Growth and Comparative Development

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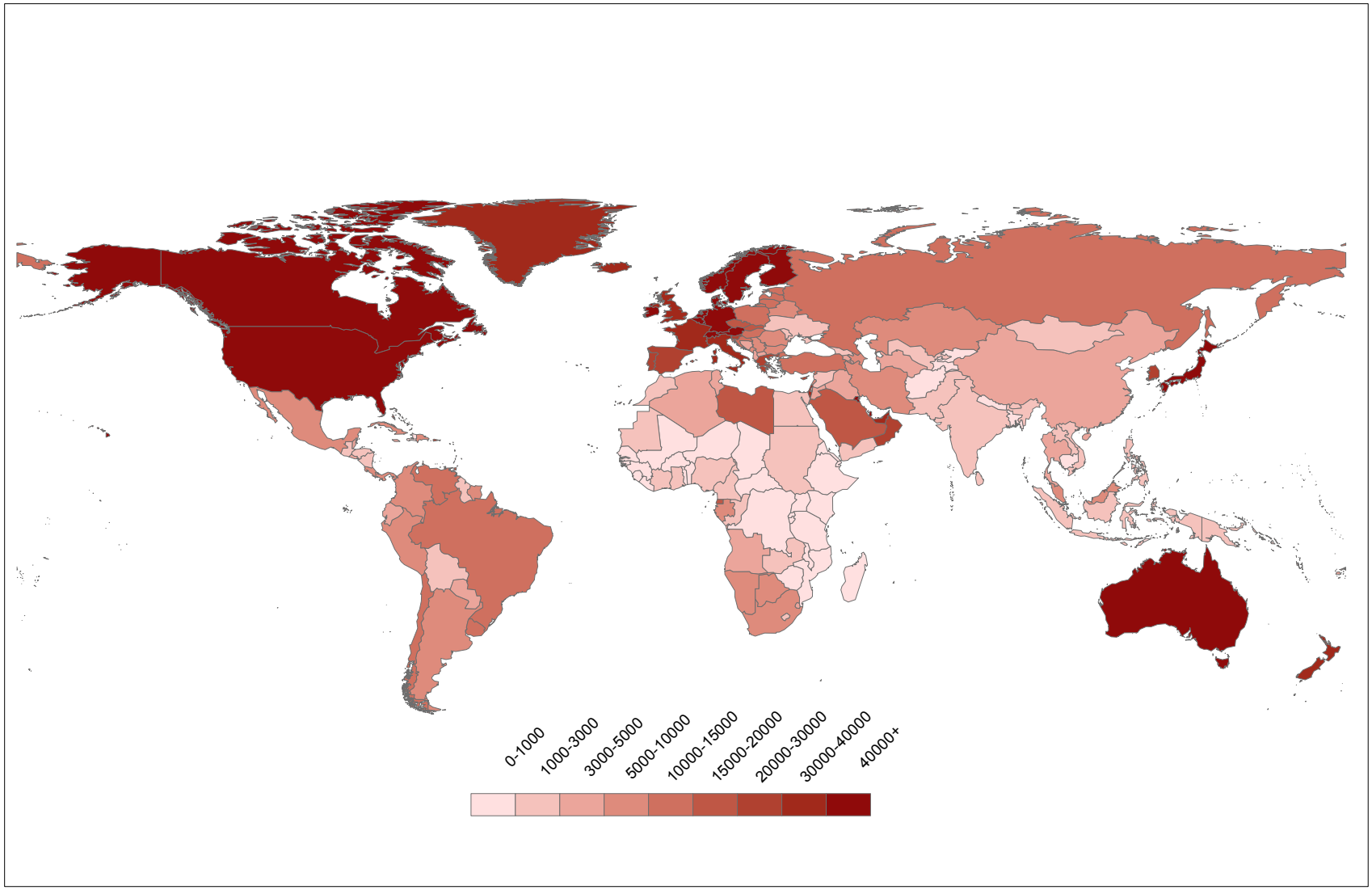
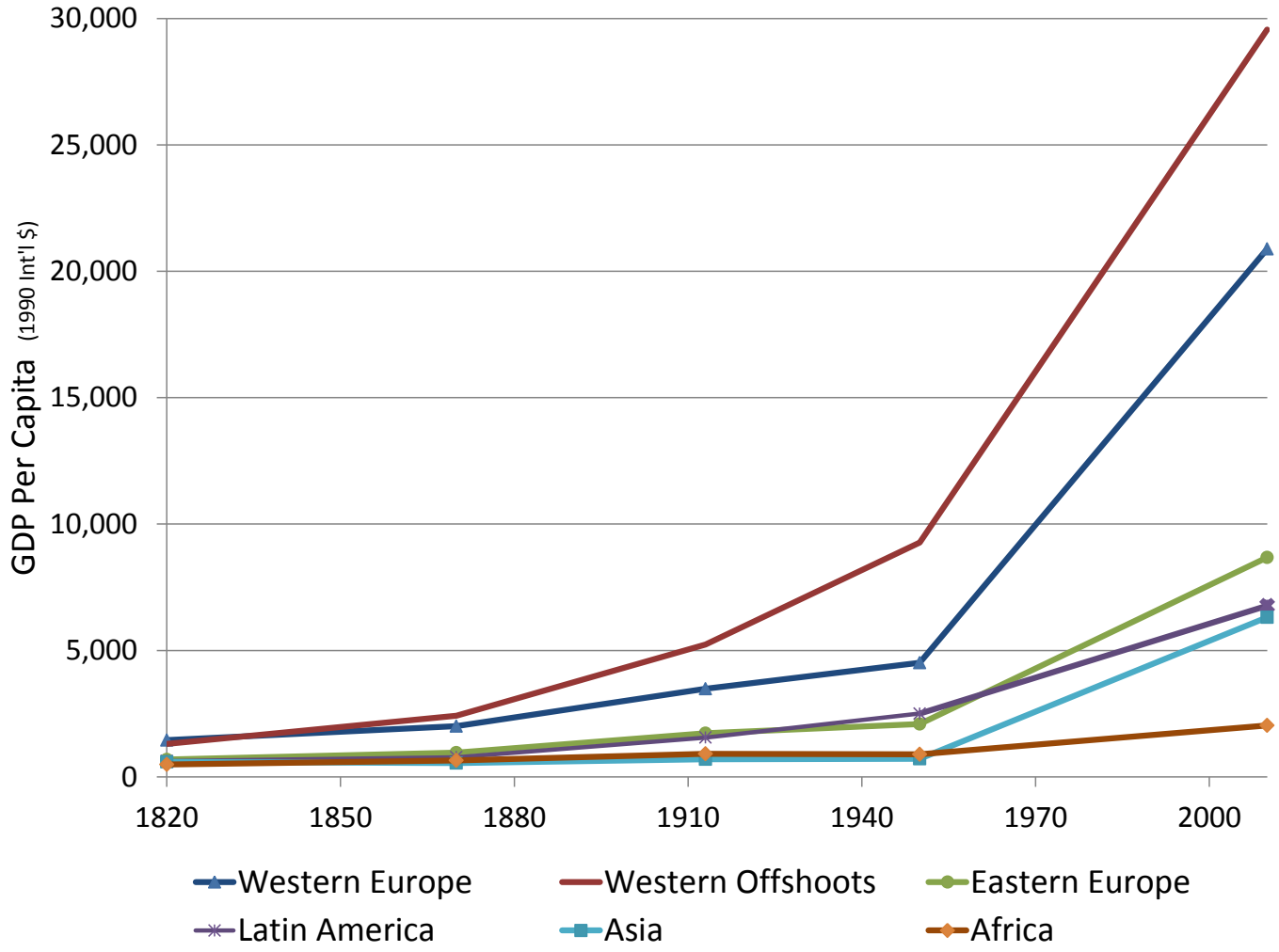
AEA Continuing Education Program

Lecture I – AEA 2014

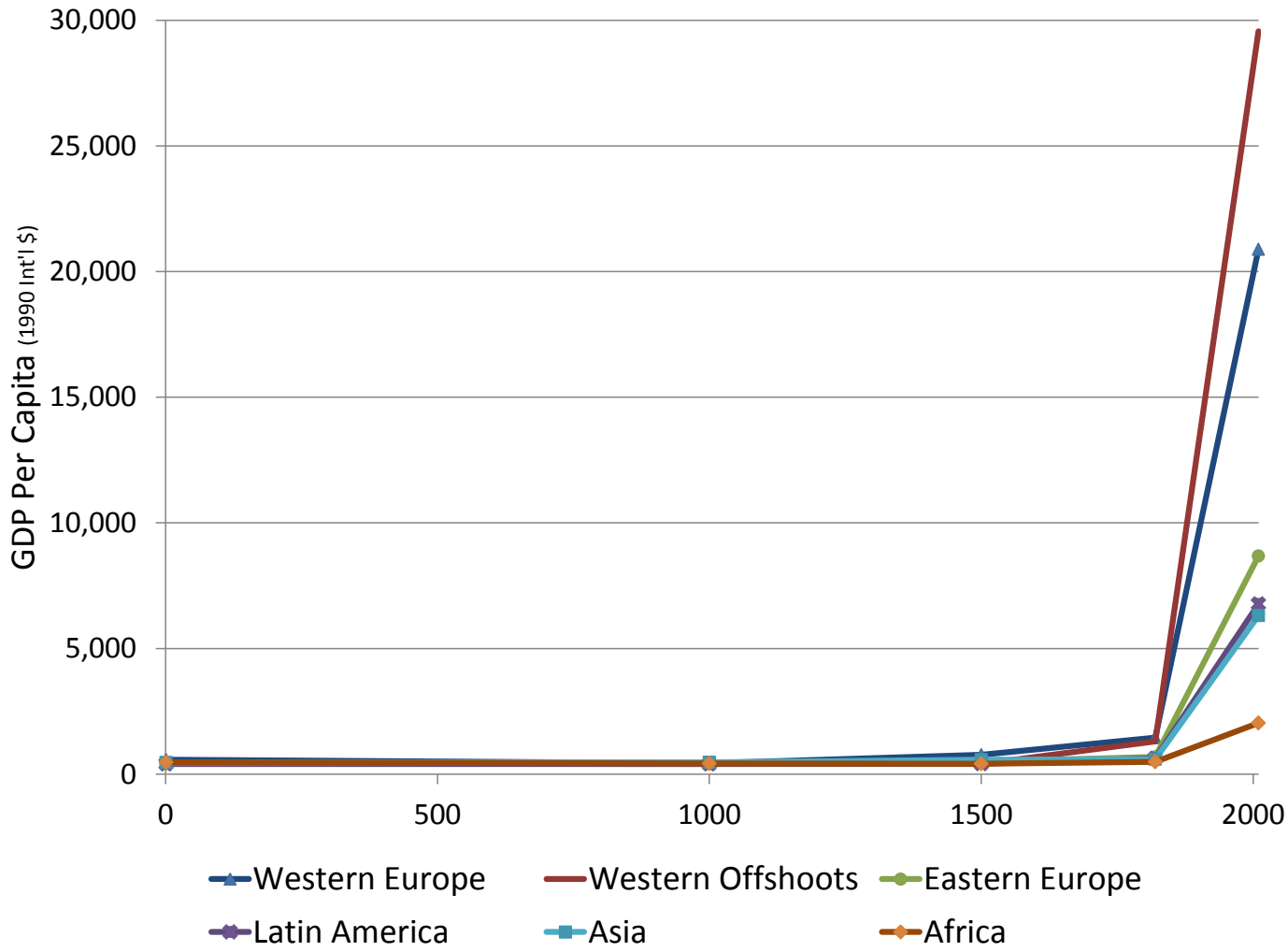
Income per Capita across the Globe in 2010



Divergence across Regions: 1820–2010



Regional Income per Capita: 1–2010

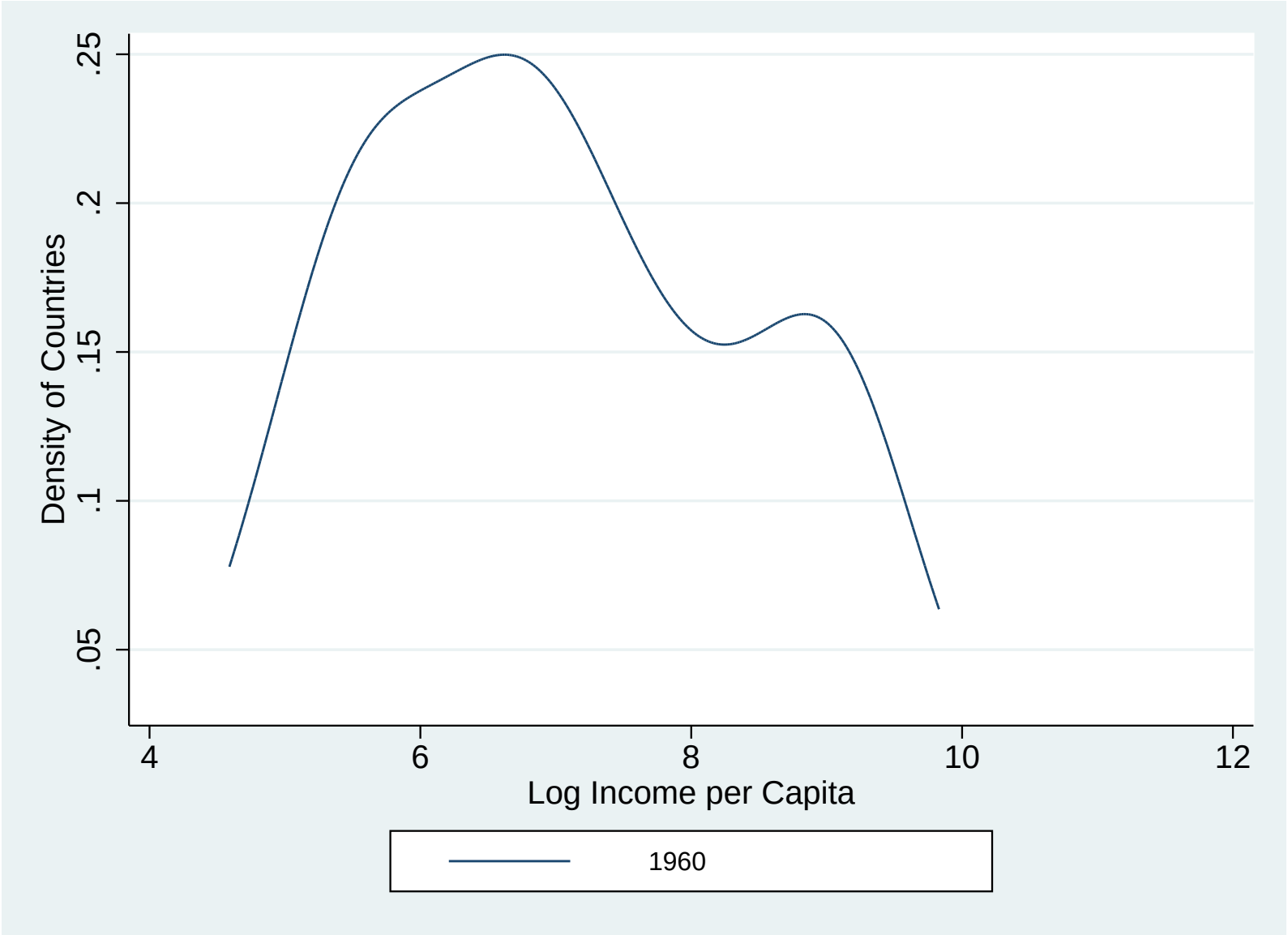


Evolution of Inequality across Regions: 1–2010

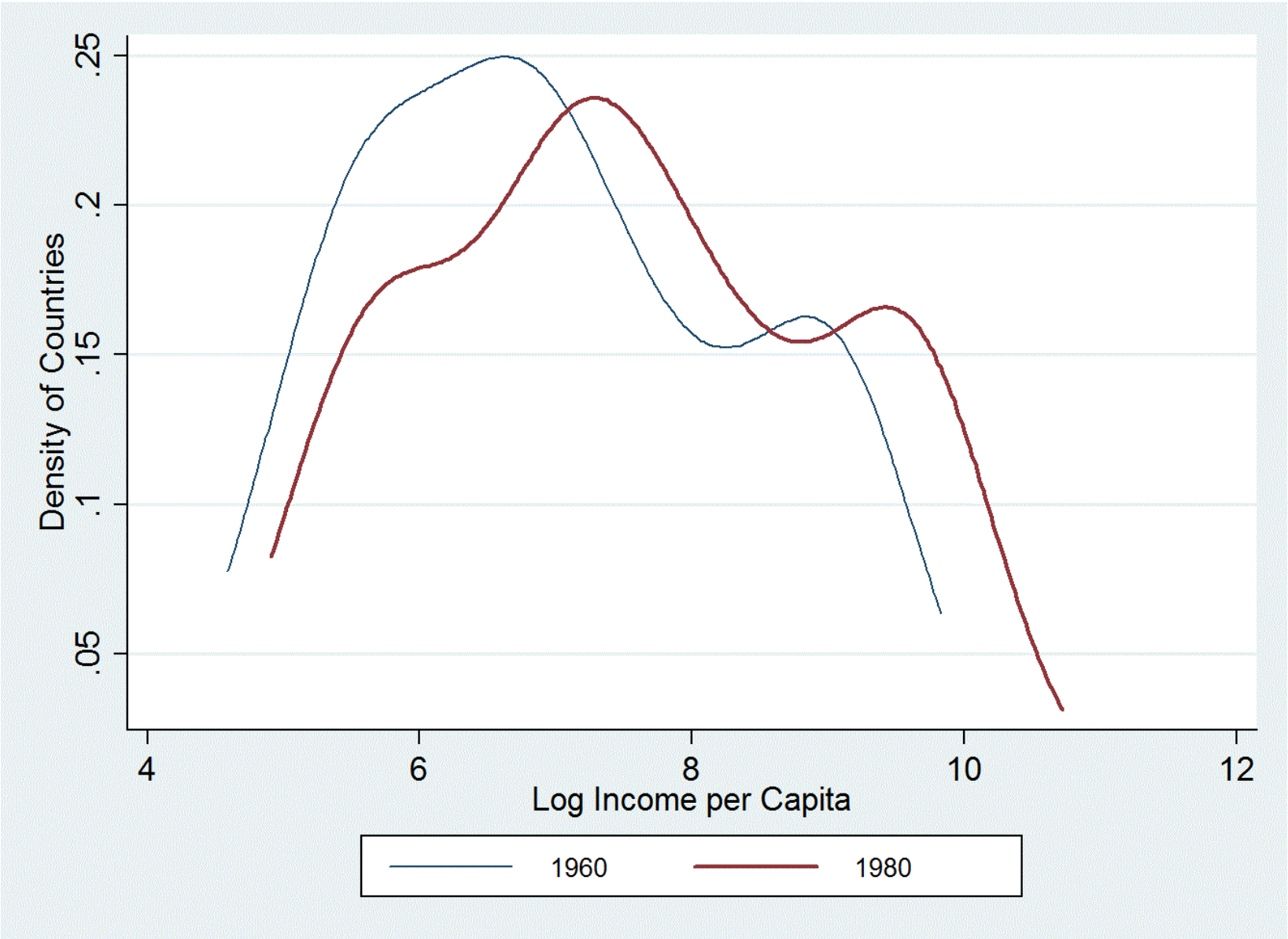
	Income per Capita (1990 Int'l $)				
	1	1000	1500	1820	2010
Western Offshoots	400	400	400	1,302	29,564
Western Europe	576	427	771	1,455	20,889
Latin America	400	400	416	628	6,767
Asia	456	470	568	591	6,307
Africa	472	425	414	486	2,034
Richest-Poorest Ratio	1.4	1.2	2	3	15

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

Income Distribution in 1960

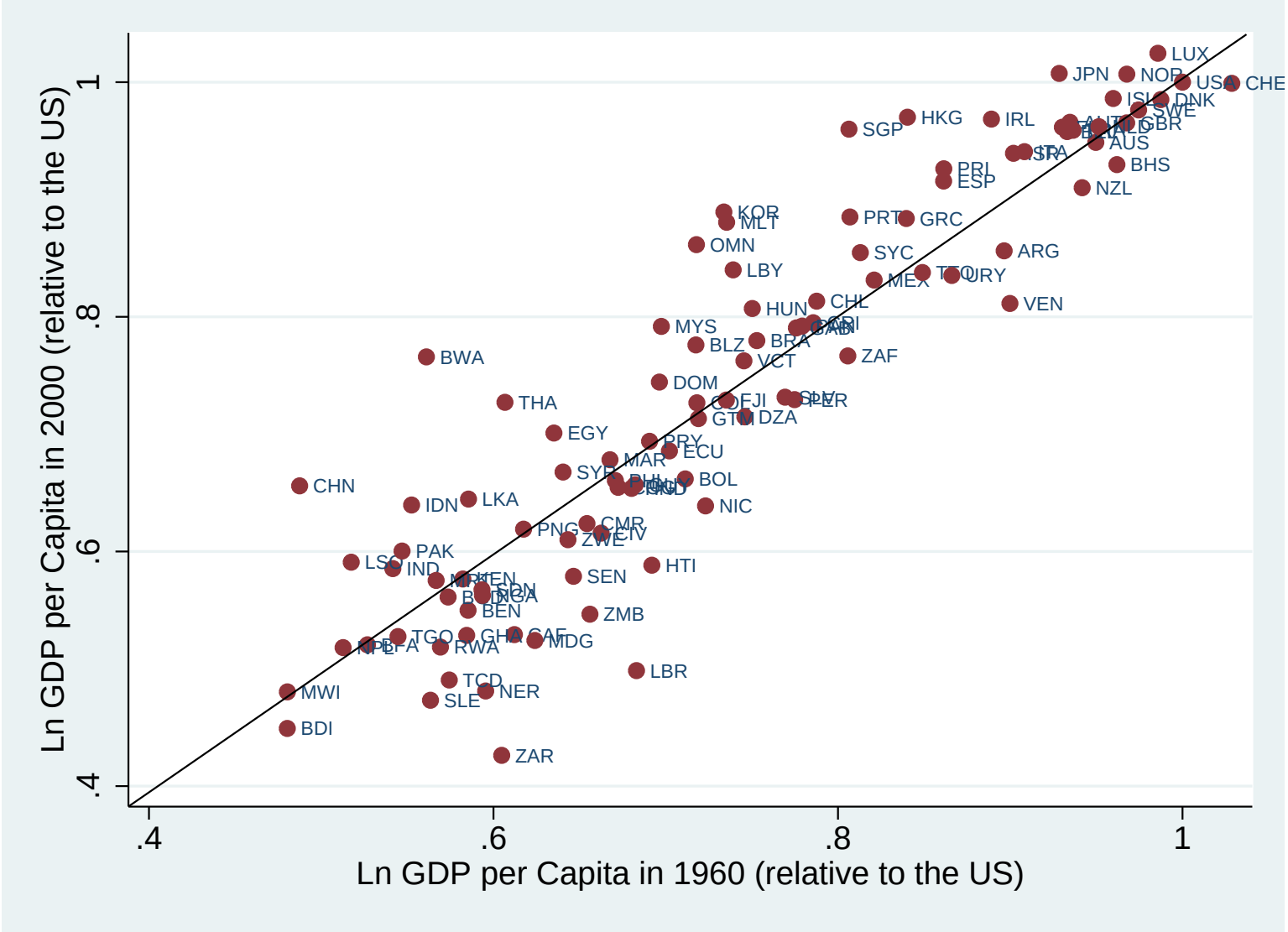


Lack of Convergence across Nations: 1960–1980



Lack of Convergence across Nations: 1960–2000

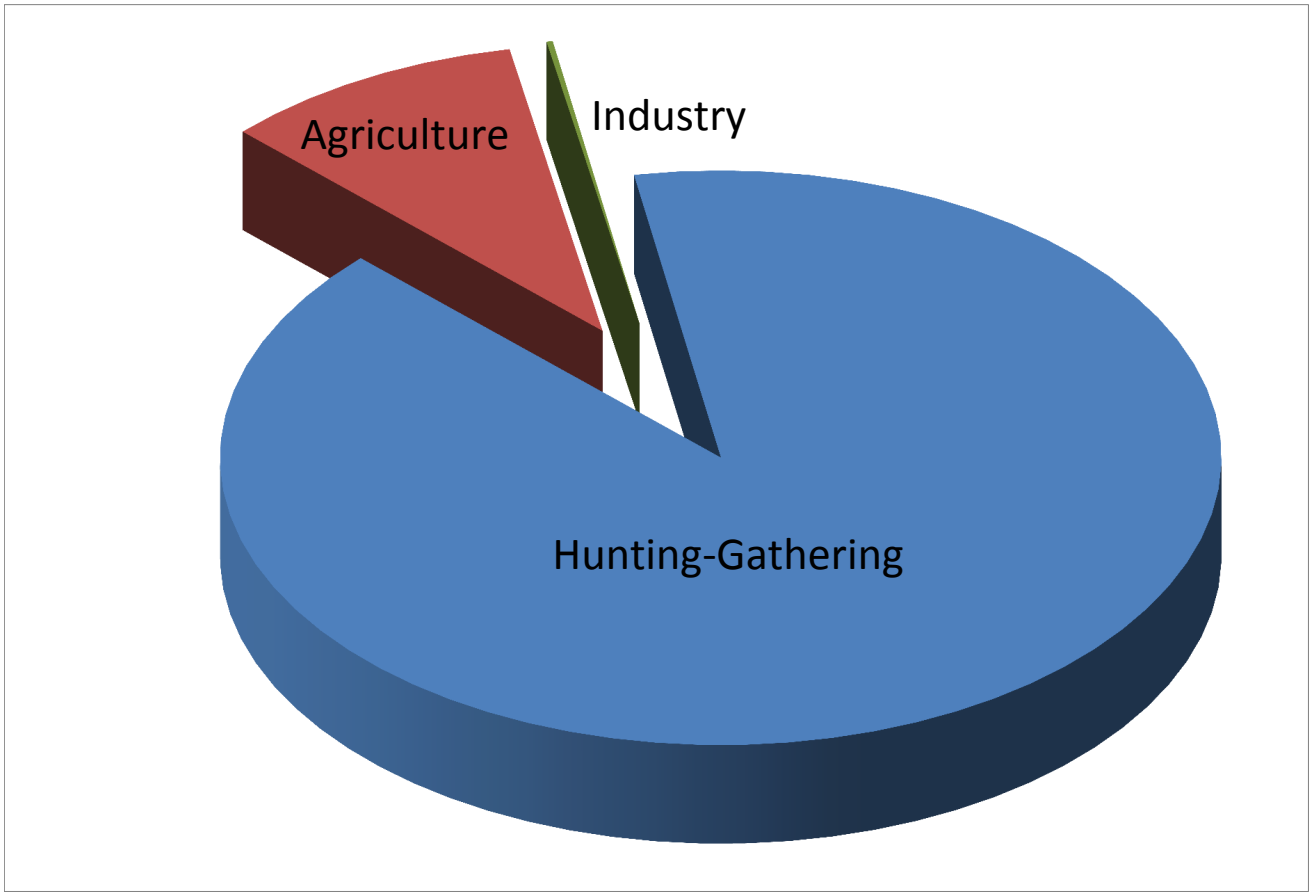
Persistent Inequality across Nations: 1960–2000



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?

Phases of Development: Modes of Production

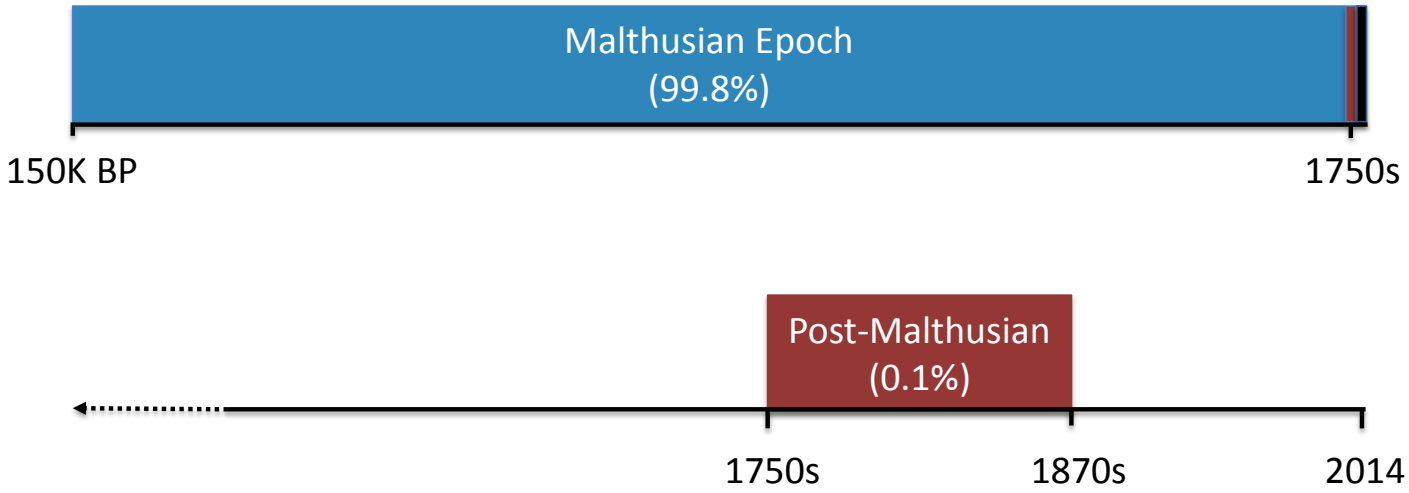


Phases of Development: Standard of Living

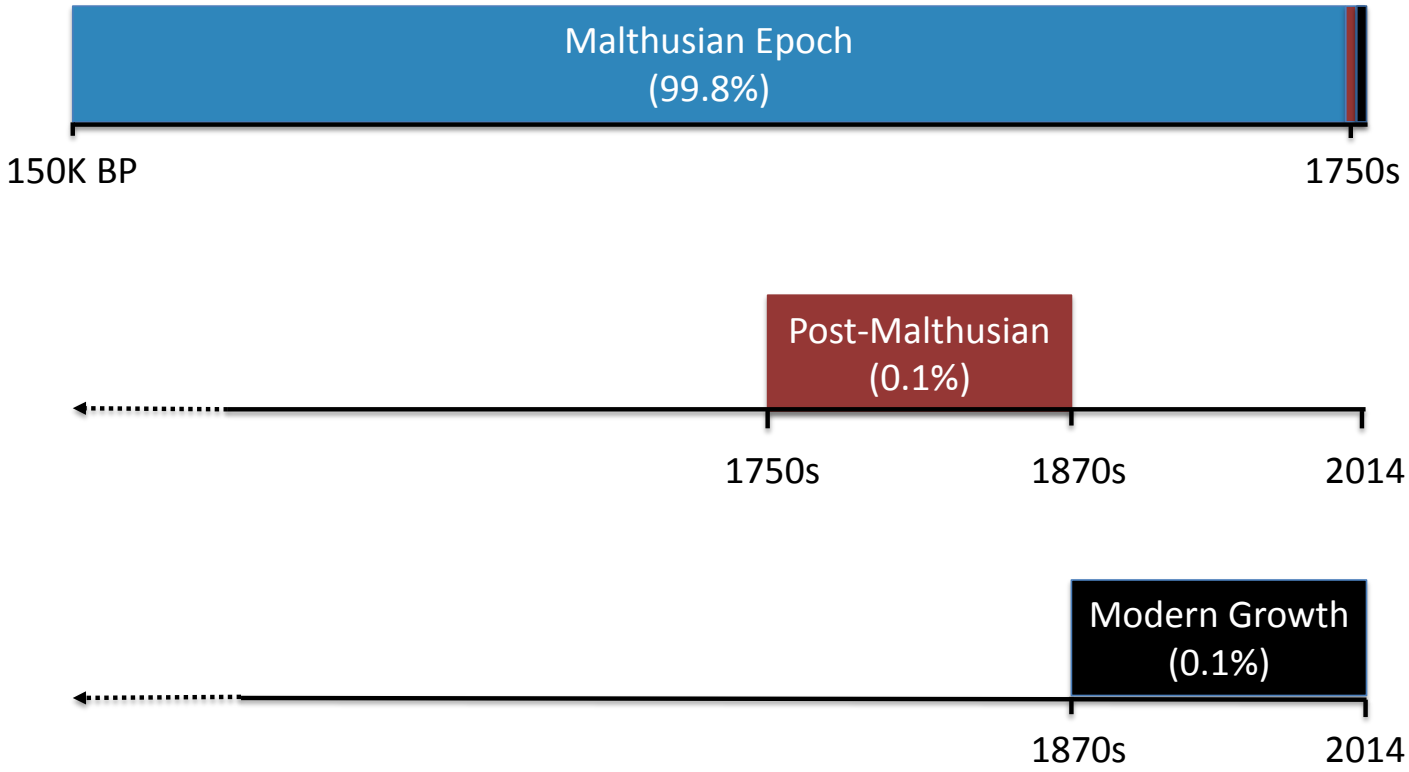
- The Malthusian Epoch
- The Post-Malthusian Regime
- The Modern Growth Regime

Phases of Development: Timeline of the Most Developed Economies

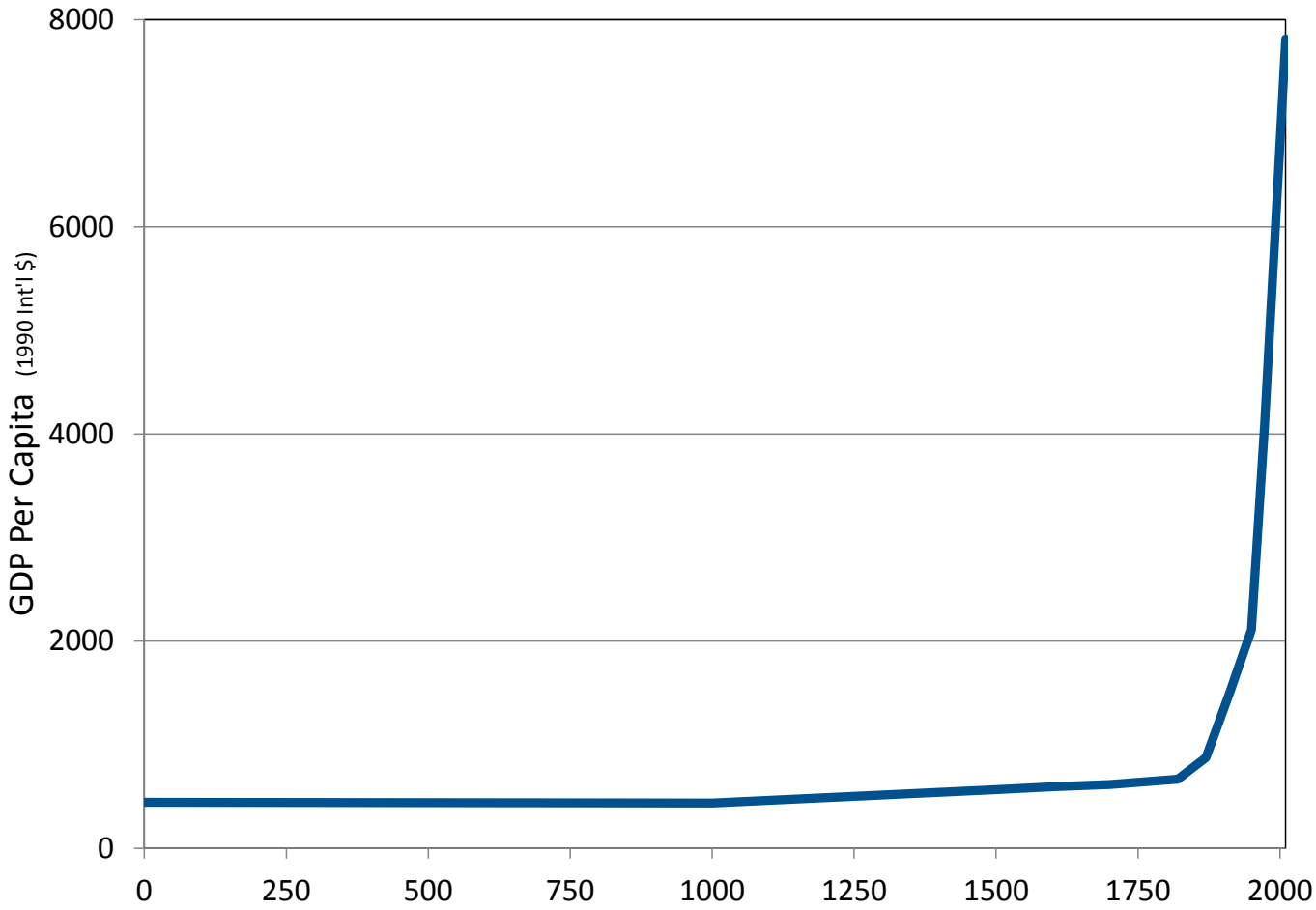
Phases of Development: Timeline of the Most Developed Economies



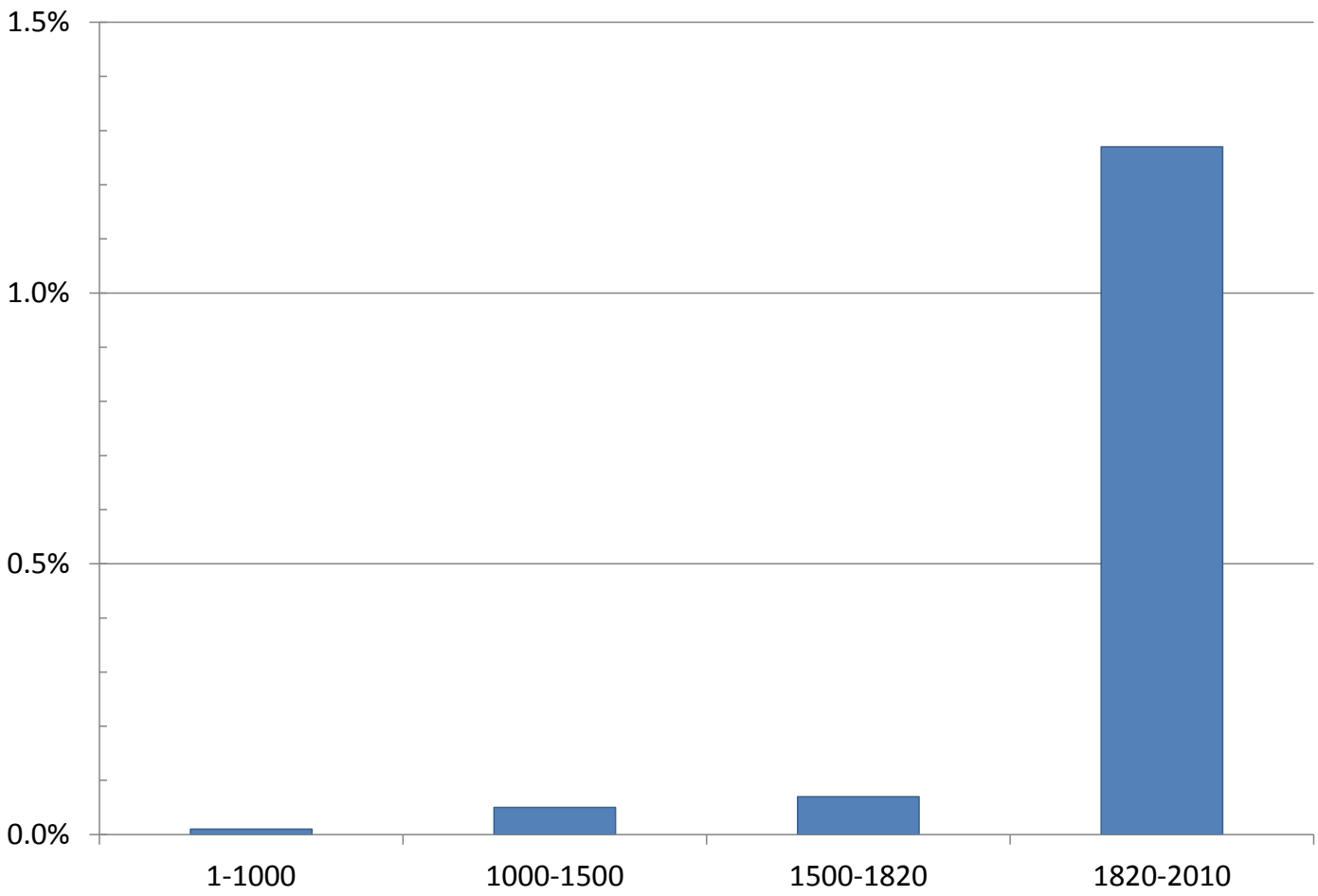
Phases of Development: Timeline of the Most Developed Economies



World Income per Capita: 1–2010



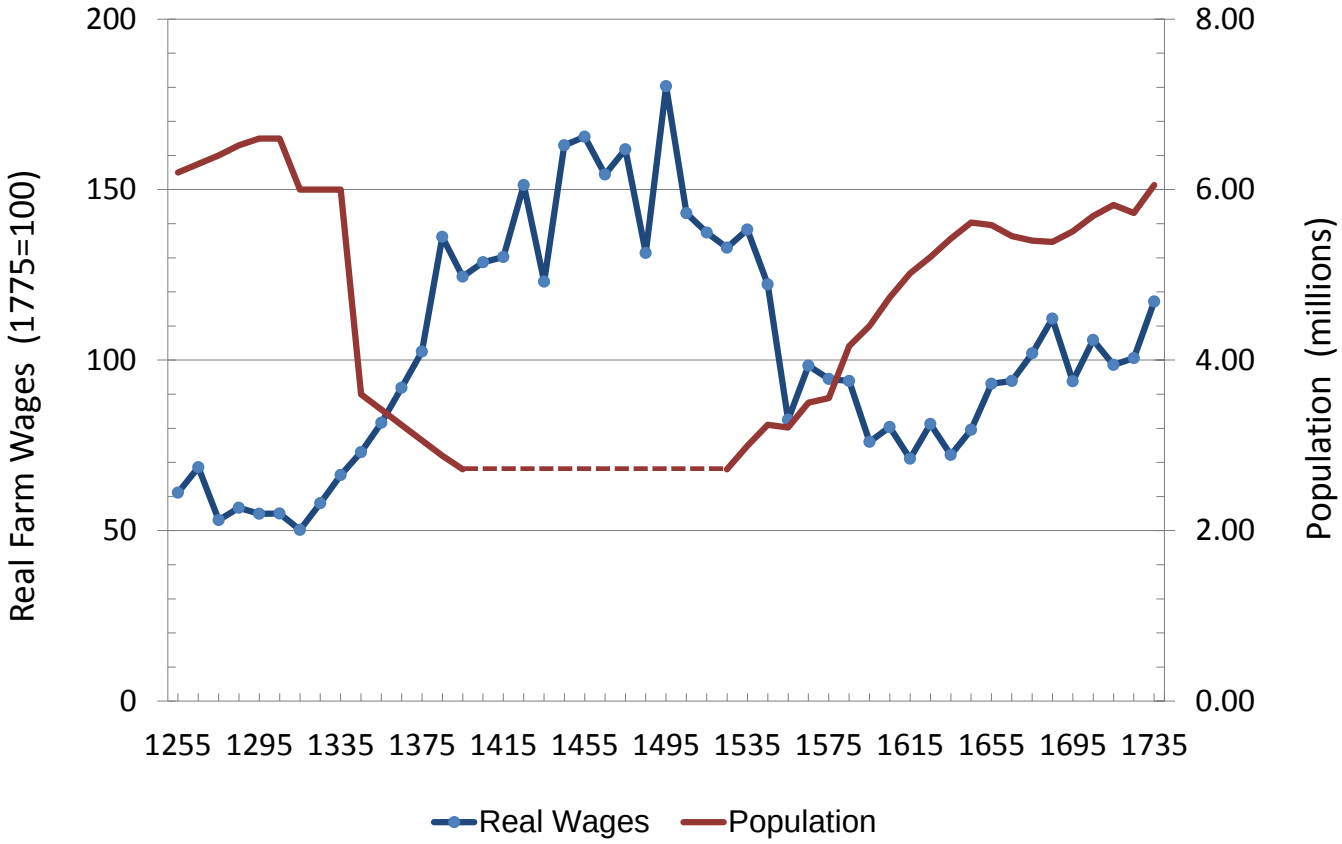
Growth of World Income per Capita: 1–2010



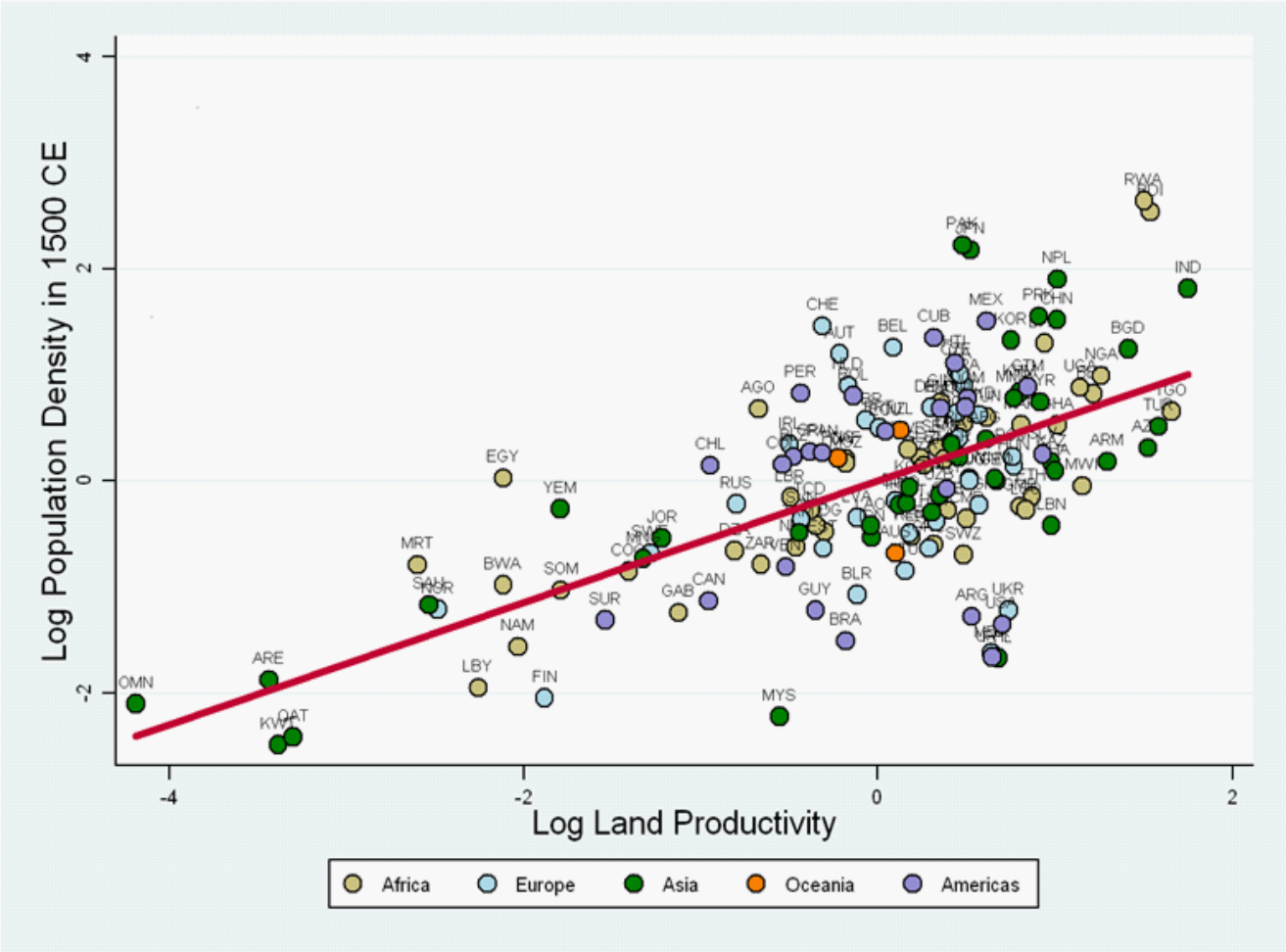
The Malthusian Epoch

- Income per capita fluctuates around a subsistence level
- Characteristics of the period:
  - Income per capita has a positive effect on population growth
  - Fixed factor of production (land) $\Longrightarrow$ Diminishing returns to labor
- Technological progress, land expansion or adverse shock to population
  - $\Longrightarrow$ Temporary increase in the level of income per capita
  - $\Longrightarrow$ Increase in the size of the population
  - $\Longrightarrow$ Marginal productivity of labor returns to its previous level
  - $\Longrightarrow$ No effect on the level of income per capita in the long run
- Technologically advanced & land-rich economies:
  - Higher population density
  - Largely similar levels of income per-capita in the long-run

Malthusian Adjustments to the Black Death: England, 1250–1750



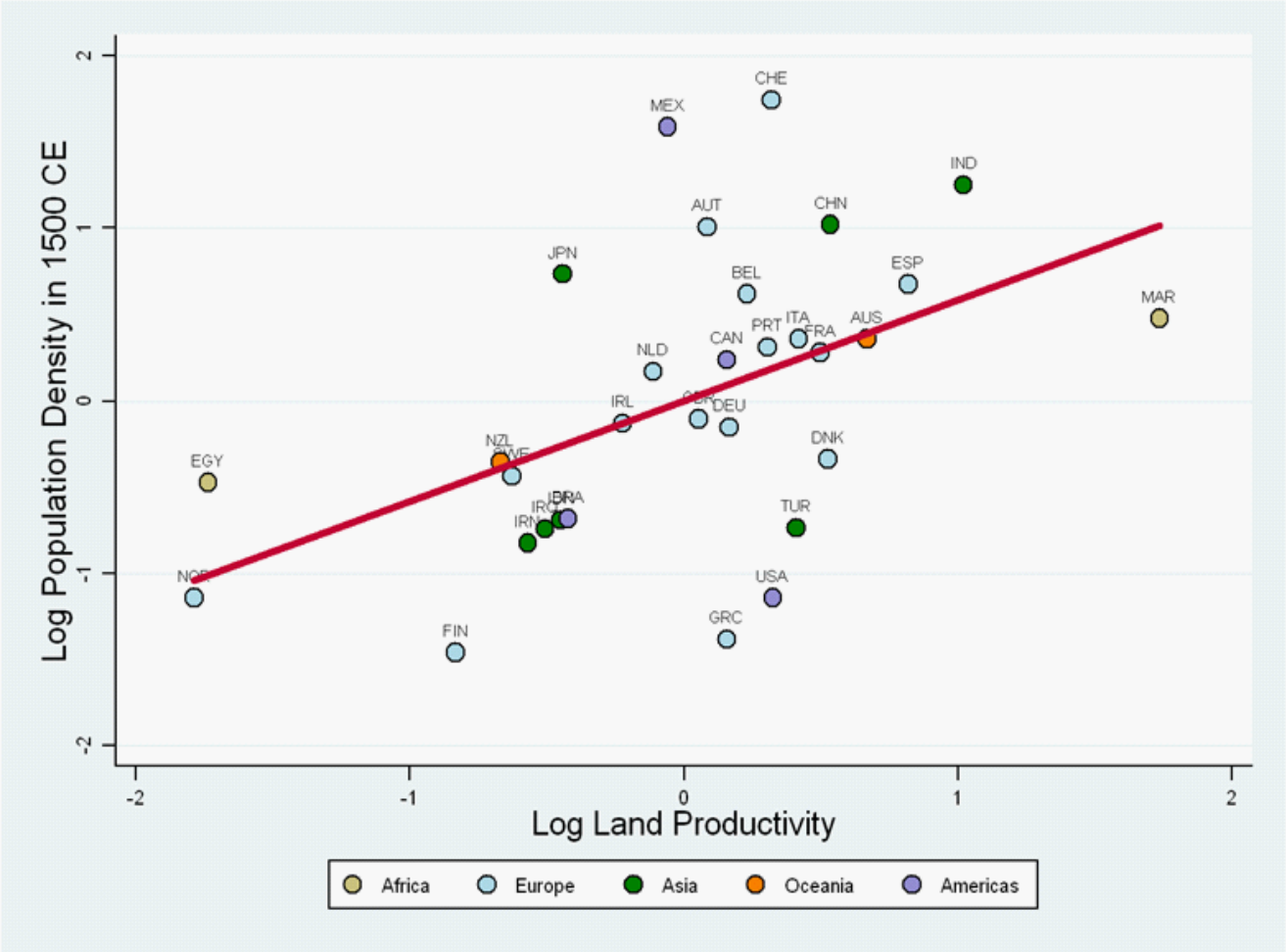
Land Productivity and Population Density in 1500



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

Source: Ashraf-Galor (AER 2011)

Land Productivity and Population Density in 1500 (Income Sample)



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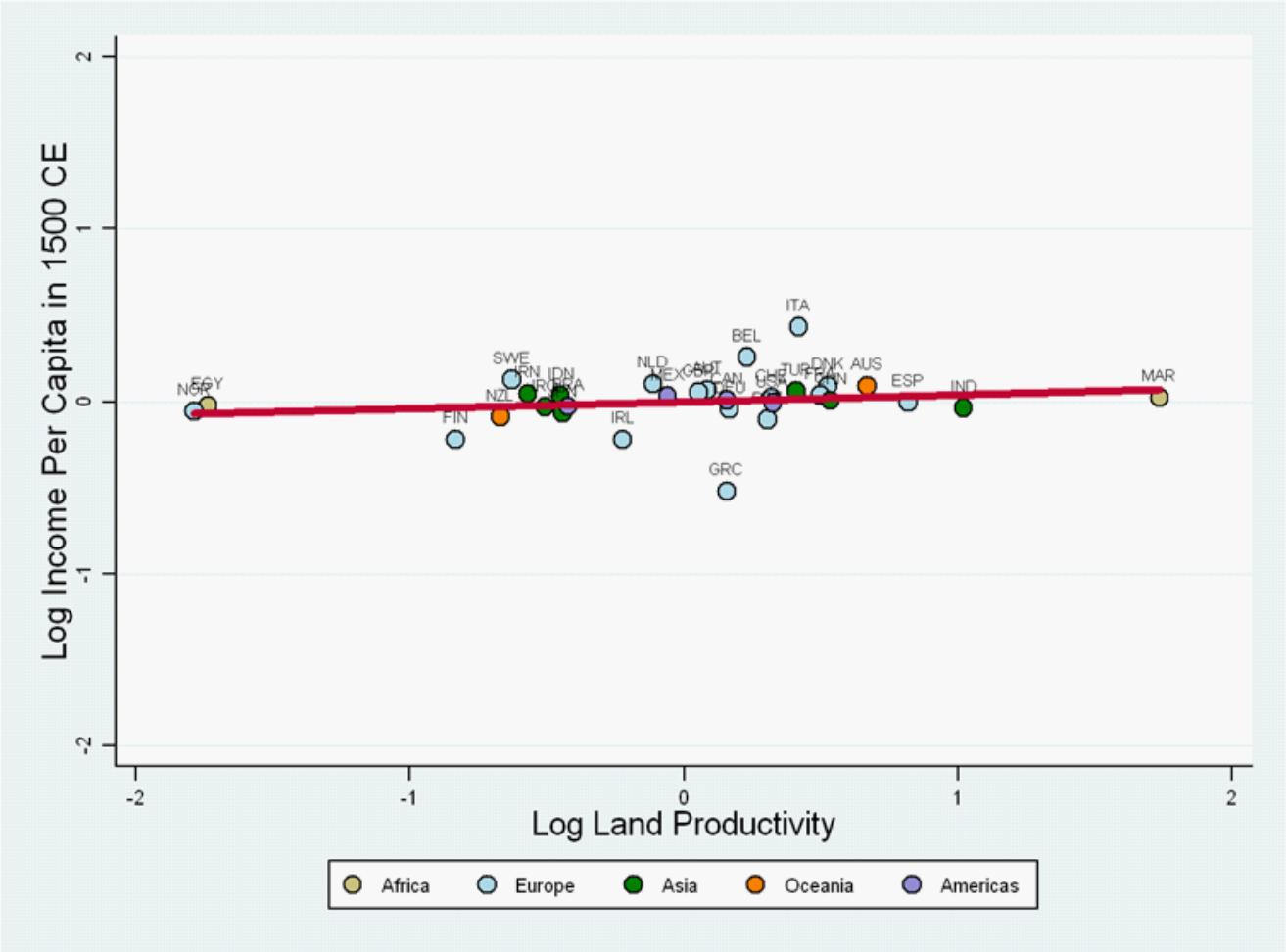
Land Productivity and Income per Capita in 1500



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

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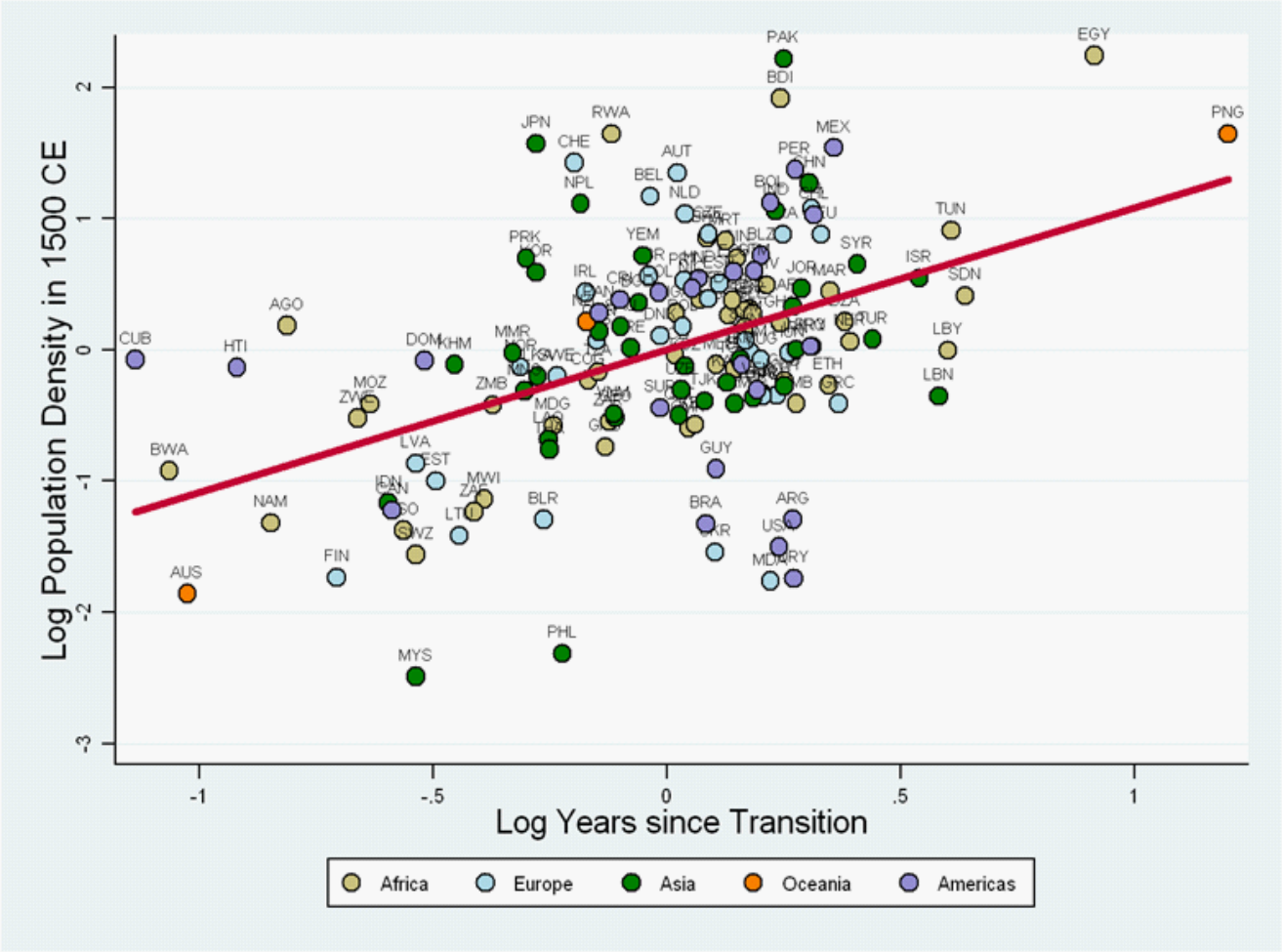
Technology and Population Density in 1500

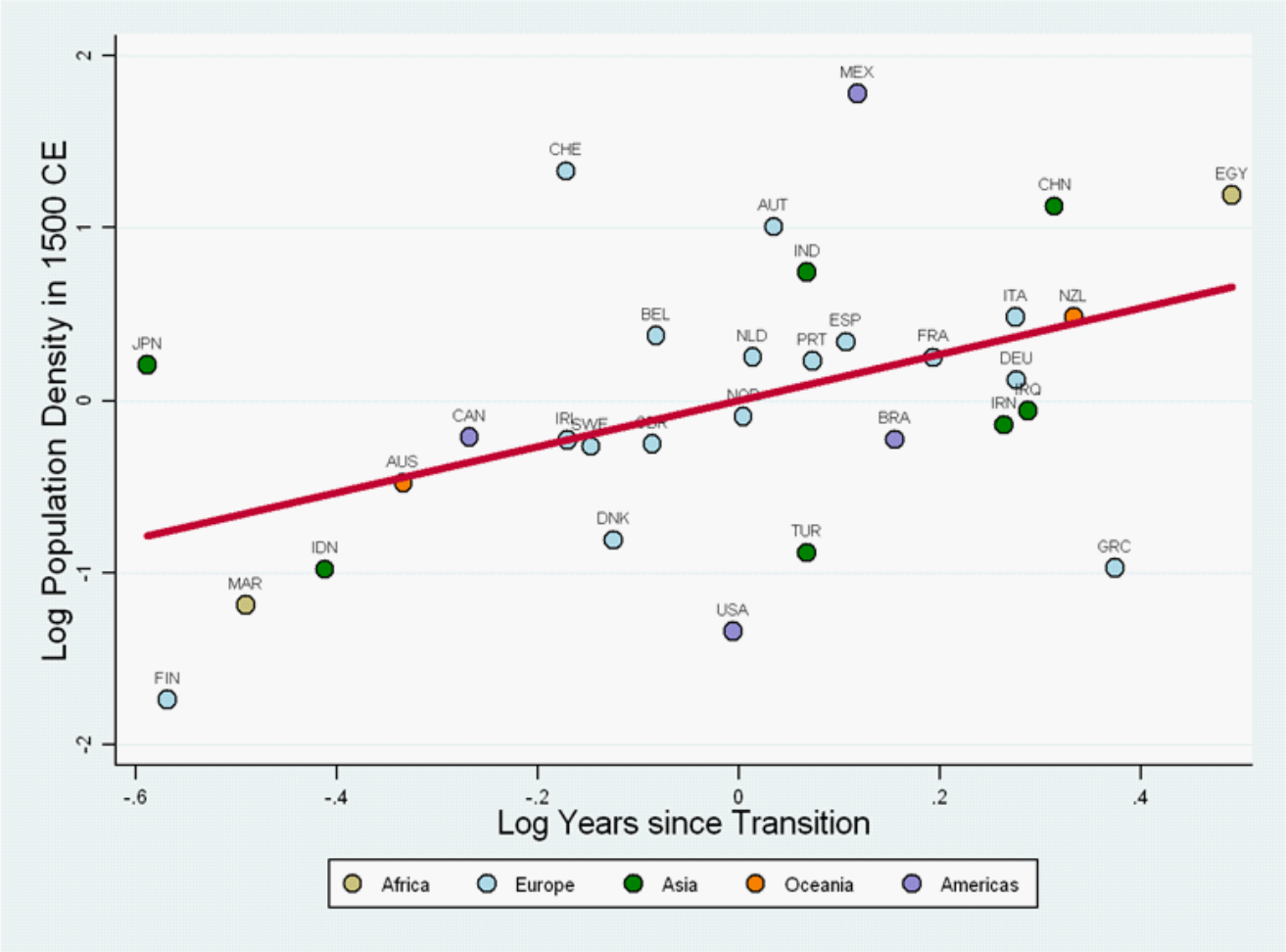


Years elapsed since the Neolithic Transition reflects the technological level in 1500.

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

Source: Ashraf-Galor (AER 2011)

Technology and Population Density in 1500 (Income Sample)



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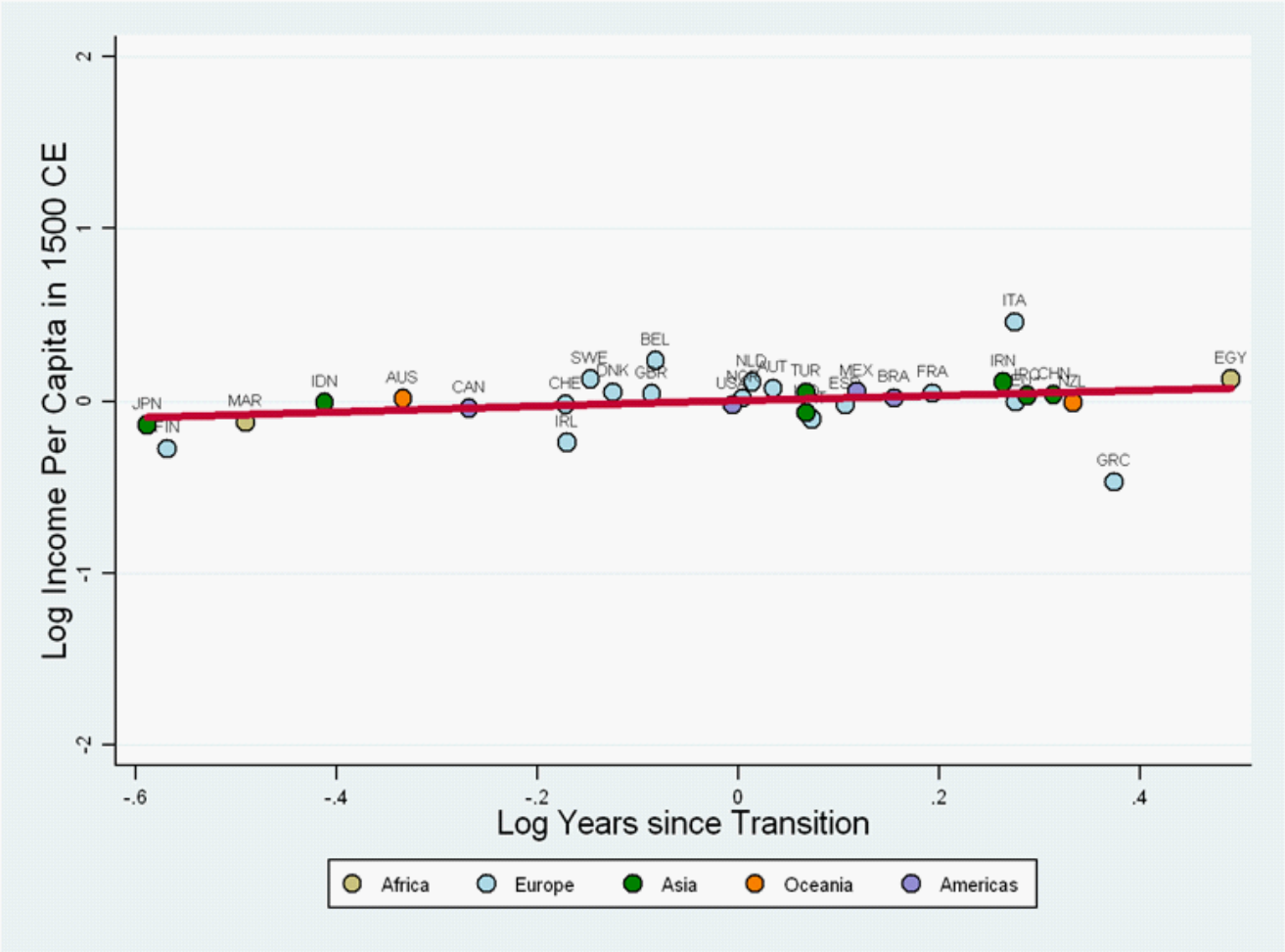
Technology and Income per Capita in 1500



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

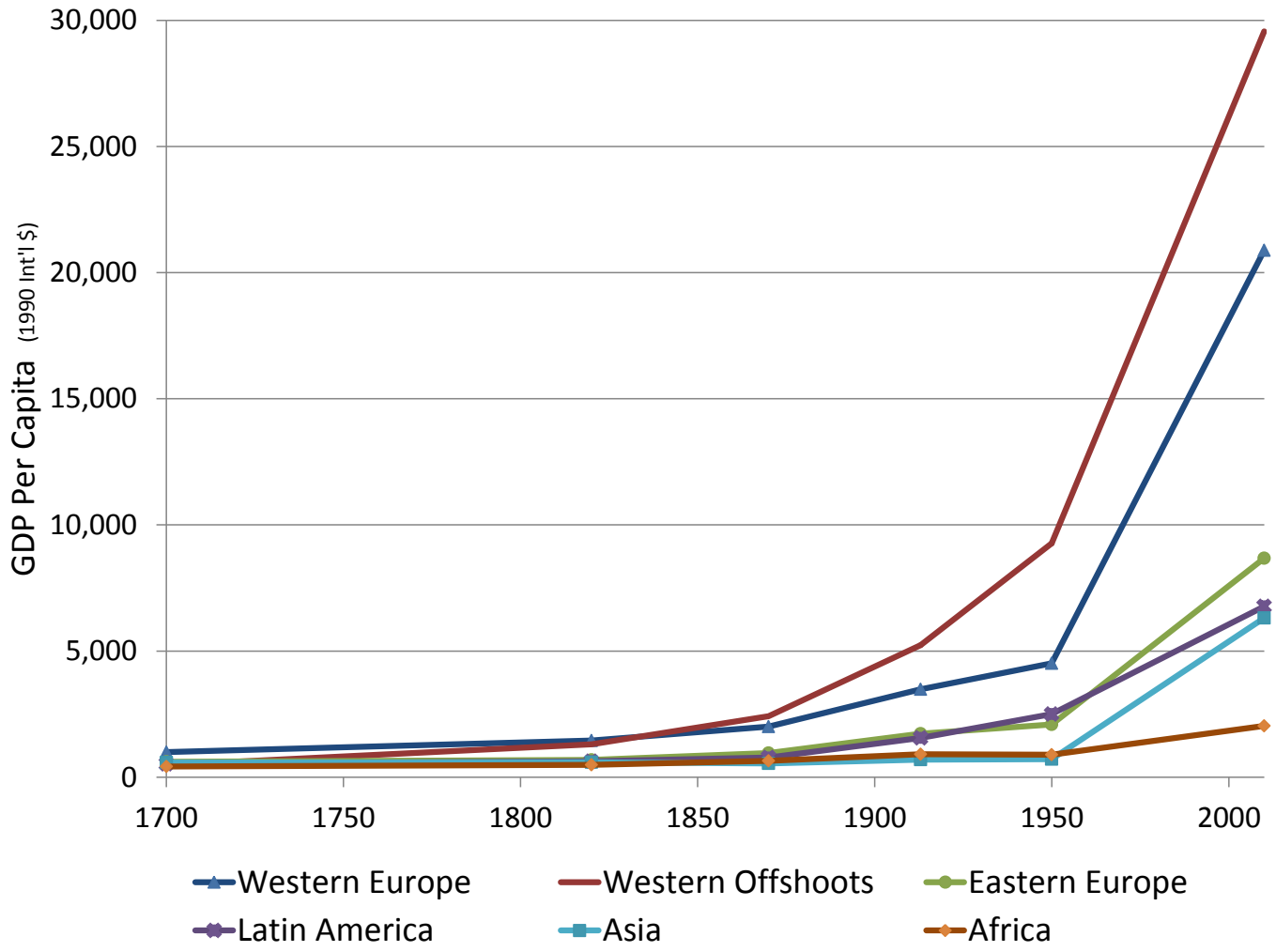
Conditional on land productivity, geographical factors, and continental fixed effects.

Source: Ashraf-Galor (AER 2011)

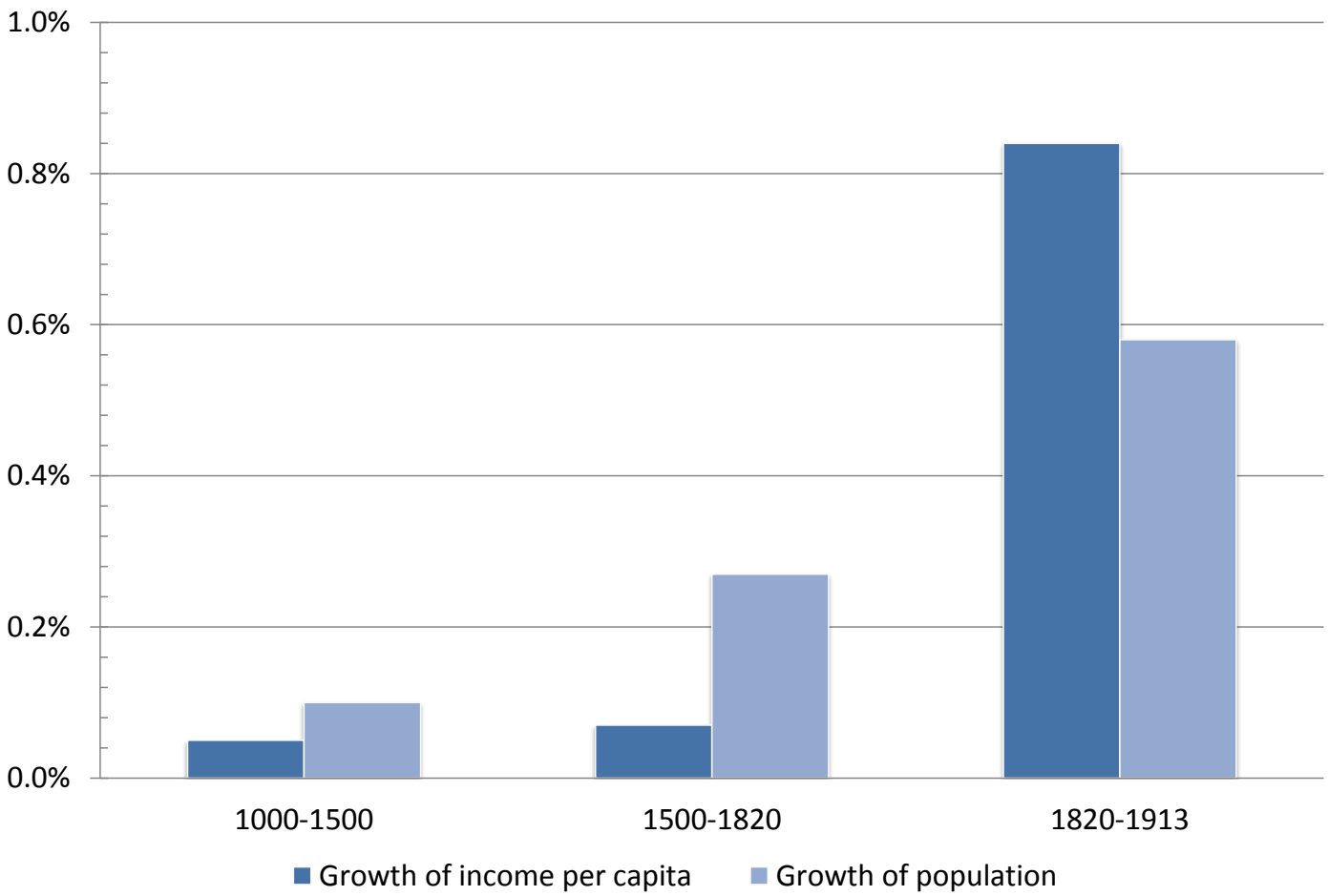
The Post-Malthusian Regime

- Take-off from a Malthusian equilibrium:
  - Technological progress accelerates
  - Income per capita still has a positive effect on population growth
  - Technological progress generates:
    - Rapid increase in total output
    - Relatively slower increase in population (Malthusian adjustment)
    - Increase in per-capita income
  - Faster growth of income per capita and population (relative to the Malthusian regime)

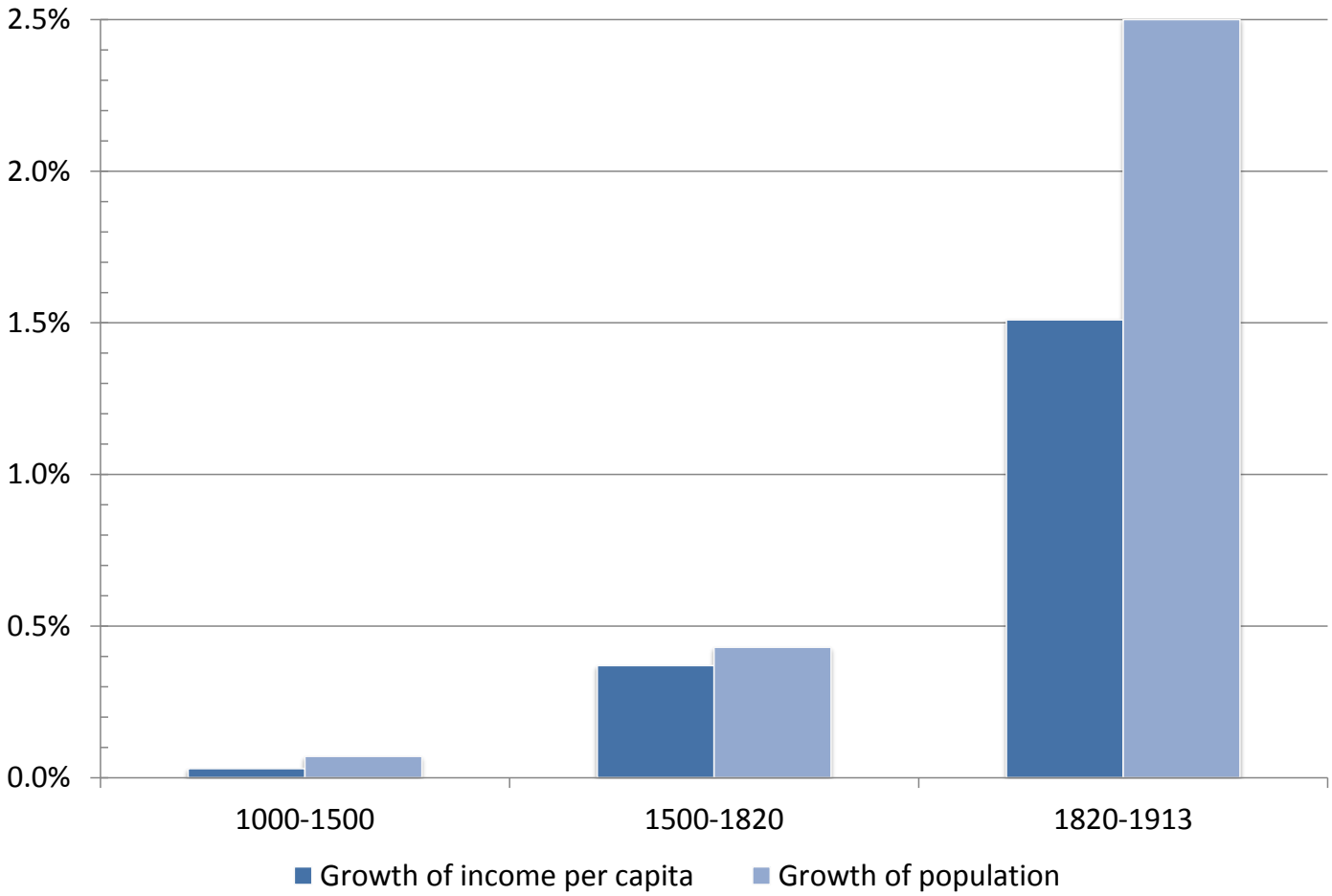
Regional Variation in the Timing of the Take-off



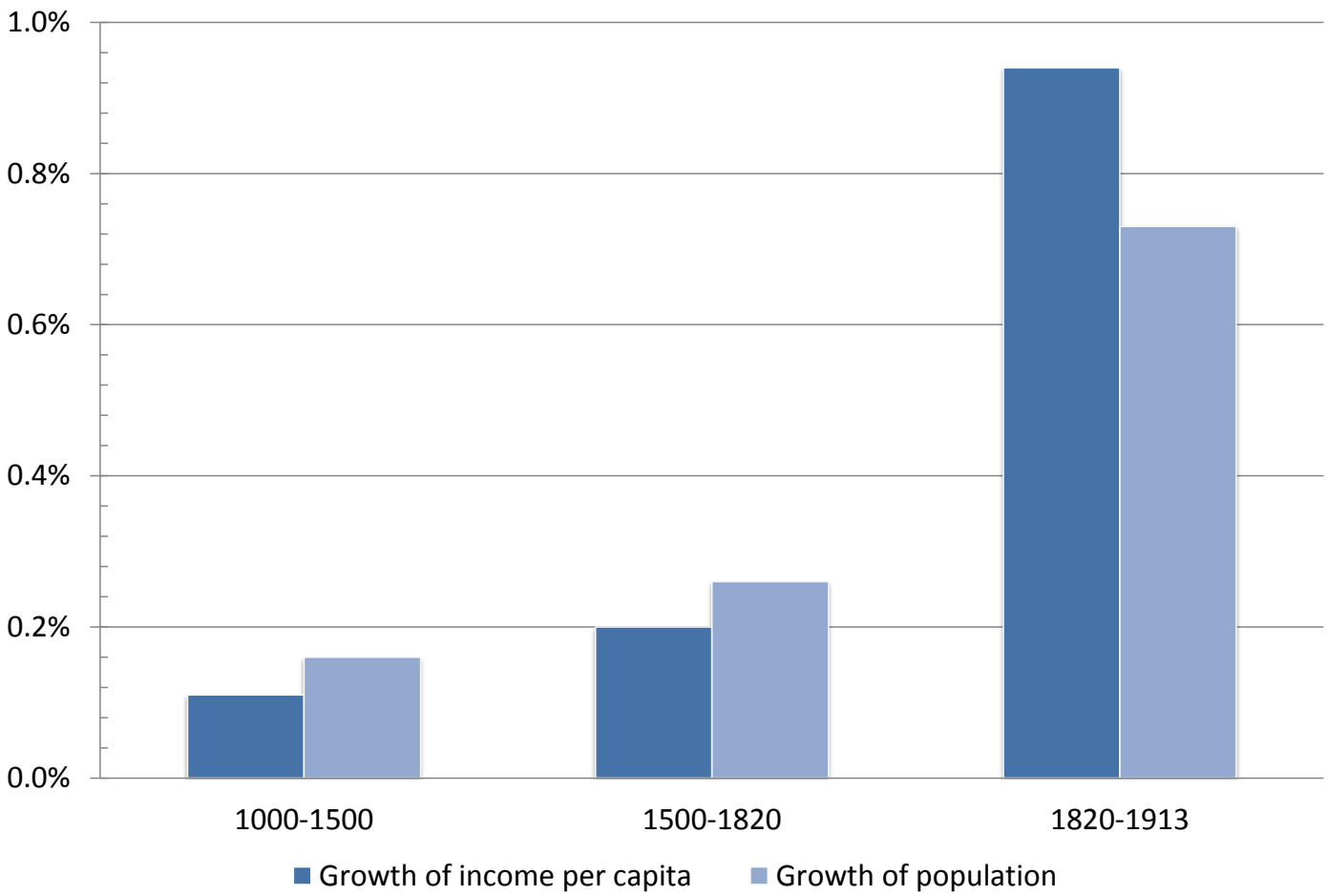
Take-off: Growth of Population & Income per Capita – World



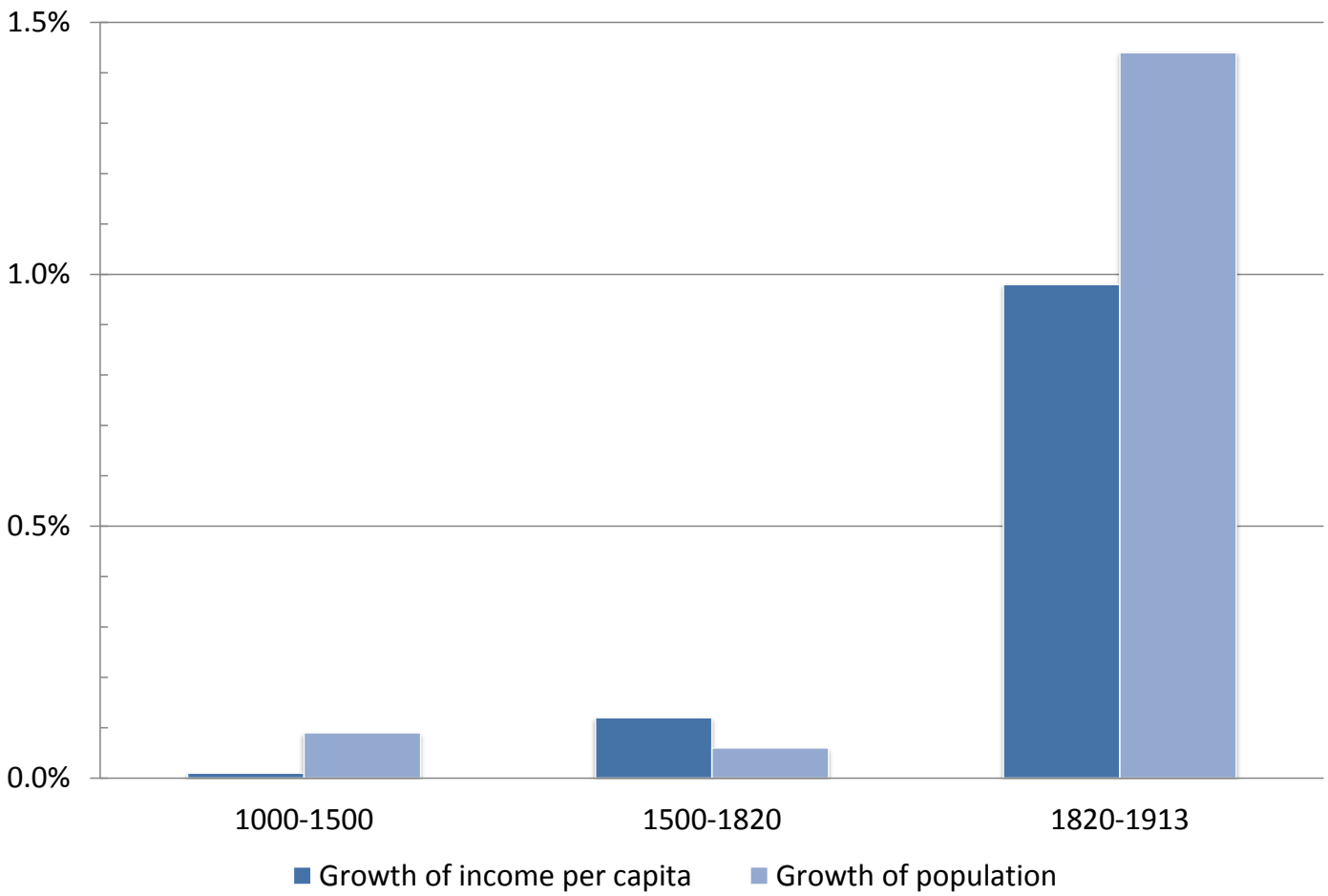
Take-off: Growth of Population & Income per Capita – Western Offshoots



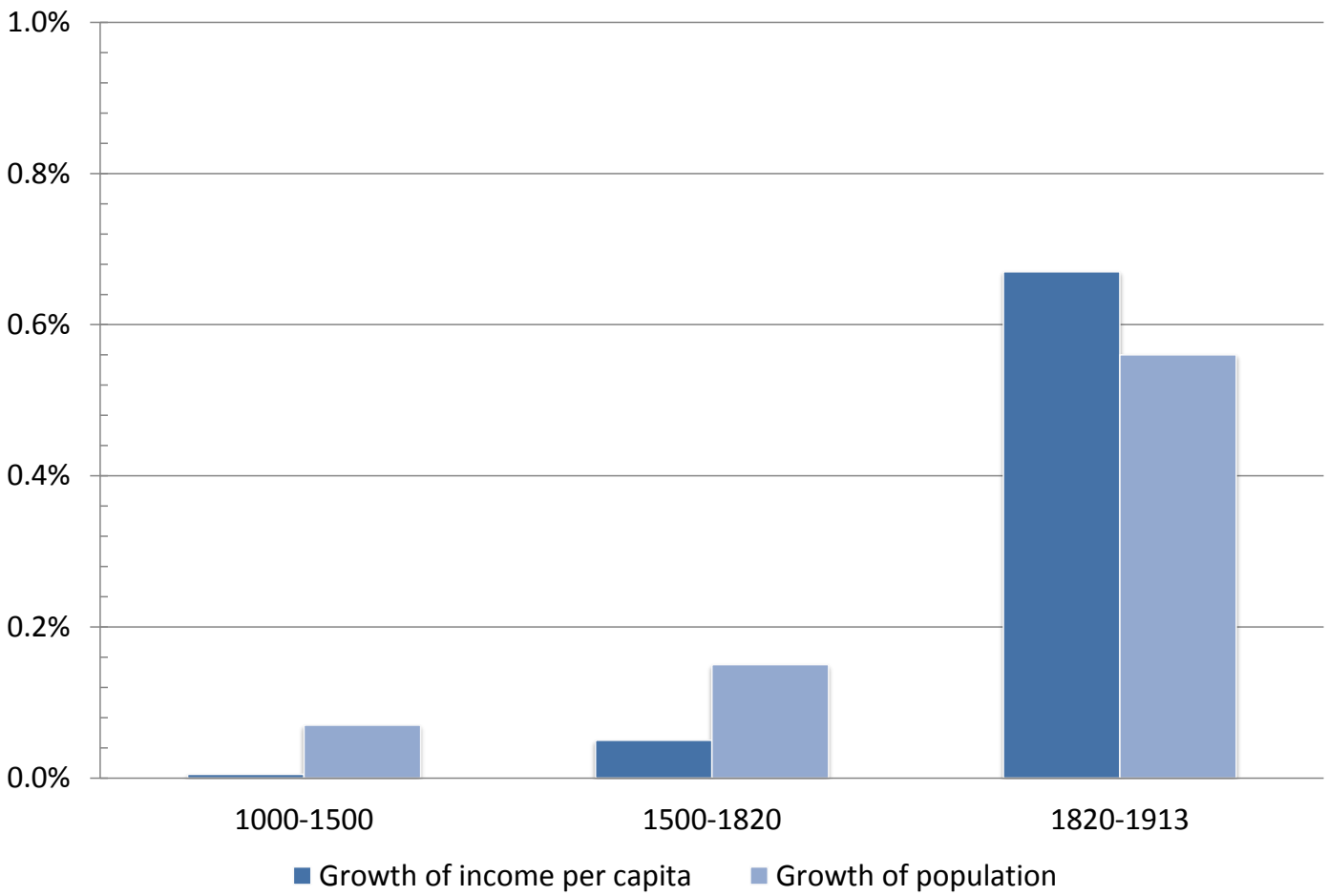
Take-off: Growth of Population & Income per Capita – Western Europe



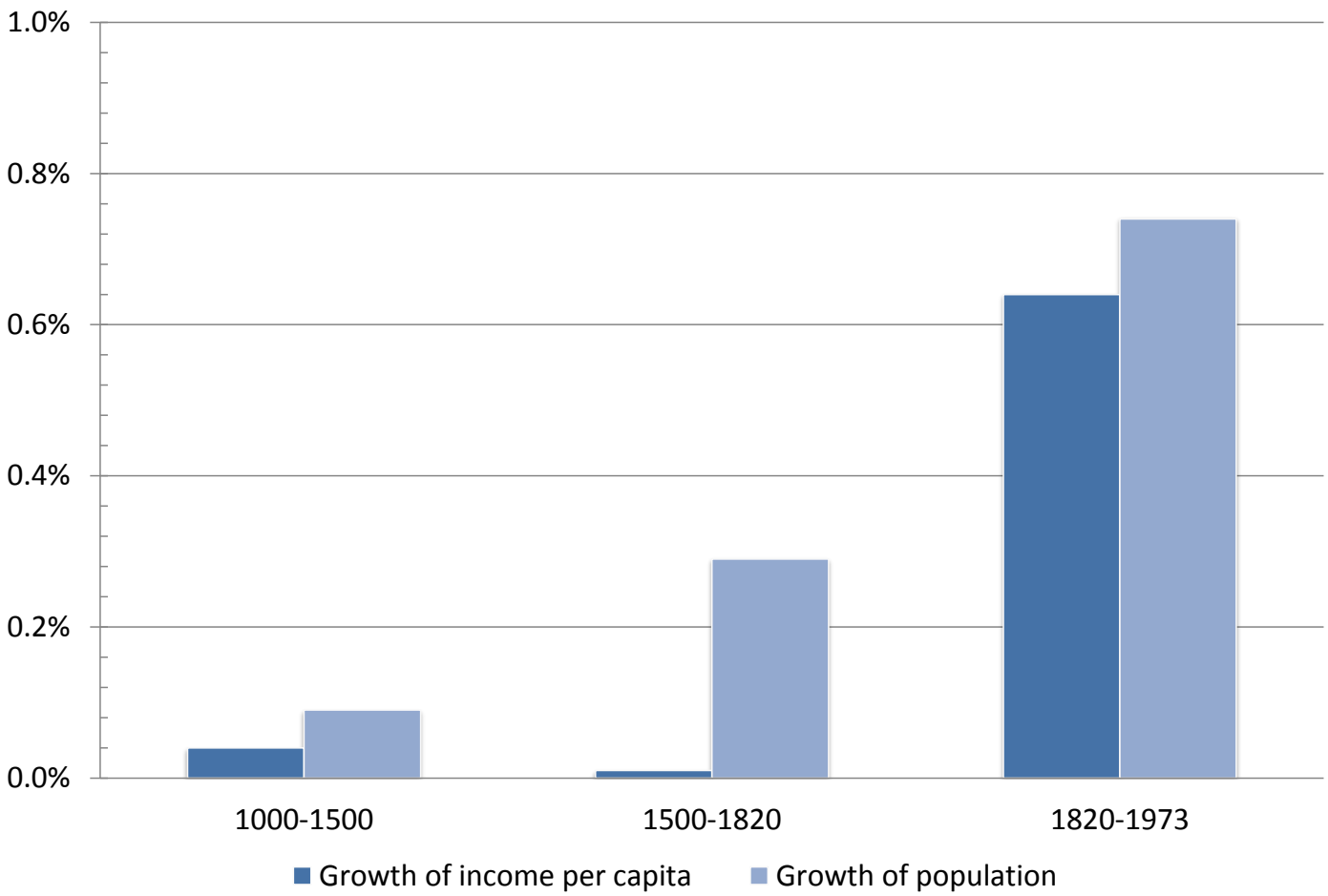
Take-off: Growth of Population & Income per Capita – Latin America



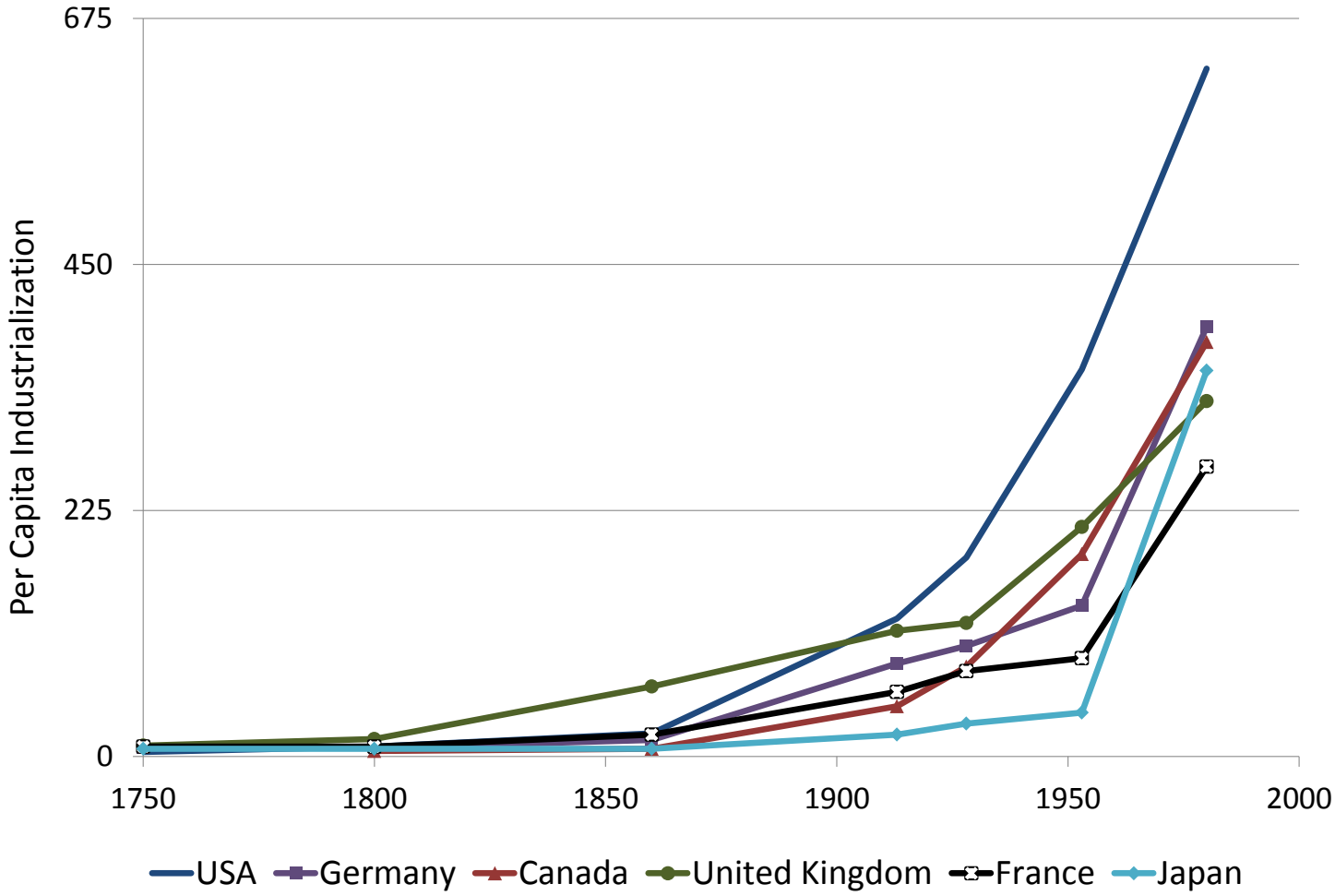
Take-off: Growth of Population & Income per Capita – Africa



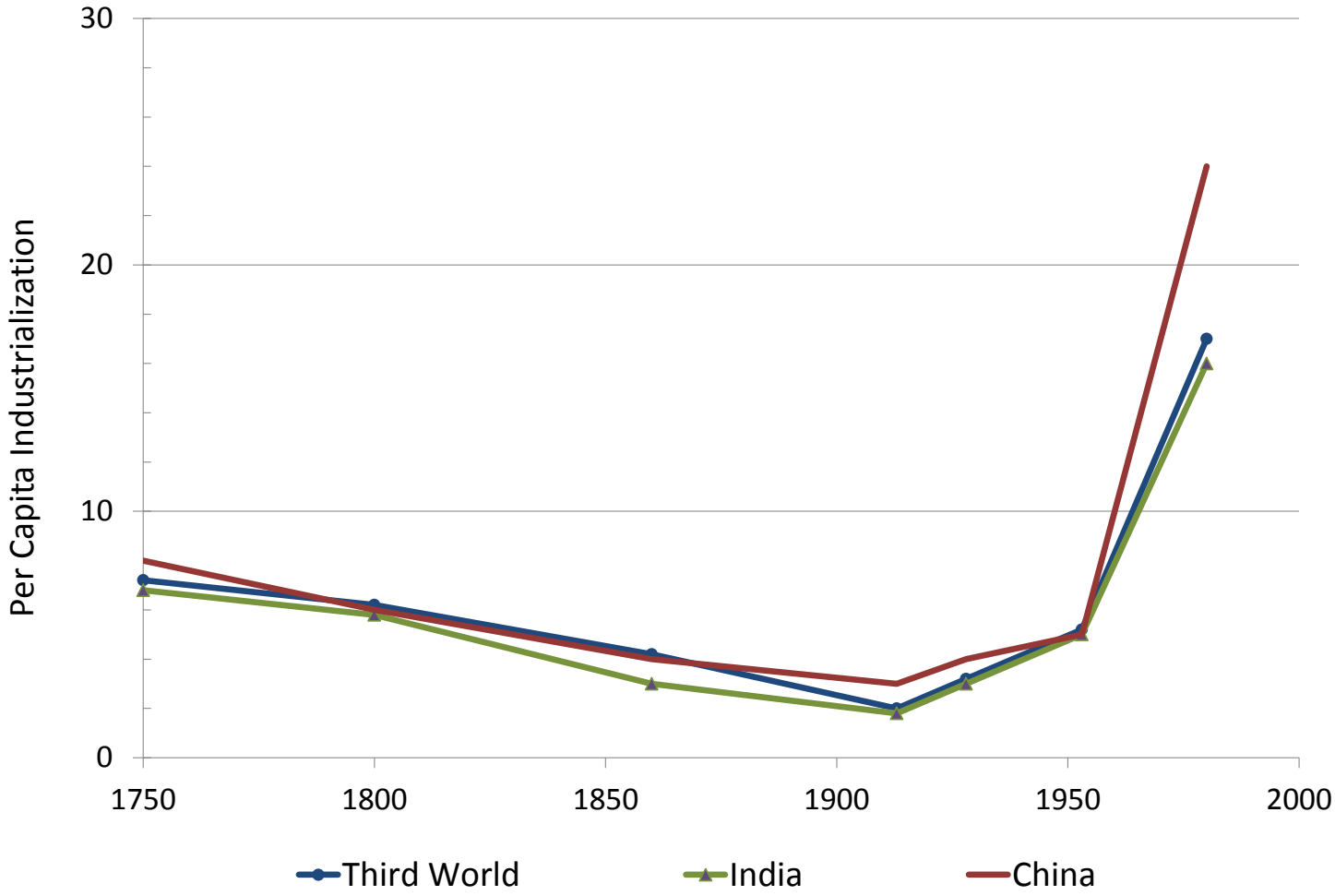
Take-off: Growth of Population & Income per Capita – Asia



Take-off & Increased Industrialization per Capita



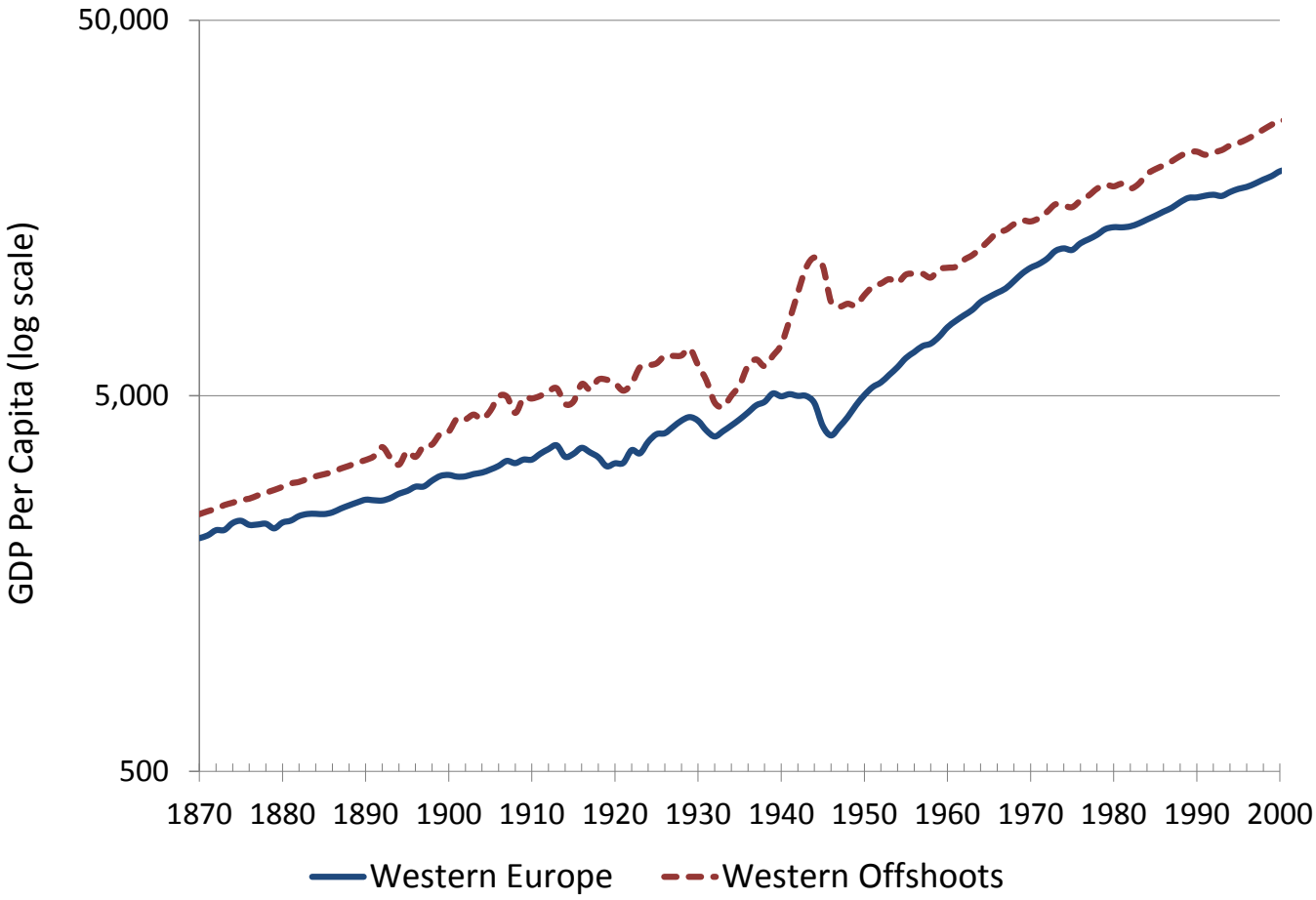
Take-off in Developed Economies & Decline in Industrialization in LDCs



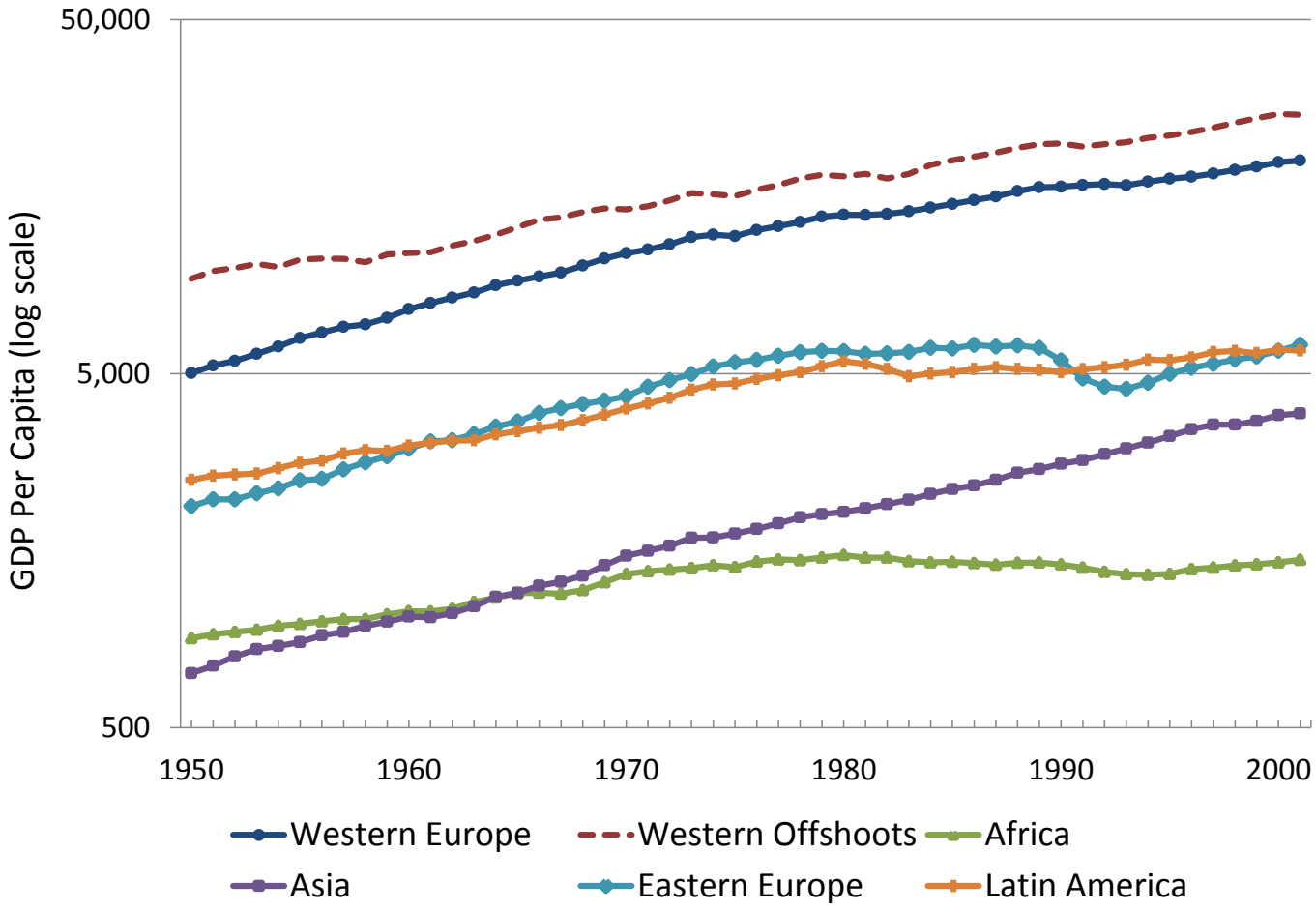
The Modern Growth Regime

- The emergence of sustained economic growth
  - Acceleration in technological progress
    - $\Longrightarrow$ Industrial demand for human capital
  - Human capital formation
    - $\Longrightarrow$ Decline in fertility rates
    - $\Longrightarrow$ Further technological progress
  - Population growth declines
    - $\Longrightarrow$ Economic growth is freed from counterbalancing effects of population
  - Technological progress, human capital & decline in population growth
    - $\Longrightarrow$ Sustained economic growth

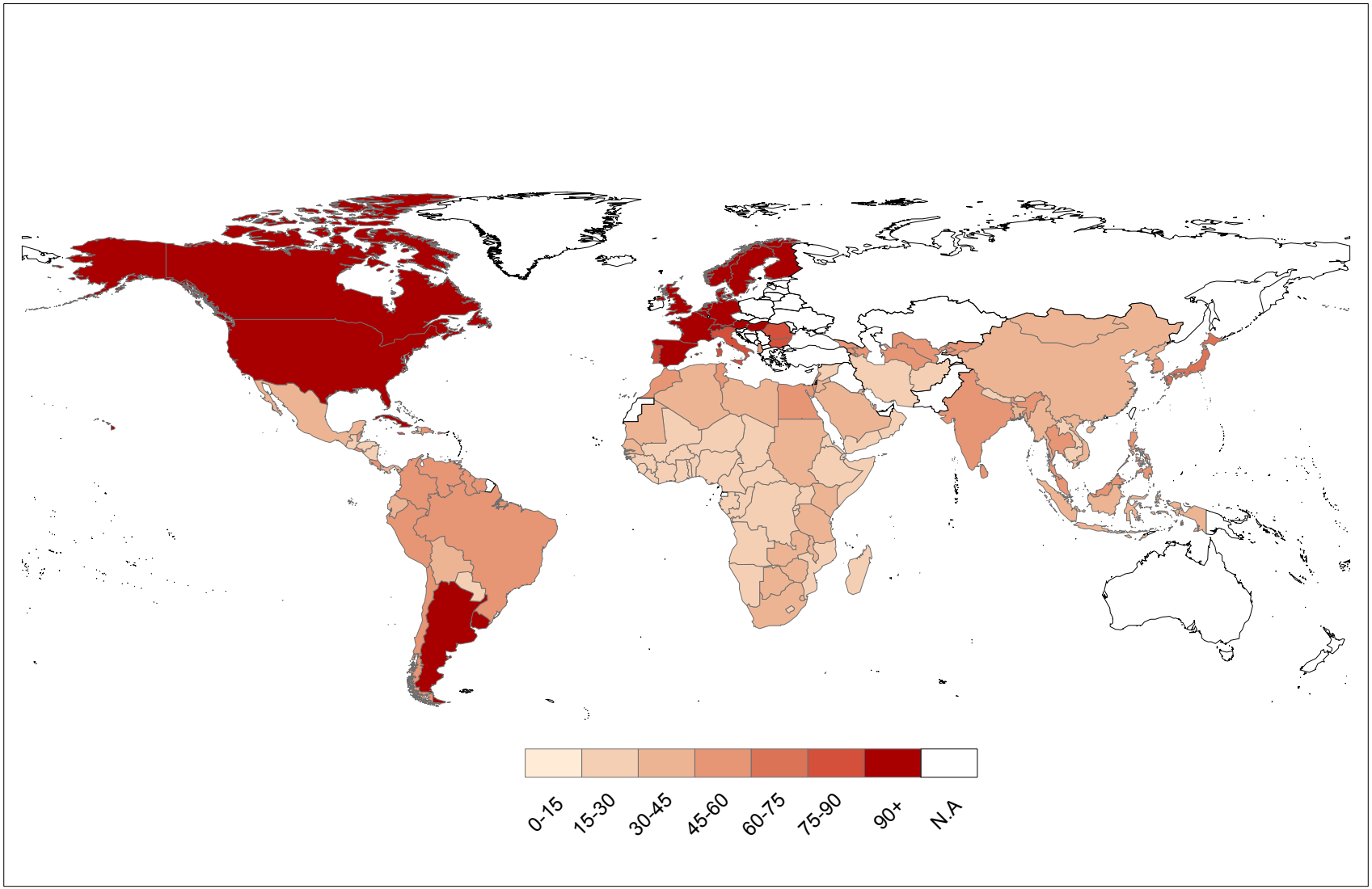
Sustained Economic Growth: 1870–2000



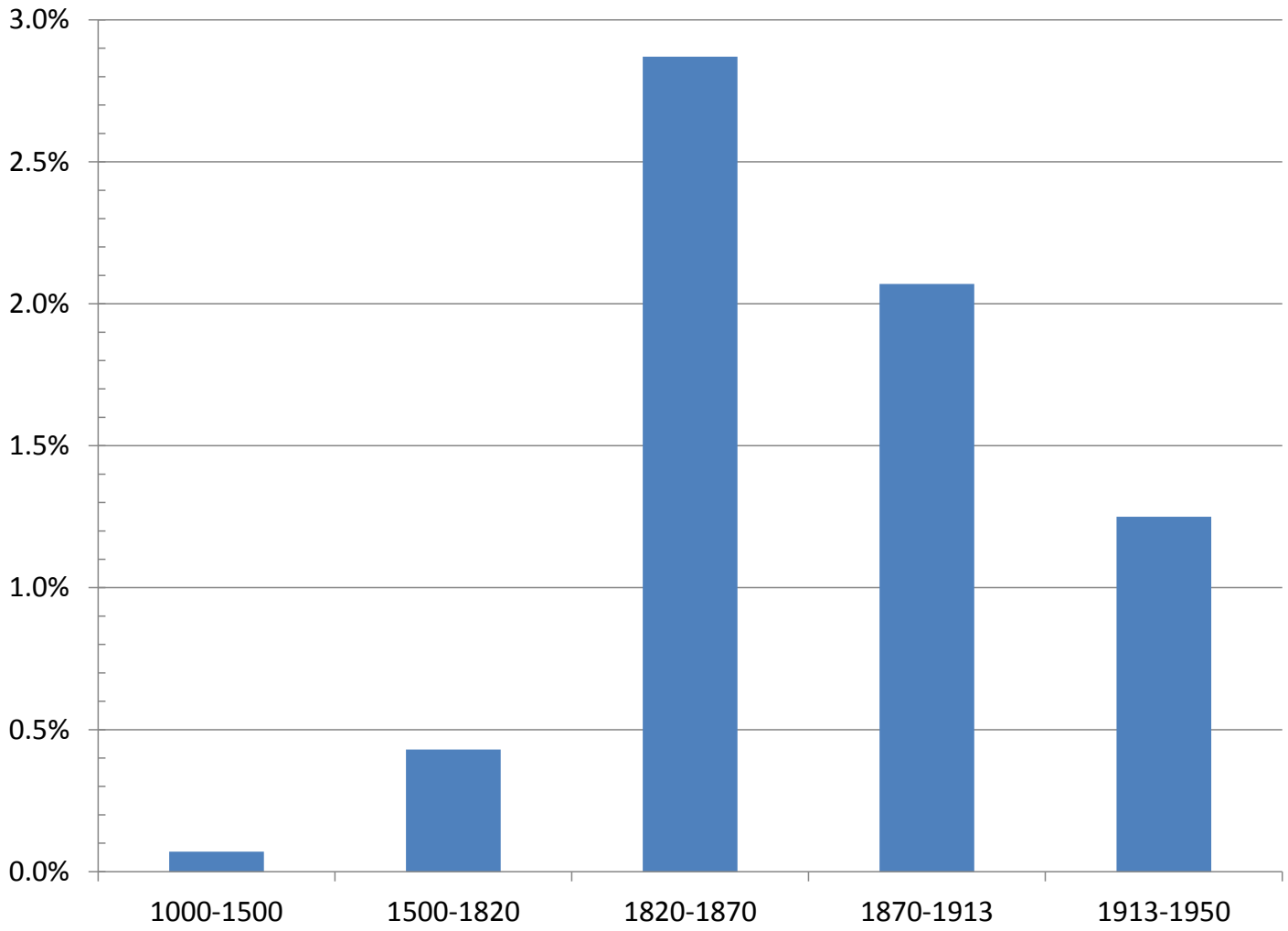
Regional Variation in Growth of Income per Capita: 1950–2000



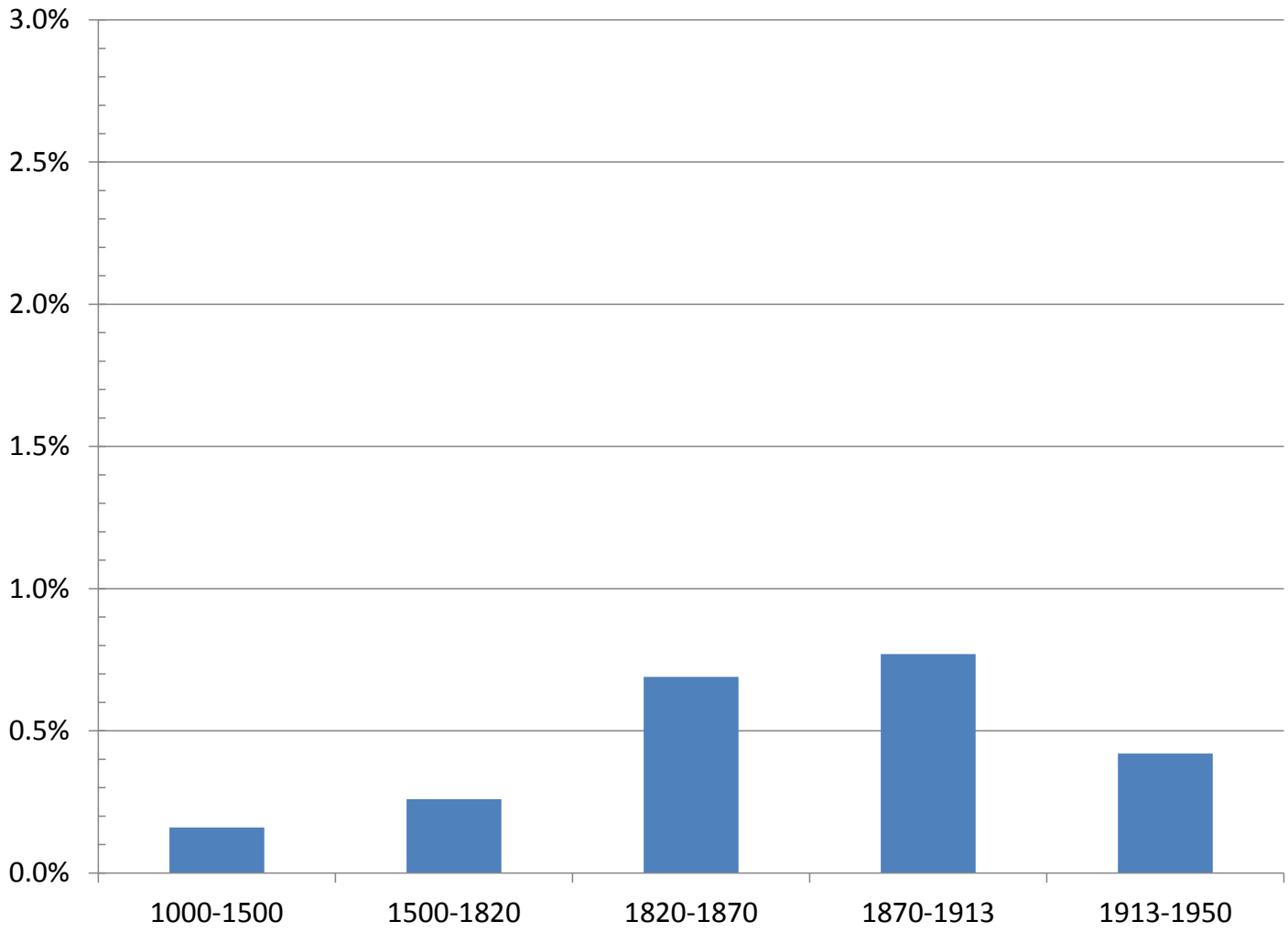
Years Elapsed since the Onset of the Fertility Decline



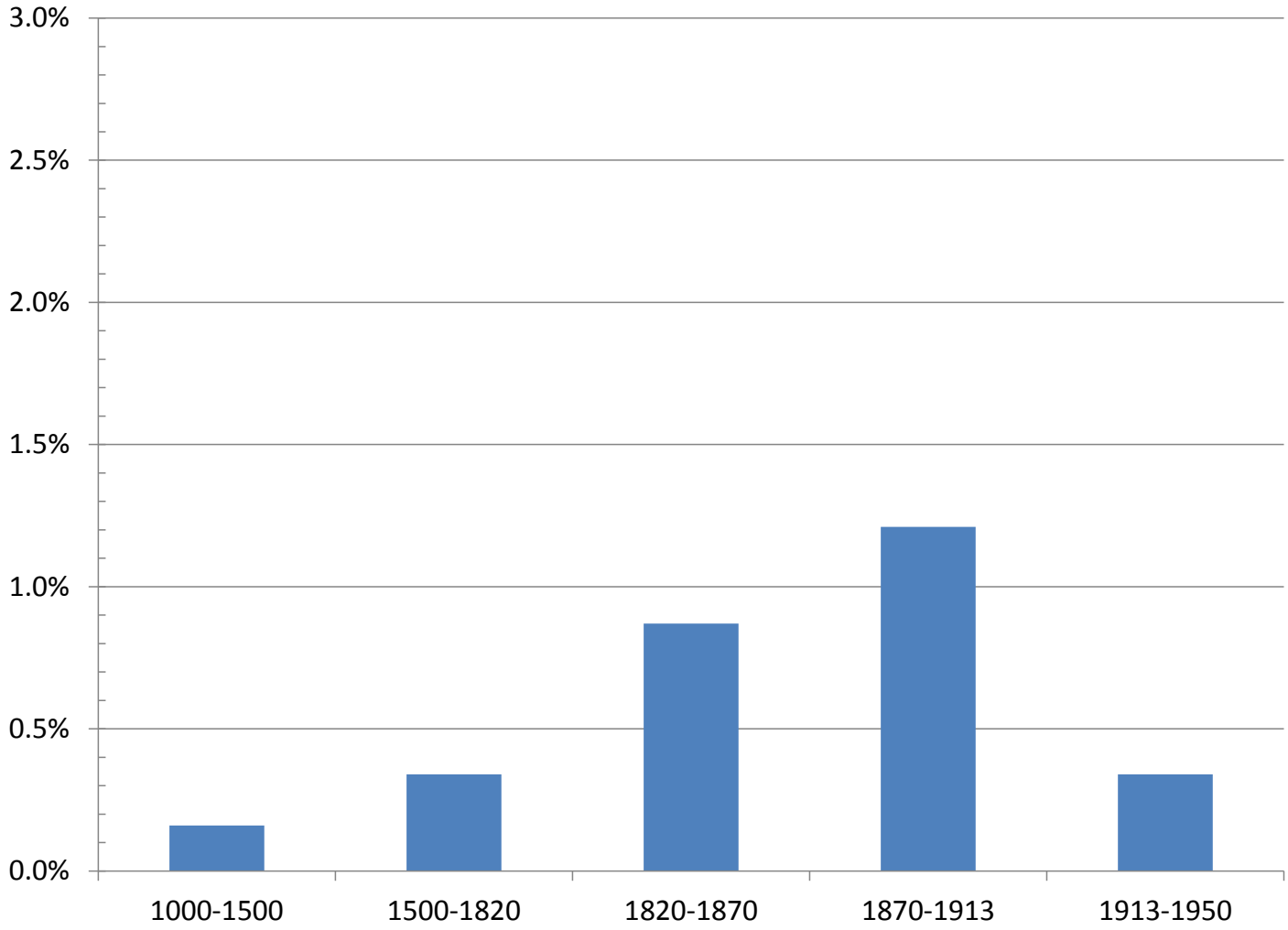
Early Fertility Decline – Western Offshoots



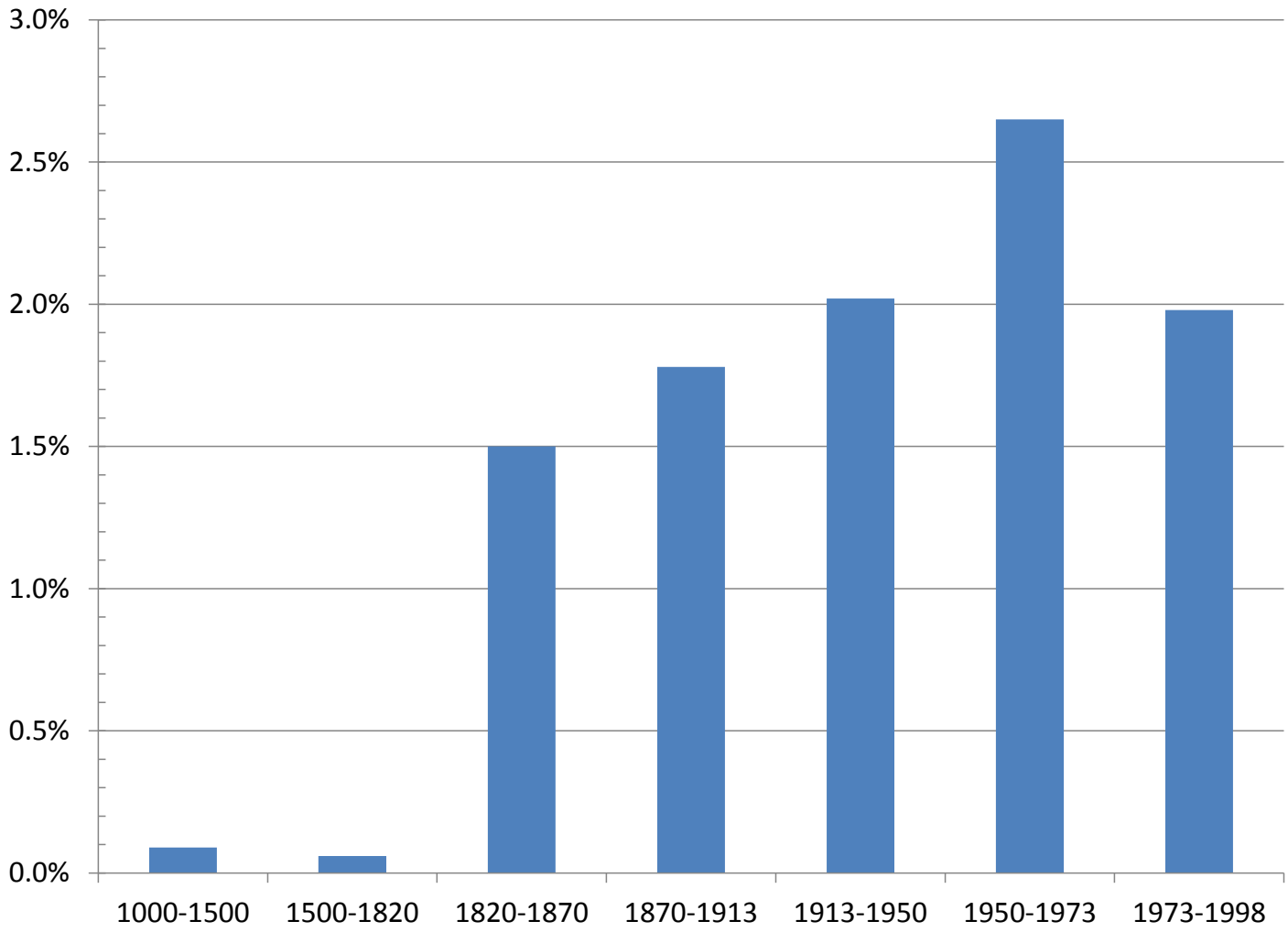
Early Fertility Decline – Western Europe



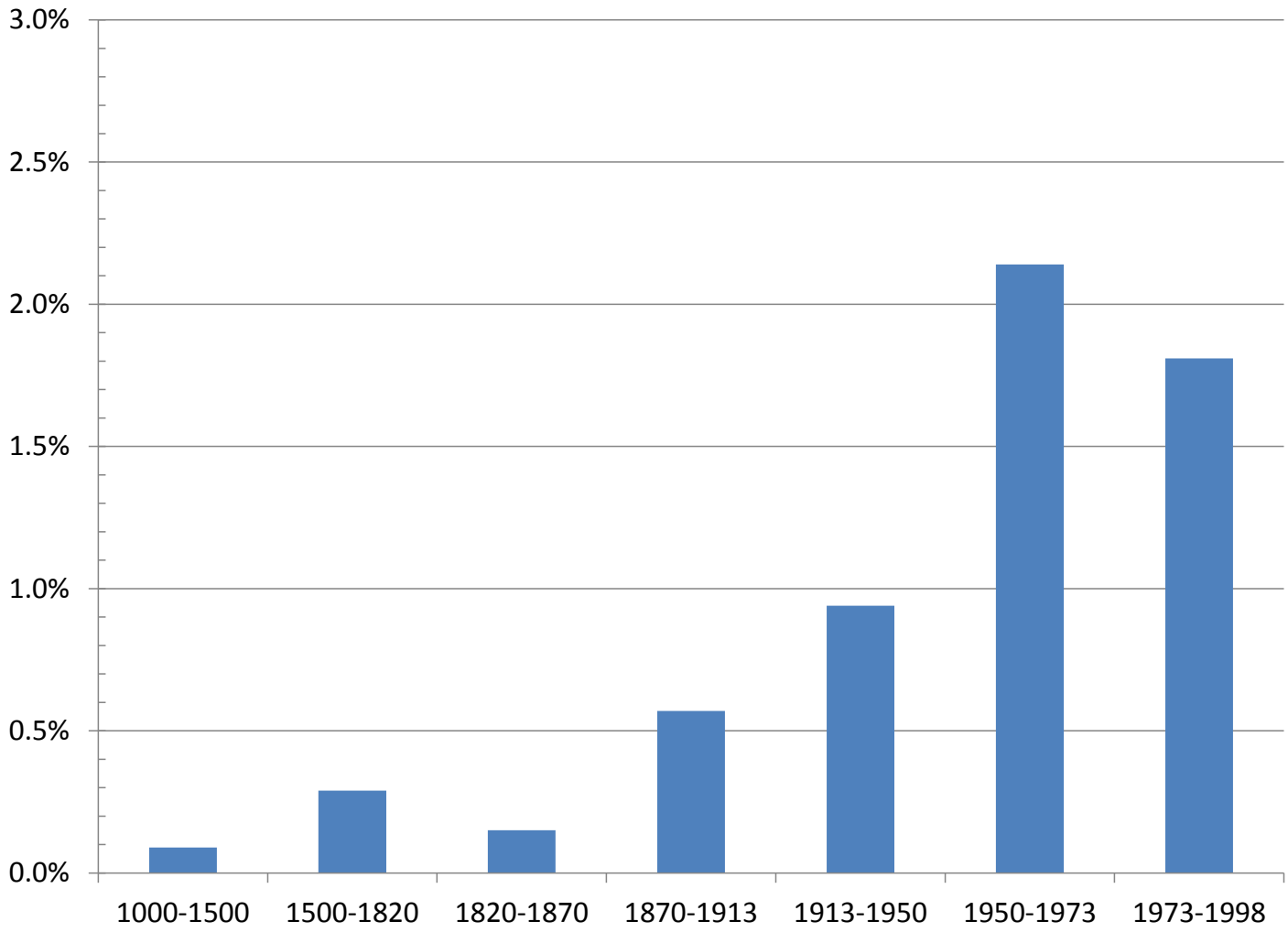
Early Fertility Decline – Eastern Europe



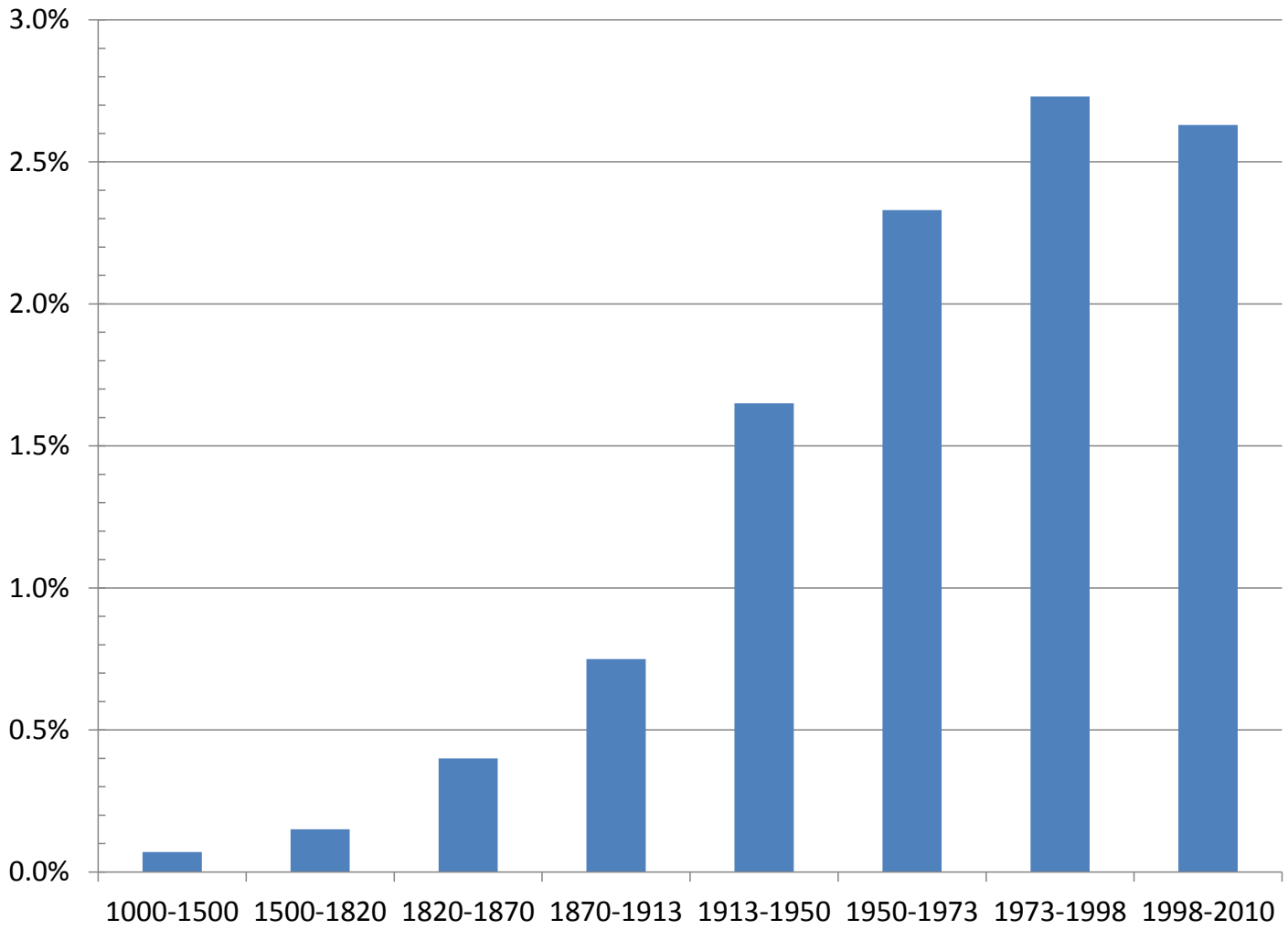
Late Fertility Decline – Latin America



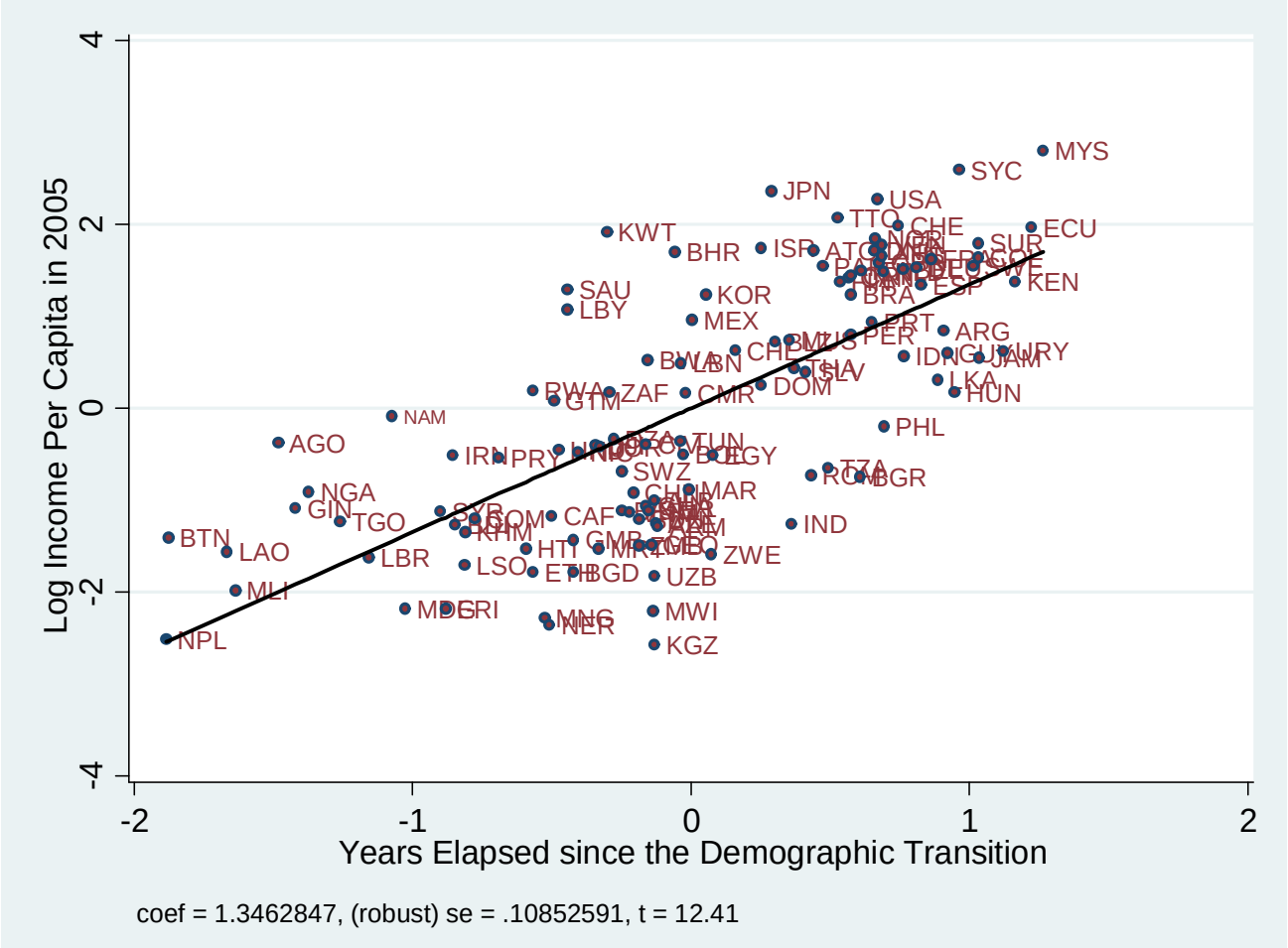
Late Fertility Decline – Asia



Late Fertility Decline – Africa

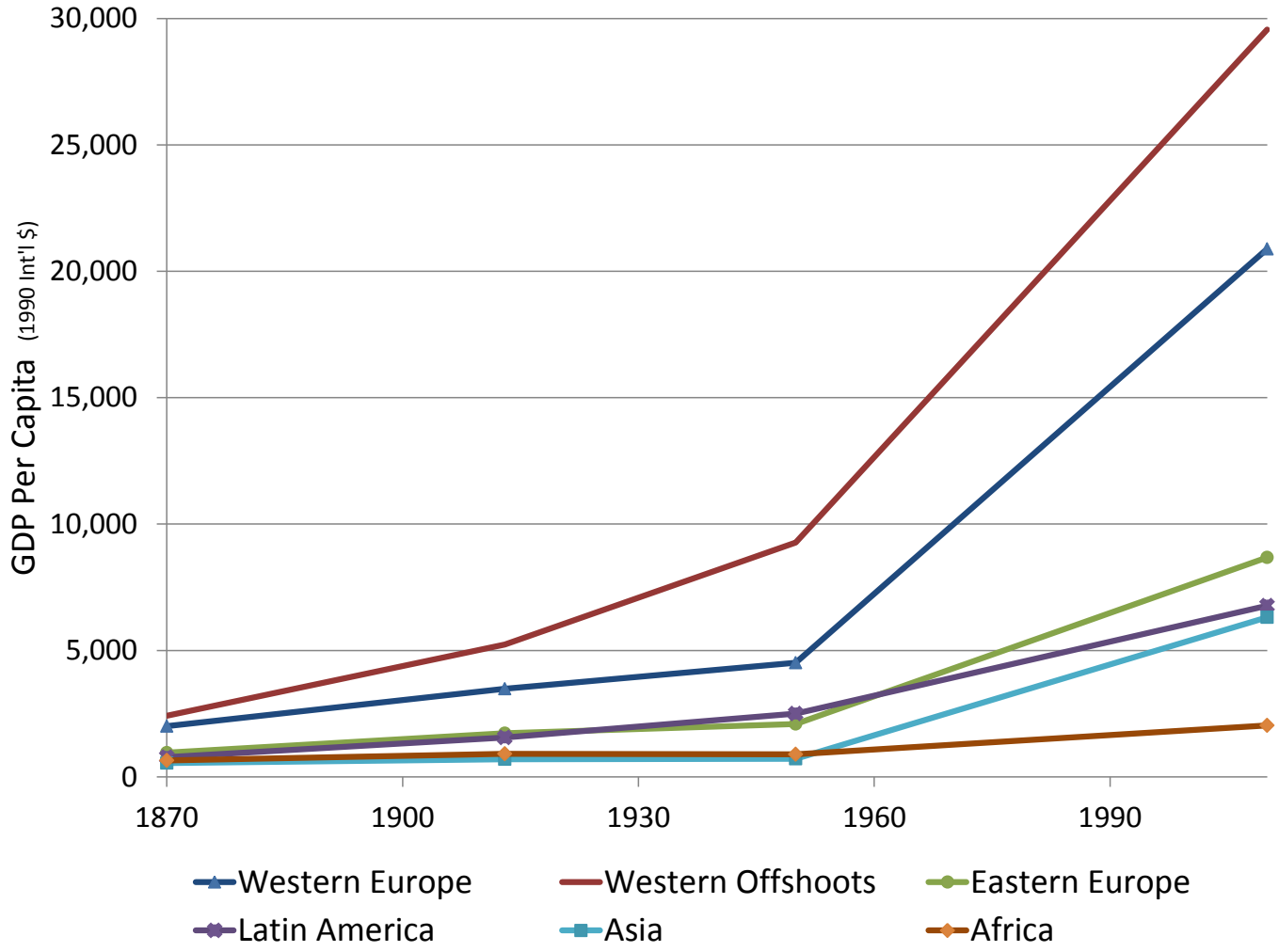


Timing of the Demographic Transition and Current Income per Capita



Conditional on absolute latitude.

Timing of the Demographic Transition and Divergence across Regions



Puzzling Patterns for Growth Theory: The Malthusian Epoch

- What accounts for the epoch of stagnation that characterized most of human history?
- Why did increased productivity lead to increased population rather than higher income per capita?
- Why did episodes of technological progress in the pre-industrialization era fail to generate sustained economic growth?

Puzzling Patterns for Growth Theory: Transition from Stagnation to Growth

- What is the origin of the sudden increase in growth rates of income per capita and population?
- What triggered the demographic transition?
- Is a demographic transition critical for the transition to a state of sustained economic growth?
- What factors account for the transition from stagnation to growth of DCs?
  - What are their implications for the hurdles faced by LDCs in the transition from stagnation to growth?

Puzzling Patterns for Growth Theory: Comparative Development

- What accounts for the sudden take-off from stagnation to growth in some countries and the persistent stagnation in others?
- What governs the differential timing of the demographic transition across the globe?
- What is the origin of the vast inequality in income per capita that emerged across countries in the past two centuries?
- What is the contribution of deep rooted factors to the vast inequality across countries?
- Has the earlier transition of advanced economies adversely affected the process of development in LDCs?

Non-Unified Growth Theory (GT)

- Inconsistent with the development process over most of human history:
  - GT: growth rates decline in the transition to sustained growth
    - Evidence: non-decreasing growth rates in the development of DCs
  - GT: technological progress increases steady-state income per capita
    - Malthusian Epoch - tech progress had no effect on LR income
  - GT: does not capture the demographic transition (DT)
    - Evidence: DT is central for the take-off to modern growth
  - GT: does not capture the take-off from stagnation to growth
    - Evidence: key for the understanding of comparative development
  - GT: convergence
    - Evidence: divergence in the past two centuries

Non-Unified Growth Theory

- Captures the role of factor accumulation and technological progress in the modern growth regime
- Not designed to shed light on:
  - The historical origins of vast and persistent inequality across countries
  - The forces that triggered the transition of DCs from stagnation to growth
  - The hurdles faced by LDCs in their take-off from stagnation to growth
  - The factors that hindered convergence across countries
  - The role of deep rooted factors in comparative development

Proximate Causes of Growth

- Factor Accumulation:
  - Physical capital accumulation (Solow, QJE 1956)
  - Human capital accumulation (Lucas, JME 1998)
- Technological Progress:
  - Endogenous Growth (Romer, JPE 1990; Grossman-Helpman, 1991; Aghion-Howitt, ECT 1992)

Proximate Causes of Growth – Major Challenge

- Why do some societies fail to:
  - Efficiently invest in physical and human capital?
  - Adopt advance technologies?
- In the absence of barriers to accumulation and innovations,
  - Access to international capital markets
  - Technological diffusion
  - Global education and health campaigns
    - $\Longrightarrow$ convergence

Barriers to Accumulation and Innovation

- Inequality
  - Suboptimal accumulation of human and physical capital
    - Credit market imperfections (Galor-Zeira, RES 1993)
    - Sociopolitical instability (Alesina et al., JEG 1996)
    - Inferior institutions (Engerman-Sokoloff, 1997)
    - Inefficient provision of education (Galor-Moav-Vollrath, RES 2009)
- Ethnic fractionalization
  - Sociopolitical instability & Inefficient provision of public goods
    - Suboptimal investment (Easterly-Levine, QJE 1997; Alesina et al., JEG 2003)
- Institutions (limited protection of property rights & rule of law)
  - Reduced incentive to accumulate/innovate (North, 1981; Acemoglu-Robinson, 2012)
- Social capital (limited trust & cooperation)
  - Increased investment cost (Putnam, 1993; Guiso et al., JEP 2006; Tabellini, JEEA 2010)

Colonialism and the Persistent Effects of Institutions and Human Capital

- Persistent effect of institutions implemented by colonial powers
  - Reversal of fortune (Engerman-Sokoloff, 1997; Acemoglu et al., AER 2001, QJE 2002)
    - Exclusive institutions imposed in densely populated areas
    - Inclusive institutions implemented in sparsely populated areas
  - Slavery (Nunn, QJE 2008)
- Persistent effect of the human capital and diversity brought by the colonists
  - Larger effect of colonizers in sparsely populated areas (Glaeser et al., JEG 2004; Easterly-Levine, 2012; Ashraf-Galor, 2014)
- Persistent effect of the legal system of colonial powers
  - Common law (Britain) is more complementary than civil law (France, Spain & Portugal) to the development of financial systems (La Porta et al., JF 1997)
- Persistent effect of artificial borders & ethnic division created by colonists
  - Sub-Saharan Africa (Alesina et al., JEEA 2011; Papaioannou-Michalopoulos, ECT 2012)

Origin and Persistence of Cultural Factors

- Geographical origins and persistence of:
  - Trust & cooperation (Guiso et al., QJE 2009; Algan-Cahuc, AER 2010; Durante, 2010; Litina, 2012)
  - Cultural diversity (Ashraf-Galor, 2012)
  - The European Marriage Pattern (Voigtlander-Voth, AER 2013)
  - Female labor force participation (Alesina et al., QJE 2013)
- Technological origins and persistence of:
  - Female emancipation & labor force participation (Galor-Weil, AER 1996; Fernández-Fogli-Olivetti, QJE 2004; Greenwood-Seshadri-Yorukoglu, RES 2005; Doepke-Tertilt, QJE 2009)
- Religious origins of:
  - Preferences for human capital (Becker-Woessmann, QJE 2009; Botticini-Eckstein, 2012)
  - Work ethic & thrift & entrepreneurial spirit (Weber, 1905; Andersen et al., 2013)
- Intergenerational transmission of:
  - Preferences for human capital (Galor-Moav, QJE 2002)
  - Entrepreneurial spirit & thrift (Deopke-Zilibotti, QJE 2008; Galor-Michalopoulos, JET 2012)

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)
  - Persistence effect on life expectancy (Galor-Moav, 2009)
- Disease environment
  - Persistent effect on labor productivity & investment in human capital (Gallup-Sachs, 2001; Andersen-Dalgaard-Selaya, 2012)
- Geographical isolation
  - Reduced trade and technological diffusion (Gallup-Mellinger-Sachs, 1999)
  - Persistence of culture conducive for innovations (Ashraf-Galor-Ozak, JEEA 2010)

Persistent Effects of Geographical Factors

- Land suitable for large plantations
  - Inequality:
    - Extractive institutions (Engerman-Sokoloff, 1997)
  - Concentration of landownership:
    - Suboptimal investment in public education (Galor-Moav-Vollrath, RES 2009)
- Soil quality conducive for agriculture
  - Specialization in unskilled-intensive goods
    - Reduces human capital formation & increases fertility & slows the transition to modern growth (Galor-Mountford, RES 2008)

Persistent Effects of Geographical Factors

- Range of soil quality
  - Emergence of geographical specific human capital $\Longrightarrow$ reduced mobility $\Longrightarrow$ 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 (Dalgaard-Strulik, 2013)

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, 2013)
  - 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:
    - Higher cultural fragmentation (Ashraf-Galor, AER-PP 2013)
    - Increased mistrust & prevalence of civil conflict (Arbatli-Ashraf-Galor, 2013)
  - Generates a wider range of complementarity traits conducive for innovations
  - Has a hump-shaped relationship with productivity (Ashraf-Galor, AER 2013)
    Lower income in overly homogenous & diverse societies