

# The Journey of Humanity

## Roots of Global Inequality

Oded Galor

October 26, 2019

# Two Mysteries

- The Mystery of Growth:

# Two Mysteries

- The Mystery of Growth:
  - Why economic growth emerged only in the past two centuries, after hundreds of thousands of years of stagnation?

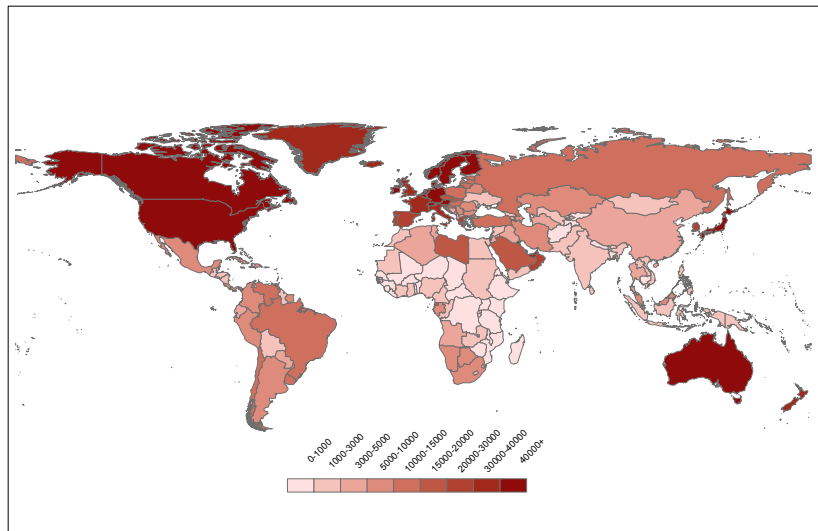
## Two Mysteries

- The Mystery of Growth:
  - Why economic growth emerged only in the past two centuries, after hundreds of thousands of years of stagnation?
- The Mystery of the Gaps

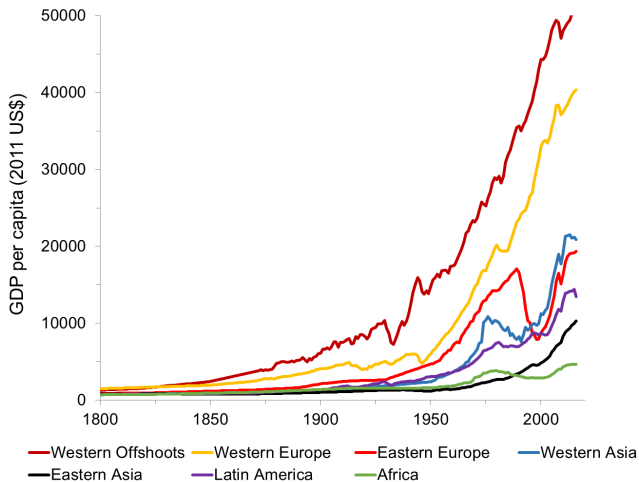
# Two Mysteries

- The Mystery of Growth:
  - Why economic growth emerged only in the past two centuries, after hundreds of thousands of years of stagnation?
- The Mystery of the Gaps
  - What is the origin of the vast inequality in income per capita across countries and regions?

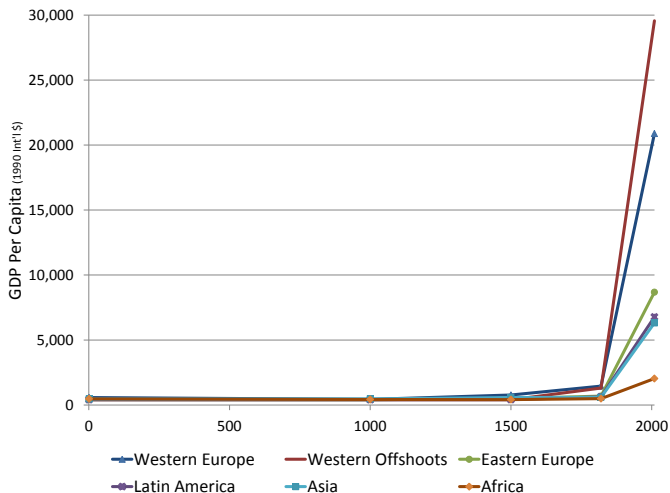
# Inequality in the Wealth of Nations: Income per Capita, only 2010



# Regional Divergence: 1820–2010



# Regional Divergence: 1–2010





# Inferences from Neoclassical Growth Theory

- Diminishing returns to physical and human capital accumulation

# Inferences from Neoclassical Growth Theory

- Diminishing returns to physical and human capital accumulation
- Diminishing effect of technological progress on productivity

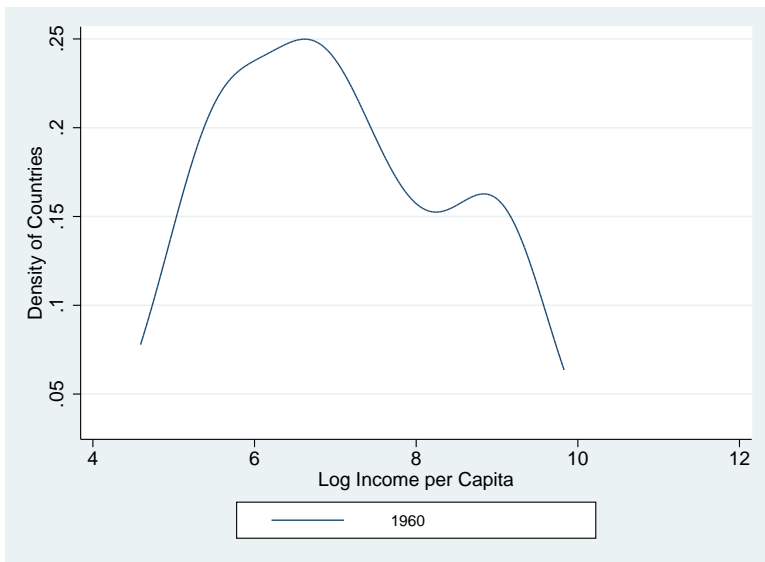
# Inferences from Neoclassical Growth Theory

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

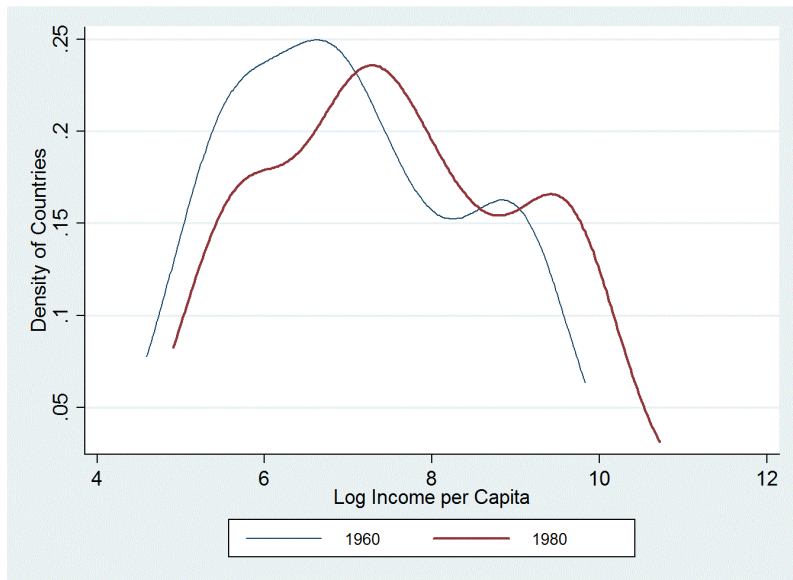
# Inferences from Neoclassical Growth Theory

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

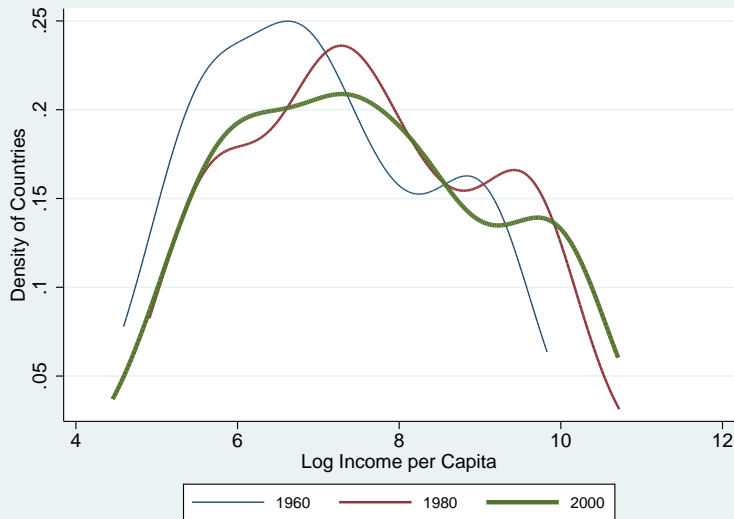
# Income Distribution in 1960



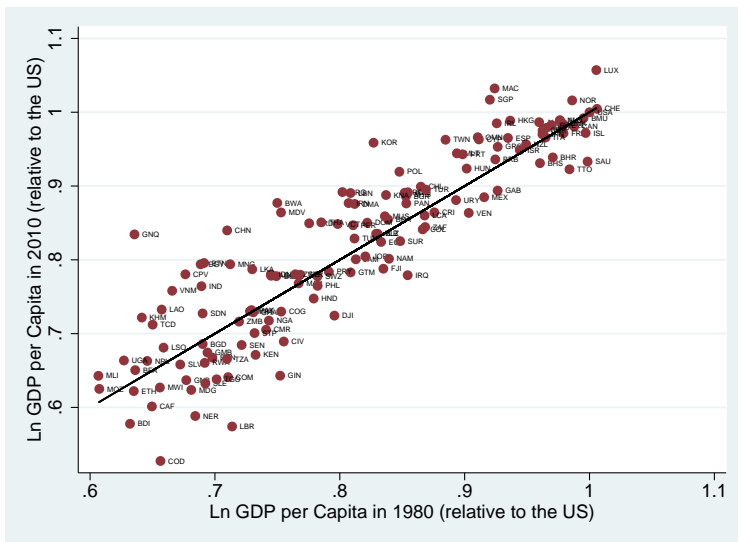
# Lack of Convergence across Nations: 1960–1980



# Lack of Convergence across Nations: 1960–2000



# Persistent Inequality across Nations: 1980–2010





# Fundamental Mysteries

- The Mystery of Growth:

# Fundamental Mysteries

- The Mystery of Growth:
  - Why economic growth emerged only in the past two centuries, after hundreds of thousands of years of stagnation?

# Fundamental Mysteries

- The Mystery of Growth:
  - Why economic growth emerged only in the past two centuries, after hundreds of thousands of years of stagnation?
- The Mystery of the Gaps

# Fundamental Mysteries

- The Mystery of Growth:
  - Why economic growth emerged only in the past two centuries, after hundreds of thousands of years of stagnation?
- The Mystery of the Gaps
  - What is the origin of the vast inequality in income per capita across countries and regions?

# Fundamental Mysteries

- The Mystery of Growth:
  - Why economic growth emerged only in the past two centuries, after hundreds of thousands of years of stagnation?
- The Mystery of the Gaps
  - 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?

# Fundamental Mysteries

- The Mystery of Growth:
  - Why economic growth emerged only in the past two centuries, after hundreds of thousands of years of stagnation?
- The Mystery of the Gaps
  - 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?

# Fundamental Mysteries

- The Mystery of Growth:
  - Why economic growth emerged only in the past two centuries, after hundreds of thousands of years of stagnation?
- The Mystery of the Gaps
  - 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

- Requires the identification of:



## Resolution of these Mysteries

- Requires the identification of:
  - Forces that permitted the transition from stagnation to growth

## Resolution of these Mysteries

- Requires the identification of:
  - Forces that permitted the transition from stagnation to growth
  - The origins of the differential timing of the transition across the globe

## Resolution of these Mysteries

- Requires the identification of:
  - Forces that permitted the transition from stagnation to growth
  - The origins of the differential timing of the transition across the globe
  - The role of historical pre-historical factors in this process

## Resolution of these Mysteries

- Requires the identification of:
  - Forces that permitted the transition from stagnation to growth
  - The origins of the differential timing of the transition across the globe
  - The role of historical pre-historical factors in this process
  - The contribution of evolutionary forces in this process

## Resolution of these Mysteries

- Requires the identification of:
  - Forces that permitted the transition from stagnation to growth
  - The origins of the differential timing of the transition across the globe
  - The role of historical pre-historical factors in this process
  - The contribution of evolutionary forces in this process
- Provides insights about:

## Resolution of these Mysteries

- Requires the identification of:
  - Forces that permitted the transition from stagnation to growth
  - The origins of the differential timing of the transition across the globe
  - The role of historical pre-historical factors in this process
  - The contribution of evolutionary forces in this process
- Provides insights about:
  - Hurdles faced by LDCs in their transitions from stagnation to growth

## Resolution of these Mysteries

- Requires the identification of:
  - Forces that permitted the transition from stagnation to growth
  - The origins of the differential timing of the transition across the globe
  - The role of historical pre-historical factors in this process
  - The contribution of evolutionary forces in this process
- Provides insights about:
  - Hurdles faced by LDCs in their transitions from stagnation to growth
  - Policies to expedite the transition of LDCs to modern growth

# Historical Evidence

- Forces that operated in the distant past contributed to:



# Historical Evidence

- Forces that operated in the distant past contributed to:
  - The timing of the transition from stagnation to growth

# Historical Evidence

- Forces that operated in the distant past contributed to:
  - The timing of the transition from stagnation to growth
  - The vast inequality across countries and regions

# Phases of Development

- The Malthusian Epoch

# Phases of Development

- The Malthusian Epoch
- The Post-Malthusian Regime

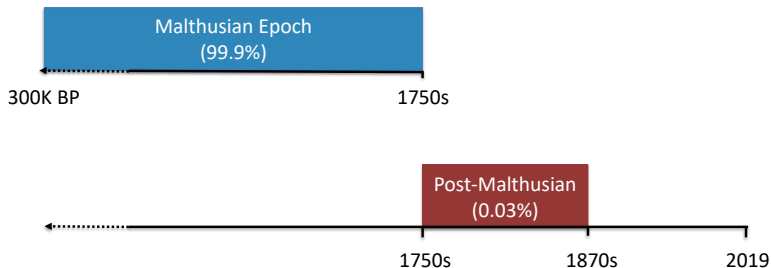
# Phases of Development

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

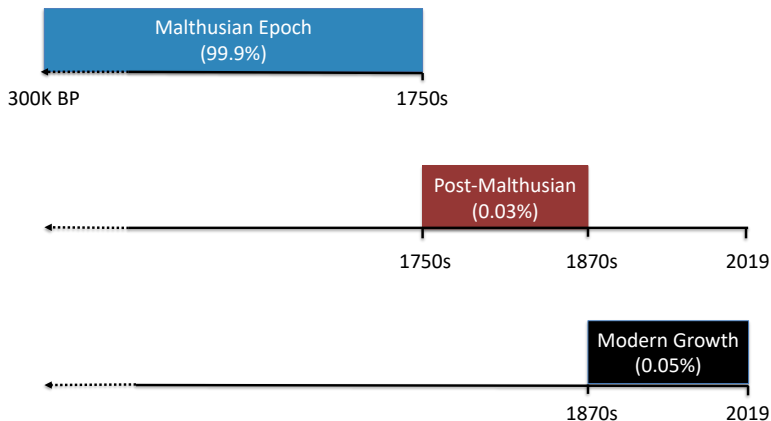
# Phases of Development: Timeline of the Most Developed Economies



# Phases of Development: Timeline of the Most Developed Economies



# Phases of Development: Timeline of the Most Developed Economies





# The Malthusian Epoch

- Dualism: Stagnation & Dynamism:

# The Malthusian Epoch

- Dualism: Stagnation & Dynamism:
  - Stagnation in living standards:

# The Malthusian Epoch

- Dualism: Stagnation & Dynamism:
  - Stagnation in living standards:
    - Income per capita: trendless fluctuation in a narrow range

# The Malthusian Epoch

- Dualism: Stagnation & Dynamism:
  - Stagnation in living standards:
    - Income per capita: trendless fluctuation in a narrow range
    - Life expectancy: trendless fluctuation in the range of 25-40 years

# The Malthusian Epoch

- Dualism: Stagnation & Dynamism:
  - Stagnation in living standards:
    - Income per capita: trendless fluctuation in a narrow range
    - Life expectancy: trendless fluctuation in the range of 25-40 years
  - Dynamism:

# The Malthusian Epoch

- Dualism: Stagnation & Dynamism:
  - Stagnation in living standards:
    - Income per capita: trendless fluctuation in a narrow range
    - Life expectancy: trendless fluctuation in the range of 25-40 years
  - Dynamism:
    - Technological progress

# The Malthusian Epoch

- Dualism: Stagnation & Dynamism:
  - Stagnation in living standards:
    - Income per capita: trendless fluctuation in a narrow range
    - Life expectancy: trendless fluctuation in the range of 25-40 years
  - Dynamism:
    - Technological progress
    - Population growth

# The Malthusian Epoch

- Dualism: Stagnation & Dynamism:
  - Stagnation in living standards:
    - Income per capita: trendless fluctuation in a narrow range
    - Life expectancy: trendless fluctuation in the range of 25-40 years
  - Dynamism:
    - Technological progress
    - Population growth
    - Evolution: adaptation of human traits



# The Malthusian Epoch

- Dualism: Stagnation & Dynamism:
  - Stagnation in living standards:
    - Income per capita: trendless fluctuation in a narrow range
    - Life expectancy: trendless fluctuation in the range of 25-40 years
  - Dynamism:
    - Technological progress
    - Population growth
    - Evolution: adaptation of human traits
- Malthusian dynamism

# The Malthusian Epoch

- Dualism: Stagnation & Dynamism:
  - Stagnation in living standards:
    - Income per capita: trendless fluctuation in a narrow range
    - Life expectancy: trendless fluctuation in the range of 25-40 years
  - Dynamism:
    - Technological progress
    - Population growth
    - Evolution: adaptation of human traits
- Malthusian dynamism
  - Ultimately triggered the transition from stagnation to growth

# The Malthusian Epoch

- Central characteristics of the period:

# The Malthusian Epoch

- Central characteristics of the period:
  - Positive effect of income on population growth due to:

# The Malthusian Epoch

- Central characteristics of the period:
  - Positive effect of income on population growth due to:
    - reduction in child mortality, increase in fertility & life expectancy

# The Malthusian Epoch

- Central characteristics of the period:
  - Positive effect of income on population growth due to:
    - reduction in child mortality, increase in fertility & life expectancy
  - Diminishing returns to labor:

# The Malthusian Epoch

- Central characteristics of the period:
  - Positive effect of income on population growth due to:
    - reduction in child mortality, increase in fertility & life expectancy
  - Diminishing returns to labor:
    - reflecting the existence of a land constraint

# The Malthusian Epoch

- Central characteristics of the period:
  - Positive effect of income on population growth due to:
    - reduction in child mortality, increase in fertility & life expectancy
  - Diminishing returns to labor:
    - reflecting the existence of a land constraint
- Technological progress over this period



# The Malthusian Epoch

- Central characteristics of the period:
  - Positive effect of income on population growth due to:
    - reduction in child mortality, increase in fertility & life expectancy
  - Diminishing returns to labor:
    - reflecting the existence of a land constraint
- Technological progress over this period
  - Increased income per capita in the short-run

# The Malthusian Epoch

- Central characteristics of the period:
  - Positive effect of income on population growth due to:
    - reduction in child mortality, increase in fertility & life expectancy
  - Diminishing returns to labor:
    - reflecting the existence of a land constraint
- Technological progress over this period
  - Increased income per capita in the short-run
  - Population increased, as long as income remains above subsistence

# The Malthusian Epoch

- Central characteristics of the period:
  - Positive effect of income on population growth due to:
    - reduction in child mortality, increase in fertility & life expectancy
  - Diminishing returns to labor:
    - reflecting the existence of a land constraint
- Technological progress over this period
  - Increased income per capita in the short-run
  - Population increased, as long as income remains above subsistence
  - Income per capita ultimately returned to its long-run level

# The Malthusian Epoch

- Central characteristics of the period:
  - Positive effect of income on population growth due to:
    - reduction in child mortality, increase in fertility & life expectancy
  - Diminishing returns to labor:
    - reflecting the existence of a land constraint
- Technological progress over this period
  - Increased income per capita in the short-run
  - Population increased, as long as income remains above subsistence
  - Income per capita ultimately returned to its long-run level
- Technologically advanced & land-rich economies had:

# The Malthusian Epoch

- Central characteristics of the period:
  - Positive effect of income on population growth due to:
    - reduction in child mortality, increase in fertility & life expectancy
  - Diminishing returns to labor:
    - reflecting the existence of a land constraint
- Technological progress over this period
  - Increased income per capita in the short-run
  - Population increased, as long as income remains above subsistence
  - Income per capita ultimately returned to its long-run level
- Technologically advanced & land-rich economies had:
  - Higher population density

# The Malthusian Epoch

- Central characteristics of the period:
  - Positive effect of income on population growth due to:
    - reduction in child mortality, increase in fertility & life expectancy
  - Diminishing returns to labor:
    - reflecting the existence of a land constraint
- Technological progress over this period
  - Increased income per capita in the short-run
  - Population increased, as long as income remains above subsistence
  - Income per capita ultimately returned to its long-run level
- Technologically advanced & land-rich economies had:
  - Higher population density
  - Similar levels of income per-capita in the long-run

## Malthusian Dynamics - Prominent Examples

- The dynamics of Irish economy (1650 - 1850)

## Malthusian Dynamics - Prominent Examples

- The dynamics of Irish economy (1650 - 1850)
  - Triggered by the adoption of a new world crop – potato



## Malthusian Dynamics - Prominent Examples

- The dynamics of Irish economy (1650 - 1850)
  - Triggered by the adoption of a new world crop – potato
- The dynamics of the Chinese Economy (1500 - 1910)

## Malthusian Dynamics - Prominent Examples

- The dynamics of Irish economy (1650 - 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

## Malthusian Dynamics - Prominent Examples

- The dynamics of Irish economy (1650 - 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 - 1700)

## Malthusian Dynamics - Prominent Examples

- The dynamics of Irish economy (1650 - 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 - 1700)
  - Triggered by the Black Death

## Malthusian Dynamics - Ireland (1650 - 1850)

- The Colombian Exchange  $\implies$  massive cultivation of potato post-1650

## Malthusian Dynamics - Ireland (1650 - 1850)

- The Colombian Exchange  $\implies$  massive cultivation of potato post-1650
  - 1650-1840s

## Malthusian Dynamics - Ireland (1650 - 1850)

- The Colombian Exchange  $\implies$  massive cultivation of potato post-1650
  - 1650-1840s
    - Population grew from 2 to 6 million

## Malthusian Dynamics - Ireland (1650 - 1850)

- The Colombian Exchange  $\implies$  massive cultivation of potato post-1650
  - 1650-1840s
    - Population grew from 2 to 6 million
    - Income per capita increased only very modestly



## Malthusian Dynamics - Ireland (1650 - 1850)

- The Colombian Exchange  $\implies$  massive cultivation of potato post-1650
  - 1650-1840s
    - Population grew from 2 to 6 million
    - Income per capita increased only very modestly
  - 1845-1852 Potato blight destroys crops  $\implies$  Great Famine

## Malthusian Dynamics - Ireland (1650 - 1850)

- The Colombian Exchange  $\implies$  massive cultivation of potato post-1650
  - 1650-1840s
    - Population grew from 2 to 6 million
    - Income per capita increased only very modestly
  - 1845-1852 Potato blight destroys crops  $\implies$  Great Famine
    - Population declined by about 2 million (Death & Emigration)

## Malthusian Dynamics - Ireland (1650 - 1850)

- The Colombian Exchange  $\implies$  massive cultivation of potato post-1650
  - 1650-1840s
    - Population grew from 2 to 6 million
    - Income per capita increased only very modestly
  - 1845-1852 Potato blight destroys crops  $\implies$  Great Famine
    - Population declined by about 2 million (Death & Emigration)
    - Income per capita remained nearly unchanged

## Malthusian Dynamics - China (1500 - 1910)

- Superior agricultural technology

## Malthusian Dynamics - China (1500 - 1910)

- Superior agricultural technology
  - 1500-1820

## Malthusian Dynamics - China (1500 - 1910)

- Superior agricultural technology
  - 1500-1820
    - Population increased from 103 to 381 million

## 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%

## 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



## 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

## 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

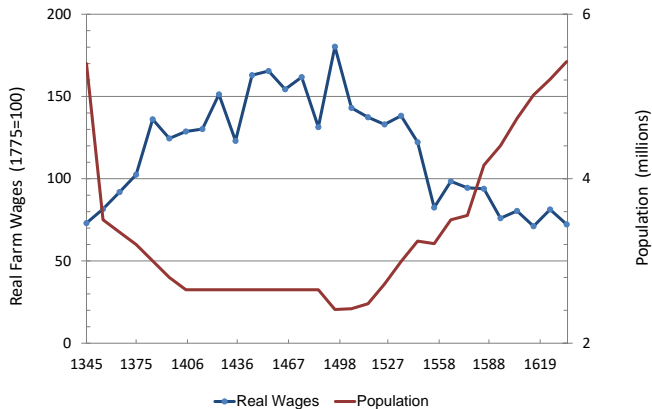
## Malthusian Dynamics - China (1500 - 1910)

- 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

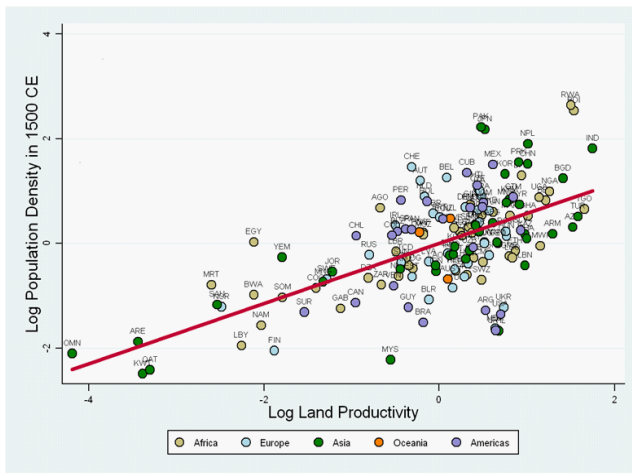
## Malthusian Dynamics - China (1500 - 1910)

- 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



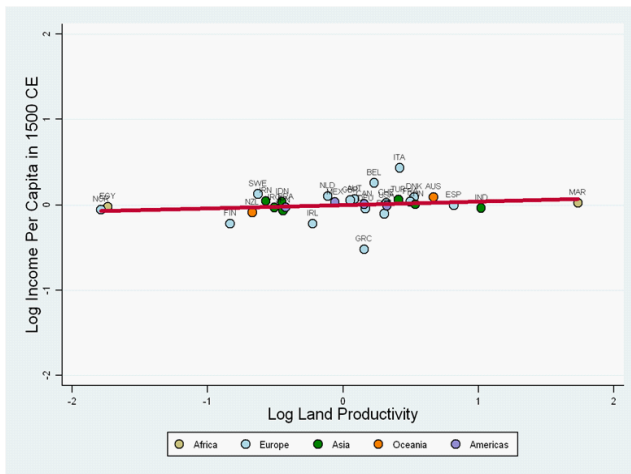
# Land Productivity and Population Density in 1500



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

Source: Ashraf-Galor (AER 2011)

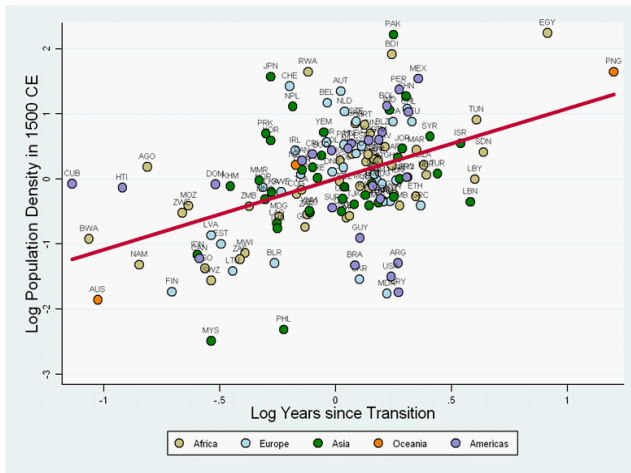
# Land Productivity and Income per Capita in 1500



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

Source: Ashraf-Galor (AER 2011)

# Technology and Population Density in 1500



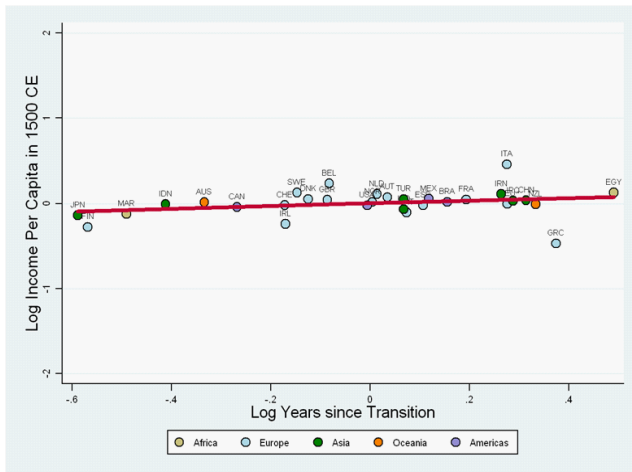
Years elapsed since the Neolithic Transition reflects the technological level in 1500.

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

Source: Ashraf-Galor (AER 2011)



# Technology and 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 Malthusian Epoch – Evolution of Human Traits

- The Malthusian pressure affected

# The Malthusian Epoch – Evolution of Human Traits

- The Malthusian pressure affected
  - The size of the population

# The Malthusian Epoch – Evolution of Human Traits

- The Malthusian pressure affected
  - The size of the population
  - The composition of the population

## The Malthusian Epoch – Evolution of Human Traits

- The Malthusian pressure affected
  - The size of the population
  - The composition of the population
- Hereditary (physical and cognitive) traits that were complementary to the growth process

## The Malthusian Epoch – Evolution of Human Traits

- The Malthusian pressure affected
  - The size of the population
  - The composition of the population
- Hereditary (physical and cognitive) traits that were complementary to the growth process
  - Generated higher income

## The Malthusian Epoch – Evolution of Human Traits

- The Malthusian pressure affected
  - The size of the population
  - The composition of the population
- Hereditary (physical and cognitive) traits that were complementary to the growth process
  - Generated higher income
  - Higher reproductive success

## The Malthusian Epoch – Evolution of Human Traits

- The Malthusian pressure affected
  - The size of the population
  - The composition of the population
- Hereditary (physical and cognitive) traits that were complementary to the growth process
  - Generated higher income
  - Higher reproductive success
  - Became more prevalent in the population



## The Malthusian Epoch – Evolution of Human Traits

- The Malthusian pressure affected
  - The size of the population
  - The composition of the population
- Hereditary (physical and cognitive) traits that were complementary to the growth process
  - Generated higher income
  - Higher reproductive success
  - Became more prevalent in the population
- Evolutionary processes (cultural or biological)

## The Malthusian Epoch – Evolution of Human Traits

- The Malthusian pressure affected
  - The size of the population
  - The composition of the population
- Hereditary (physical and cognitive) traits that were complementary to the growth process
  - Generated higher income
  - Higher reproductive success
  - Became more prevalent in the population
- Evolutionary processes (cultural or biological)
  - Raised the prevalence of complementary traits to the growth process

## The Malthusian Epoch – Evolution of Human Traits

- The Malthusian pressure affected
  - The size of the population
  - The composition of the population
- Hereditary (physical and cognitive) traits that were complementary to the growth process
  - Generated higher income
  - Higher reproductive success
  - Became more prevalent in the population
- Evolutionary processes (cultural or biological)
  - Raised the prevalence of complementary traits to the growth process
  - Reinforced the growth process

## The Malthusian Epoch – Evolution of Human Traits

- The Malthusian pressure affected
  - The size of the population
  - The composition of the population
- Hereditary (physical and cognitive) traits that were complementary to the growth process
  - Generated higher income
  - Higher reproductive success
  - Became more prevalent in the population
- Evolutionary processes (cultural or biological)
  - Raised the prevalence of complementary traits to the growth process
  - Reinforced the growth process
  - Stimulated the take-off from stagnation to growth

# The Malthusian Epoch – Technological Progress

- The size & composition of the population fostered technological progress via:

# The Malthusian Epoch – Technological Progress

- The size & composition of the population fostered technological progress via:
  - Supply of innovations

## The Malthusian Epoch – Technological Progress

- The size & composition of the population fostered technological progress via:
  - Supply of innovations
  - Demand for innovations

## The Malthusian Epoch – Technological Progress

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



## The Malthusian Epoch – Technological Progress

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

## The Malthusian Epoch – 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 Malthusian Epoch – 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
  - Evolution in the prevalence of human capital

# The Post-Malthusian Regime

- The onset of economic growth

# The Post-Malthusian Regime

- The onset of economic growth
- Income per capita still has a positive effect on population growth

# The Post-Malthusian Regime

- The onset of economic growth
- Income per capita still has a positive effect on population growth
- Positive feedback loop between population & technology during the Malthusian epoch contributed to:

# The Post-Malthusian Regime

- The onset of economic growth
- Income per capita still has a positive effect on population growth
- Positive feedback loop between population & technology during the Malthusian epoch contributed to:
  - The size of the population

## The Post-Malthusian Regime

- The onset of economic growth
- Income per capita still has a positive effect on population growth
- Positive feedback loop between population & technology during the Malthusian epoch contributed to:
  - The size of the population
  - The prevalence of growth enhancing traits in the population



## The Post-Malthusian Regime

- The onset of economic growth
- Income per capita still has a positive effect on population growth
- Positive feedback loop between population & technology during the Malthusian epoch contributed to:
  - The size of the population
  - The prevalence of growth enhancing traits in the population
  - The rate of technological progress

## The Post-Malthusian Regime

- The onset of economic growth
- Income per capita still has a positive effect on population growth
- Positive feedback loop between population & technology during the Malthusian epoch contributed to:
  - The size of the population
  - The prevalence of growth enhancing traits in the population
  - The rate of technological progress
- Technological progress outpaced biological reproduction:

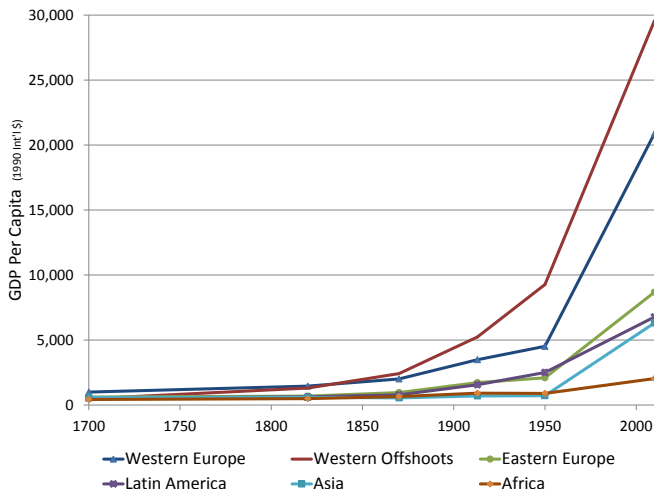
## The Post-Malthusian Regime

- The onset of economic growth
- Income per capita still has a positive effect on population growth
- Positive feedback loop between population & technology during the Malthusian epoch contributed to:
  - The size of the population
  - The prevalence of growth enhancing traits in the population
  - The rate of technological progress
- Technological progress outpaced biological reproduction:
  - Output increased more than population

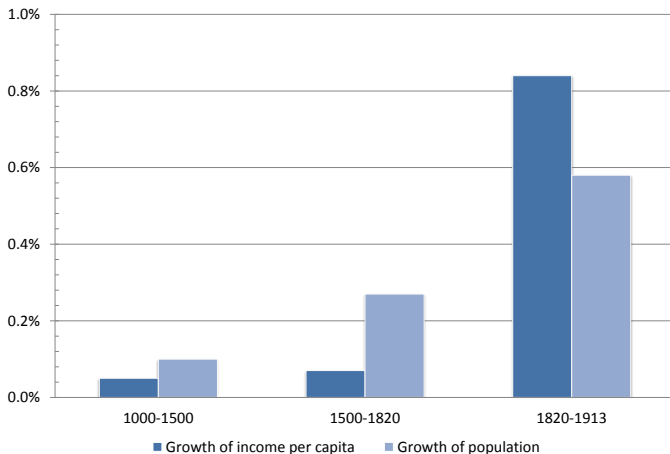
# The Post-Malthusian Regime

- The onset of economic growth
- Income per capita still has a positive effect on population growth
- Positive feedback loop between population & technology during the Malthusian epoch contributed to:
  - The size of the population
  - The prevalence of growth enhancing traits in the population
  - The rate of technological progress
- Technological progress outpaced biological reproduction:
  - Output increased more than population
    - growth in income per capita

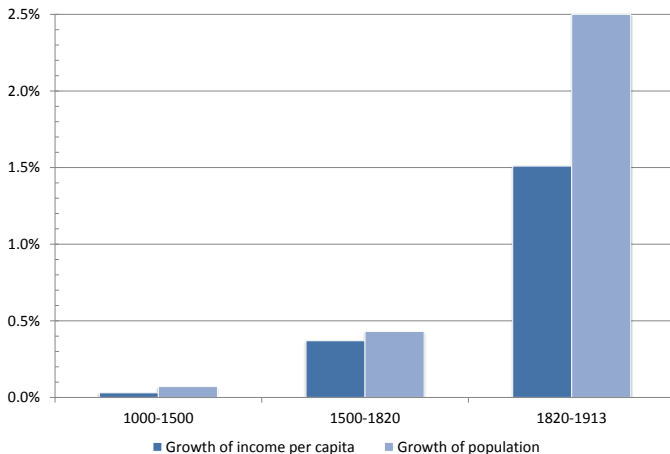
# Regional Variation in the Timing of the Take-off



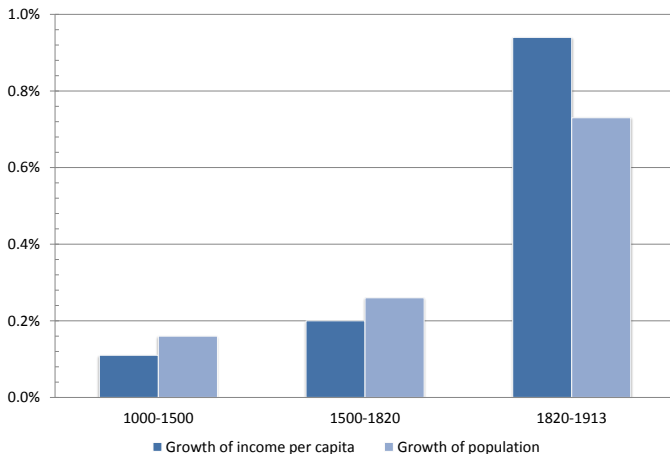
## Take-off: Growth of Population & Income per Capita – World



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

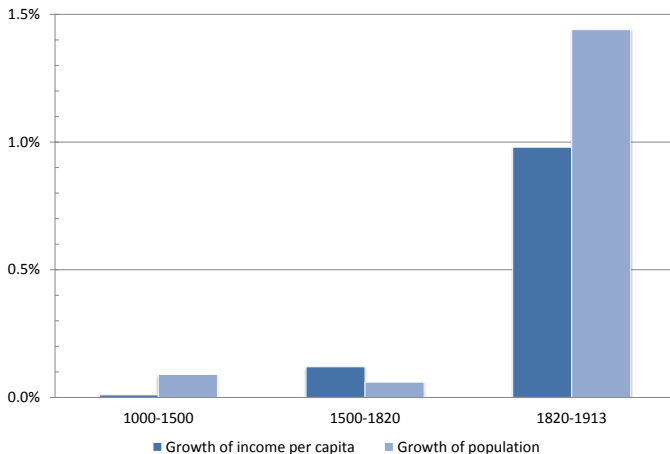


# Take-off: Growth of Population & Income per Capita – Western Europe

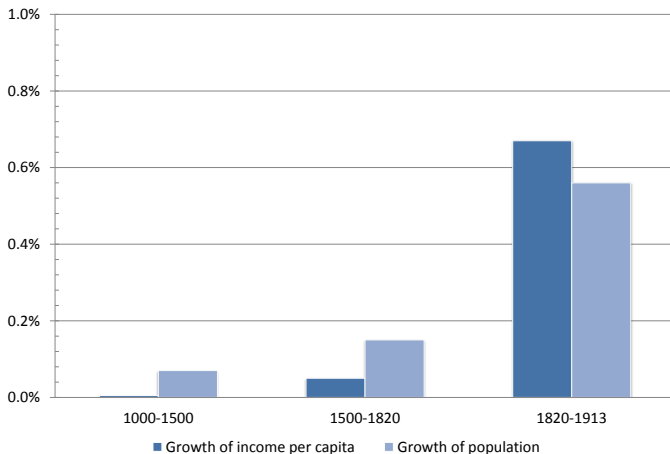




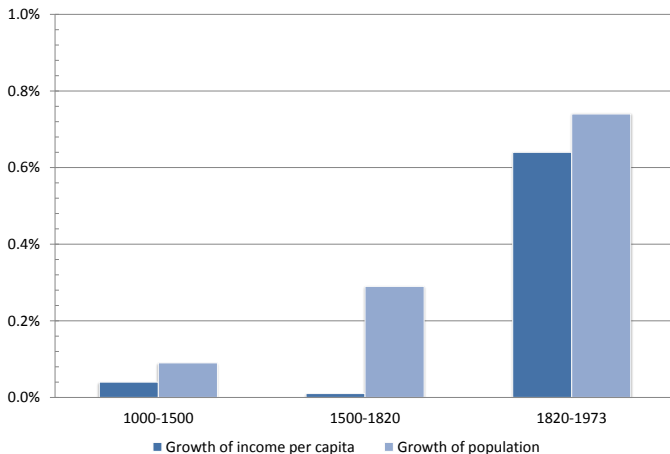
## Take-off: Growth of Population & Income per Capita – Latin America



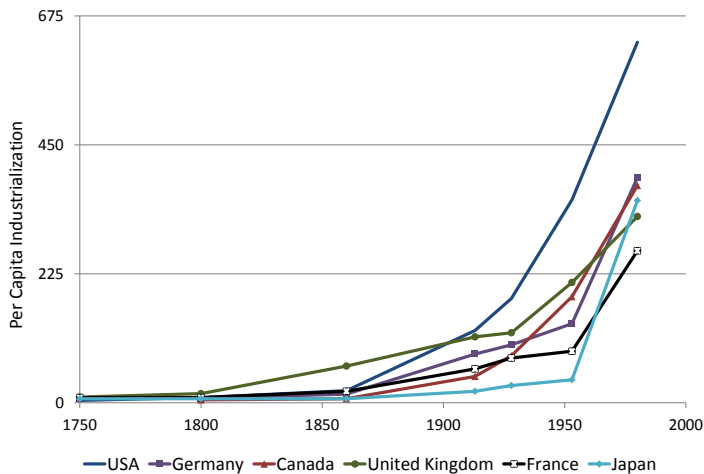
# Take-off: Growth of Population & Income per Capita – Africa



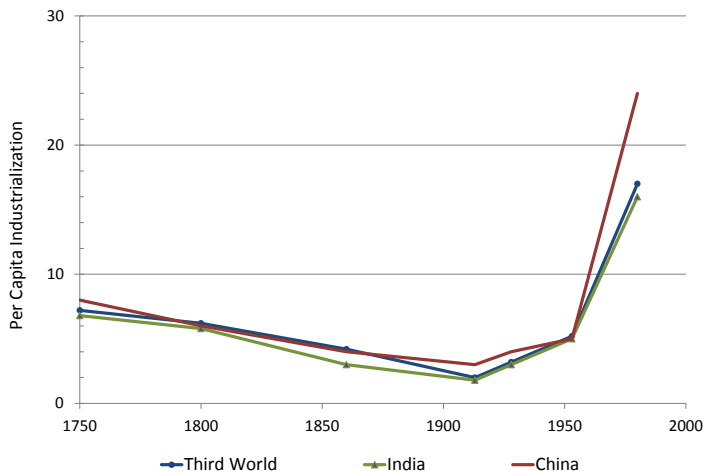
## Take-off: Growth of Population & Income per Capita – Asia



# Take-off & Increased Industrialization per Capita



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



# The Modern Growth Regime

- Sustained economic growth

# The Modern Growth Regime

- Sustained economic growth
  - Technological progress accelerates

# The Modern Growth Regime

- Sustained economic growth
  - Technological progress accelerates
    - $\Rightarrow$  Industrial demand for human capital



# The Modern Growth Regime

- Sustained economic growth
  - Technological progress accelerates
    - $\Rightarrow$  Industrial demand for human capital
  - Human capital formation

# The Modern Growth Regime

- Sustained economic growth
  - Technological progress accelerates
    - $\Rightarrow$  Industrial demand for human capital
  - Human capital formation
    - $\Rightarrow$  Decline in fertility rates (substitution of quantity by quality)

# The Modern Growth Regime

- Sustained economic growth
  - Technological progress accelerates
    - $\Rightarrow$  Industrial demand for human capital
  - Human capital formation
    - $\Rightarrow$  Decline in fertility rates (substitution of quantity by quality)
  - The decline in population growth

# The Modern Growth Regime

- Sustained economic growth
  - Technological progress accelerates
    - $\Rightarrow$  Industrial demand for human capital
  - Human capital formation
    - $\Rightarrow$  Decline in fertility rates (substitution of quantity by quality)
  - The decline in population growth
    - $\Rightarrow$  Freed the growth process from counterbalancing effects of population growth

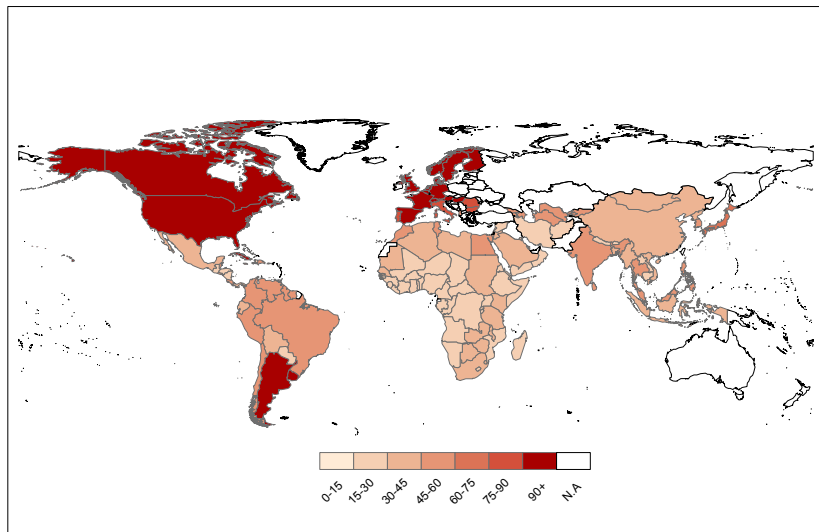
# The Modern Growth Regime

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

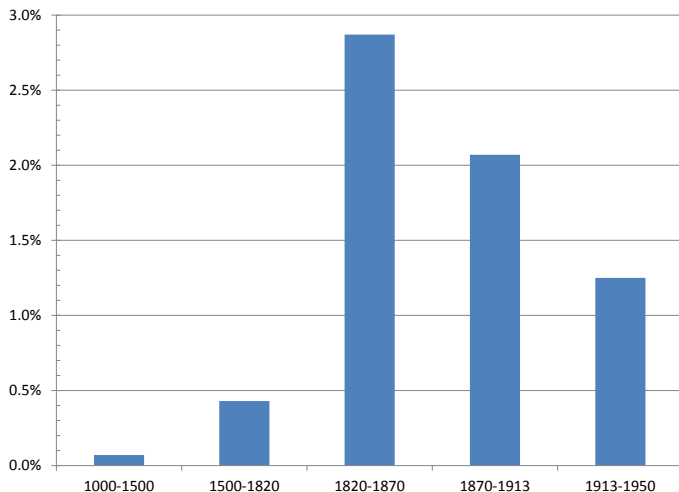
# The Modern Growth Regime

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

## Years Elapsed since the Onset of the Fertility Decline

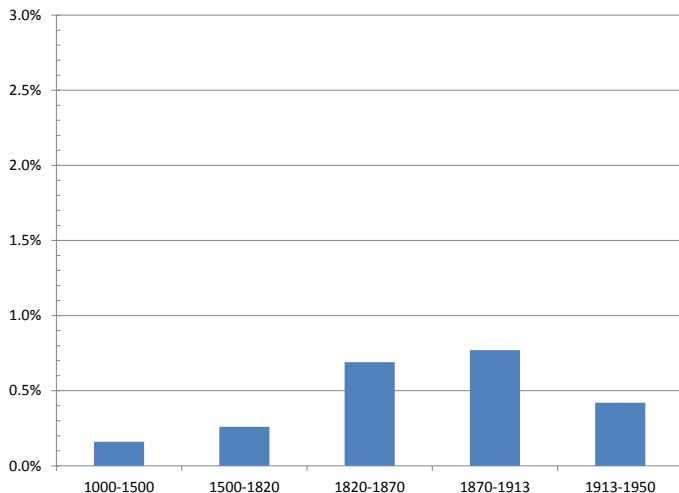


## Early Fertility Decline – Western Offshoots

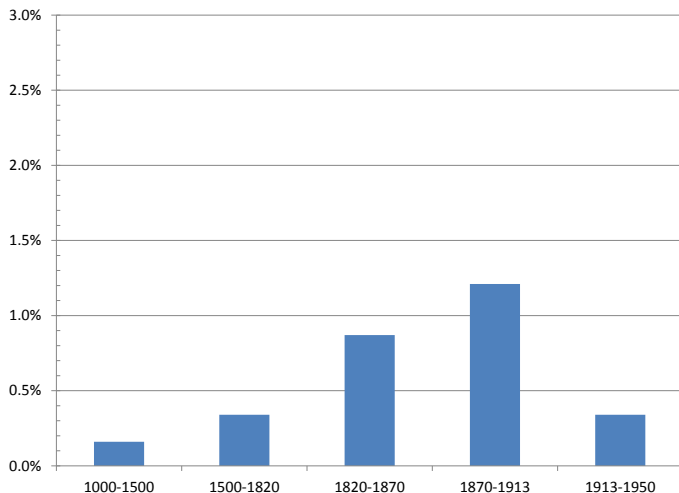




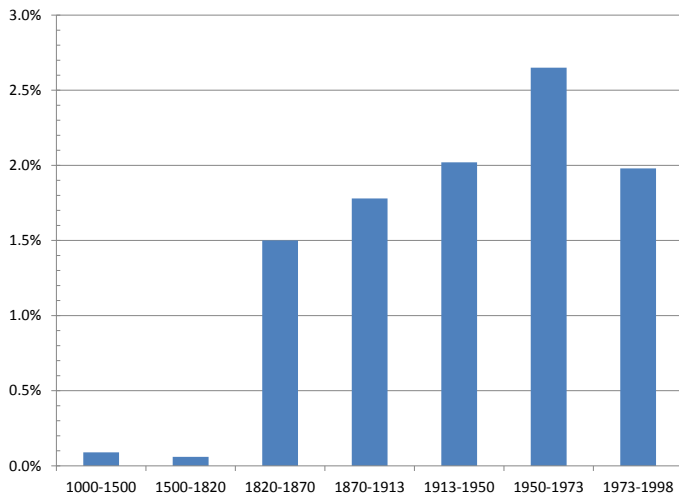
## Early Fertility Decline – Western Europe



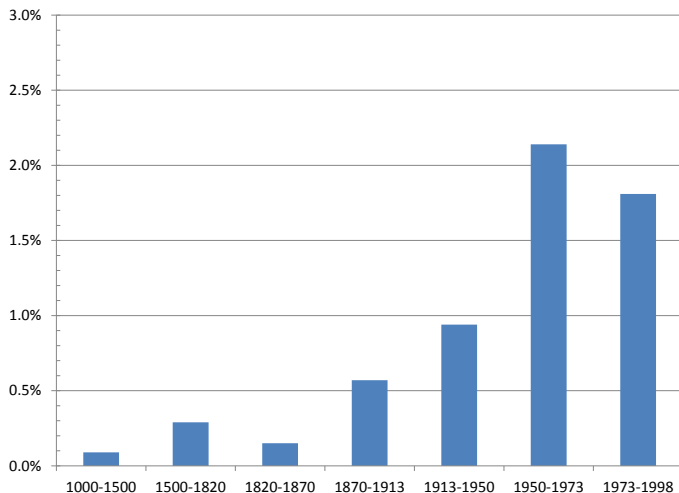
## Early Fertility Decline – Eastern Europe



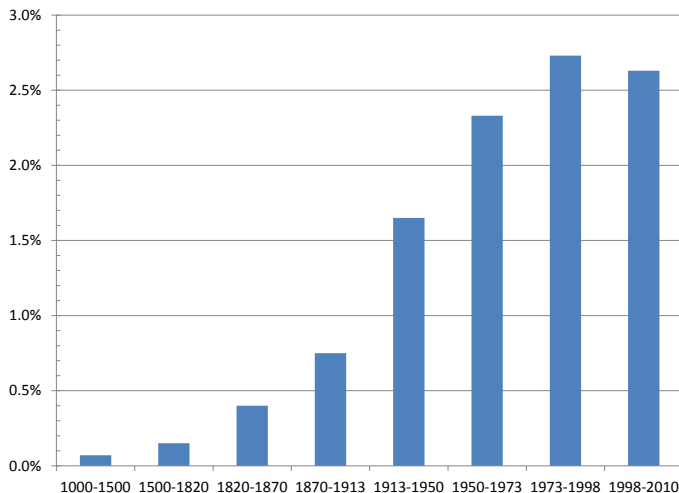
## Late Fertility Decline – Latin America



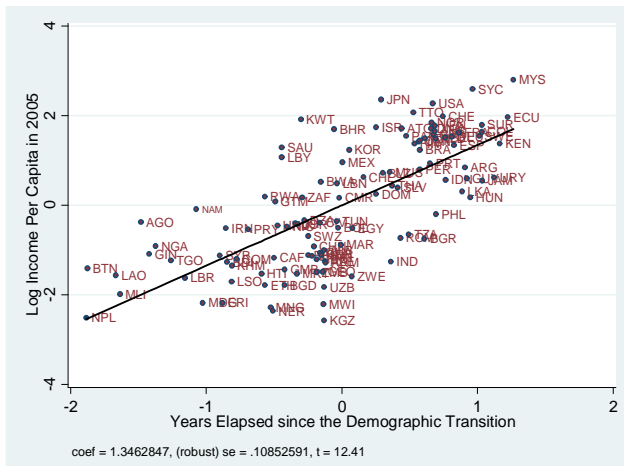
## Late Fertility Decline – Asia



## Late Fertility Decline – Africa

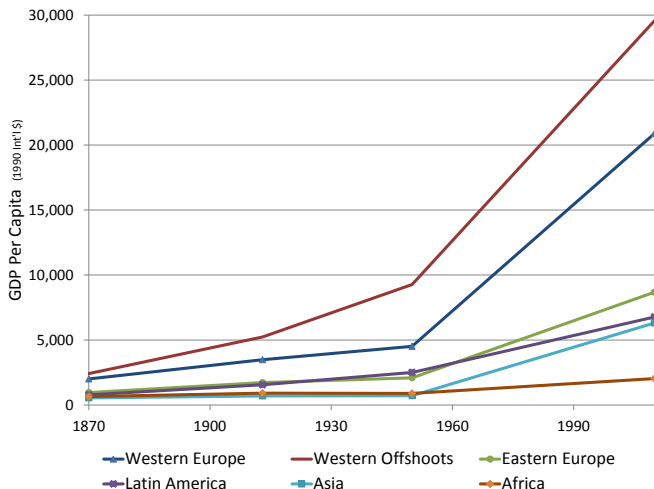


# Timing of the Demographic Transition and Current Income per Capita

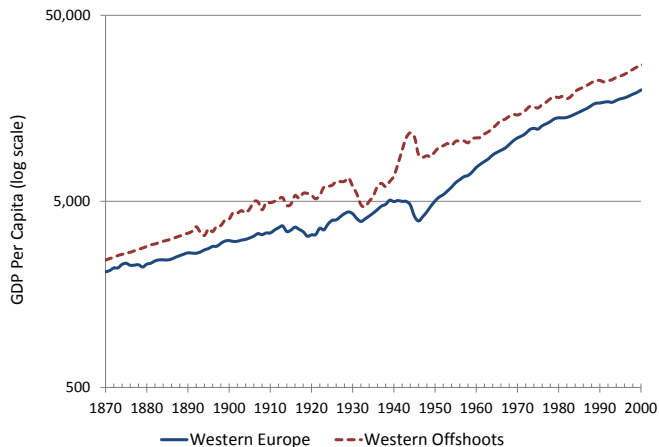


Conditional on absolute latitude.

# Timing of the Demographic Transition and Divergence across Regions

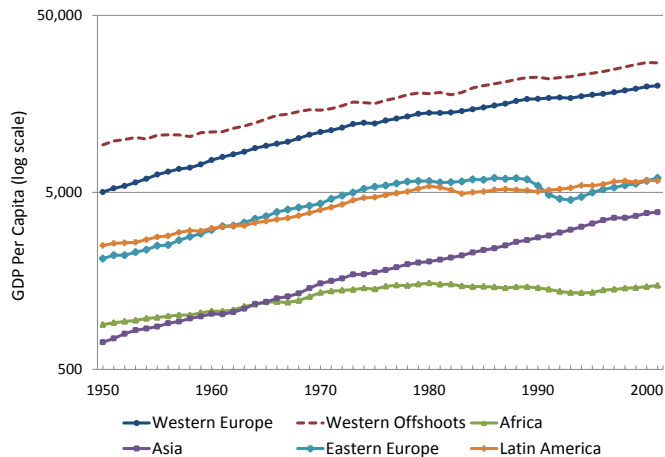


# Sustained Economic Growth: 1870–2000





# 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?

## Fundamental Research Questions: The Malthusian Epoch

- What accounts for the epoch of stagnation that characterized most of human history?
  - Why had episodes of technological progress in the pre-industrialization era fail to generate sustained economic growth?

## Fundamental Research Questions: The Malthusian Epoch

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

## Fundamental Research Questions: Transition from Stagnation to Growth

- What are the factors that generated the transition from stagnation to growth of DCs?

## Fundamental Research Questions: Transition from Stagnation to Growth

- What are the factors that generated the transition from stagnation to growth of DCs?
- What are the hurdles faced by LDCs in the transition from stagnation to growth?

## Fundamental Research Questions: Transition from Stagnation to Growth

- What are the factors that generated the transition from stagnation to growth of DCs?
- What are the hurdles faced by LDCs in the transition from stagnation to growth?
- What triggered the demographic transition?

## Fundamental Research Questions: Transition from Stagnation to Growth

- What are the factors that generated the transition from stagnation to growth of DCs?
- What are the hurdles faced by LDCs in the transition from stagnation to growth?
- What triggered the demographic transition?
- Is the demographic transition a necessary condition for sustained economic growth?



## Fundamental Research Questions: Comparative Development

- What accounts for the transition from stagnation to growth in some countries and the persistent stagnation in others?

## Fundamental Research Questions: Comparative Development

- What accounts for the transition from stagnation to growth in some countries and the persistent stagnation in others?
- What governs the differential timing of the demographic transition across nations?

## Fundamental Research Questions: Comparative Development

- What accounts for the transition from stagnation to growth in some countries and the persistent stagnation in others?
- What governs the differential timing of the demographic transition across nations?
- What is the origin of the vast inequality that emerged across countries in the past two centuries?

## Fundamental Research Questions: Comparative Development

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

## Fundamental Research Questions: Comparative Development

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

## Neoclassical Growth Theory (GT)

- Inconsistent with the development process over most of human history:

## Neoclassical Growth Theory (GT)

- Inconsistent with the development process over most of human history:
  - GT: growth rates decline in the transition to sustained growth

## Neoclassical 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



## Neoclassical 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

## Neoclassical 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

## Neoclassical 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)

## Neoclassical 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

## Neoclassical 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

## Neoclassical 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

## Neoclassical 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

## Neoclassical 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



## Neoclassical Growth Theory (GT)

- Focuses on the proximate causes of growth

## Neoclassical Growth Theory (GT)

- Focuses on the proximate causes of growth
  - Factor Accumulation:

# Neoclassical Growth Theory (GT)

- Focuses on the proximate causes of growth
  - Factor Accumulation:
    - Physical capital accumulation (Solow, QJE 1956)

## Neoclassical Growth Theory (GT)

- Focuses on the proximate causes of growth
  - Factor Accumulation:
    - Physical capital accumulation (Solow, QJE 1956)
    - Human capital accumulation (Lucas, JME 1988)

## Neoclassical Growth Theory (GT)

- Focuses on the proximate causes of growth
  - Factor Accumulation:
    - Physical capital accumulation (Solow, QJE 1956)
    - Human capital accumulation (Lucas, JME 1988)
  - Technological Progress:

## Neoclassical Growth Theory (GT)

- Focuses on the proximate causes of growth
  - Factor Accumulation:
    - Physical capital accumulation (Solow, QJE 1956)
    - Human capital accumulation (Lucas, JME 1988)
  - Technological Progress:
    - Endogenous Growth (Romer, JPE 1990; Grossman-Helpman, 1991; Aghion-Howitt, ECT 1992)

## Neoclassical Growth Theory (GT)

- Captures the role of factor accumulation and technological progress among countries that are in the modern growth regime

## Neoclassical Growth Theory (GT)

- Captures the role of factor accumulation and technological progress among countries that are in the modern growth regime
- Not designed to shed light on:



## Neoclassical Growth Theory (GT)

- Captures the role of factor accumulation and technological progress among countries that are in the modern growth regime
- Not designed to shed light on:
  - The origins of vast and persistent inequality across countries

## Neoclassical Growth Theory (GT)

- Captures the role of factor accumulation and technological progress among countries that are in the modern growth regime
- Not designed to shed light on:
  - The origins of vast and persistent inequality across countries
  - The forces that triggered the transition of DCs from stagnation to growth

## Neoclassical Growth Theory (GT)

- Captures the role of factor accumulation and technological progress among countries that are in the modern growth regime
- Not designed to shed light on:
  - The 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

## Neoclassical Growth Theory (GT)

- Captures the role of factor accumulation and technological progress among countries that are in the modern growth regime
- Not designed to shed light on:
  - The 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

## Neoclassical Growth Theory (GT)

- Captures the role of factor accumulation and technological progress among countries that are in the modern growth regime
- Not designed to shed light on:
  - The 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 historical roots of vast and persistent inequality across countries

# Unified Growth Theory



# Unified Growth Theory

- Captures the:

# Unified Growth Theory

- Captures the:
  - Process of development in its entirety



# Unified Growth Theory

- Captures the:
  - Process of development in its entirety
  - Forces that permitted the transition from stagnation to growth

# Unified Growth Theory

- Captures the:
  - Process of development in its entirety
  - Forces that permitted the transition from stagnation to growth
  - Hurdles faced by LDCs in their transitions from stagnation to growth

# Unified Growth Theory

- Captures the:
  - Process of development in its entirety
  - Forces that permitted the transition from stagnation to growth
  - Hurdles faced by LDCs in their transitions from stagnation to growth
  - The origins of the uneven distribution of wealth across the globe

# Unified Growth Theory

- Captures the:
  - Process of development in its entirety
  - Forces that permitted the transition from stagnation to growth
  - Hurdles faced by LDCs in their transitions from stagnation to growth
  - The origins of the uneven distribution of wealth across the globe
  - Persistent effect of initial biogeographical factors on the growth process

## Major Challenge

- Policy based on insights from growth theory encourage

## Major Challenge

- Policy based on insights from growth theory encourage
  - Investment in education and health

## Major Challenge

- Policy based on insights from growth theory encourage
  - Investment in education and health
  - Openness to international capital markets

## Major Challenge

- Policy based on insights from growth theory encourage
  - Investment in education and health
  - Openness to international capital markets
  - Technological diffusion



# Major Challenge

- Policy based on insights from growth theory encourage
  - Investment in education and health
  - Openness to international capital markets
  - Technological diffusion
    - $\Rightarrow$  failed to generate universal convergence

## Major Challenge

- Policy based on insights from growth theory encourage
  - Investment in education and health
  - Openness to international capital markets
  - Technological diffusion
    - $\Rightarrow$  failed to generate universal convergence
- Why do some societies fail to:

## Major Challenge

- Policy based on insights from growth theory encourage
  - Investment in education and health
  - Openness to international capital markets
  - Technological diffusion
    - $\implies$  failed to generate universal convergence
- Why do some societies fail to:
  - Efficiently invest in physical and human capital?

# Major Challenge

- Policy based on insights from growth theory encourage
  - Investment in education and health
  - Openness to international capital markets
  - Technological diffusion
    - $\Rightarrow$  failed to generate universal convergence
- Why do some societies fail to:
  - Efficiently invest in physical and human capital?
  - Adopt advance technologies?

# Barriers to Accumulation and Innovation

- Inequality

## Barriers to Accumulation and Innovation

- Inequality
  - Suboptimal accumulation of human and physical capital

# Barriers to Accumulation and Innovation

- Inequality
  - Suboptimal accumulation of human and physical capital
    - Credit market imperfections (Galor-Zeira, RES 1993)

# 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)



# 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)

## 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)

## 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)
- Inefficient Institutions (limited protection of property rights & rule of law)

## 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)
- Inefficient Institutions (limited protection of property rights & rule of law)
  - Reduced incentive to accumulate/innovate (North, 1981; Acemoglu-Robinson, 2012)

## 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)
- Inefficient Institutions (limited protection of property rights & rule of law)
  - Reduced incentive to accumulate/innovate (North, 1981; Acemoglu-Robinson, 2012)
- Ethnic fractionalization

# 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)
- 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

# 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)
- 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
    - Suboptimal investment (Easterly-Levine, QJE 1997; Alesina et al., JEG 2003)

## 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)
- 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
    - Suboptimal investment (Easterly-Levine, QJE 1997; Alesina et al., JEG 2003)
- Limited Social capital (limited trust & cooperation)



## 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)
- 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
    - Suboptimal investment (Easterly-Levine, QJE 1997; Alesina et al., JEG 2003)
- Limited Social capital (limited trust & cooperation)
  - Suboptimal investment (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

# 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)

# 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

# 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

# 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)

# 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

# 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)



# 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)
- Persistent effect of the legal system of colonial powers

# 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)
- 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)

# 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)
- 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

# 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)
- 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 2013)

# Origin and Persistence of Cultural Factors

- Geographical origins and persistence of:

# Origin and Persistence of Cultural Factors

- Geographical origins and persistence of:
  - Trust & Cooperation (Durante, 2010; Litina, 2016)

# Origin and Persistence of Cultural Factors

- Geographical origins and persistence of:
  - Trust & Cooperation (Durante, 2010; Litina, 2016)
  - Cultural diversity (Ashraf-Galor, 2012)

# Origin and Persistence of Cultural Factors

- Geographical origins and persistence of:
  - Trust & Cooperation (Durante, 2010; Litina, 2016)
  - Cultural diversity (Ashraf-Galor, 2012)
  - Female labor force participation (Alesina et al., QJE 2013)



# Origin and Persistence of Cultural Factors

- Geographical origins and persistence of:
  - Trust & Cooperation (Durante, 2010; Litina, 2016)
  - Cultural diversity (Ashraf-Galor, 2012)
  - Female labor force participation (Alesina et al., QJE 2013)
  - Time preference (Galor and Ozak, AER 2016)

# Origin and Persistence of Cultural Factors

- Geographical origins and persistence of:
  - **Trust & Cooperation** (Durante, 2010; Litina, 2016)
  - **Cultural diversity** (Ashraf-Galor, 2012)
  - **Female labor force participation** (Alesina et al., QJE 2013)
  - **Time preference** (Galor and Ozak, AER 2016)
  - **Loss Aversion** (Galor and Savitskiy (2018)

# Origin and Persistence of Cultural Factors

- Geographical origins and persistence of:
  - Trust & Cooperation (Durante, 2010; Litina, 2016)
  - Cultural diversity (Ashraf-Galor, 2012)
  - Female labor force participation (Alesina et al., QJE 2013)
  - Time preference (Galor and Ozak, AER 2016)
  - Loss Aversion (Galor and Savitskiy (2018)
- Religious origins of:

# Origin and Persistence of Cultural Factors

- Geographical origins and persistence of:
  - Trust & Cooperation (Durante, 2010; Litina, 2016)
  - Cultural diversity (Ashraf-Galor, 2012)
  - Female labor force participation (Alesina et al., QJE 2013)
  - Time preference (Galor and Ozak, AER 2016)
  - Loss Aversion (Galor and Savitskiy (2018)
- Religious origins of:
  - Preferences for human capital (Becker-Woessmann, QJE 2009; Botticini-Eckstein, 2012)

# Origin and Persistence of Cultural Factors

- Geographical origins and persistence of:
  - Trust & Cooperation (Durante, 2010; Litina, 2016)
  - Cultural diversity (Ashraf-Galor, 2012)
  - Female labor force participation (Alesina et al., QJE 2013)
  - Time preference (Galor and Ozak, AER 2016)
  - Loss Aversion (Galor and Savitskiy (2018)
- Religious origins of:
  - Preferences for human capital (Becker-Woessmann, QJE 2009; Botticini-Eckstein, 2012)
  - Work ethic & thrift & entrepreneurial spirit (Weber, 1905; Andersen et al., 2017)

# Origin and Persistence of Cultural Factors

- Geographical origins and persistence of:
  - Trust & Cooperation (Durante, 2010; Litina, 2016)
  - Cultural diversity (Ashraf-Galor, 2012)
  - Female labor force participation (Alesina et al., QJE 2013)
  - Time preference (Galor and Ozak, AER 2016)
  - Loss Aversion (Galor and Savitskiy (2018)
- Religious origins of:
  - Preferences for human capital (Becker-Woessmann, QJE 2009; Botticini-Eckstein, 2012)
  - Work ethic & thrift & entrepreneurial spirit (Weber, 1905; Andersen et al., 2017)
- Intergenerational transmission of:

# Origin and Persistence of Cultural Factors

- Geographical origins and persistence of:
  - Trust & Cooperation (Durante, 2010; Litina, 2016)
  - Cultural diversity (Ashraf-Galor, 2012)
  - Female labor force participation (Alesina et al., QJE 2013)
  - Time preference (Galor and Ozak, AER 2016)
  - Loss Aversion (Galor and Savitskiy (2018)
- Religious origins of:
  - Preferences for human capital (Becker-Woessmann, QJE 2009; Botticini-Eckstein, 2012)
  - Work ethic & thrift & entrepreneurial spirit (Weber, 1905; Andersen et al., 2017)
- Intergenerational transmission of:
  - Preferences for human capital (Galor-Moav, QJE 2002)

# Origin and Persistence of Cultural Factors

- Geographical origins and persistence of:
  - Trust & Cooperation (Durante, 2010; Litina, 2016)
  - Cultural diversity (Ashraf-Galor, 2012)
  - Female labor force participation (Alesina et al., QJE 2013)
  - Time preference (Galor and Ozak, AER 2016)
  - Loss Aversion (Galor and Savitskiy (2018)
- Religious origins of:
  - Preferences for human capital (Becker-Woessmann, QJE 2009; Botticini-Eckstein, 2012)
  - Work ethic & thrift & entrepreneurial spirit (Weber, 1905; Andersen et al., 2017)
- 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

# Persistent Effects of Geographical Factors

- Biogeographical conditions that triggered the Neolithic Revolution
  - Technological head-start: (Diamond, 1997; Olsson-Hibbs, EER, 2005)

# 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)

## 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 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)
- Disease environment

## 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)
- Disease environment
  - Persistent effect on labor productivity & investment in human capital (Gallup-Sachs, 2001; Andersen-Dalgaard-Selaya, 2016)

## 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)
- Disease environment
  - Persistent effect on labor productivity & investment in human capital (Gallup-Sachs, 2001; Andersen-Dalgaard-Selaya, 2016)
- Geographical isolation

## 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)
- Disease environment
  - Persistent effect on labor productivity & investment in human capital (Gallup-Sachs, 2001; Andersen-Dalgaard-Selaya, 2016)
- Geographical isolation
  - Reduced trade and technological diffusion (Gallup-Mellinger-Sachs, 1999)



## Persistent Effects of Geographical Factors

- Range of soil quality

# Persistent Effects of Geographical Factors

- Range of soil quality
  - Emergence of geographical specific human capital  $\implies$  reduced mobility  
 $\implies$  ethnic fractionalization (Michalopoulos, AER 2012)

## Persistent Effects of Geographical Factors

- 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)

# Persistent Effects of Geographical Factors

- 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

## Persistent Effects of Geographical Factors

- 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-Pascalli, 2019)

# Persistent Effects of Geographical Factors

- Land suitable for large plantations

## Persistent Effects of Geographical Factors

- Land suitable for large plantations
  - Inequality:

## Persistent Effects of Geographical Factors

- Land suitable for large plantations
  - Inequality:
    - Extractive institutions (Engerman-Sokoloff, 1997)



# Persistent Effects of Geographical Factors

- Land suitable for large plantations
  - Inequality:
    - Extractive institutions (Engerman-Sokoloff, 1997)
  - Concentration of landownership:

# 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)

## 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

## 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

## 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 Human Characteristics

- Evolution of traits that are complementary to the growth process:

## Persistent Effects of Human Characteristics

- Evolution of traits that are complementary to the growth process:
  - Preference for education (Galor-Moav, QJE 2002; Galor-Klemp, Nature E&E, 2019)

## Persistent Effects of Human Characteristics

- Evolution of traits that are complementary to the growth process:
  - Preference for education (Galor-Moav, QJE 2002; Galor-Klemp, Nature E&E, 2019)
  - Entrepreneurial spirit (Galor-Michalopoulos, JET 2012)



## Persistent Effects of Human Characteristics

- Evolution of traits that are complementary to the growth process:
  - Preference for education (Galor-Moav, QJE 2002; Galor-Klemp, Nature E&E, 2019)
  - Entrepreneurial spirit (Galor-Michalopoulos, JET 2012)
- Genetic distance between societies reduces:

## Persistent Effects of Human Characteristics

- Evolution of traits that are complementary to the growth process:
  - Preference for education (Galor-Moav, QJE 2002; Galor-Klemp, Nature E&E, 2019)
  - Entrepreneurial spirit (Galor-Michalopoulos, JET 2012)
- Genetic distance between societies reduces:
  - Diffusion from the technological frontier (Spolaore-Wacziarg, QJE 2009)

## Persistent Effects of Human Characteristics

- Evolution of traits that are complementary to the growth process:
  - Preference for education (Galor-Moav, QJE 2002; Galor-Klemp, Nature E&E, 2019)
  - 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)

## Persistent Effects of Human Characteristics

- Evolution of traits that are complementary to the growth process:
  - Preference for education (Galor-Moav, QJE 2002; Galor-Klemp, Nature E&E, 2019)
  - 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)
- Population diversity within a society:

## Persistent Effects of Human Characteristics

- Evolution of traits that are complementary to the growth process:
  - Preference for education (Galor-Moav, QJE 2002; Galor-Klemp, Nature E&E, 2019)
  - 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)
- Population diversity within a society:
  - Reduces cohesiveness:

## Persistent Effects of Human Characteristics

- Evolution of traits that are complementary to the growth process:
  - Preference for education (Galor-Moav, QJE 2002; Galor-Klemp, Nature E&E, 2019)
  - 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)
- Population diversity within a society:
  - Reduces cohesiveness:
    - Higher cultural fragmentation (Ashraf-Galor, AER-PP 2013)

## Persistent Effects of Human Characteristics

- Evolution of traits that are complementary to the growth process:
  - Preference for education (Galor-Moav, QJE 2002; Galor-Klemp, Nature E&E, 2019)
  - 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)
- Population diversity within a society:
  - Reduces cohesiveness:
    - Higher cultural fragmentation (Ashraf-Galor, AER-PP 2013)
    - Increased mistrust & prevalence of civil conflict (Arbatli-Ashraf-Galor-Klem, ECMA 2019)

## Persistent Effects of Human Characteristics

- Evolution of traits that are complementary to the growth process:
  - Preference for education (Galor-Moav, QJE 2002; Galor-Klemp, Nature E&E, 2019)
  - 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)
- Population diversity within a society:
  - Reduces cohesiveness:
    - Higher cultural fragmentation (Ashraf-Galor, AER-PP 2013)
    - Increased mistrust & prevalence of civil conflict (Arbatli-Ashraf-Galor-Klem, ECMA 2019)
  - Generates a wider range of complementarity traits conducive for innovations



## Persistent Effects of Human Characteristics

- Evolution of traits that are complementary to the growth process:
  - Preference for education (Galor-Moav, QJE 2002; Galor-Klemp, Nature E&E, 2019)
  - 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)
- Population diversity within a society:
  - Reduces cohesiveness:
    - Higher cultural fragmentation (Ashraf-Galor, AER-PP 2013)
    - Increased mistrust & prevalence of civil conflict (Arbatli-Ashraf-Galor-Klem, ECMA 2019)
  - Generates a wider range of complementarity traits conducive for innovations
  - Has a hump-shaped effect on productivity (Ashraf-Galor, AER 2013, Ashraf-Galor, JEL, 2018)

Lower income in overly homogenous & diverse societies