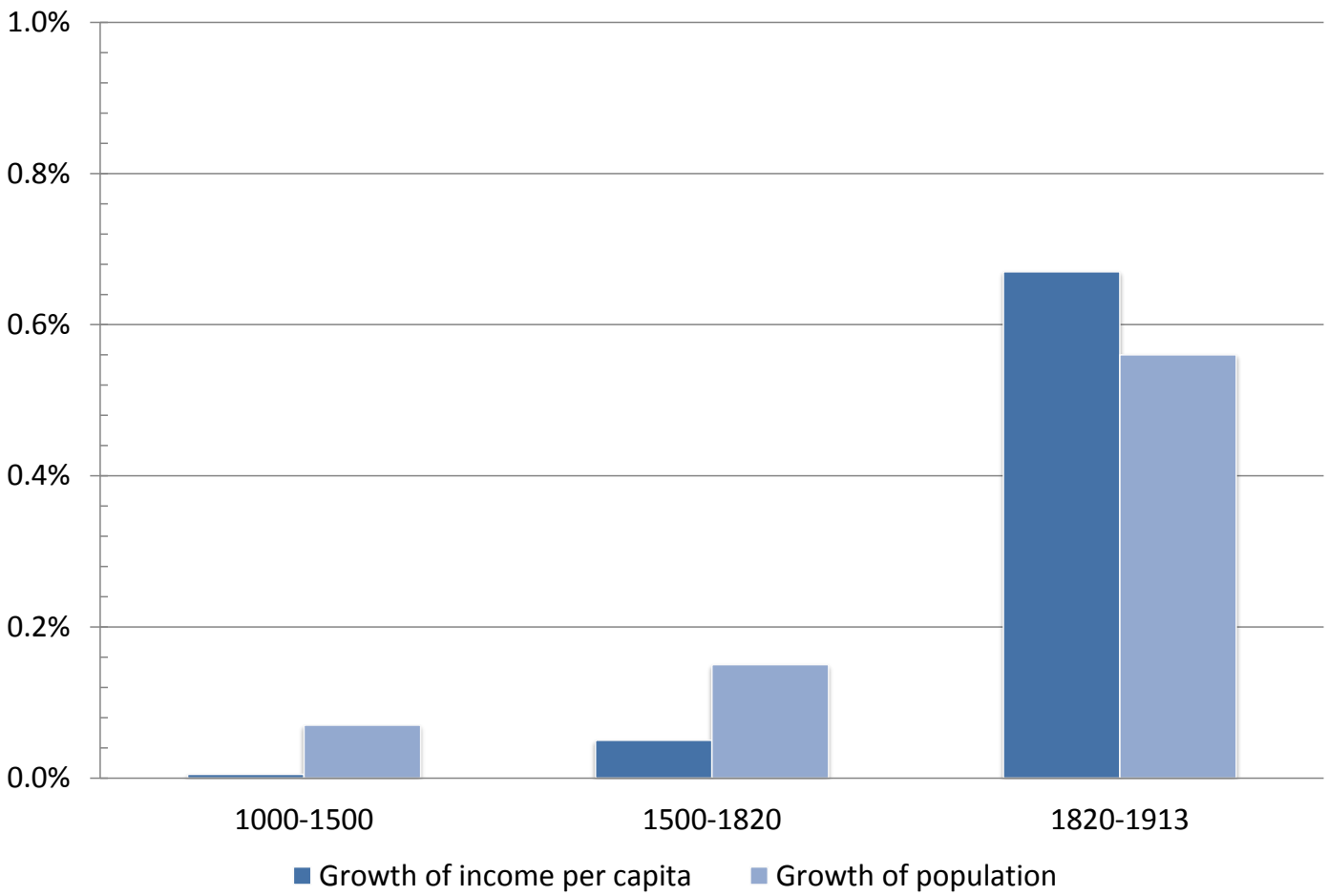
Take-off: Growth of Population & Income per Capita – Western Europe



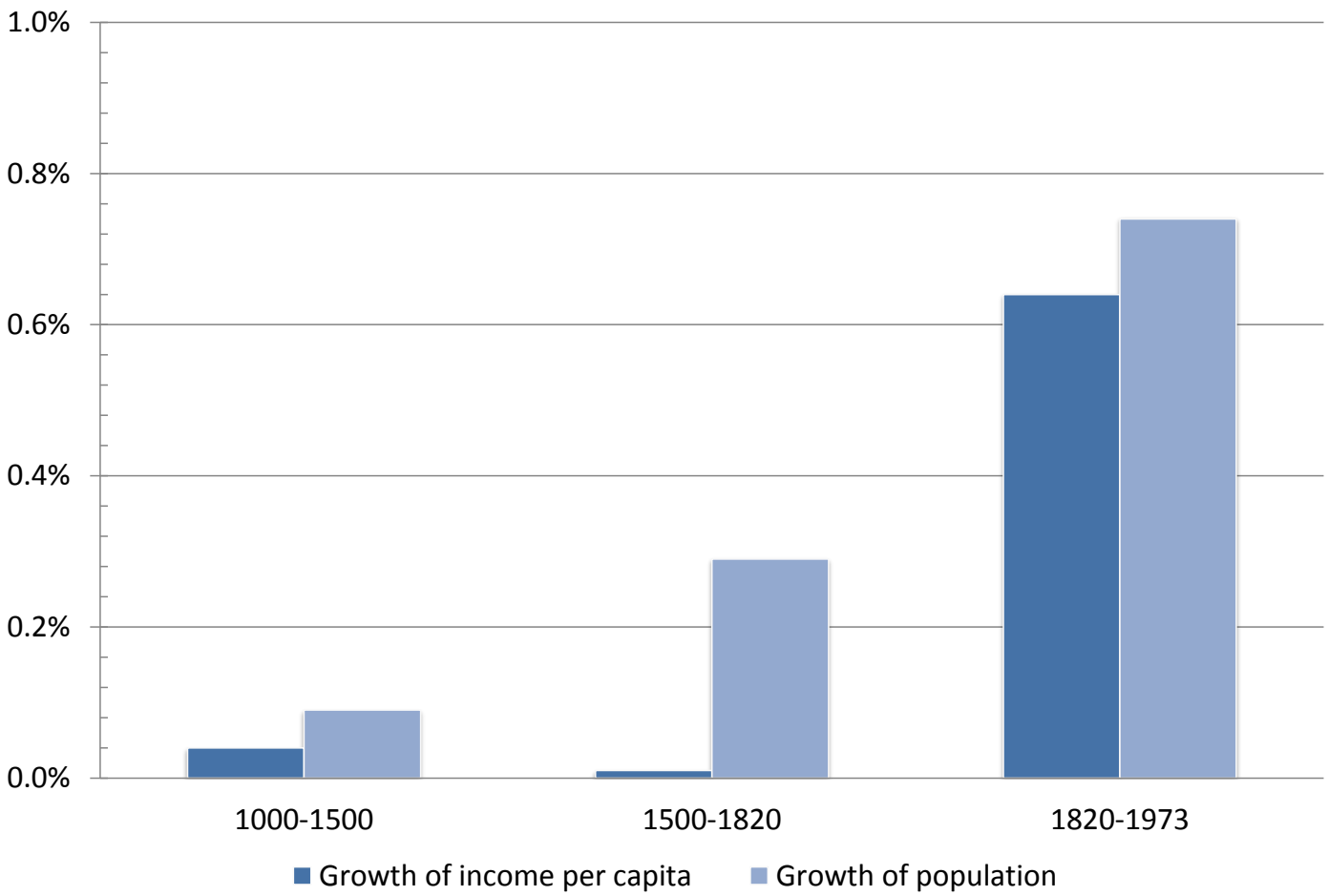
Take-off: Growth of Population & Income per Capita – Latin America



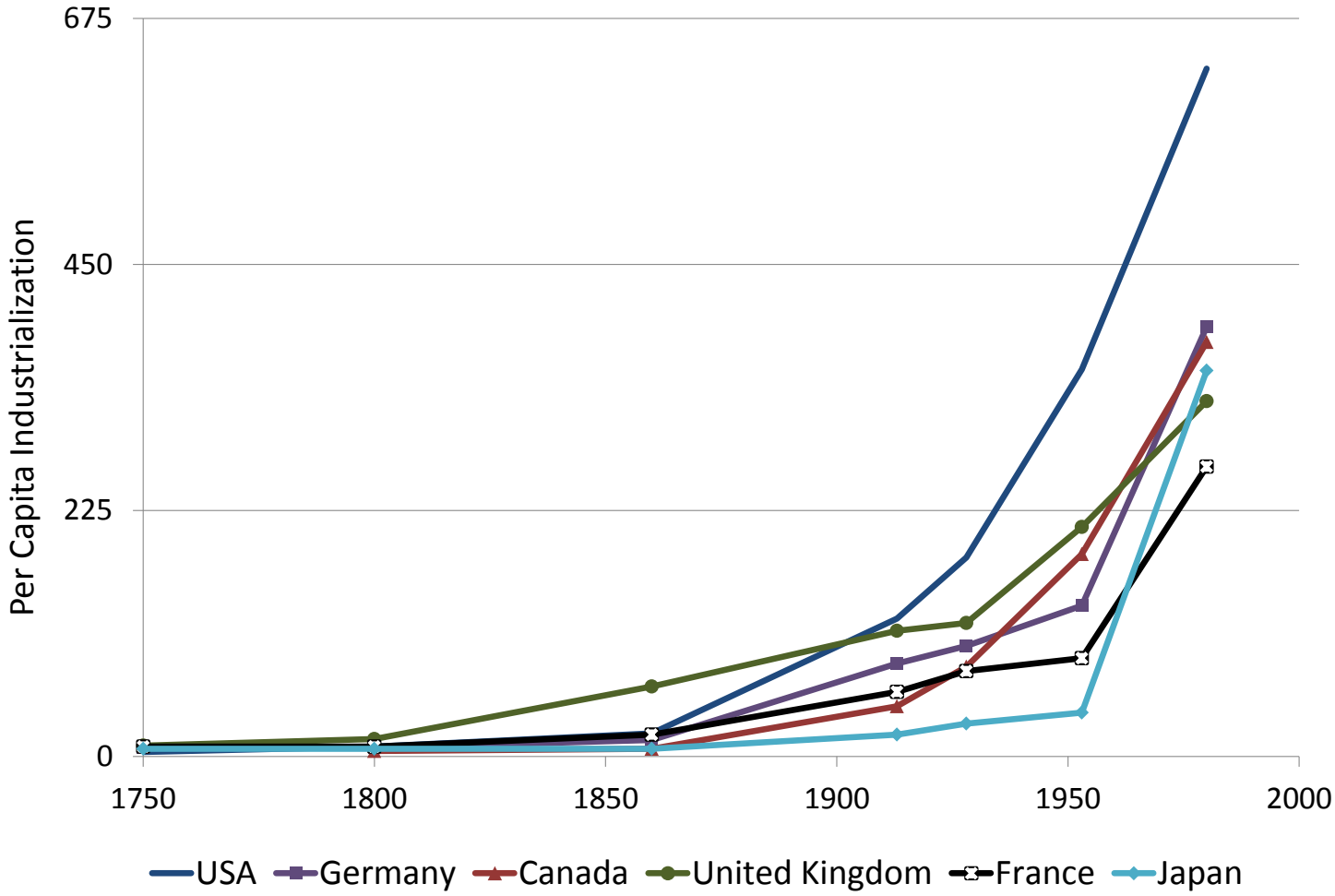
Take-off: Growth of Population & Income per Capita – Africa



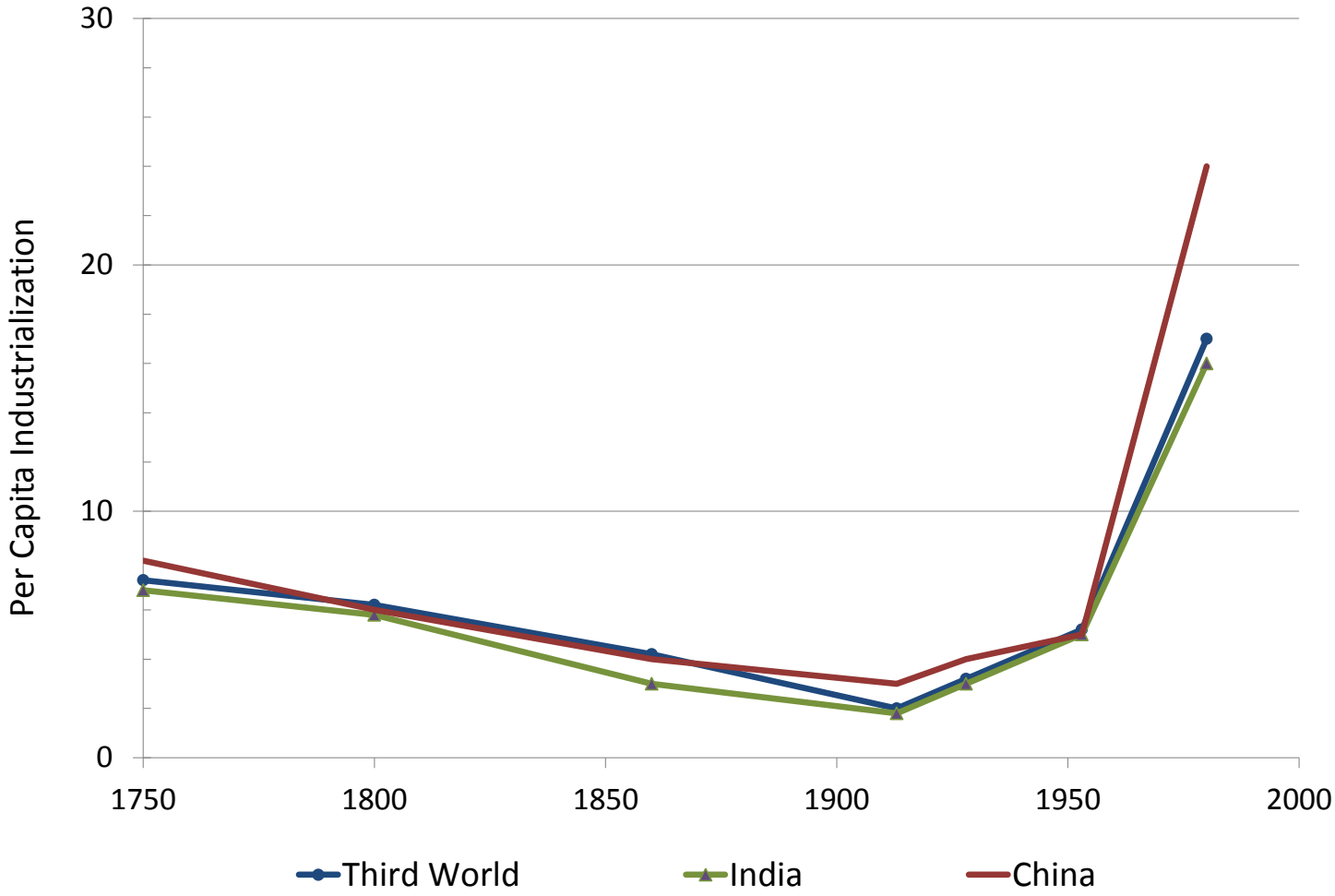
Take-off: Growth of Population & Income per Capita – Asia



Take-off & Increased Industrialization per Capita



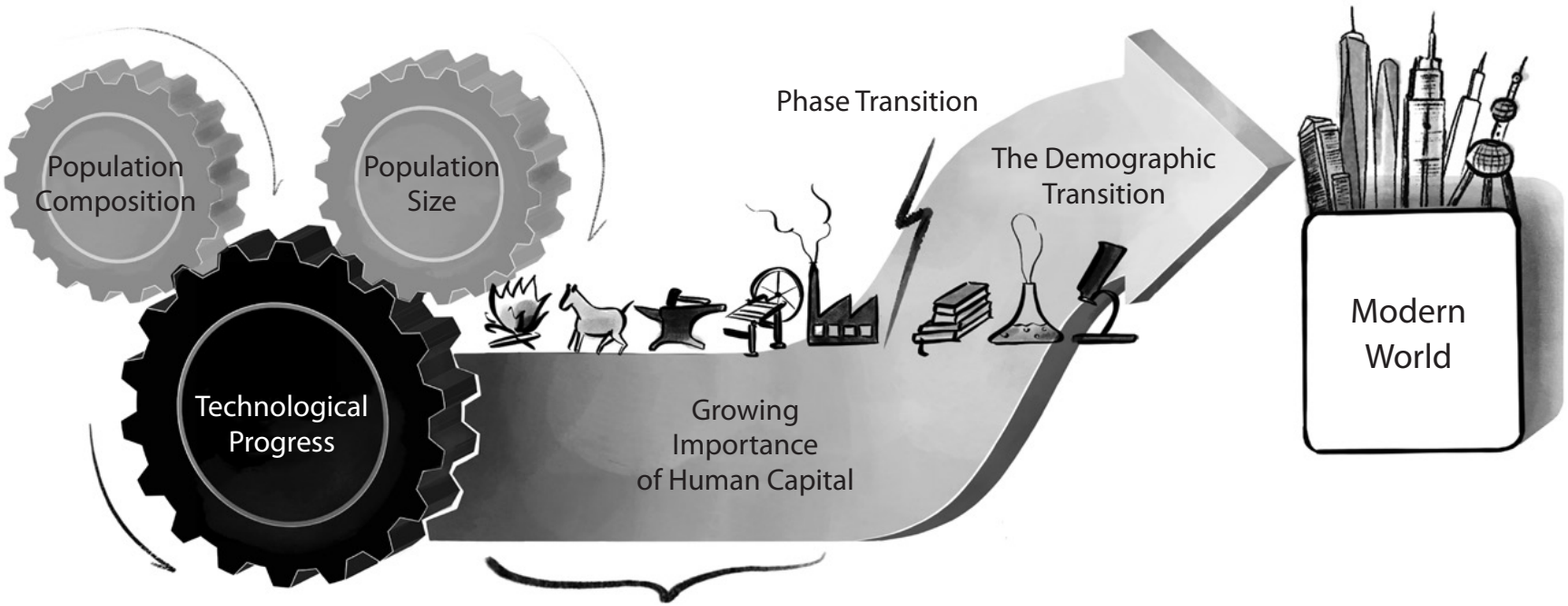
Take-off in Developed Economies & Decline in Industrialization in LDCs



The Wheels of Change

- The rotation of the 'Wheels of Change' intensified
  - Population size & composition $\Rightarrow$ Technological progress
  - Technological progress $\Rightarrow$ Population size & composition
- Technological progress accelerated & ultimately reached a critical threshold
  - Human capital became essential for coping with the rapidly changing technological environment
- Human capital formation triggered a reduction in fertility (quantity-quality trade-off)
  - Growth was freed from the counterbalancing effect of population
  - The Malthusian equilibrium vanished
- Tech progress & human capital formation & decline in population growth
  - $\Rightarrow$ Sustained economic growth

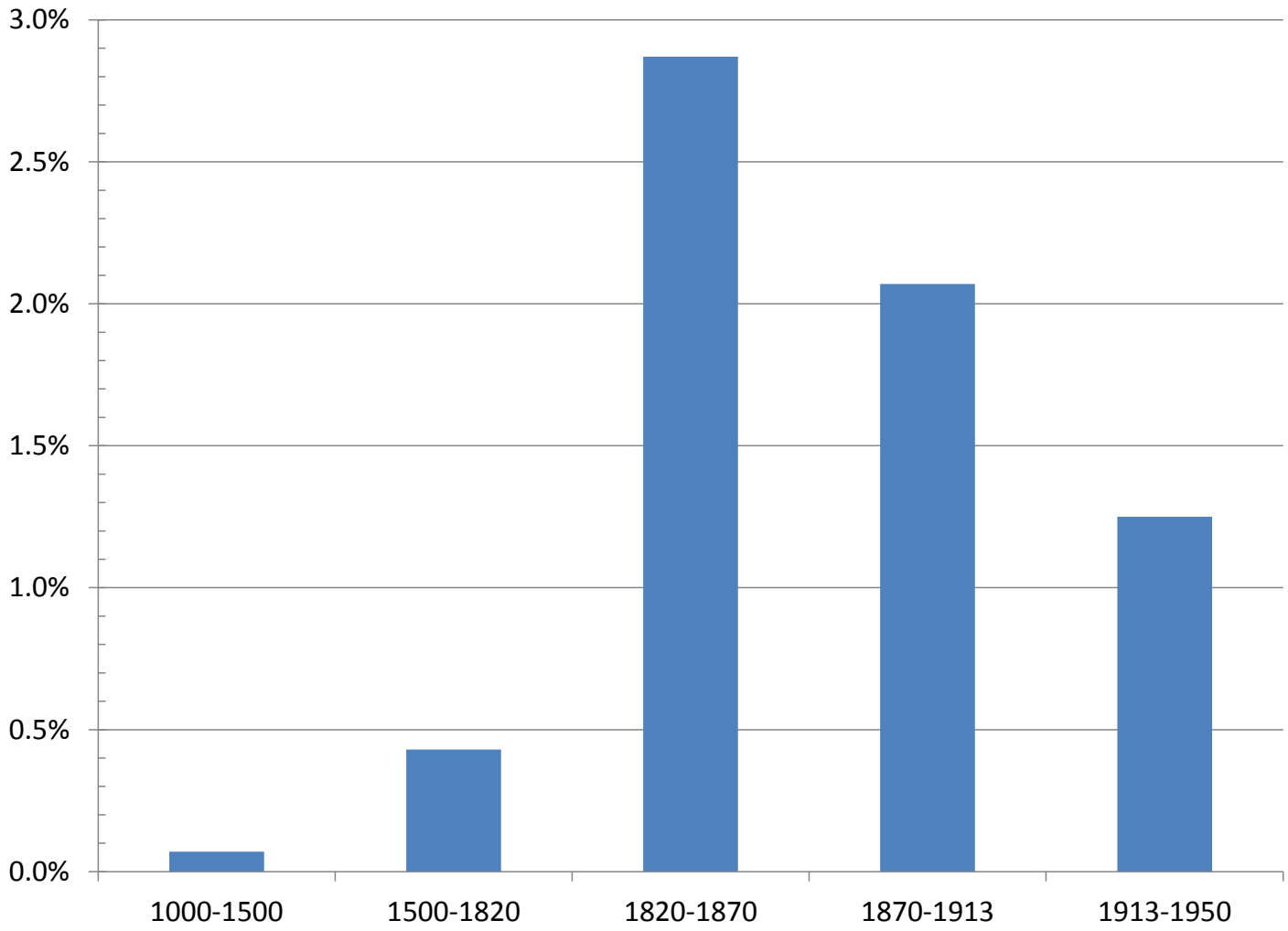
The Wheels of Change



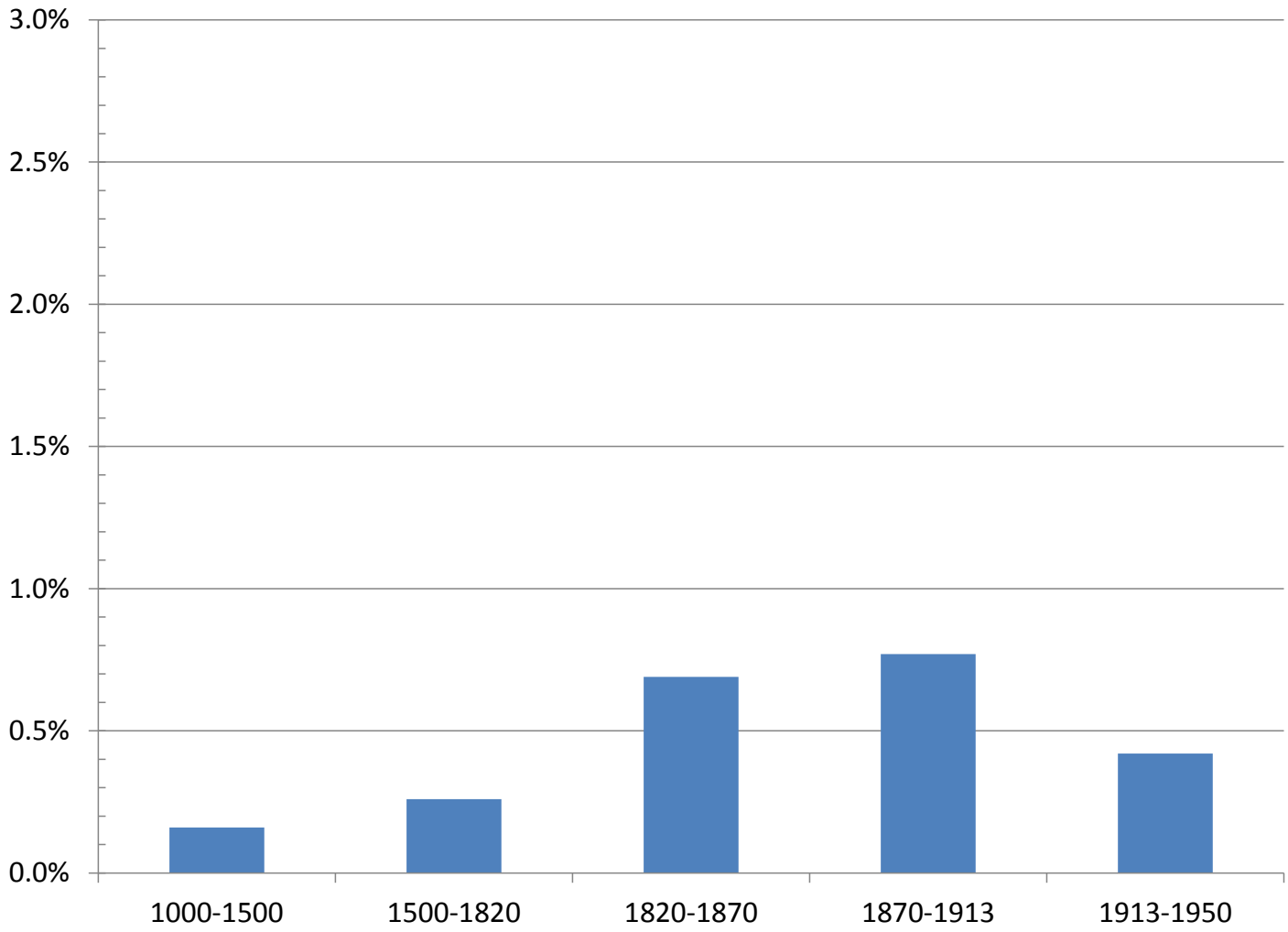
The Cogs of Change

Phase Transition

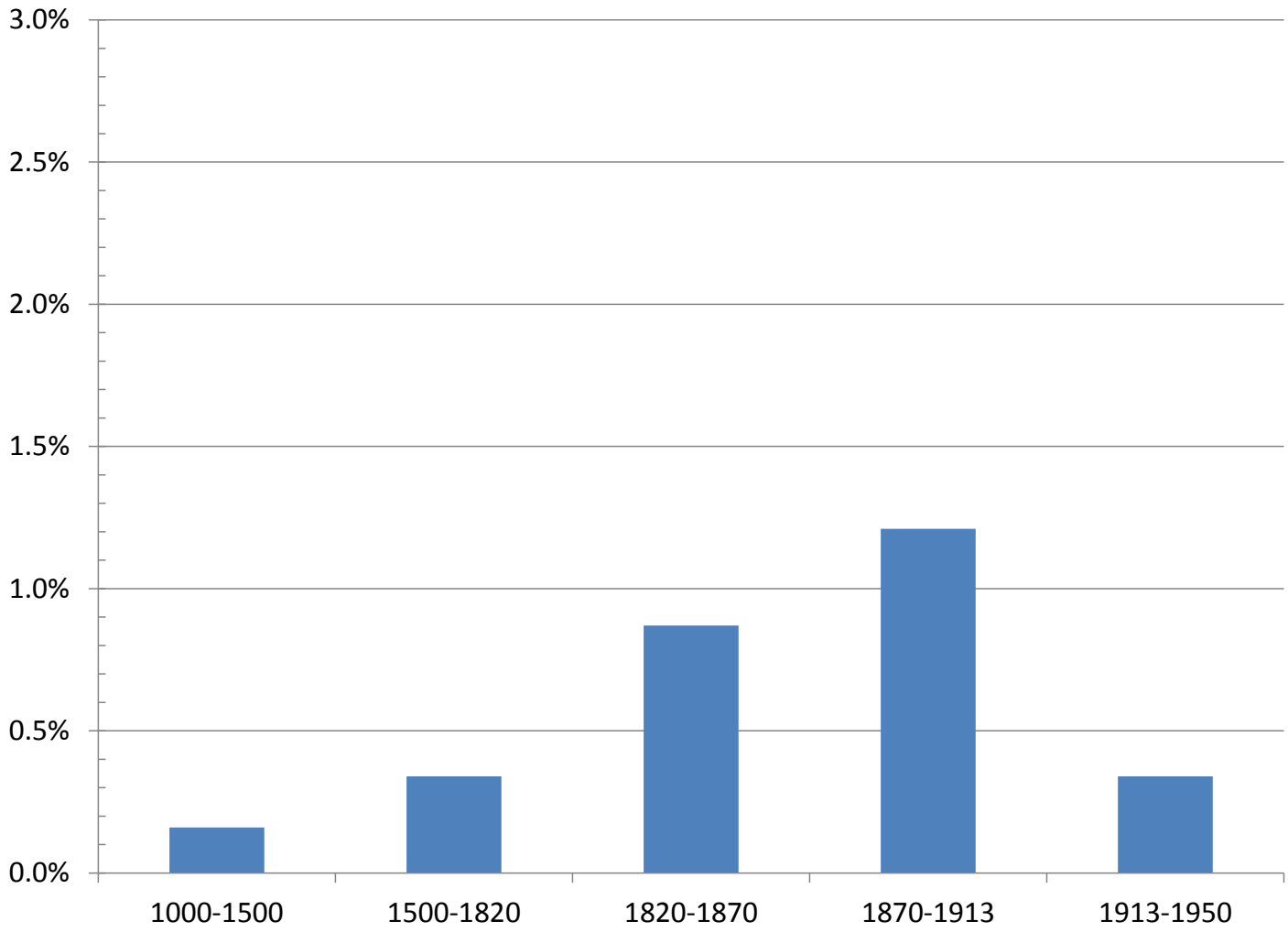
Early Fertility Decline – Western Offshoots



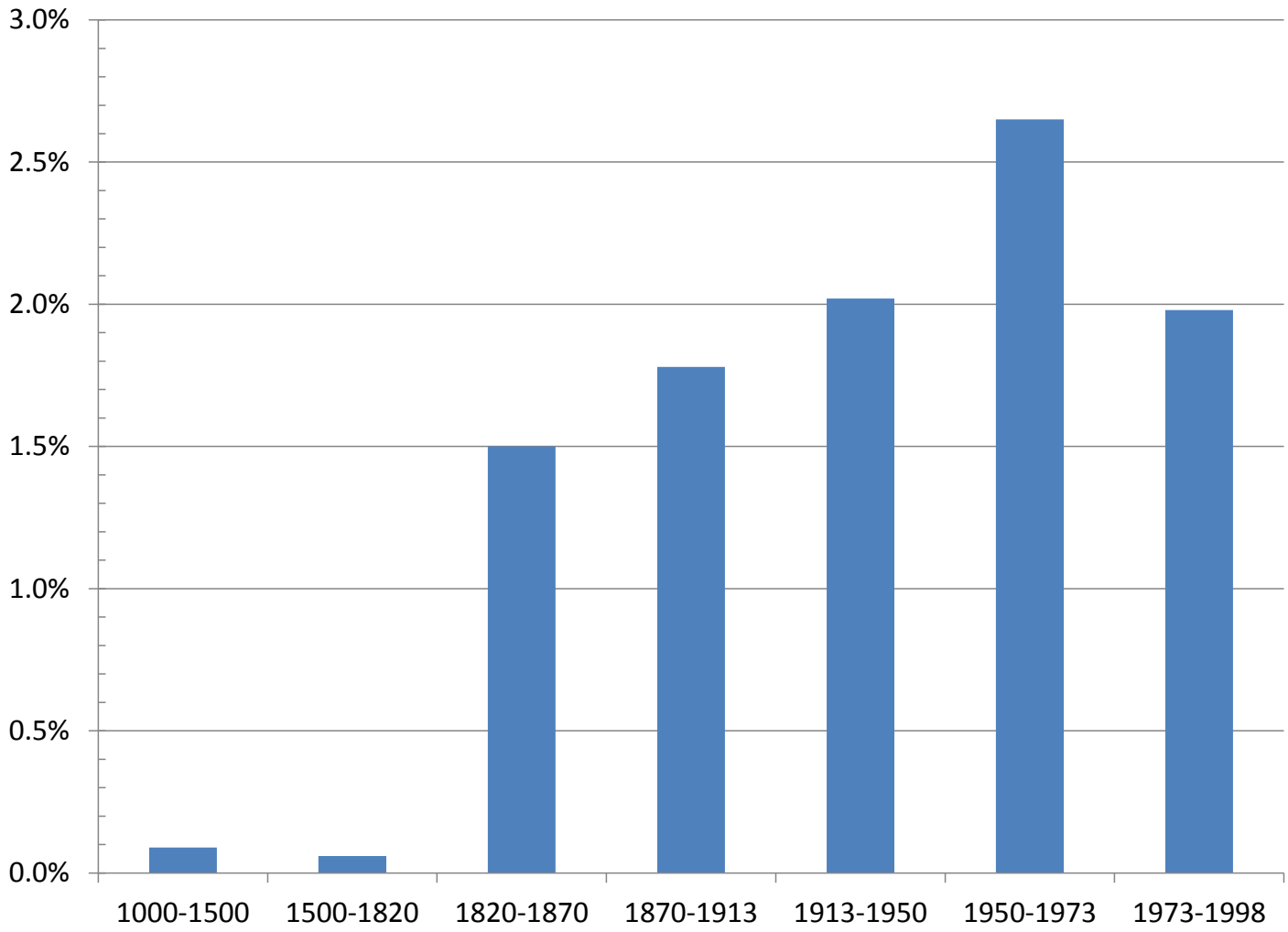
Early Fertility Decline – Western Europe



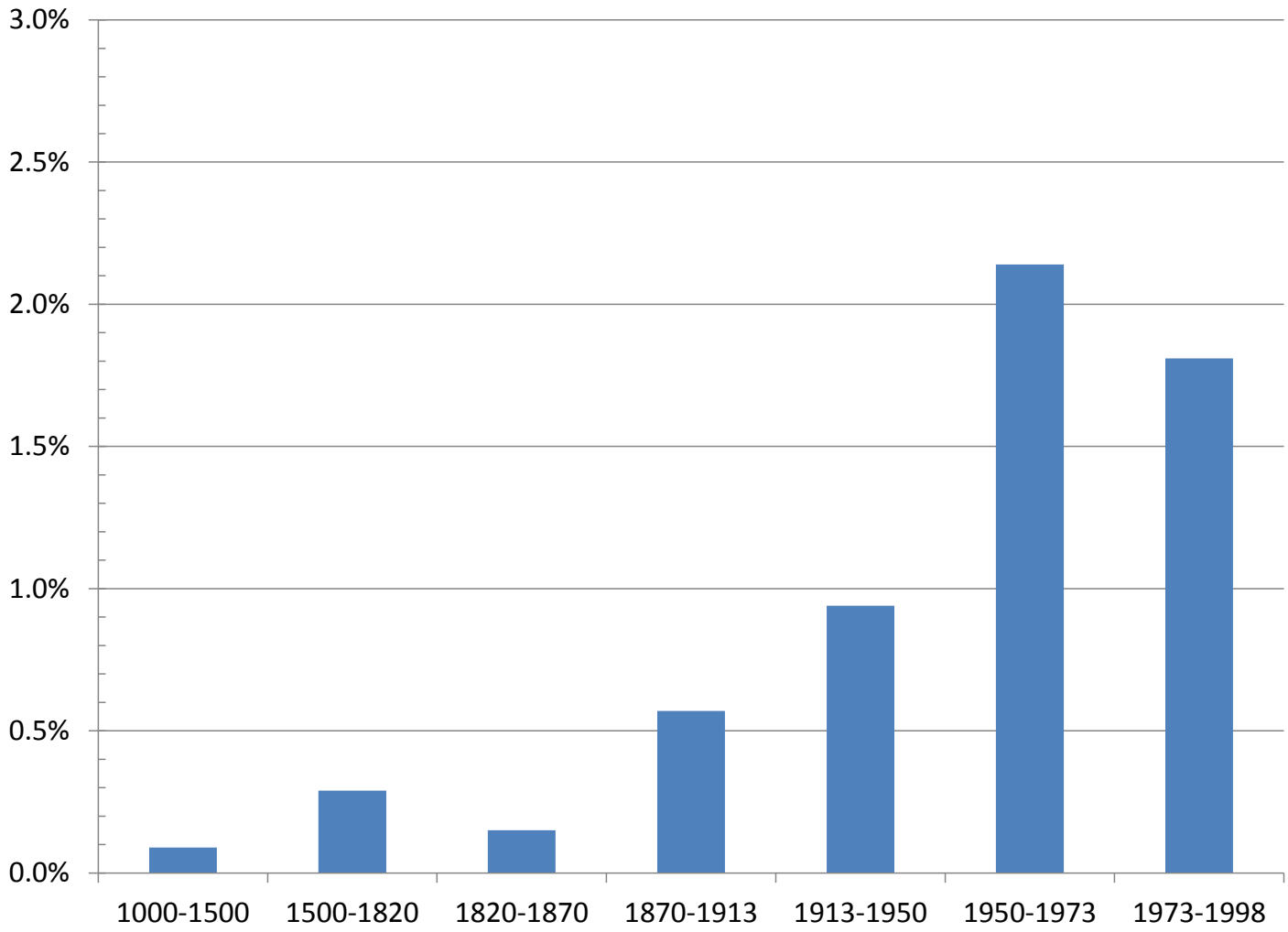
Early Fertility Decline – Eastern Europe



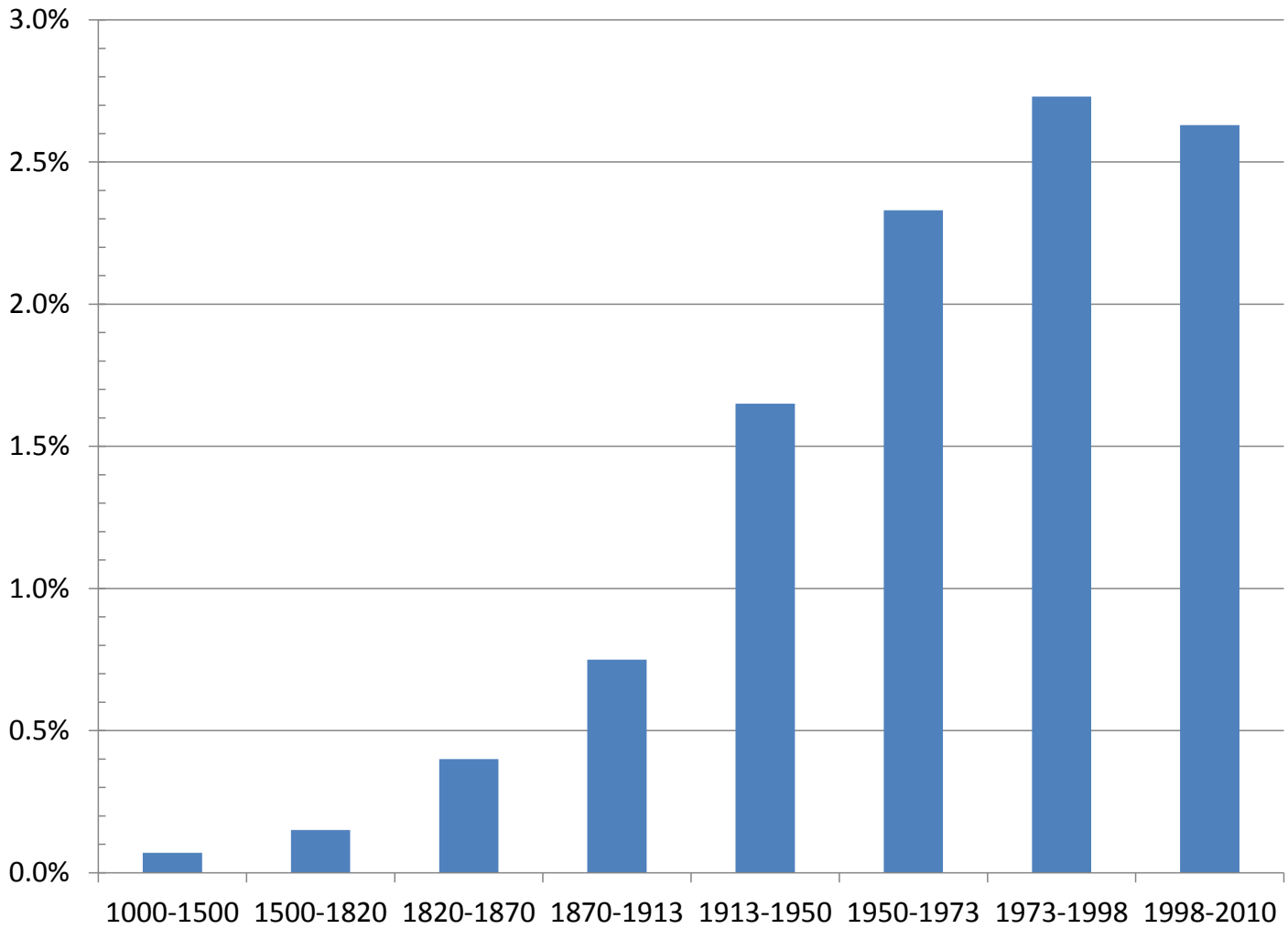
Late Fertility Decline – Latin America



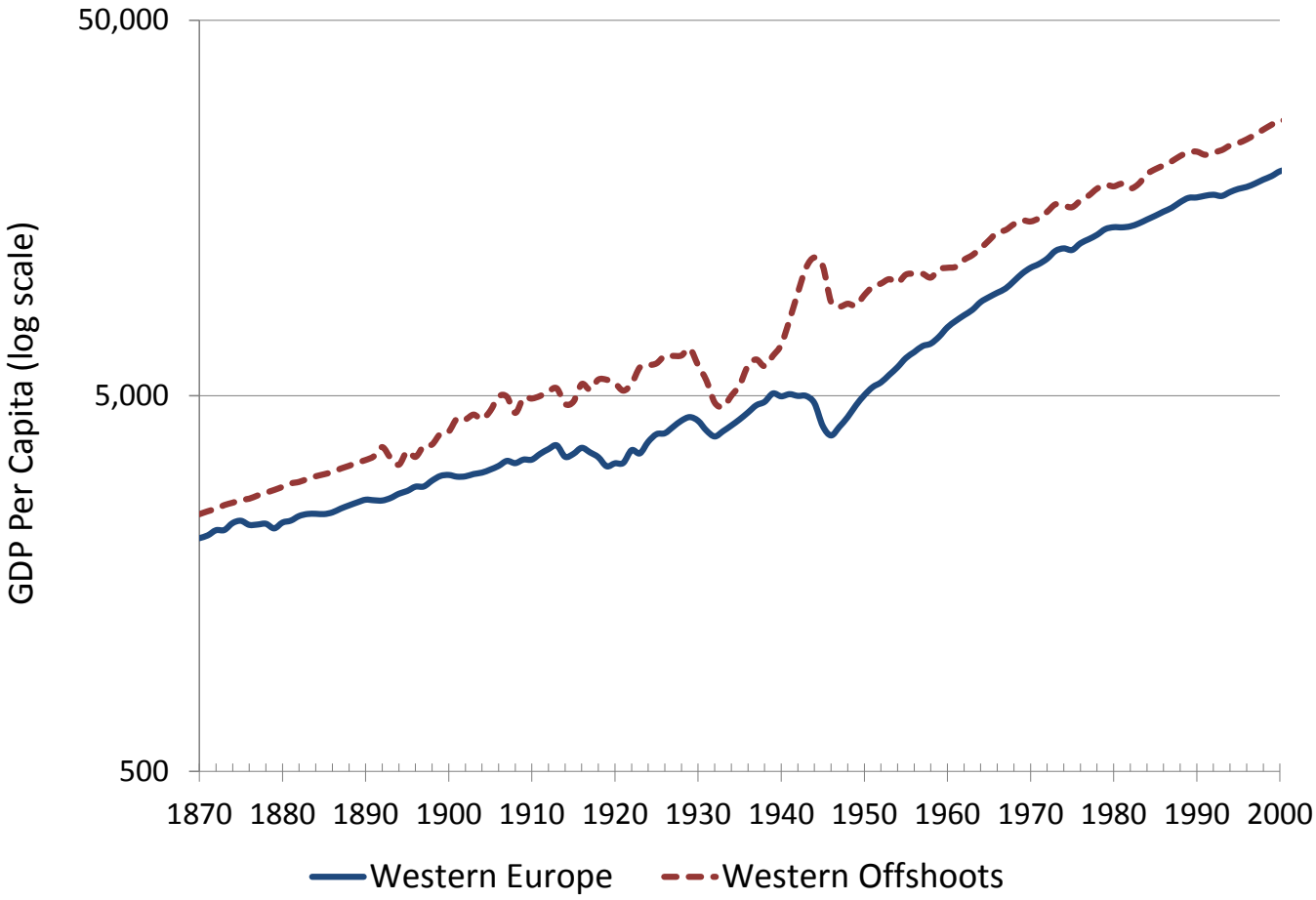
Late Fertility Decline – Asia



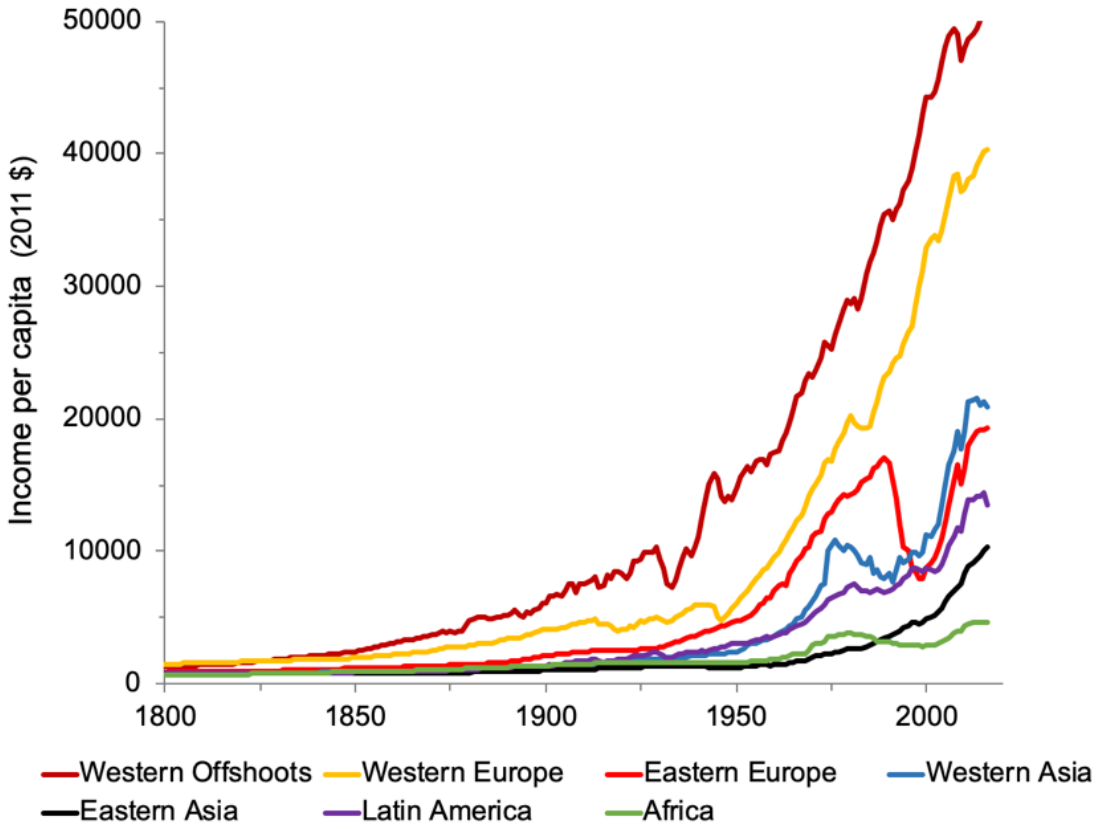
Late Fertility Decline – Africa



Sustained Economic Growth in the Developed World: 1870–2000



Great Divergence: 1800–2018



Data Source: Maddison Project (2020)

Roots of Global Inequality

- What is the origin of the vast inequality that emerged across countries in the past two centuries?'
- What accounts for the transition to modern growth in some countries & persistent stagnation in others?
- What governs the differential timing of the demographic transition across nations?
- Has the earlier transition of advanced economies adversely affected the process of development in LDCs?
- What is the contribution of deep rooted factors to global inequality?

Proximate Causes of Uneven Development

- Cross-country differences in:
  - Human capital accumulation
  - Physical capital accumulation
  - Technological Levels
- But why some societies fail to:
  - Efficiently invest in physical and human capital?
  - Adopt advance technologies?
- What are the historical and pre-Historical barriers for development?

Historical and Pre-Historical Barriers for Development

- Deeper Roots:
  - Colonialism
  - Institutional & Cultural characteristics
- Ultimate Roots:
  - Geographical & Population diversity

Colonialism & Uneven Development

- Colonialism: Extraction & Asymmetric Trade (Galor-Mountford, RES 2008)
  - Colonies: specialized in the production agricultural goods & raw material
    - Reduced demand for human capital
    - Reduced human capital formation & delayed the fertility decline
    - Delayed the take-off from stagnation to growth
  - Colonizers: specialized in the production of manufactured goods
    - Increased demand for human capital
    - Fostered human capital formation & the fertility decline
    - Expedited the take-off from stagnation to growth
- Yet colonialism was predicated on pre-existing uneven development
  - What forces led to uneven development prior to the colonial era?

The Fingerprints of Institutions

- Adoption of differential institutions: (North, 1981; Engerman-Sokoloff, 1997; Acemoglu-Robinson, 2012)
  - Growth-enhancing inclusive institution in some regions
  - Growth-retarding extractive institution in other regions
- Institutions had (sometime) emerged at "random critical junctures"
  - The Black Death's impact on the decline of Feudalism in UK
  - The Glorious Revolution & Constitutional Monarchy (England 1688-9)
  - Division of Korea (along the 38th parallel)

Impact of the Division of Korean Peninsula along the 38th Parallel

The Fingerprints of Institutions

Yet institutions have mostly evolved gradually in the course of human history

- The Neolithic (Agriculture) Revolution (Diamond, 1997)
  - Higher population density & cities & states $\rightarrow$ demand for institutions
- Land Fragmentation (Europe) vs. Geographical Connectivity (China)
  - Political competition $\rightarrow$ inclusive institutions (Europe)
  - Political uniformity $\rightarrow$ extractive institutions (China)
- Soil suitability for large plantations (Engerman-Sokoloff, 1997, Galor et al., RES 2009)
  - Concentration of political power $\rightarrow$ extractive institutions & slavery

The Cultural Factor

- Adherence to cultural norms was essential for survival
  - Norms reflected the cumulative collective wisdom of a society
    - Permitted individuals to act, as if, based on a deep understanding of their surroundings
- Emergence of differential cultural traits (norms, values, beliefs) across regions:
  - Growth-enhancing cultural traits in some regions
  - Growth-retarding cultural traits in other regions
    - Rare instances of random cultural mutations

The Geographical Roots of Cultural Traits

- High Crop Yield
  - Planting & Harvesting $\rightarrow$ Future-oriented mindset (Galor-Ozak, AER 2016)
- Suitability of the land for the use of the plow
  - Gender division of labor $\rightarrow$ Gender bias (Boserup, 1970; Alesina et al., QJE 2013)

The Shadow of Geography

Geographical characteristics: (Soil quality, Climate, Disease environment, Isolation)

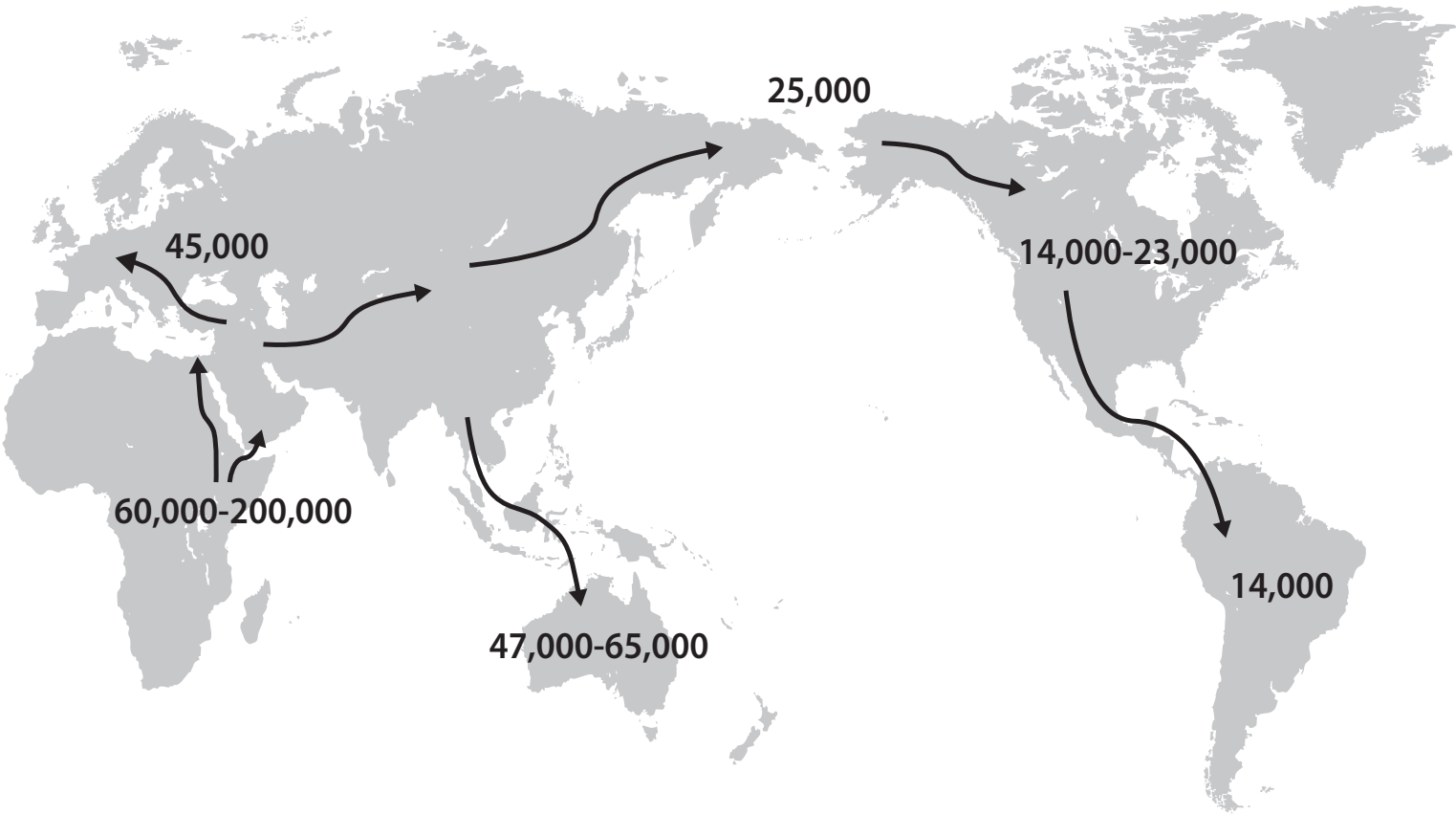
- Indirect (long shadow) impact on
  - The evolution of cultural & institutional characteristics
- Direct impact – Mitigated by diffusion of medical, transportation & IT technologies
  - Labor productivity
  - Human capital formation
  - Trade & Technological progress

The Legacy of the Agricultural Revolution (10,000 BCE)

The transition from hunter-gatherer tribes to agricultural communities

- The emergence of non-food-producing class:
  - $\Longrightarrow$ Knowledge creation (science, technology & written languages)
  - $\Longrightarrow$ Technological head start
- Variations in the timing of the NR – origins of global inequality (Diamond, 1997)

The Out of Africa Origins of Comparative Development

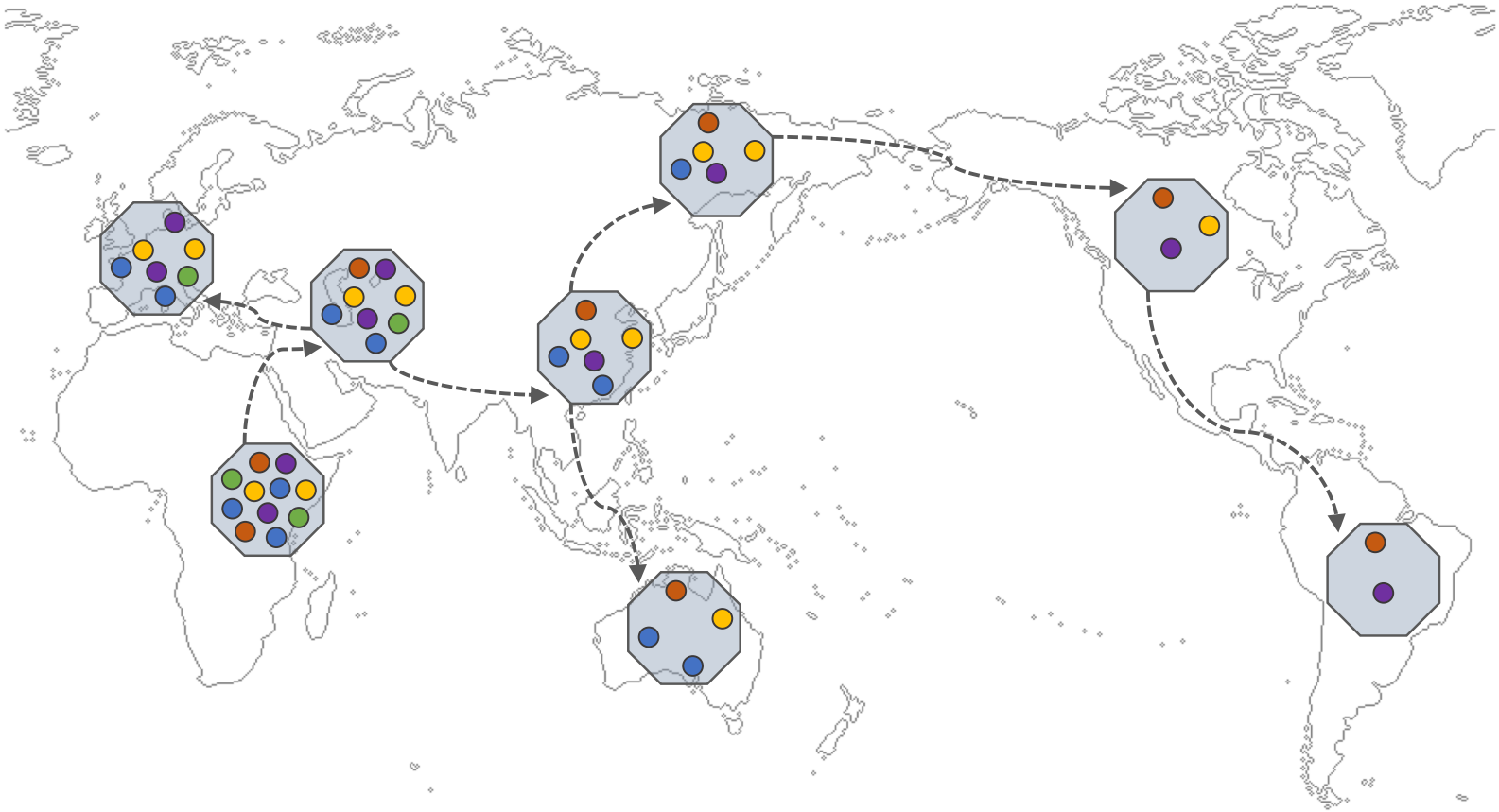


Declining Diversity with Migratory Distance from Africa

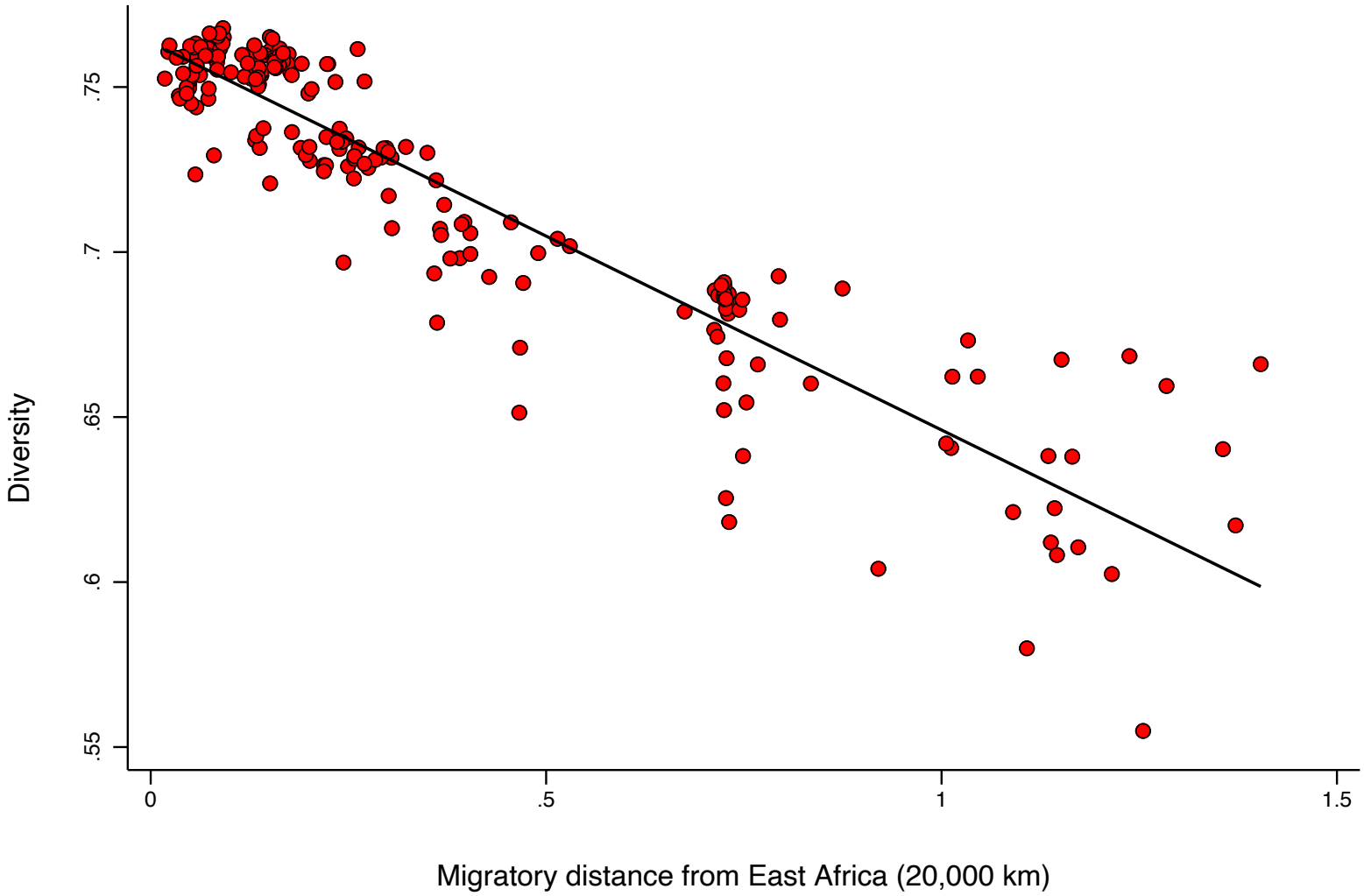
During the exodus of modern humans from Africa

- Departing populations:
  - Carried a subset of diversity of their parental colonies
  - Migration was sequential
    - Lower diversity among ancestral populations at greater migratory distances from East Africa

An Illustration of the Serial Founder Effect



Migratory Distance from Africa & Population Diversity



Slope coefficient = -0.118; (robust) standard error = 0.003; t-statistic = -33.612; observations = 207

Conflicting Effects of Diversity

- Beneficial effects on creativity and innovations
  - Cross-fertilization & complementaries in the production process
- Adverse effects on social cohesiveness
  - Mistrust
  - Disagreement about the desirable public goods
    - $\Longrightarrow$ conflicts

The Out of Africa Hypothesis of Comparative Development

- Positive & diminishing effects of:
  - Diversity on innovations
  - Homogeneity on social cohesiveness
    - Intermediate level of diversity is conducive for economic prosperity
      (Ashraf-Galor, AER 2013)

Determinants of the Pace of the Wheels of Change