# *International Well-being Inequality in the Long Run*

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# *Main Questions*

- Has **inequality** in ***well-being*** **cumulated** since ***globalization*** began?

- Do ***inequality*** **trends** in ***well-being*** **dimensions concur**?

- How much has the **gap** between the ***West*** and the ***Rest*** contributed to ***international inequality***?

# *How to Measure Living Standards? (I)*

- ***Original*** values for each **dimension of welfare?**

- ***But*** … if **well-being indicators** have ***asymptotic*** **limits**
  => a **transformation** required to **measure changes** within
  ***upper*** and ***lower*** **bounds**

**Option:** A ***linear*** **transformation** of the ***original*** values
Indices for each dimension (***I***) are computed as
$$I = (x - Mo) / (M - Mo),$$
**x**, ***observed value*** of a given dimension of welfare, **Mo** and **M**, ***maximum*** and ***minimum*** values or goalposts

- **But** with ***original*** or ***linearly transformed*** values**,**
  if a social variable has **asymptotic** limits,
  ***identical*** **absolute** changes result in
  ***different*** **increases** depending on the ***starting*** **level**

# *Allowing for* **Quality** *in Health and Education*

- ***Life expectancy at birth (LEB)***, **crude** measure of ***healthy life***

  **- but *health-adjusted life expectancy*** only available since **mid-1990s**

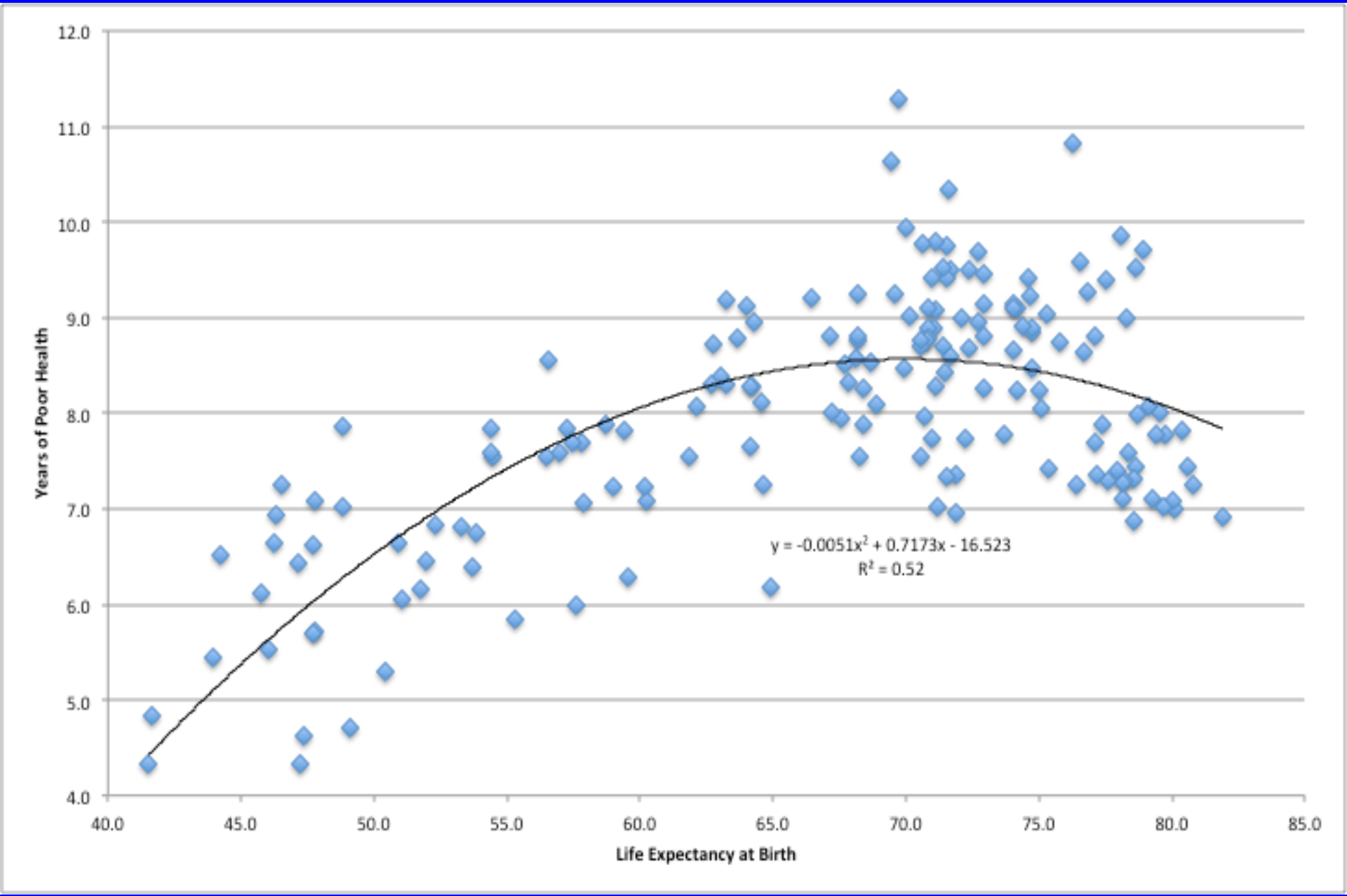
- ***Healthy*** life expectancy **increases** as ***LEB*** **expands**
  **- *Age-specific disability*** is **lower** when ***LEB*** is **higher:**
  as ***LEB*** **increases,** the ***quality*** of life **rises** for **each *age cohort***
  **=> Longer *LEB*, better *health*** in **childhood** and **youth**

- ***Literacy*** and ***Enrolment***, **crude** proxies for ***access to knowledge***

- The ***quality*** of **education** (*cognitive skills*) **improves**
  as its ***quantity*** (*literacy* and *enrolment* rates) **increases**

=> **More years of *education*, better *education*** for **children** and **youth**

# *Years of Poor Health and LEB in 2002*



# *How to Measure Living Standards? (II)*

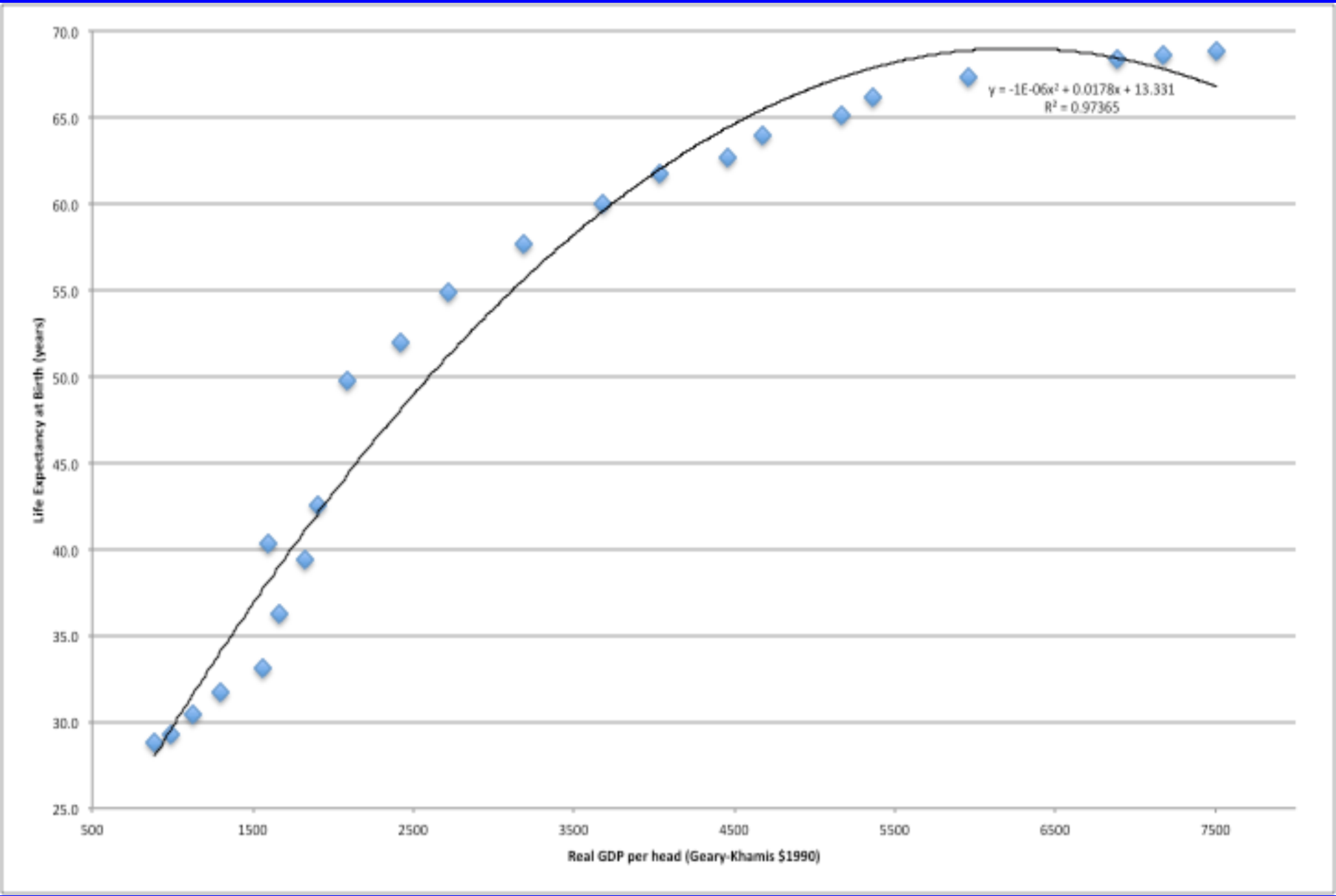
- Can t**ime *trends*** be **inferred** from **cross-section *patterns***?

- **A *non-linear* transformation** of **social** variables **(Kakwani)**
  as an indicator reaches ***higher*** **levels**,
  its ***increases*** represent ***higher*** **achievements *than***
  ***if*** the ***increase*** occurred at a ***lower*** level
  => a **convex *achievement function***

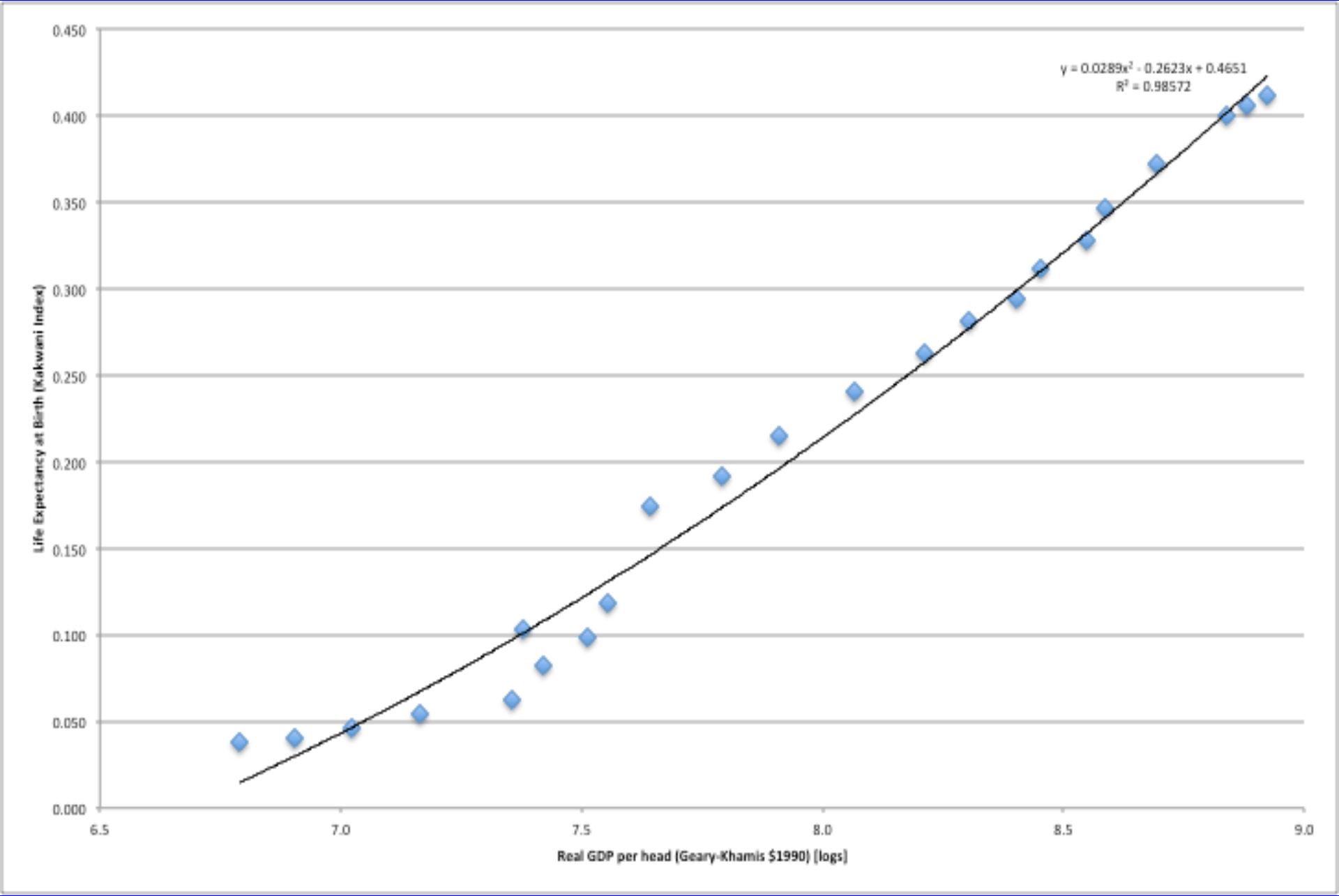
  $$f(x, Mo, M) = ((M - Mo)^{1-\varepsilon} - (M - x)^{1-\varepsilon}) / ((M - Mo)^{1-\varepsilon})$$
  for $0 < \varepsilon < 1$
  **x,** country values; **M** and **Mo**, maximum and minimum values

- If $\varepsilon$ takes a value of **1**,
  $$f(x, Mo, M) = (\log (M-Mo) - \log (M-x)) / \log (M-Mo)$$

# *Preston Curve: The World 1870-2007*



# *Preston Curve Revised: The World 1870-2007*



# *Inequality Measures*

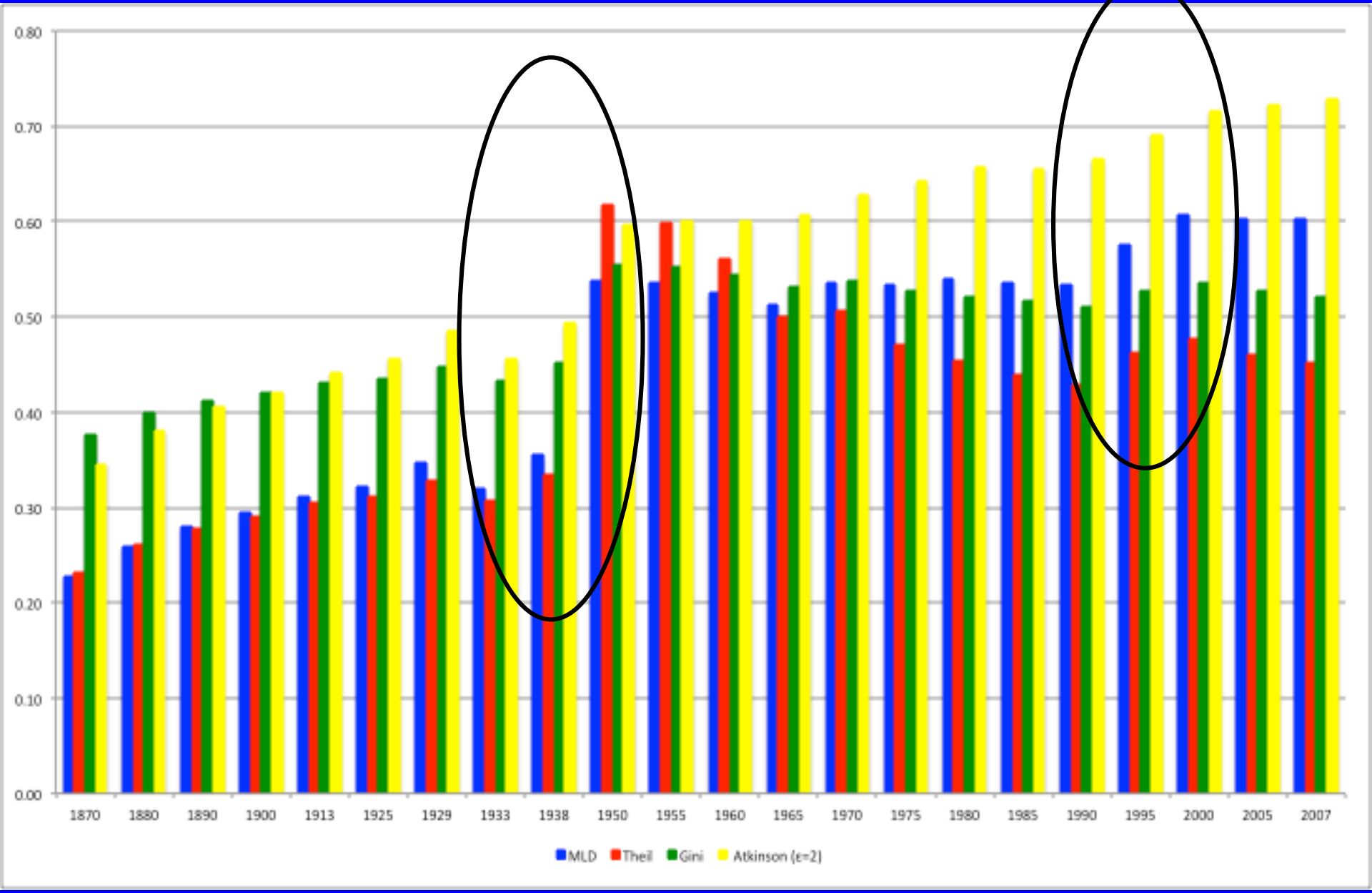
- **Gini**
- **MLD = G(0) = $\sum p_i \ln (p_i/y_i)$**
- **Theil = G(1) = $\sum y_i \ln (y_i/p_i)$**

with $p_i$ and $y_i$ representing country ***i*** **shares** in **total population** [Ni] and **social indicators (*Si*)** [Si*Ni]

- **Atkinson ($\varepsilon = 2$)**

# *International Inequality in Real Per Capita GDP*

**(unweighted)**



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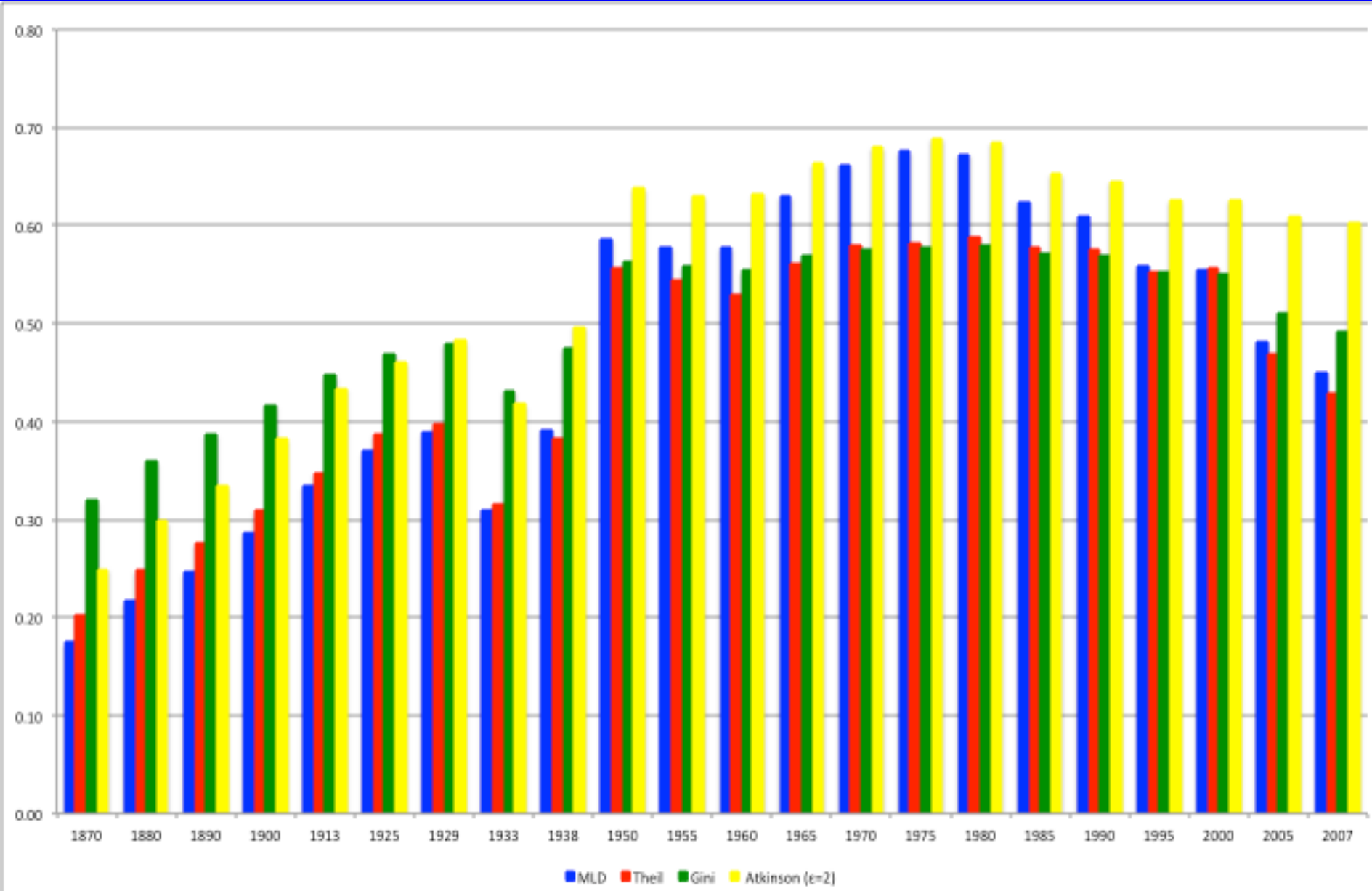
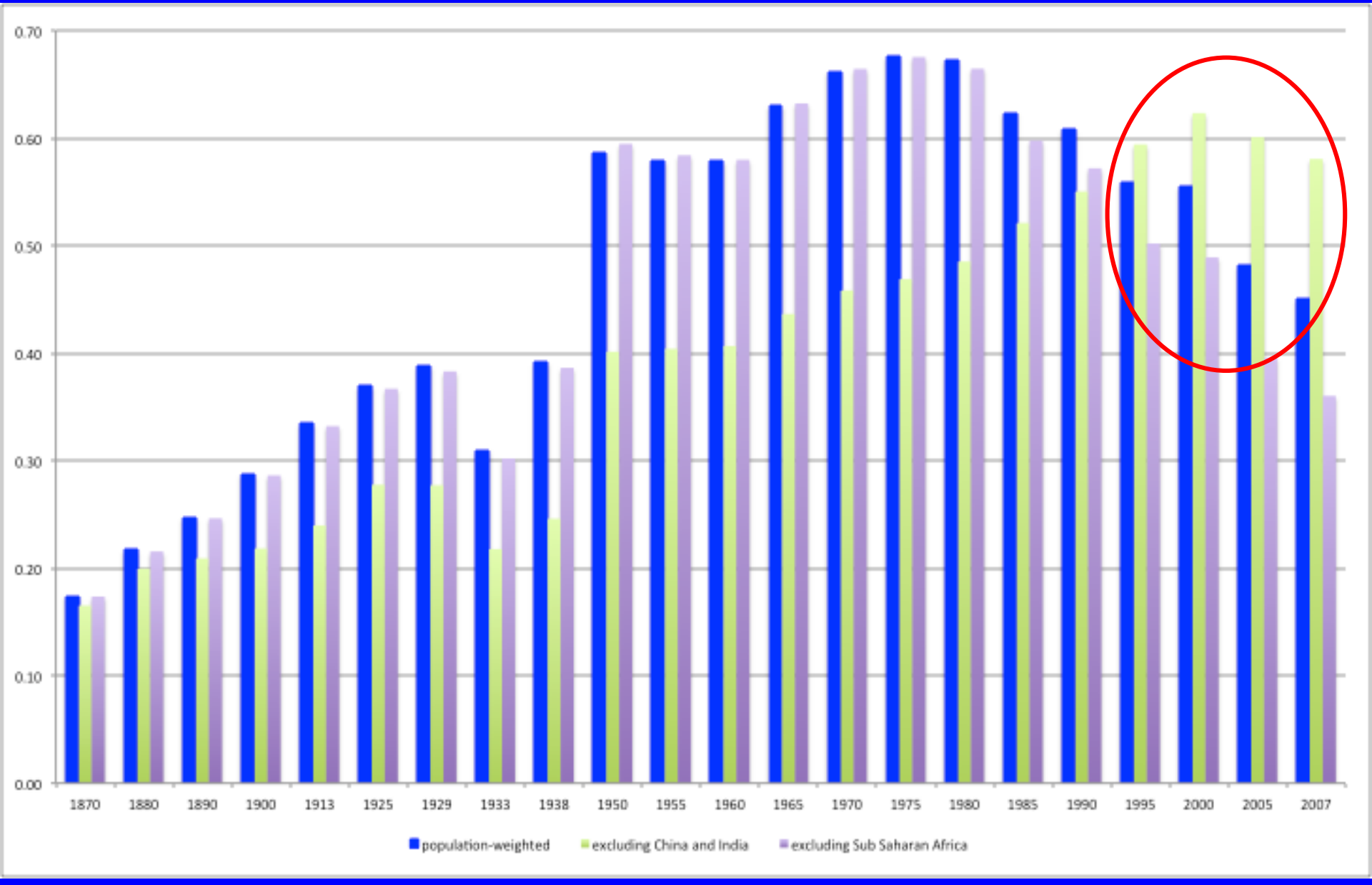
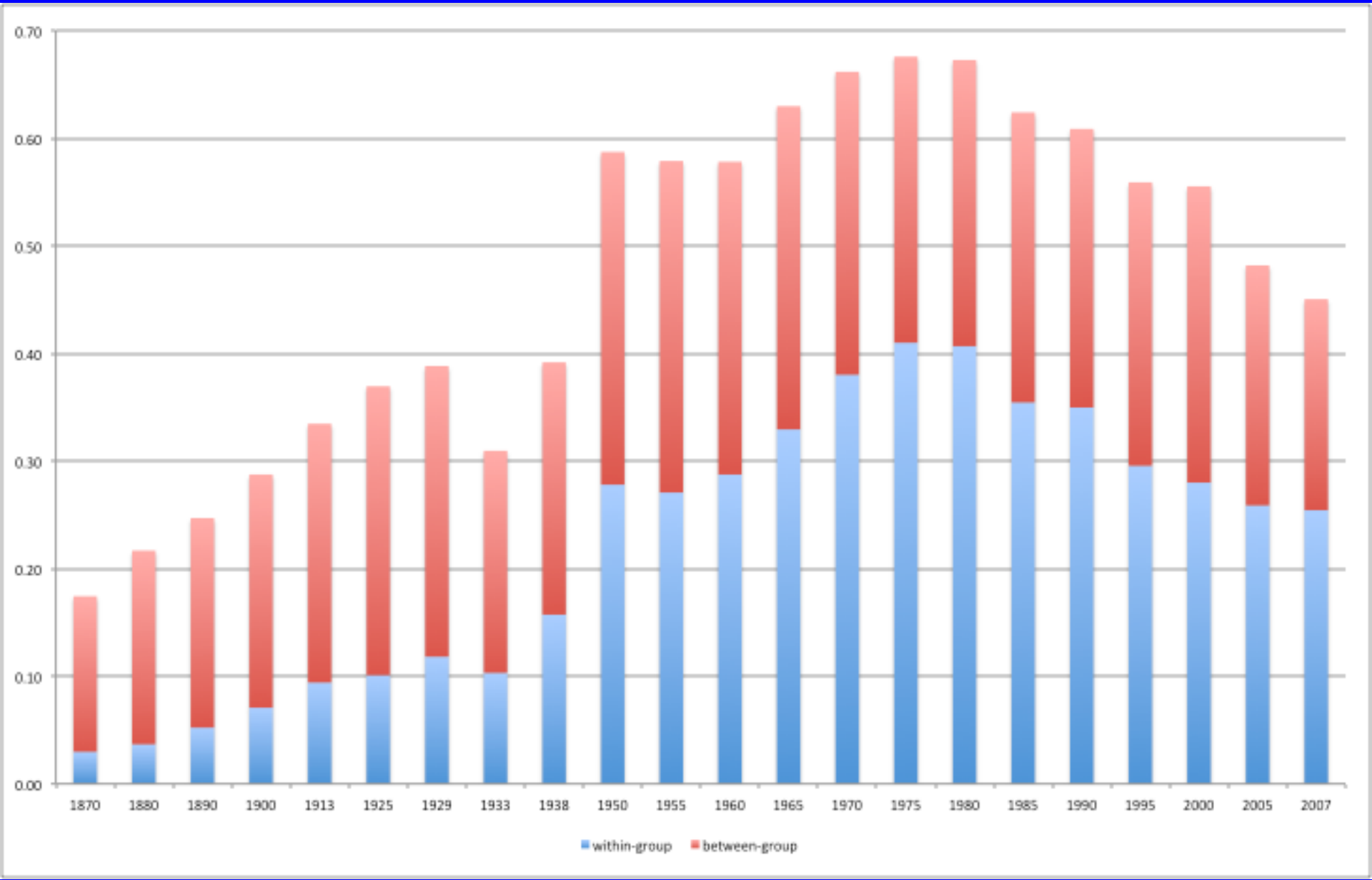


# *International Inequality in Real GDP per head:* MLD

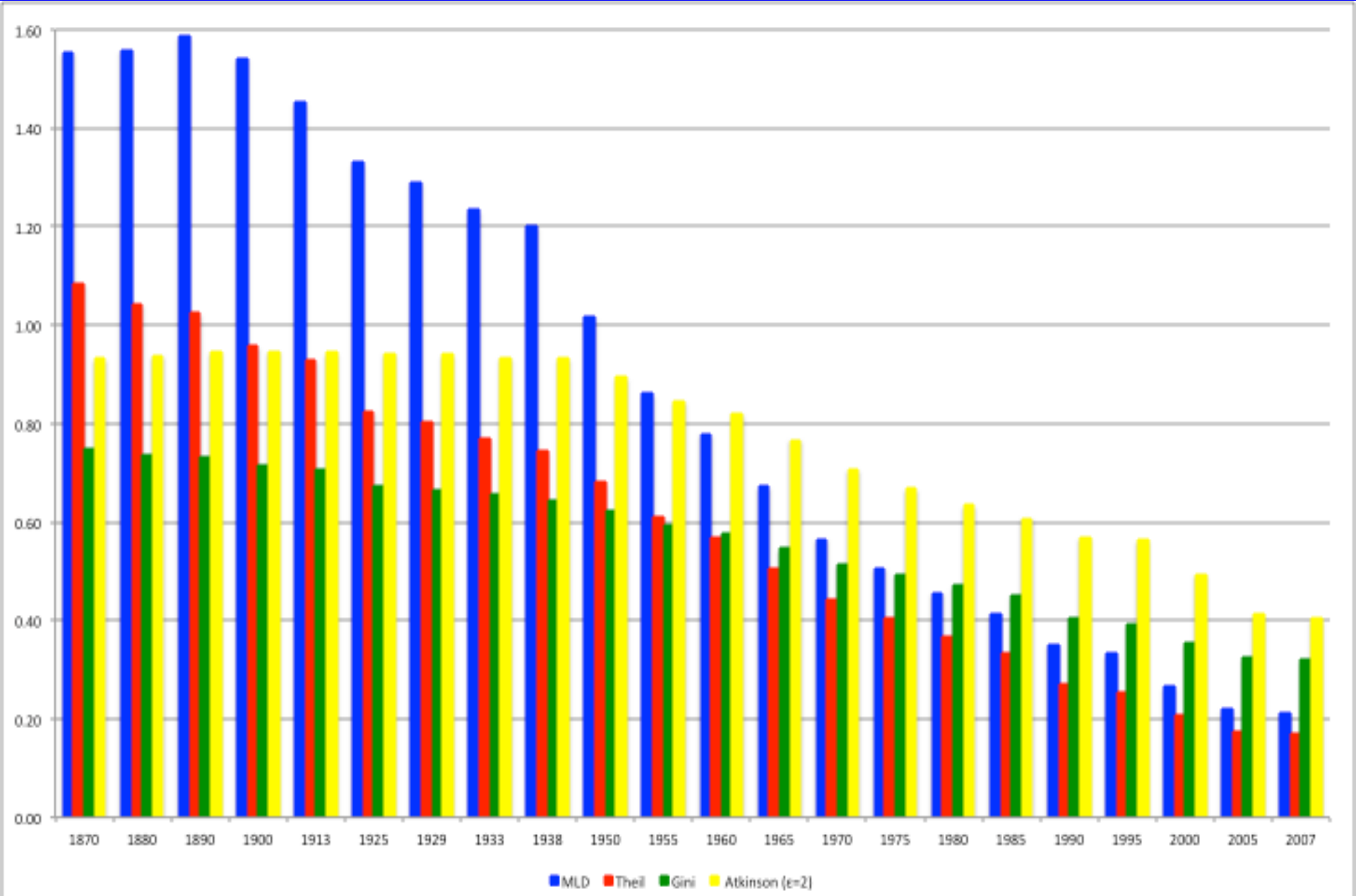
## *The Contribution of China & India and SSA*



# *Decomposing International Inequality in Real Per Capita GDP:* MLD (pop-weighted)



# *International Inequality in Literacy* (unweighted)



# *International Inequality in Gross School Enrolment*

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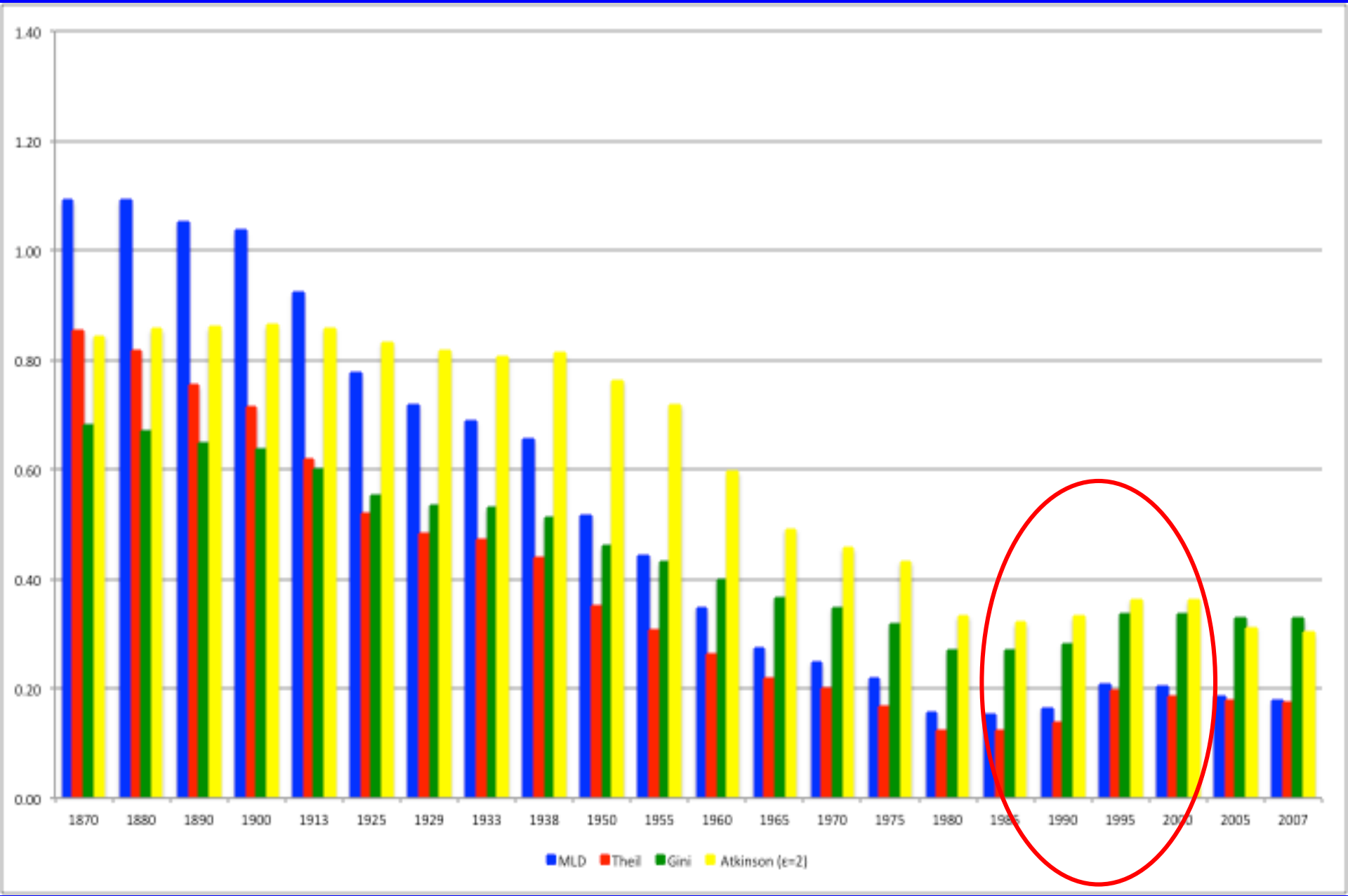

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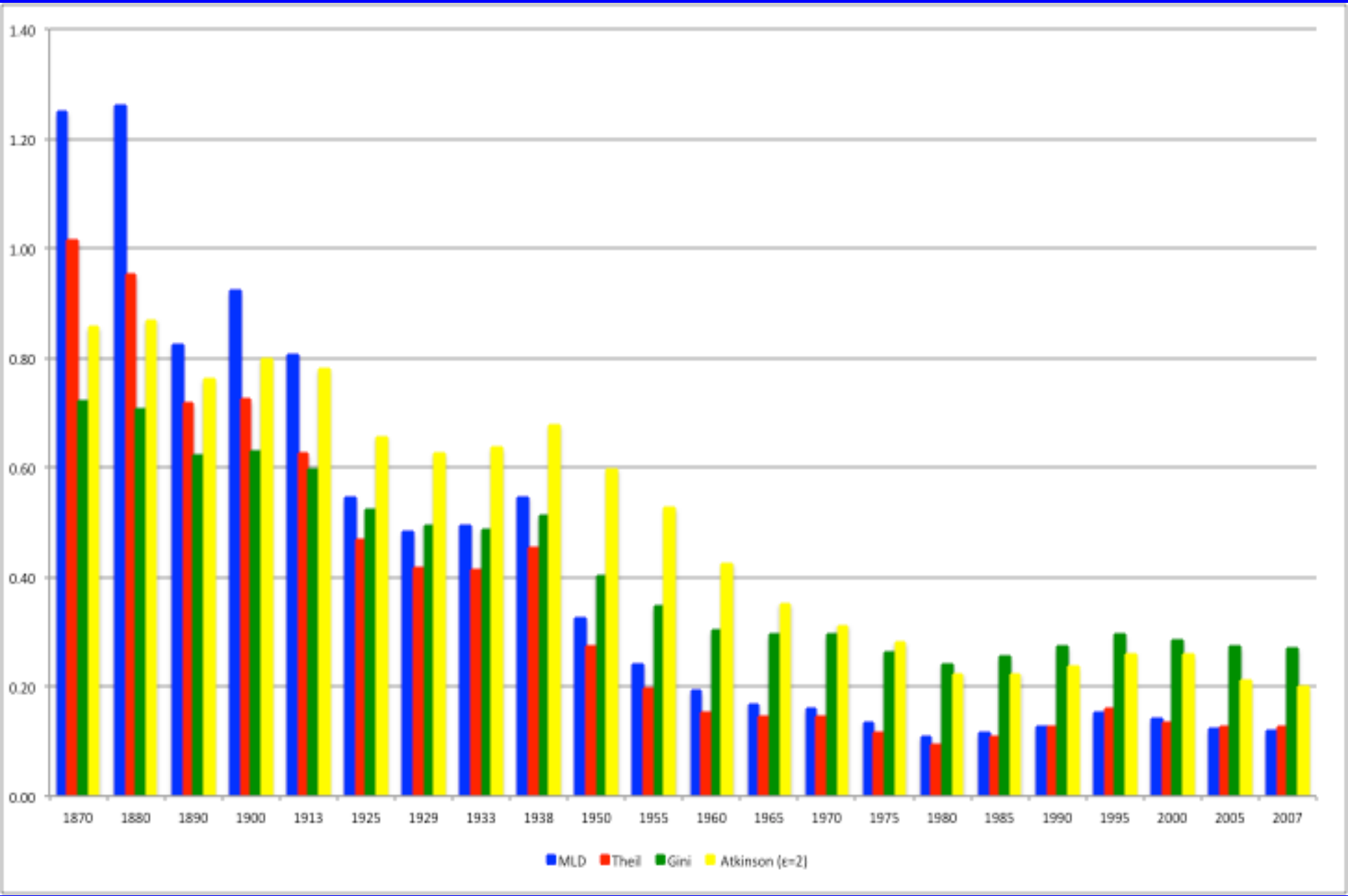

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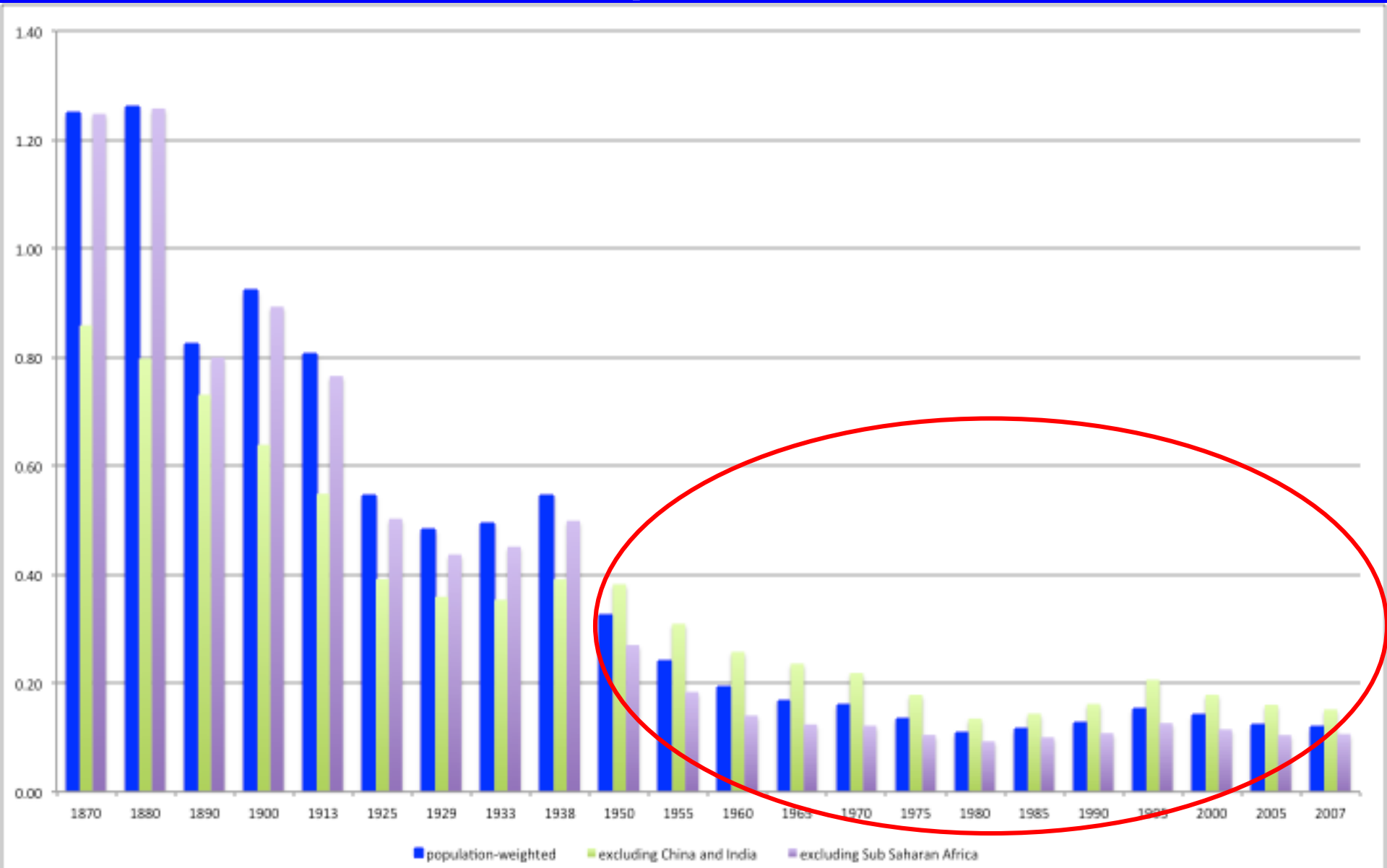
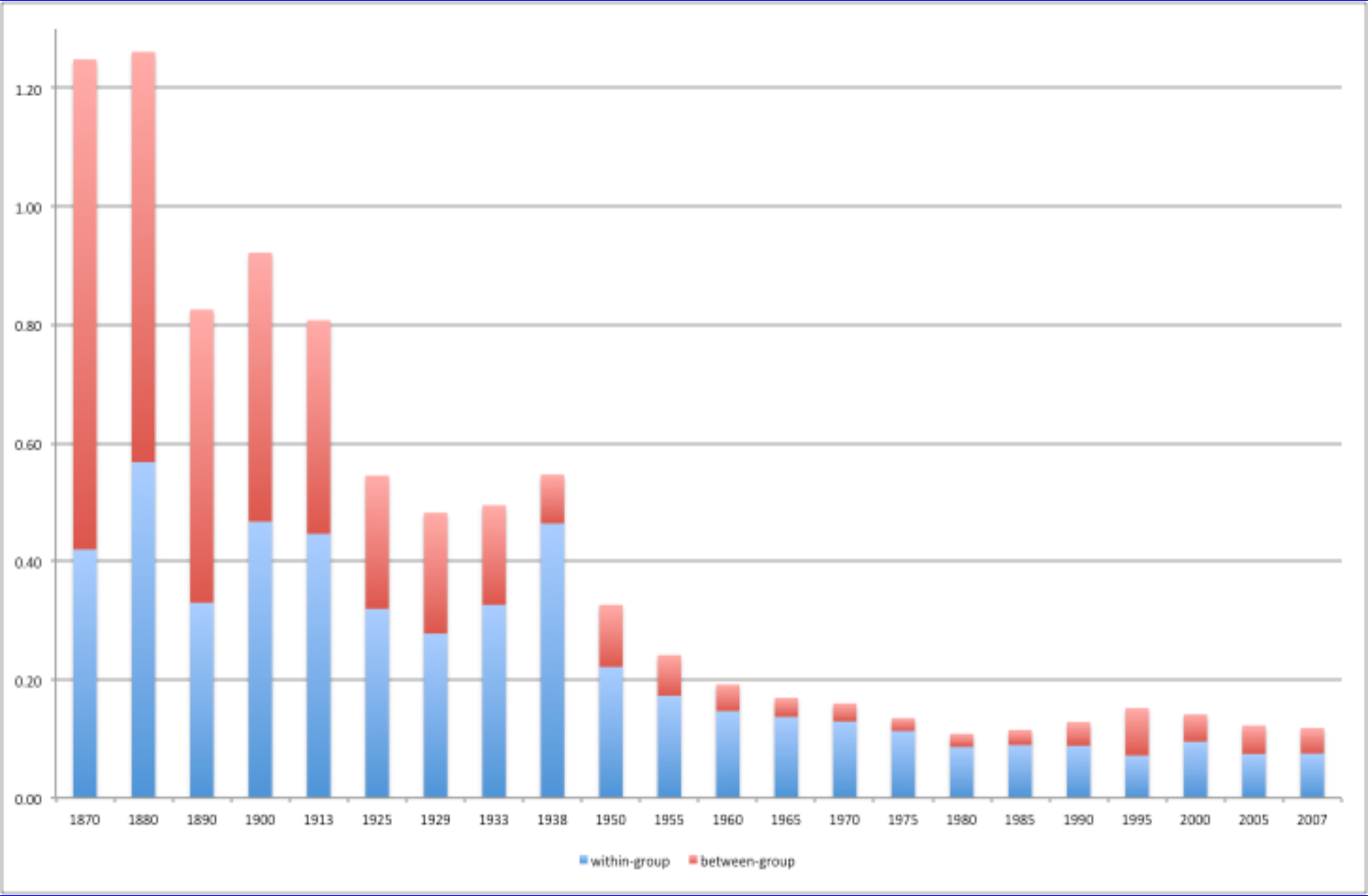
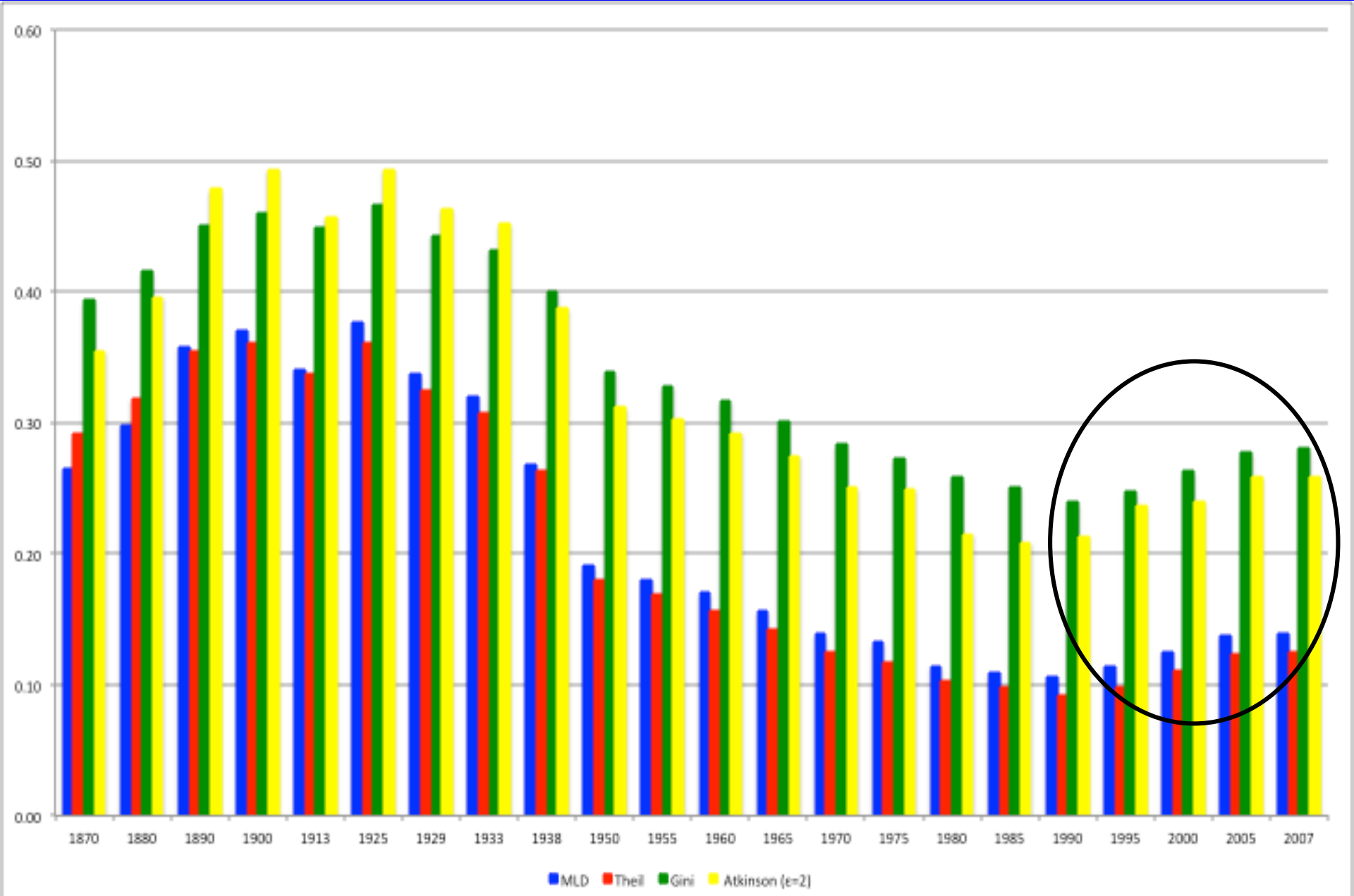


# *Decomposing International Enrolment Inequality*

**MLD (population weighted)**



# *International Inequality in Life Expectancy* (unweighted)



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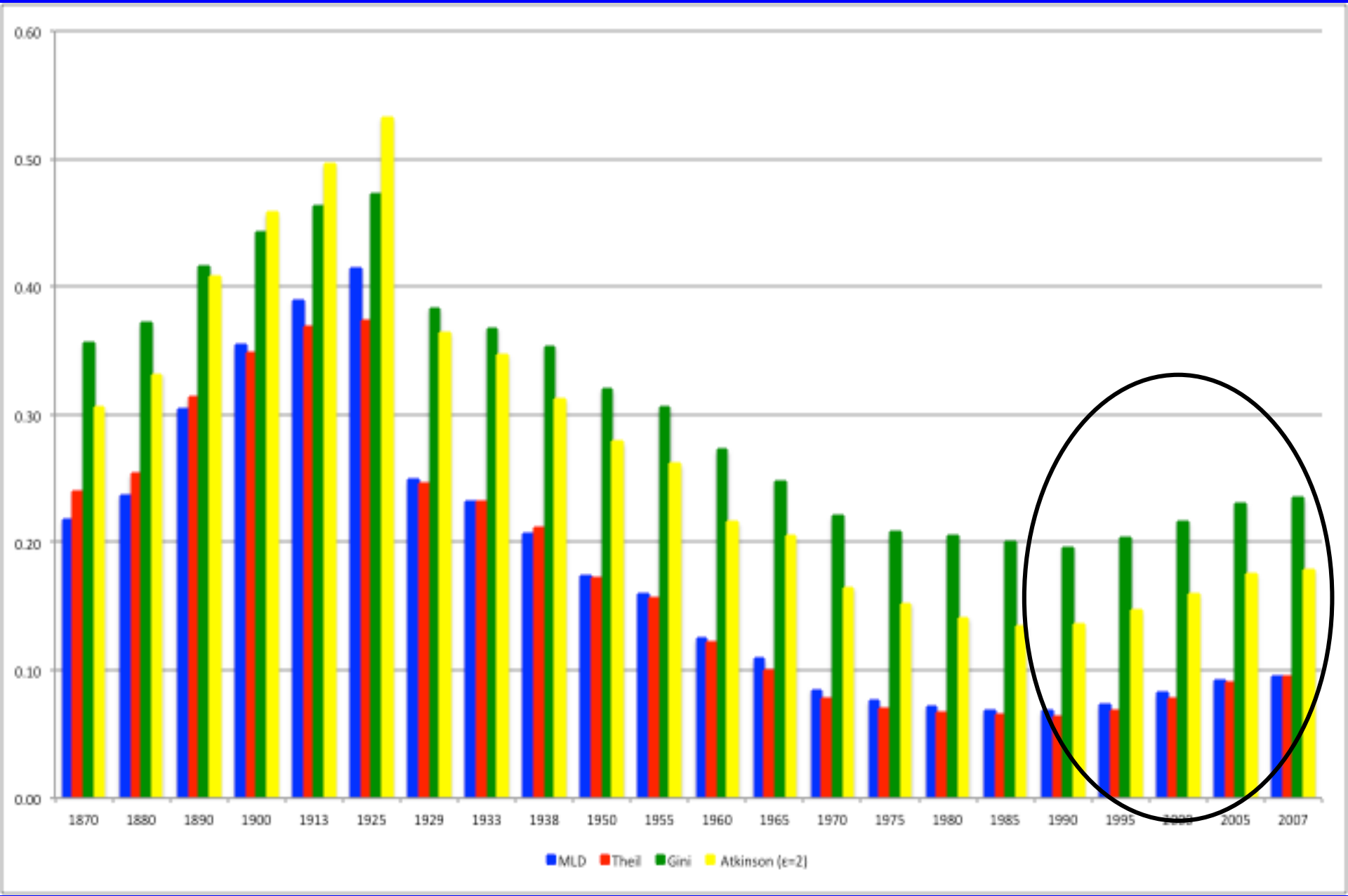

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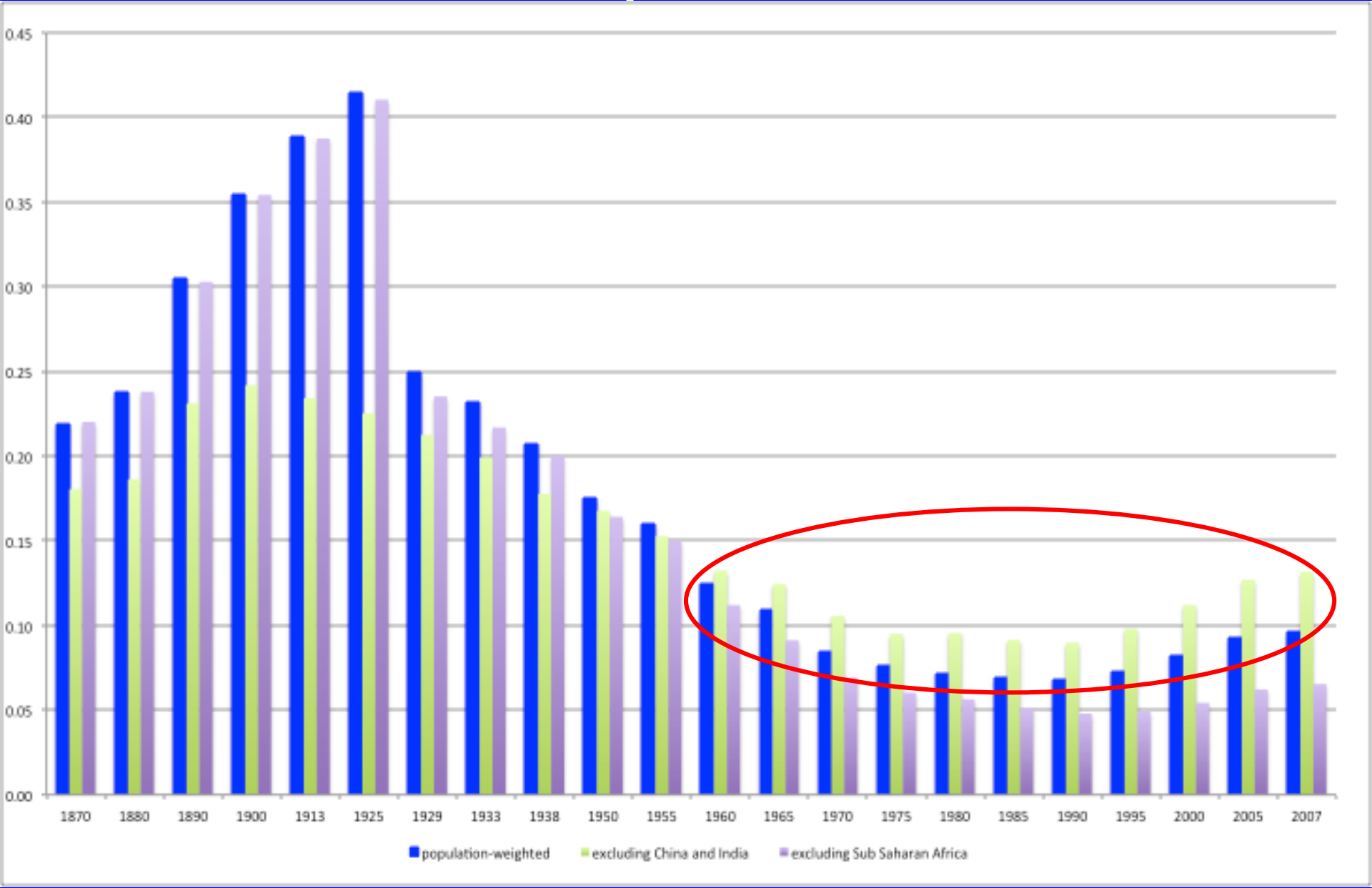
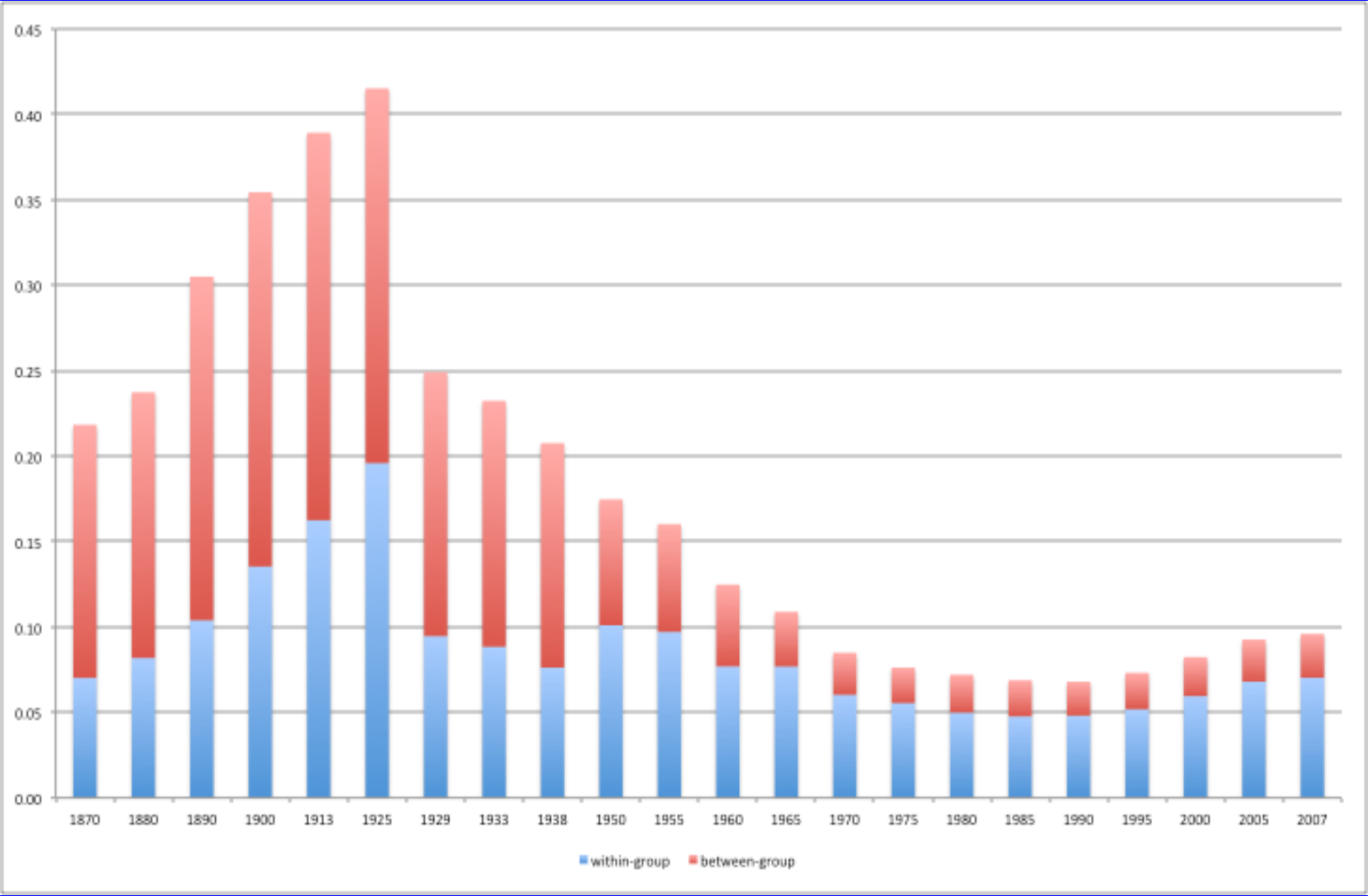
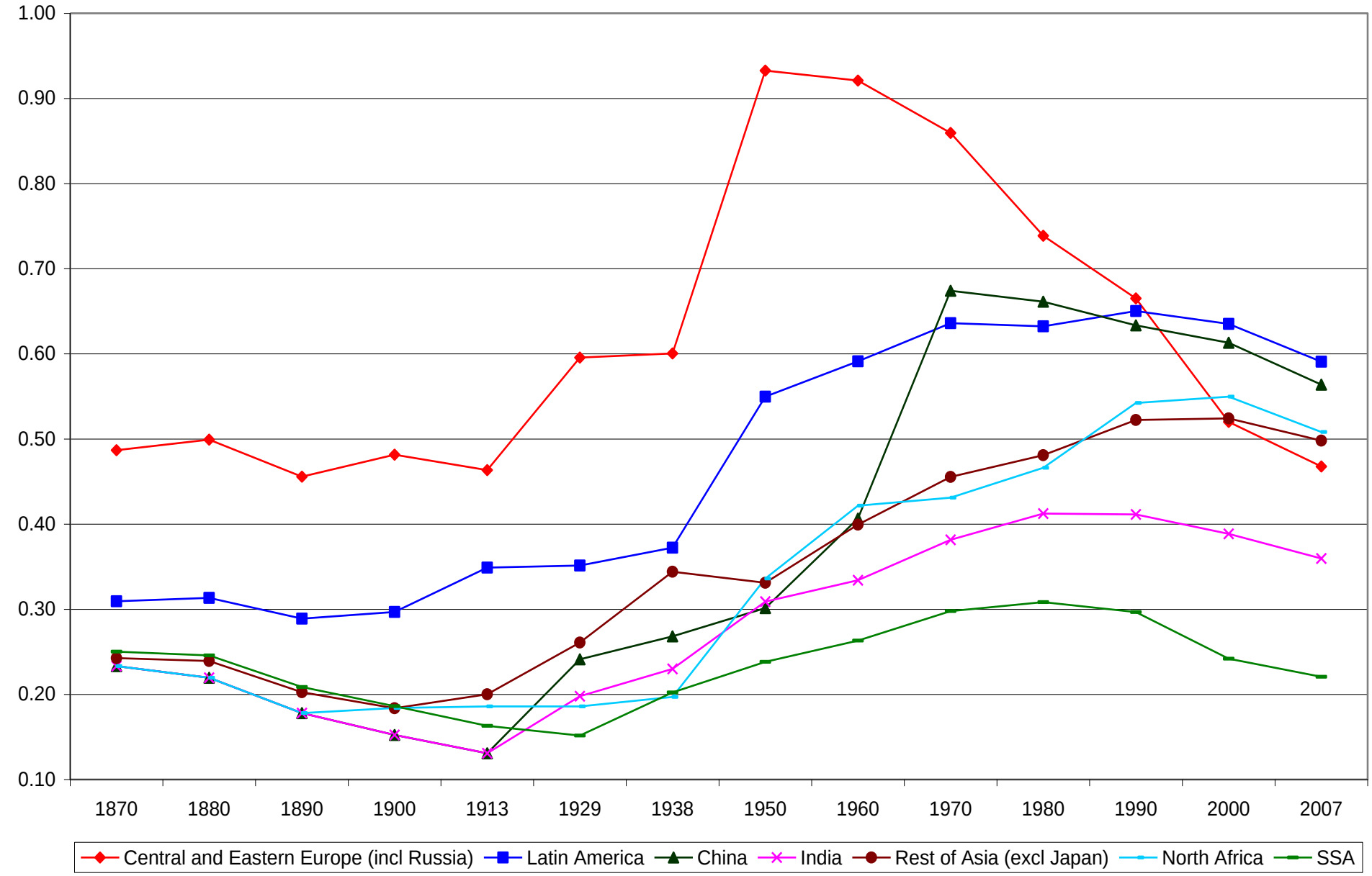


# *Decomposing International Life Expectancy Inequality*

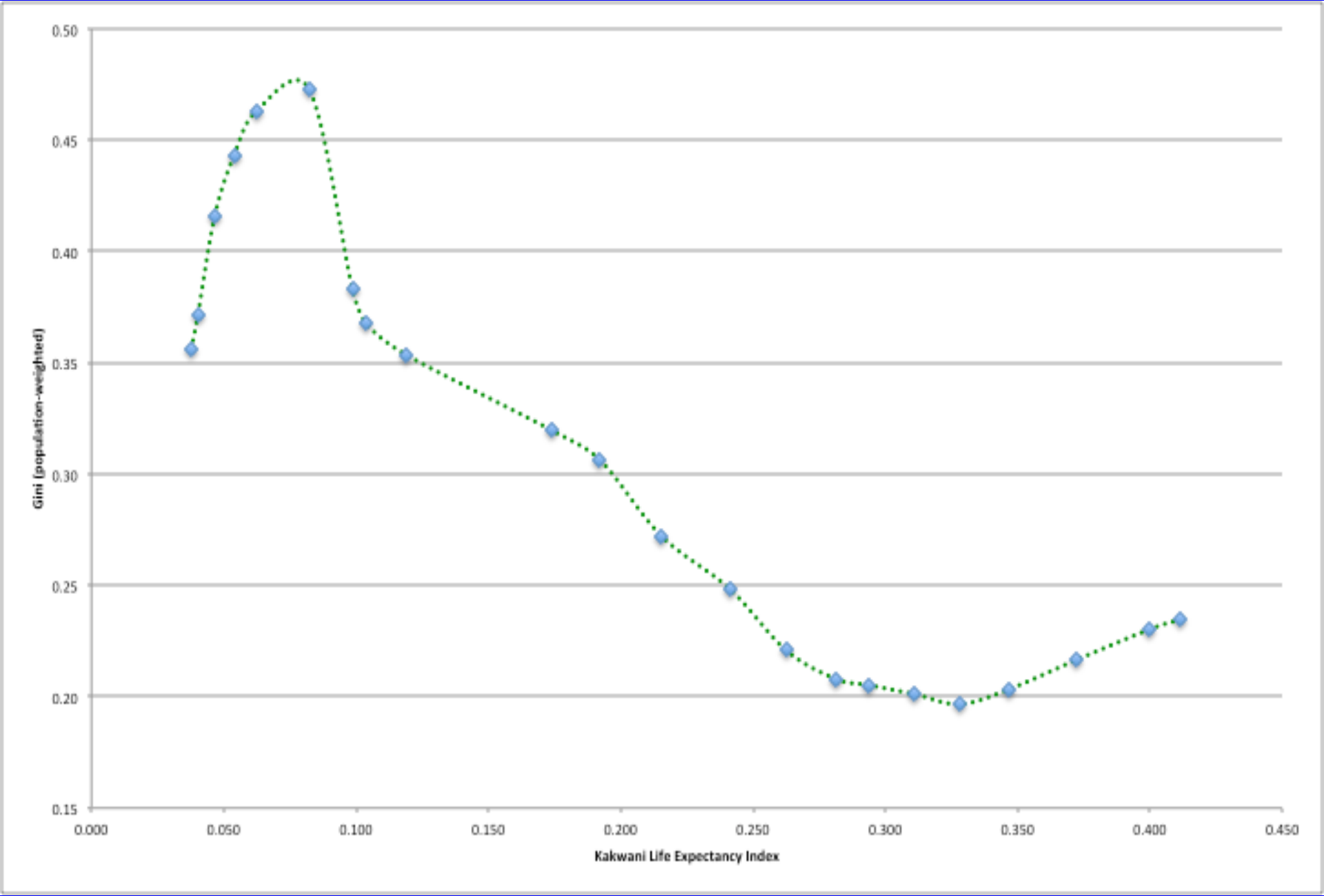
## MLD (pop-weighted)



# *Relative Life Expectancy in Developing Regions (OECD = 1)*



# *A Health Kuznets Curve?* Gini (population-weighted)



# *Main Findings*

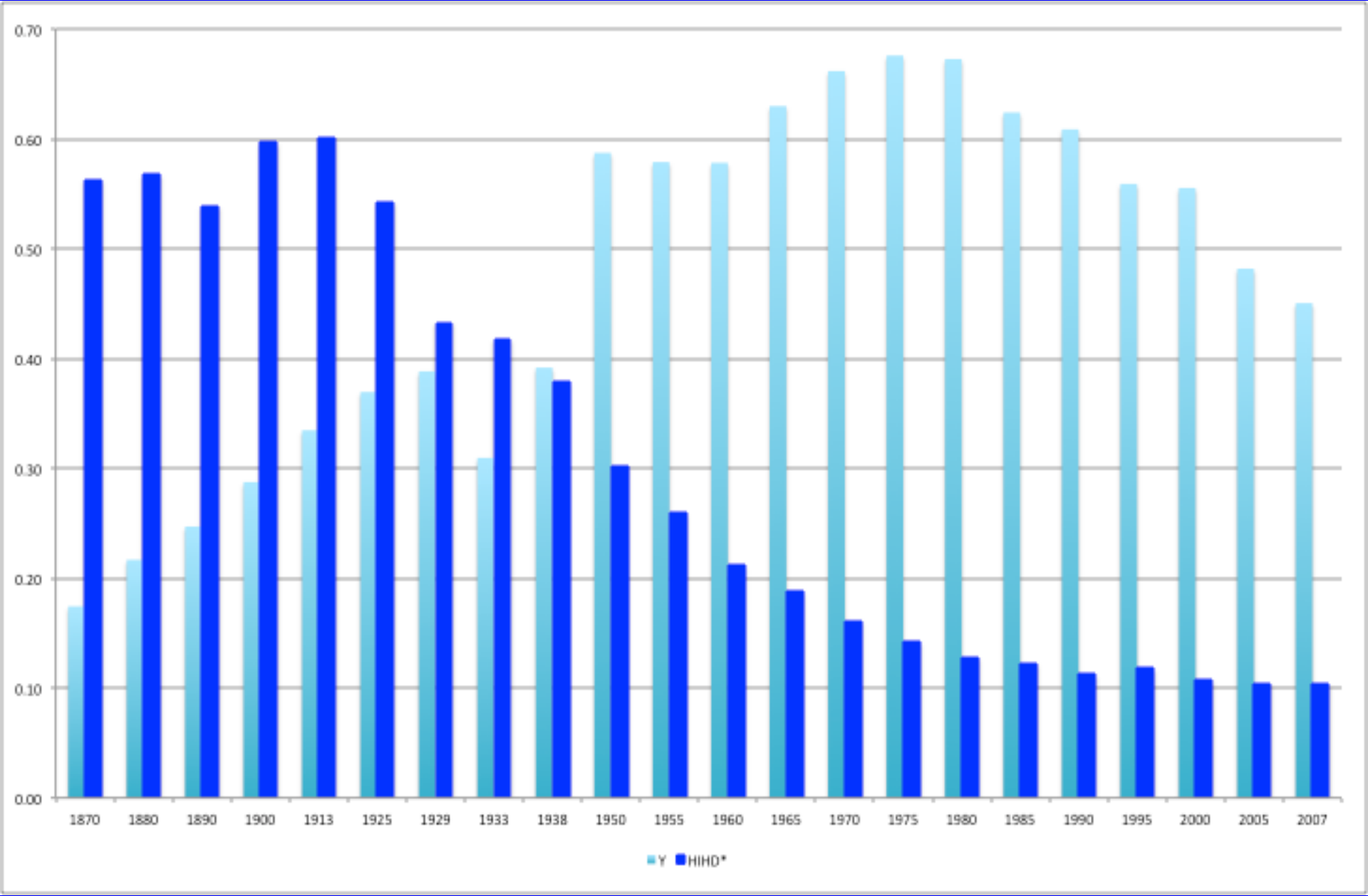
- ***Well-being inequality*** has **declined** over time

- ***Inequality*** **trends** in ***social dimensions*** **concur**

- ***Well-being dimensions*** **alter** the view on **long run inequality** derived from ***real per capita GDP***
  - **Inequality** in ***social dimensions*** **declined** since **1920s**
  - while ***income inequality*** **increased** until **mid-20$^{th}$** century

# *World Inequality in HIHD* and GDP per Head* MLD

**(population weighted)** ***excluding the income dimension**



# *Main Findings (2)*

- **China** and **India**: major **influence** on ***inequality*-2** trends, different **timing** for income and social dimensions

- The ***West-Rest*** **Gap, less relevant** for ***international*** inequality?

- The diffusion of the ***health transition(s)*** **drives** ***life expectancy*** **inequality**
  **- A Health Kuznets Curve?**

# *Research Agenda*

- **Why *inequality* declined** in ***well-being's* social** dimensions but **not** in ***GDP per head***?
  - ***Public policy***?
  - ***Medical technology,*** a **public good**?

- Why has not been a **second *health transition*** in the ***Rest***?
  - **Inequalising** new ***technologies***?
  - **Lack** of ***public policies***?

- Will the **diffusion** of the **second *health transition* reduce *life expectancy inequality*** in the **21st century**?

# *A Multidimensional Approach to Wellbeing*

- **Human Development:** ***enlarging people's choices***
- **Achievements** in ***longevity,***
  ***knowledge,***
  and ***living standard***
  provide individuals with ***freedom*** to **choose**

=> ***human development***, a measure of **positive** ***freedom***

# *An Aggregate* Well-being *Measure: Historical Index of Human Development*

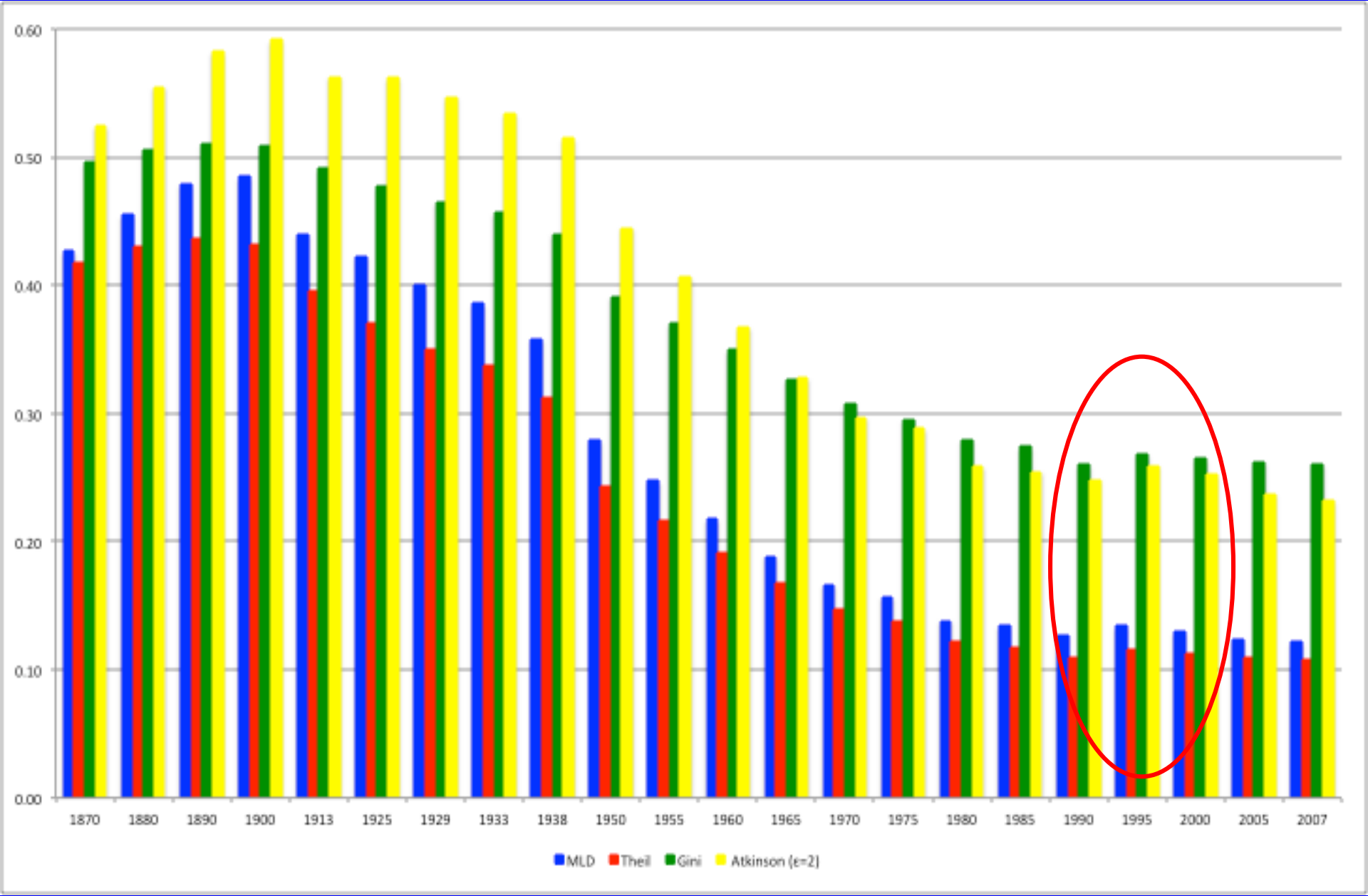
- **Social *dimensions***, transformed with
  a **convex *achievement function***

- ***Yet* … income *diminishing returns***
  => **concave transformation** (*log GDP per head, a surrogate*)

- **All combined** with a ***geometric average***
  $$HIHD = L^{1/3}\ E^{1/3}\ UNY^{1/3}$$
  to **reduce** its ***substitutability***
  => only **if *all*** dimensions ***improve***, ***HIHD*** **improves**

# *International Inequality in Human Development*

**(unweighted)**



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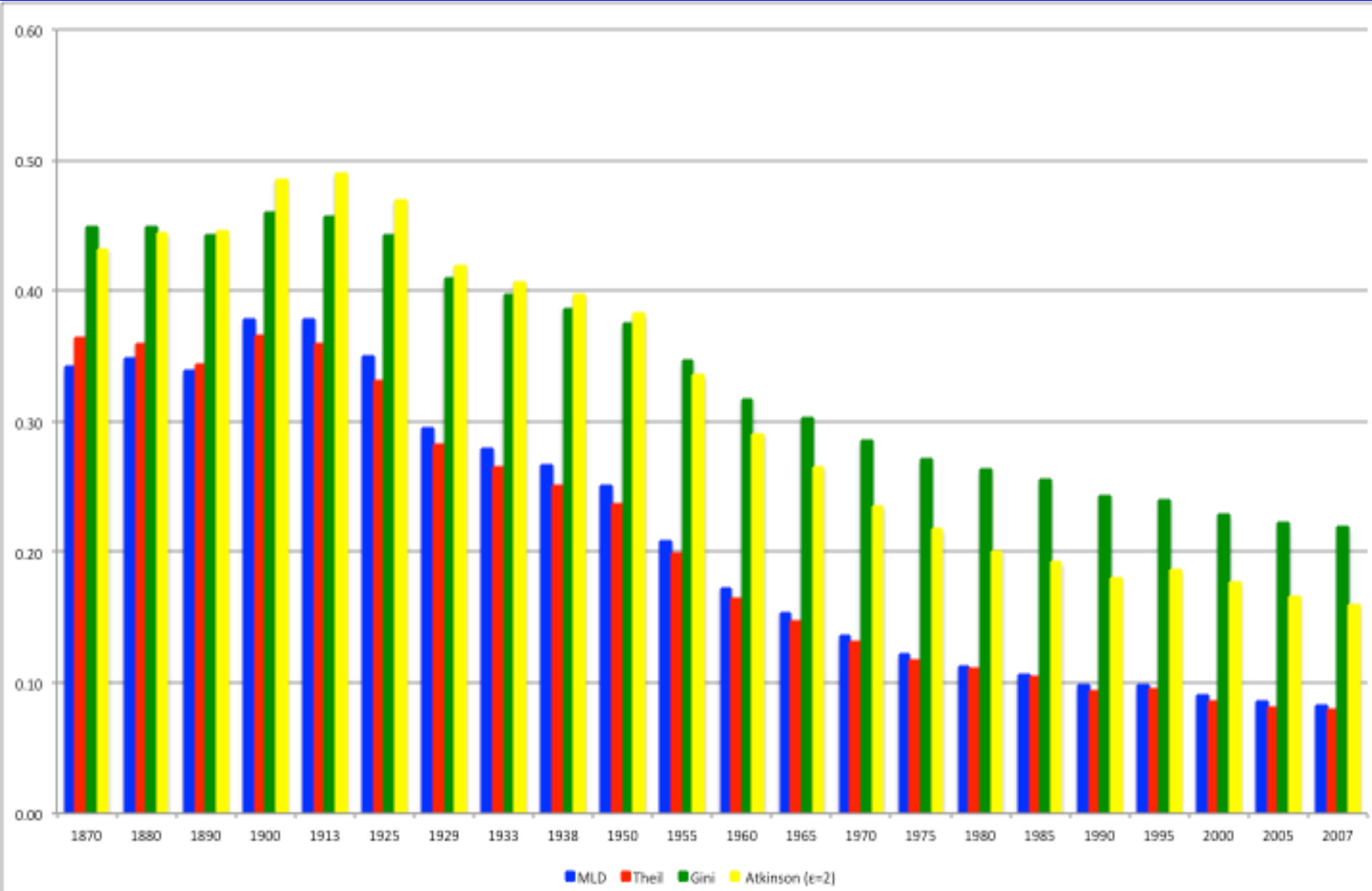
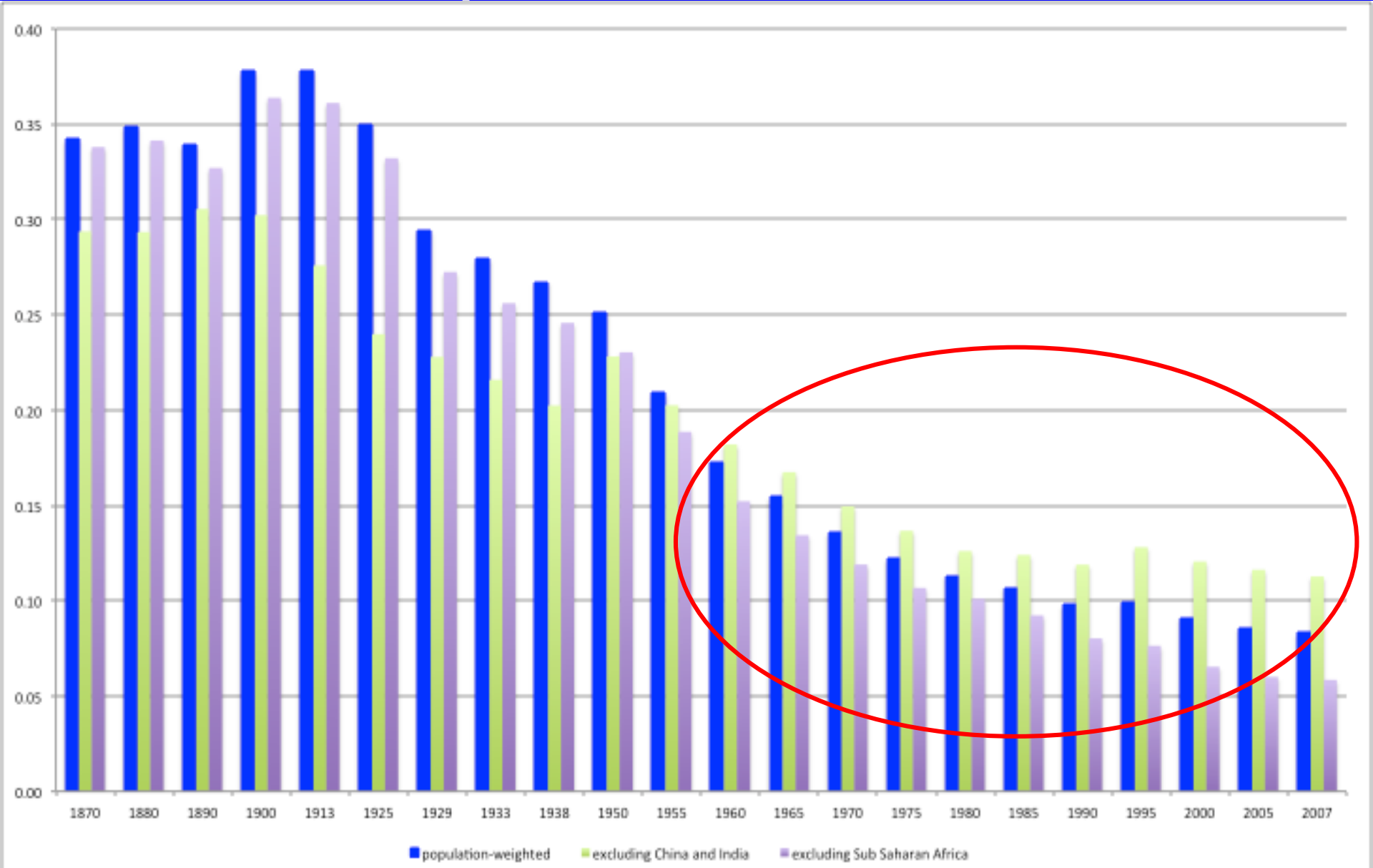
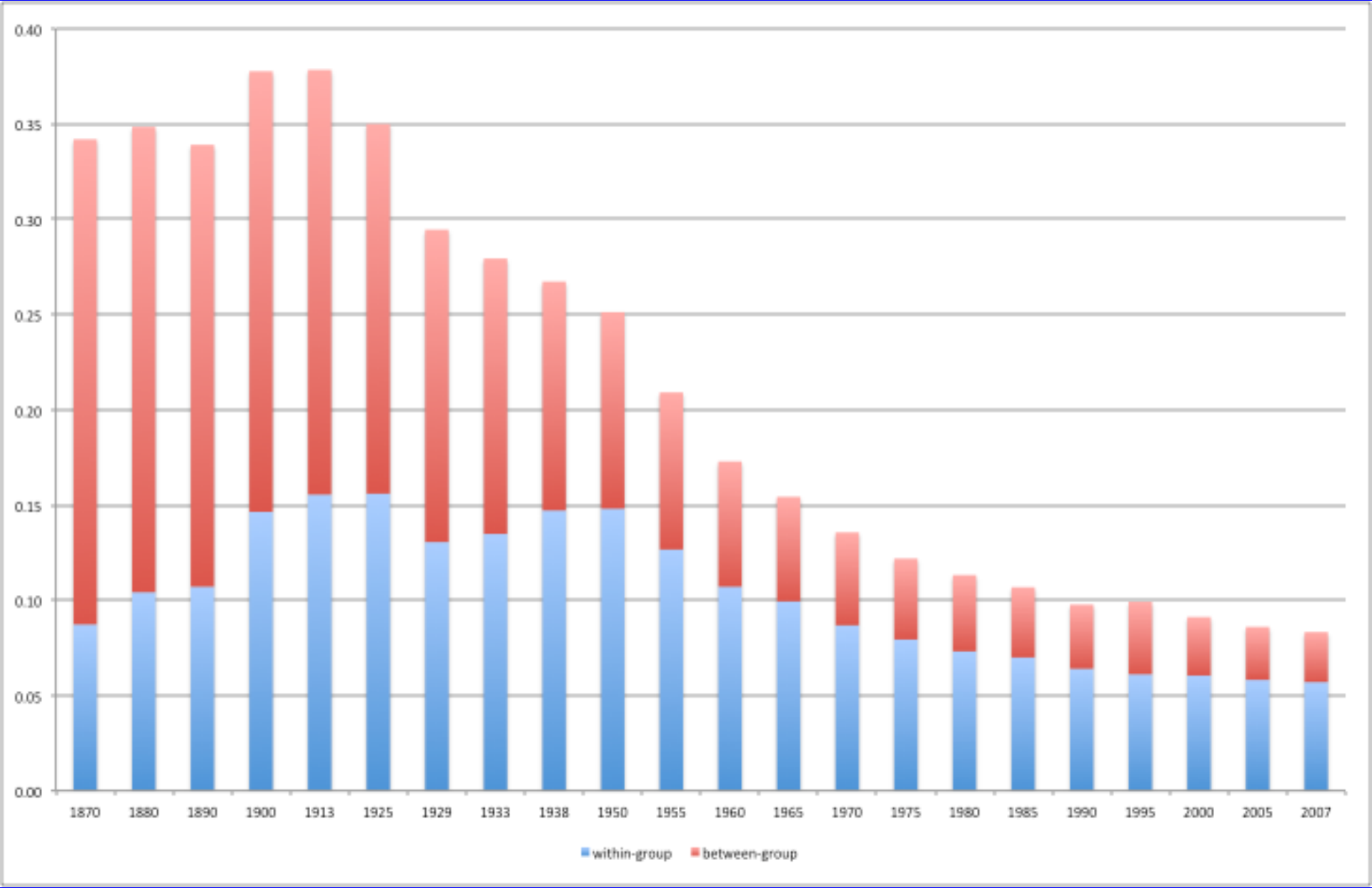


# *International Inequality in Human Development* MLD
## *The Contribution of China & India and SSA* (population weighted)



# *Decomposing Human Development Inequality* MLD

**(pop-weighted)**



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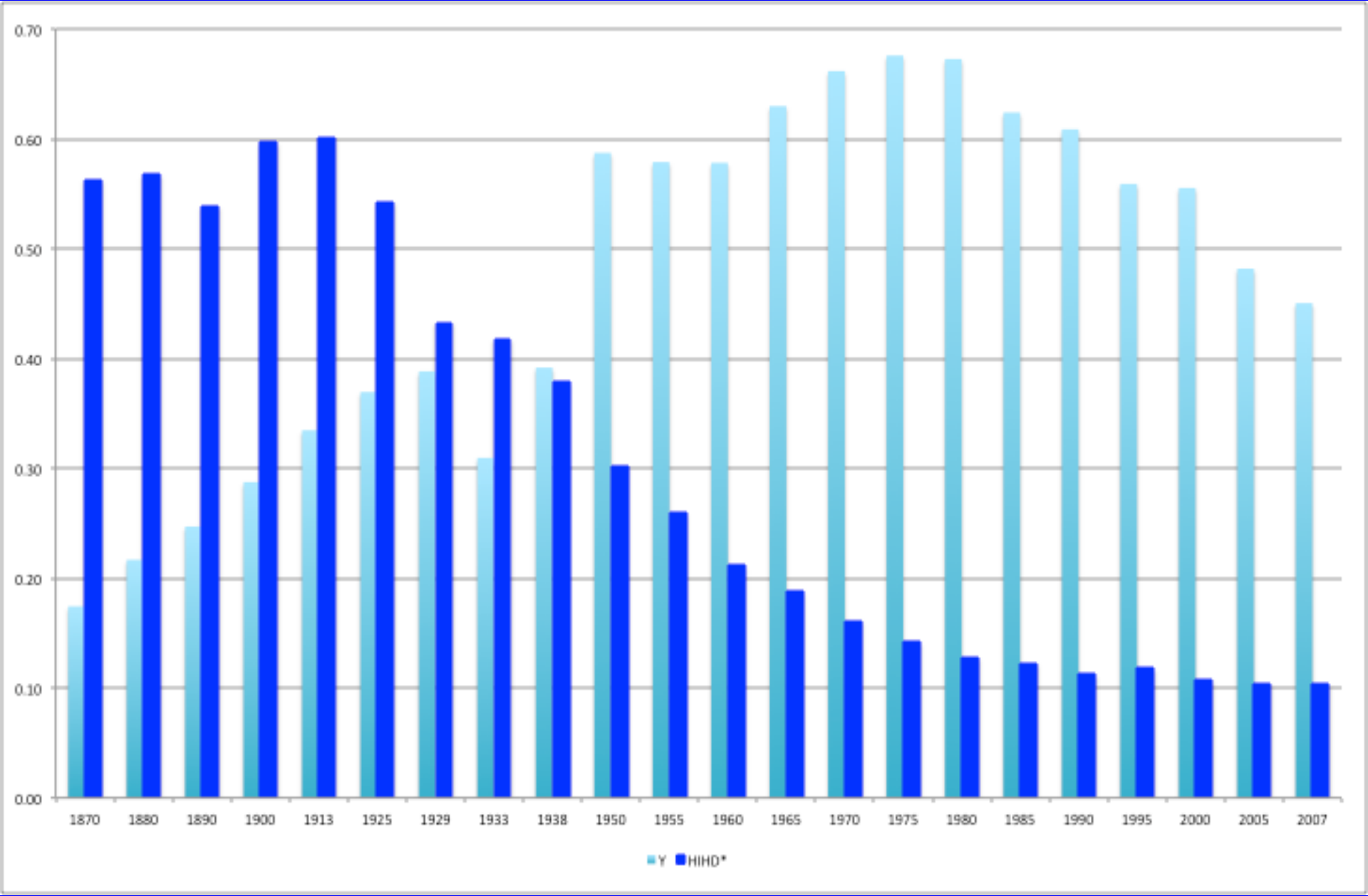


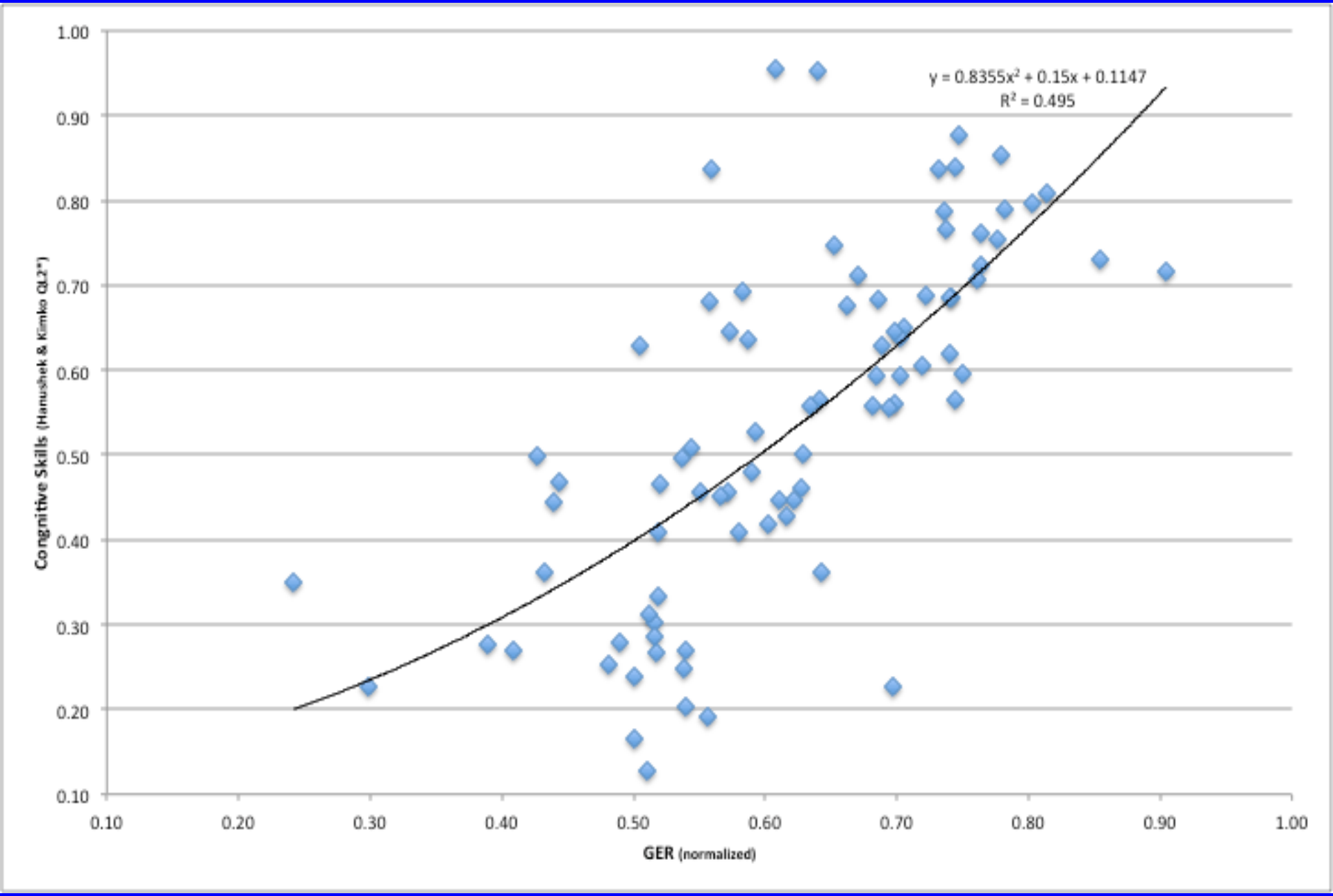
# *Main Findings*

- ***Well-being inequality*** has **declined** over time
- ***Inequality*** **trends** in ***social dimensions*** **concur**
- ***Well-being dimensions*** **alter** the view on **long run inequality** derived from ***real per capita GDP***
  **-** **Inequality** in ***social dimensions*** **declined** after **WWI** while ***income inequality*** **increased**
- **China** and **India**: major **influence** on ***inequality*****-2** trends
- The diffusion of the ***health transition(s)*** **drives** ***life expectancy*** **inequality**
  **- A Health Kuznets Curve?**

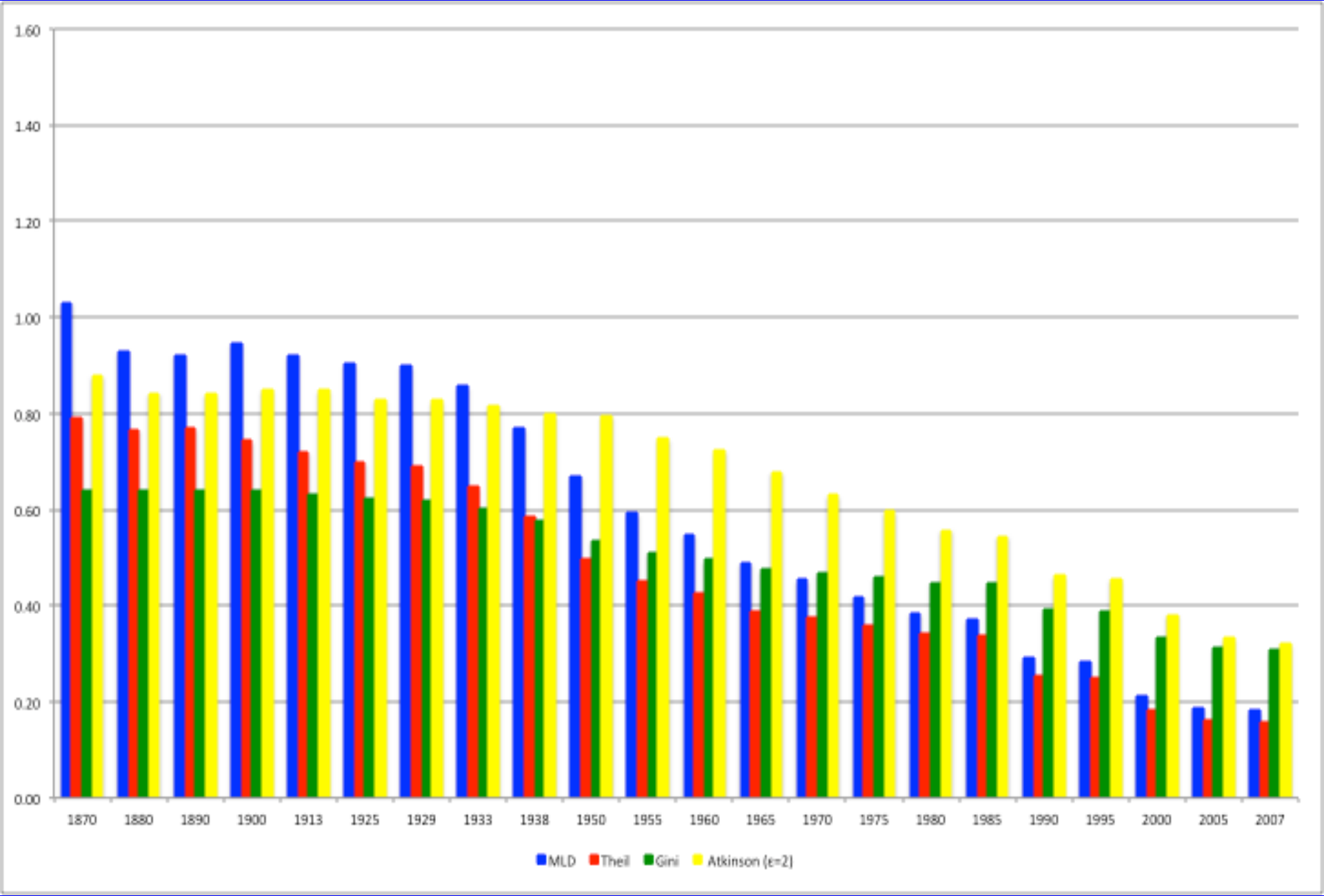
# *Research Agenda*

- **Why *inequality* declined** in ***social dimensions*** and ***HD***, but **not** in ***GDP per head***?
  - ***Public policy***?
  - ***Medical technology,*** a **public good**?
- Why has not been a **second *health transition*** in the ***Rest***?
  - **Inequalising** new ***technologies***?
  - **Lack** of ***public policies***?
  - **Health** and **education**, ***high income elastic*** goods?
- Will the **diffusion** of the **second *health transition* reduce *life expectancy*** (and ***HD***) ***inequality***?

# Cognitive Skills and Enrolment (normalized) 1960-90



# *International Inequality in Literacy* (pop weighted)



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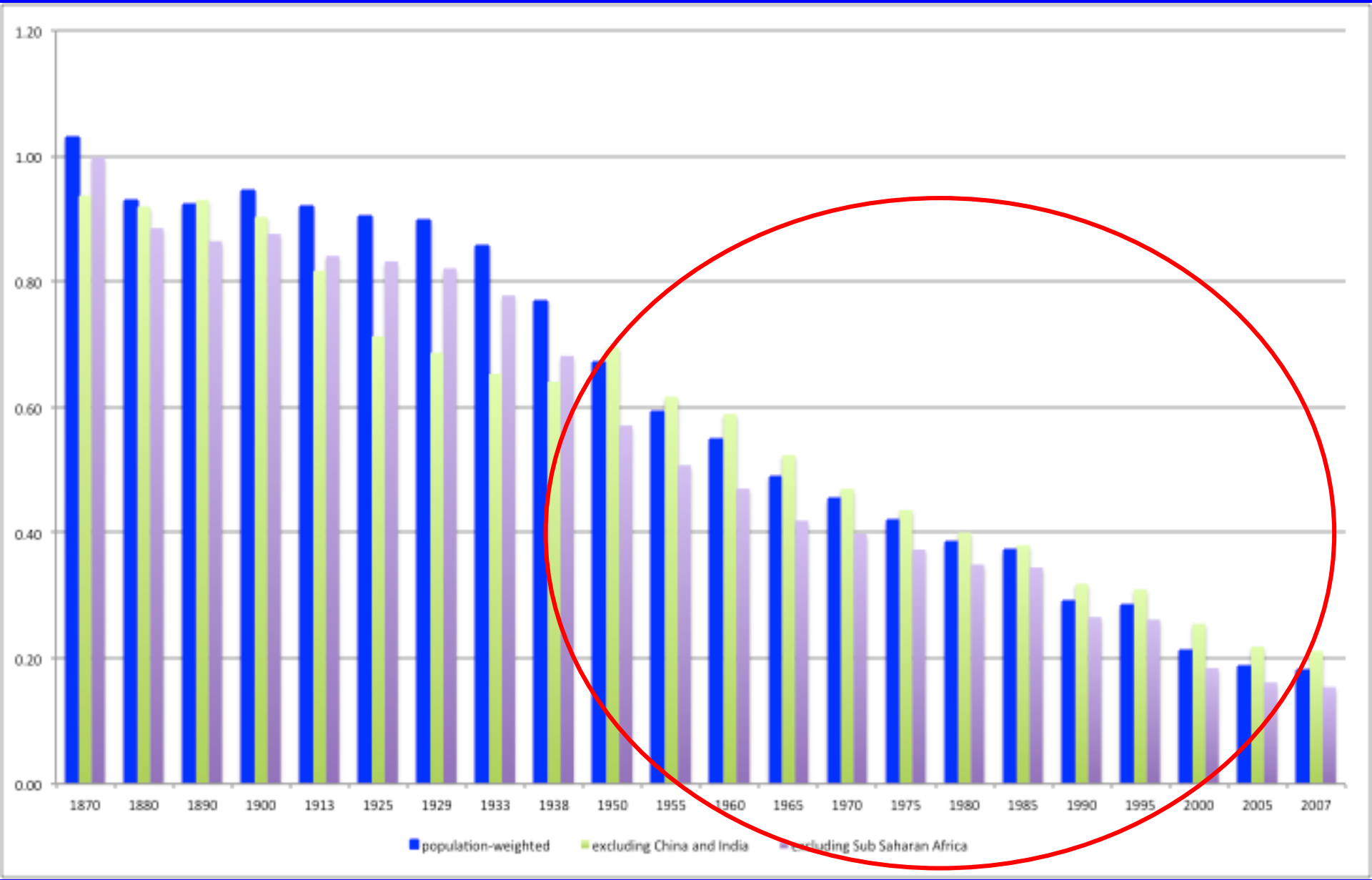
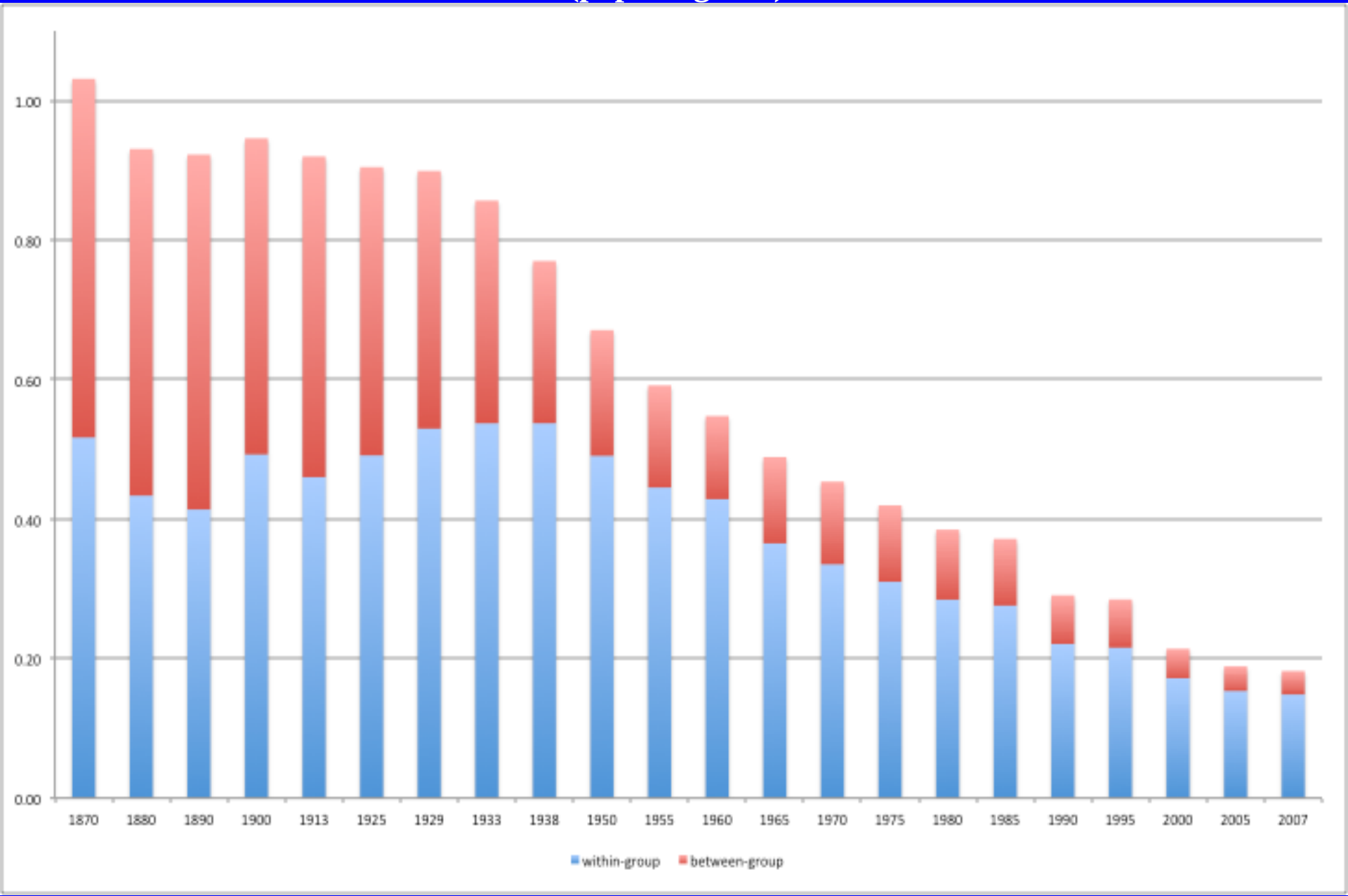
## *The Contribution of China & India and SSA*



# *Decomposing International Literacy Inequality* MLD

**(pop-weighted)**



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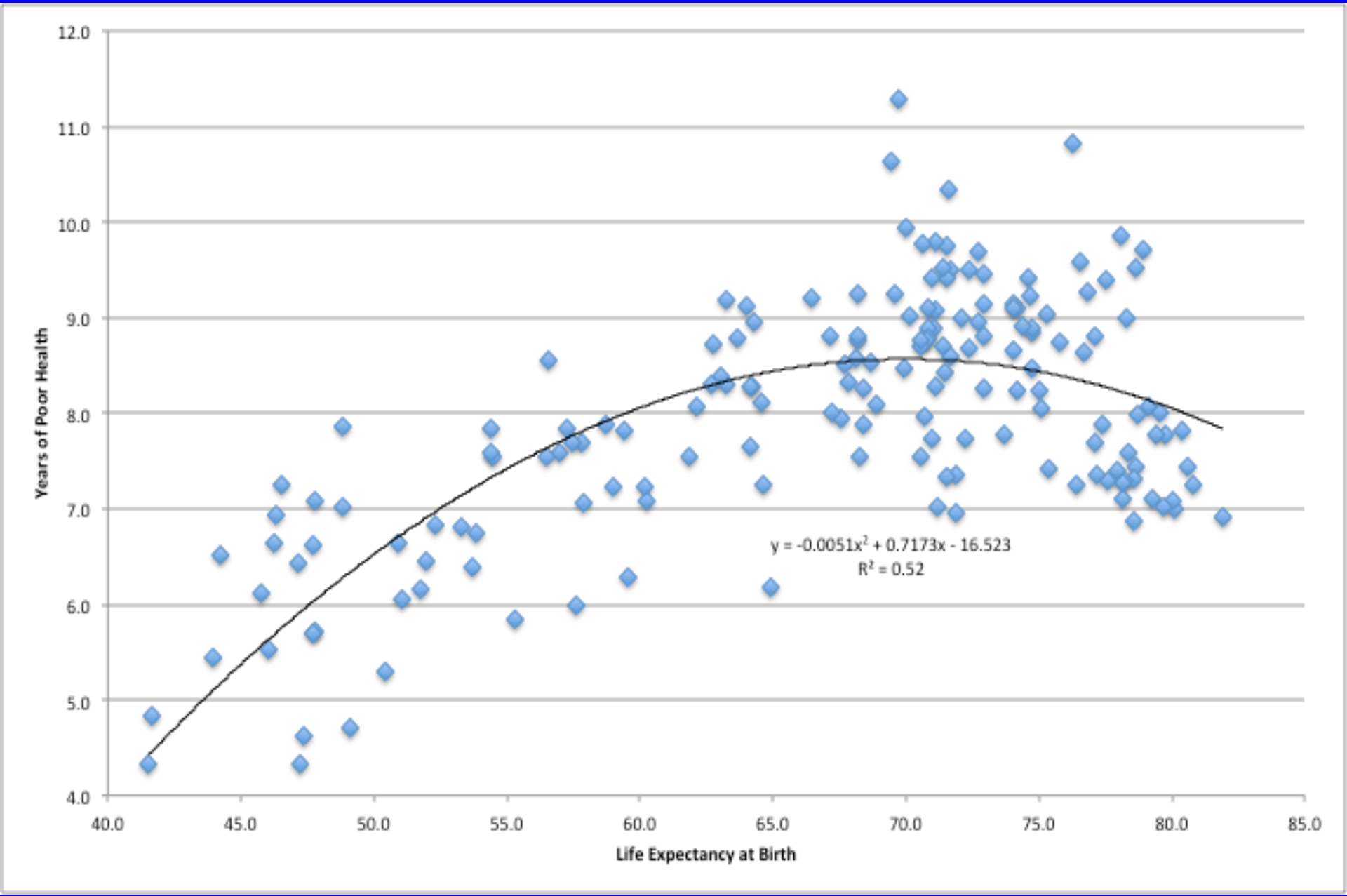

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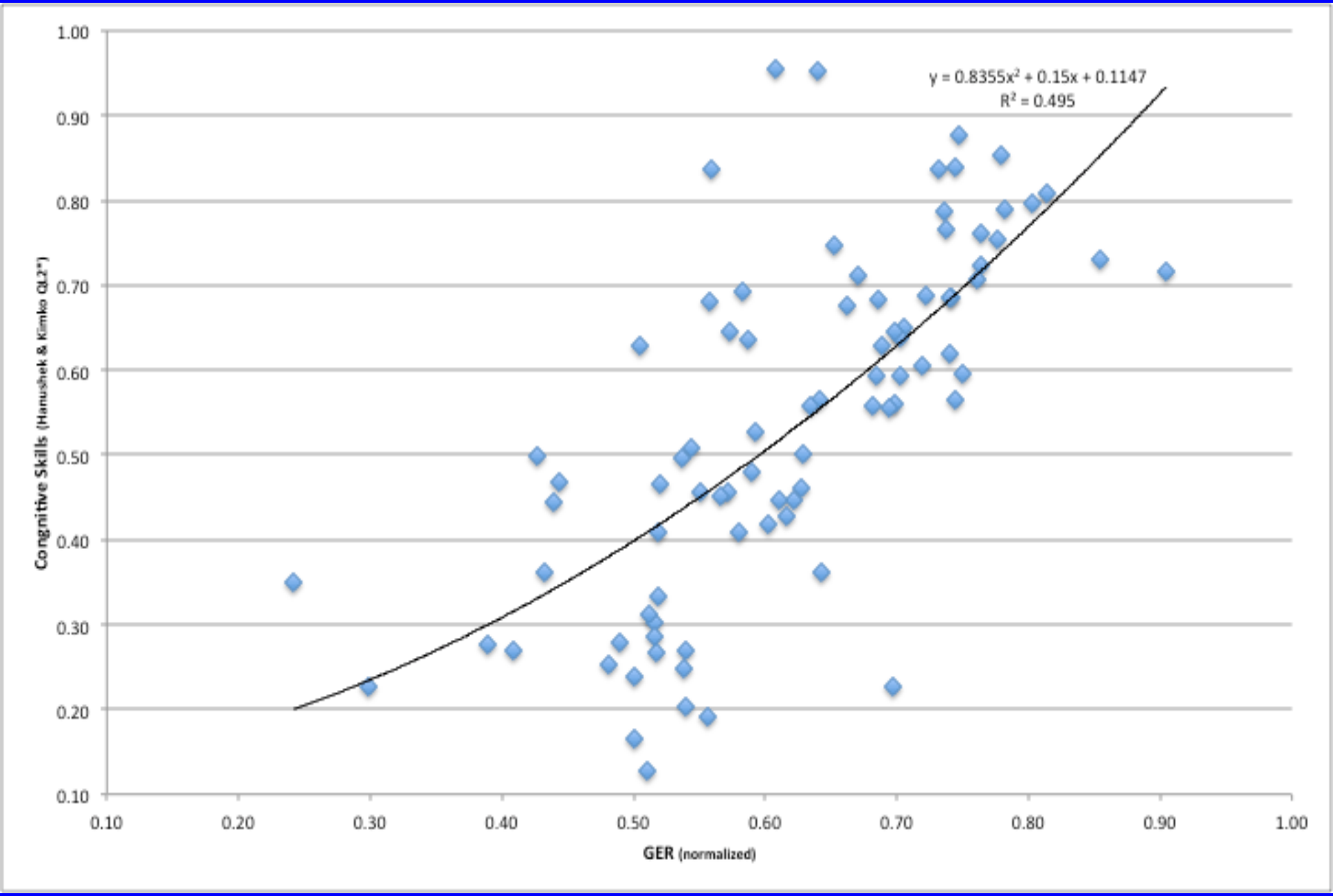
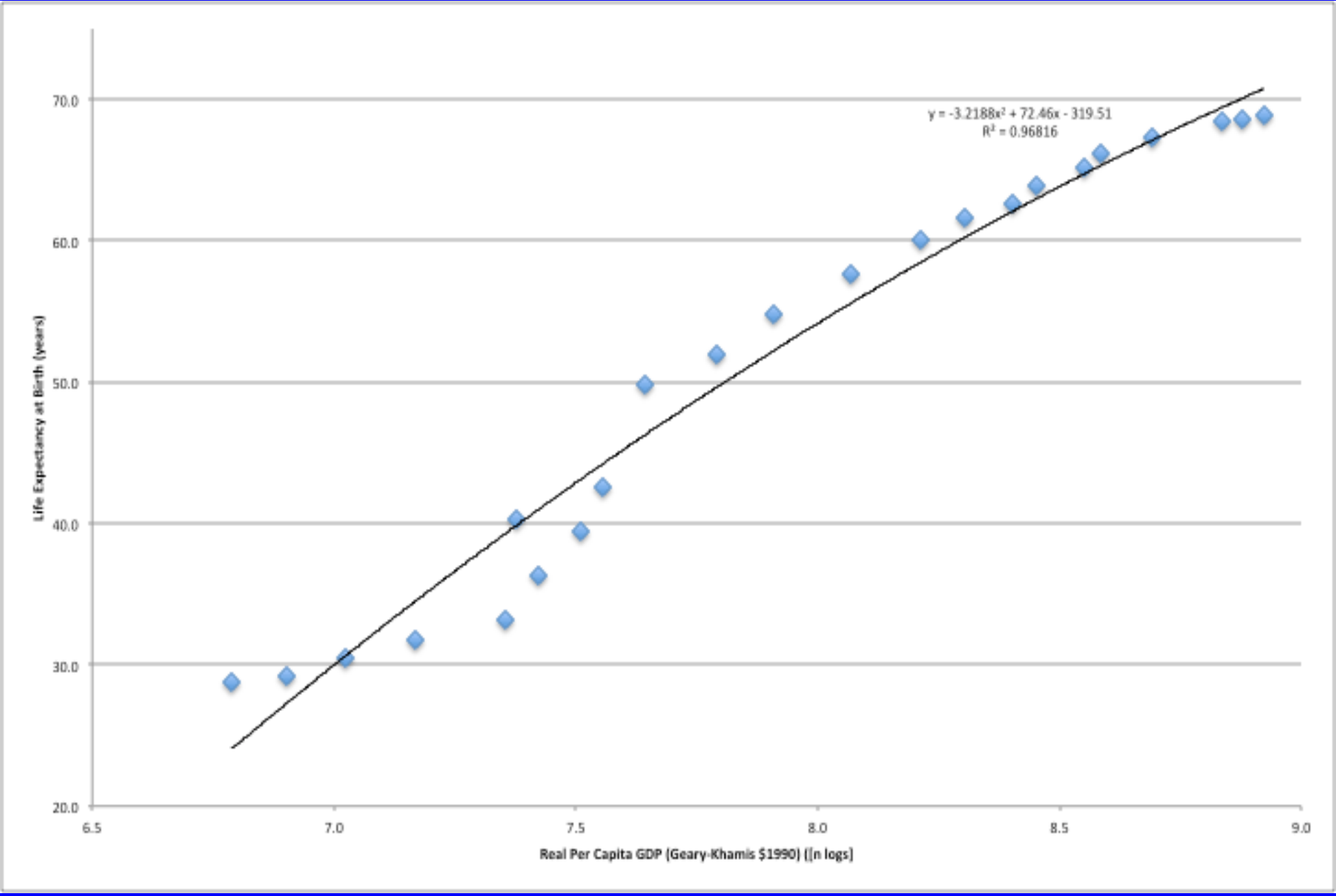
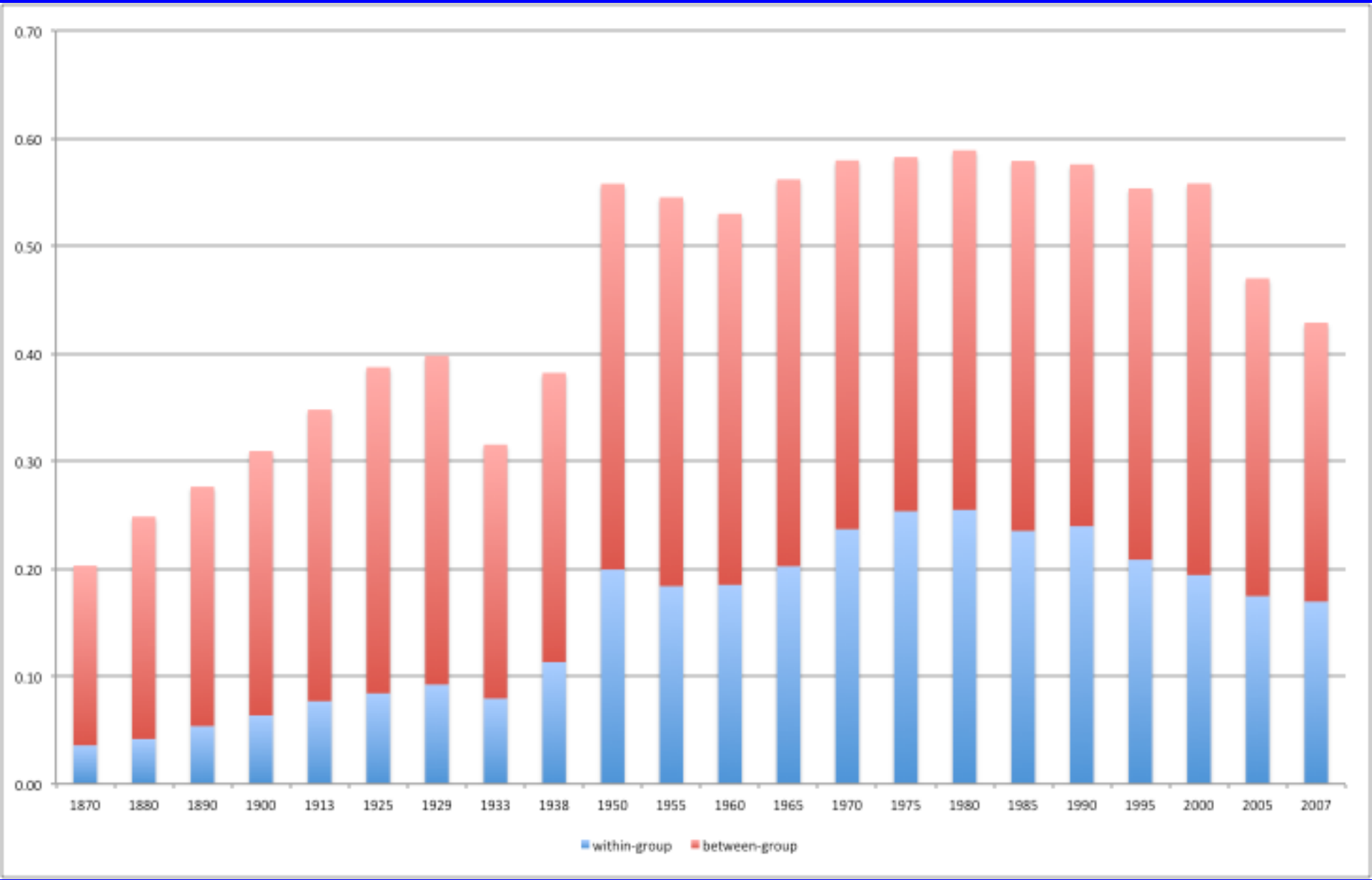


# *Preston Curve: The World 1870-2007 Deaton's Revision*

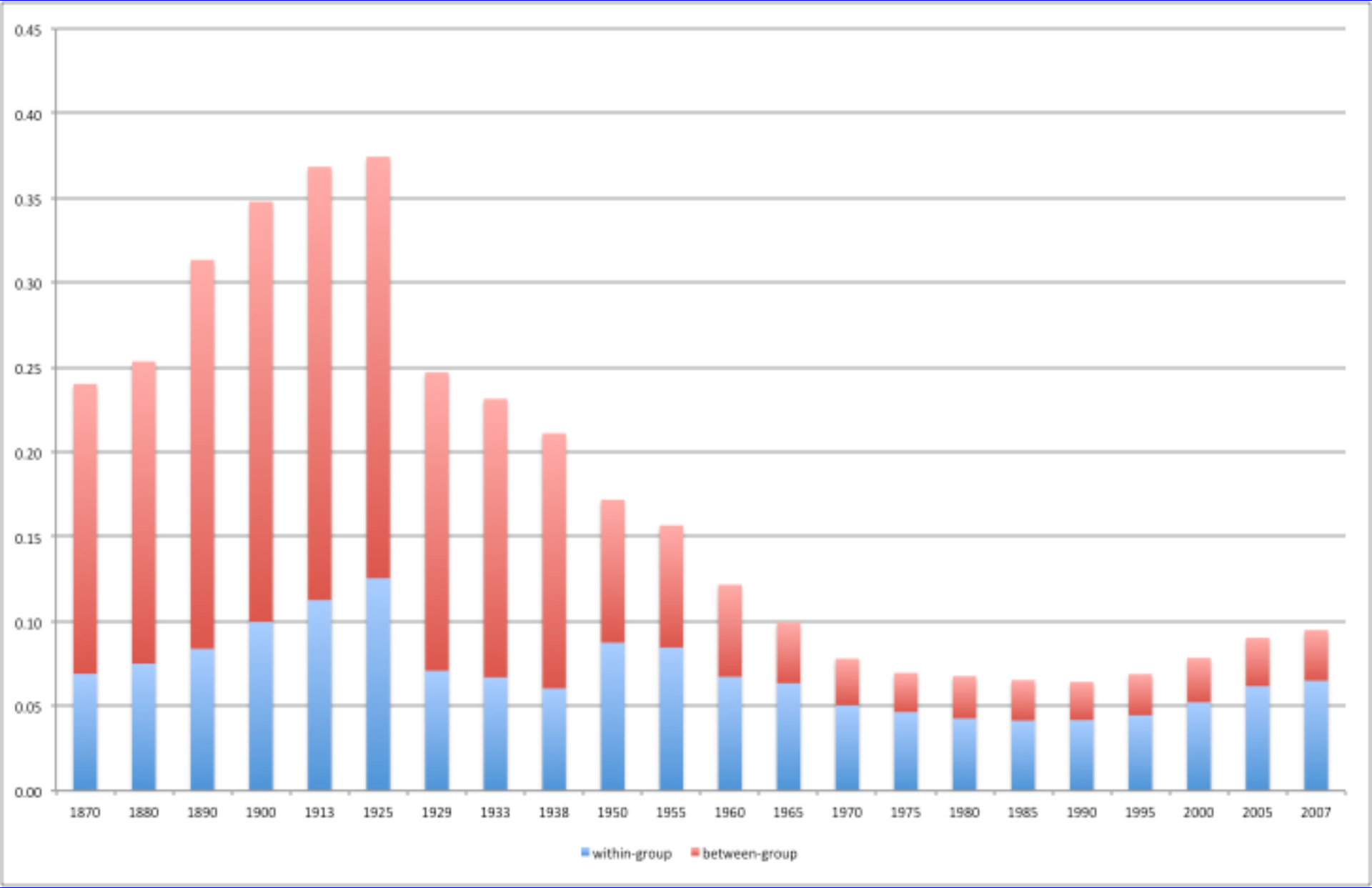


# *Decomposing International Inequality in Real Per Capita GDP:* Theil (pop-weighted)



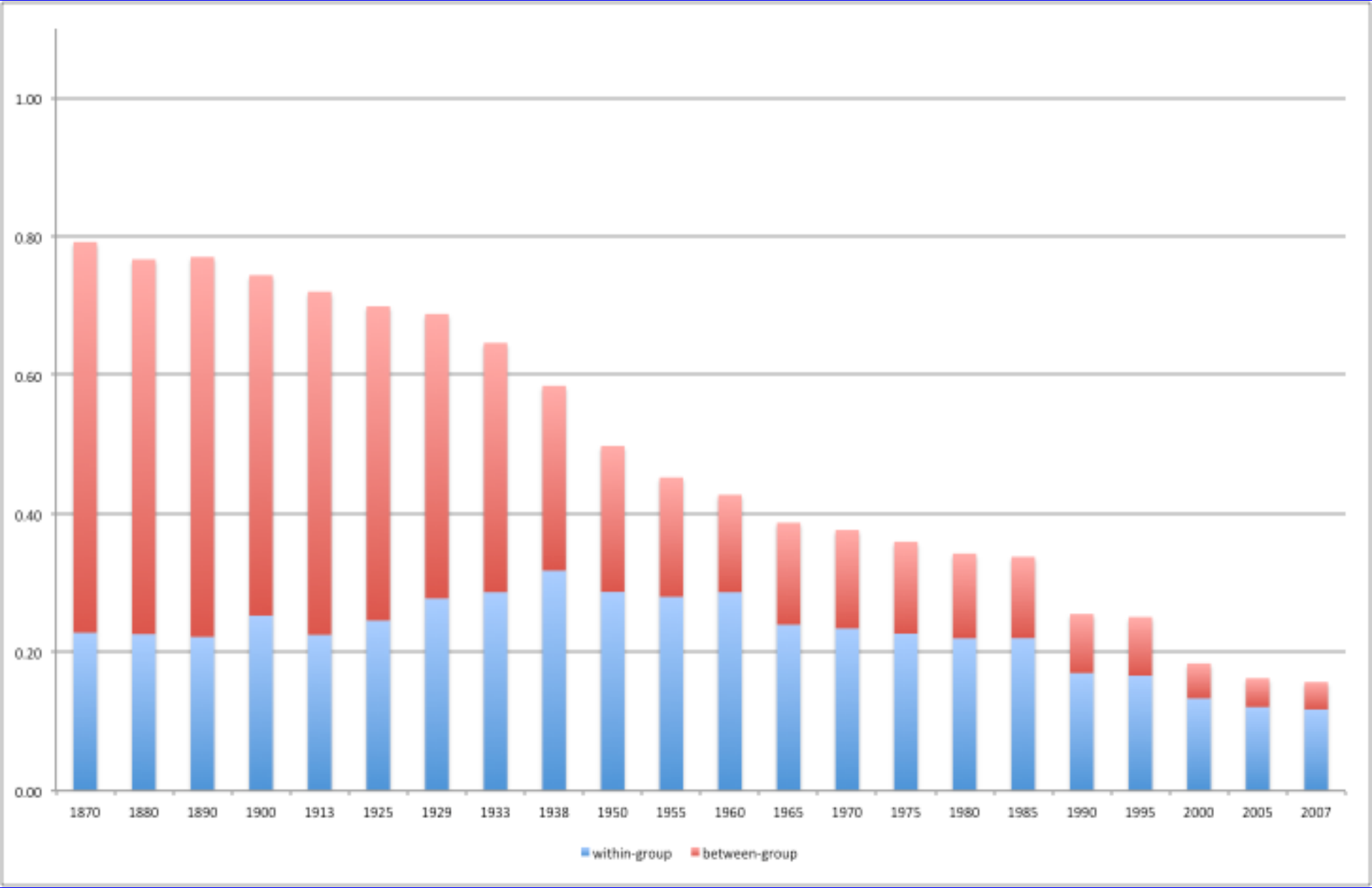
# *Decomposing International Life Expectancy Inequality*

## Theil (pop-weighted)



# *Decomposing International Literacy Inequality* Theil

**(pop-weighted)**



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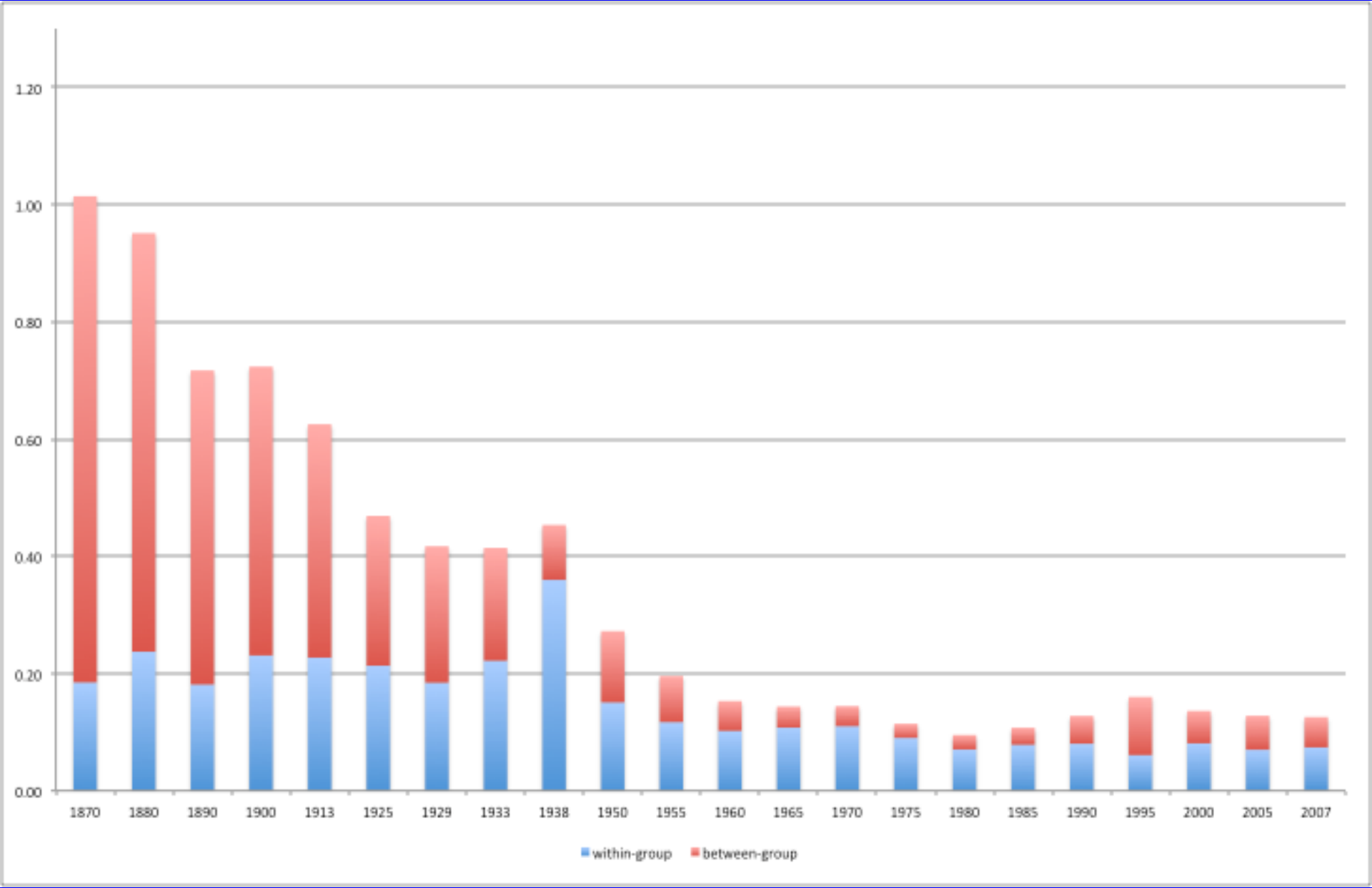

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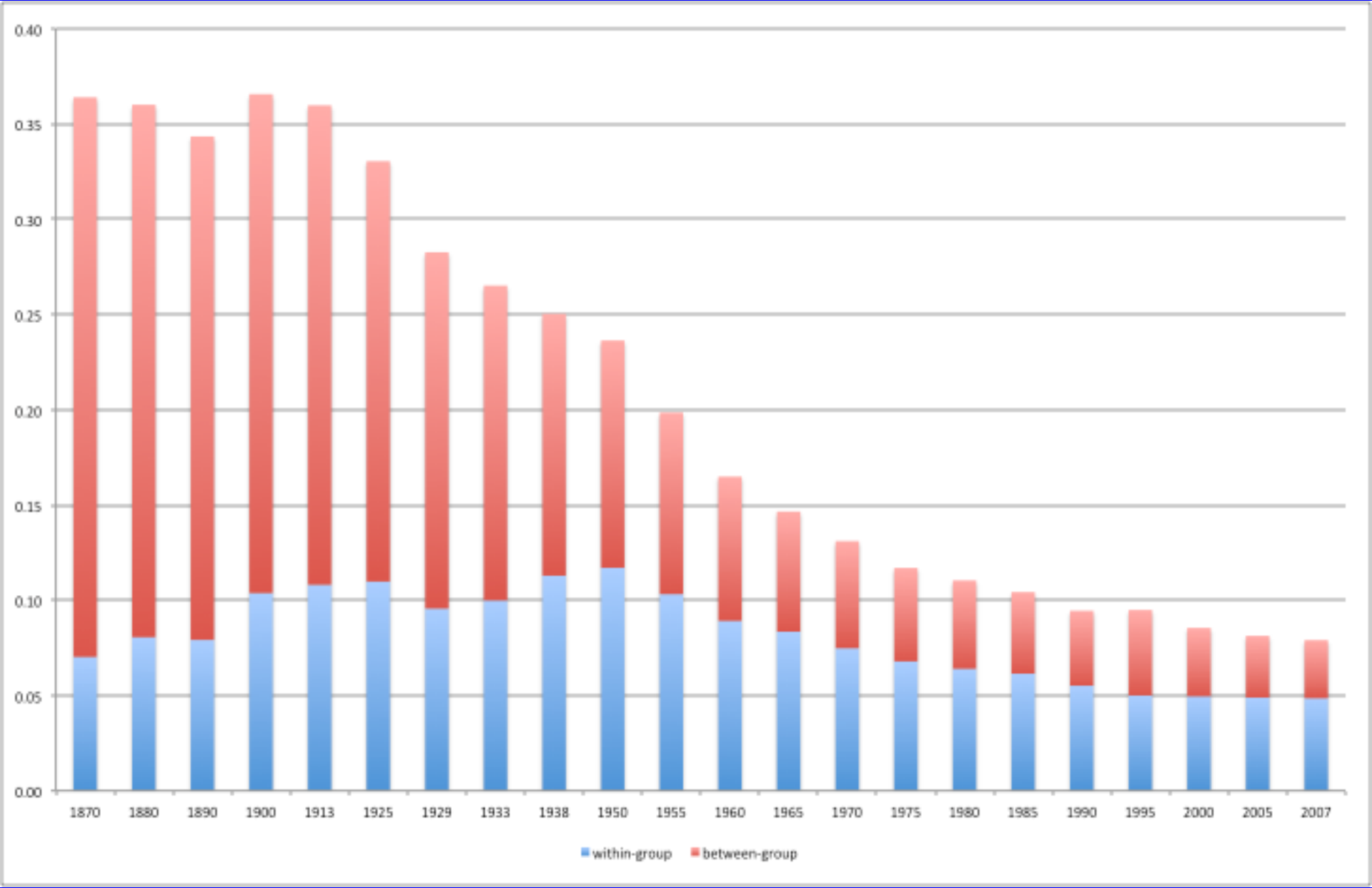

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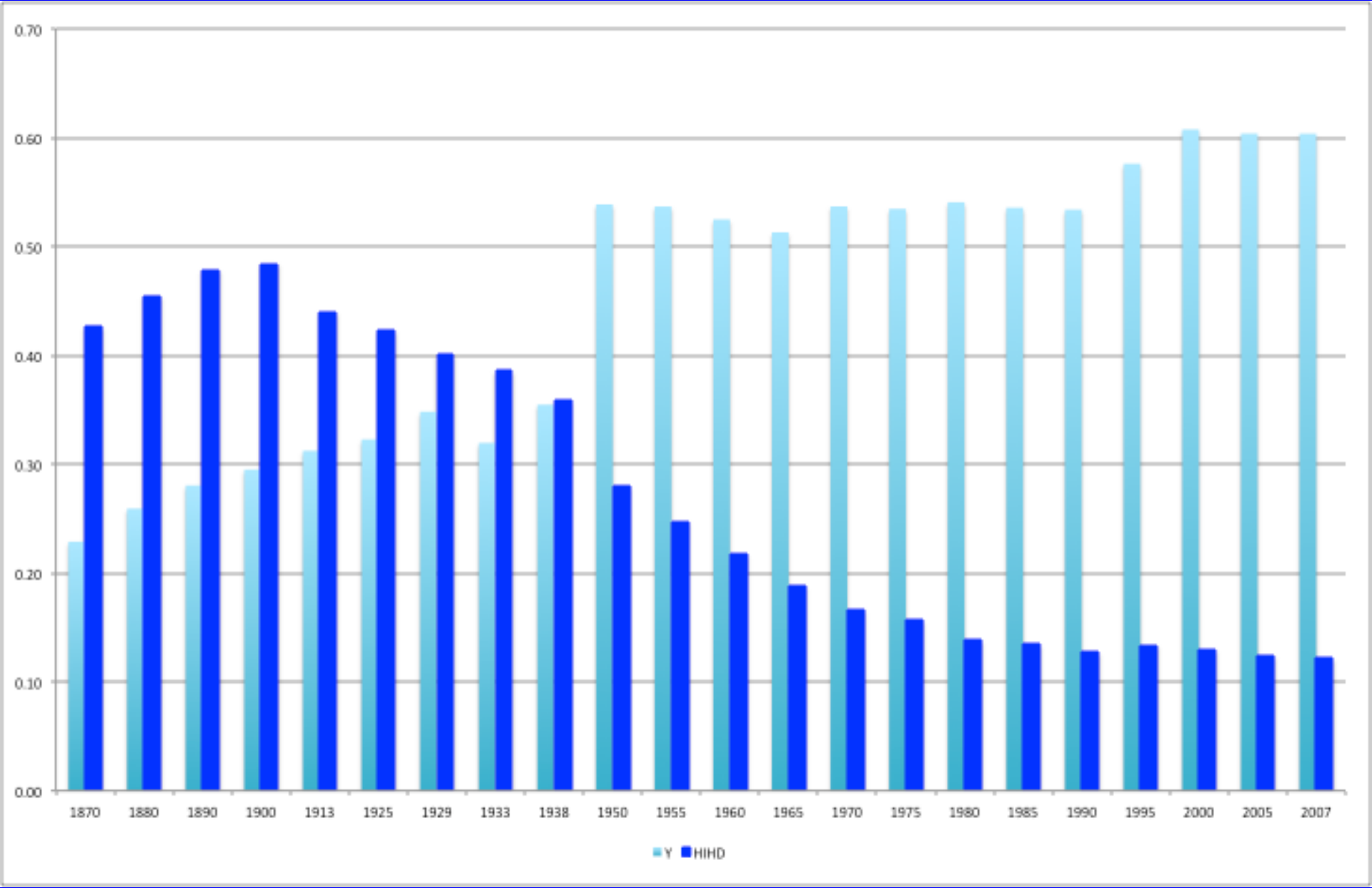
## MLD (unweighted)



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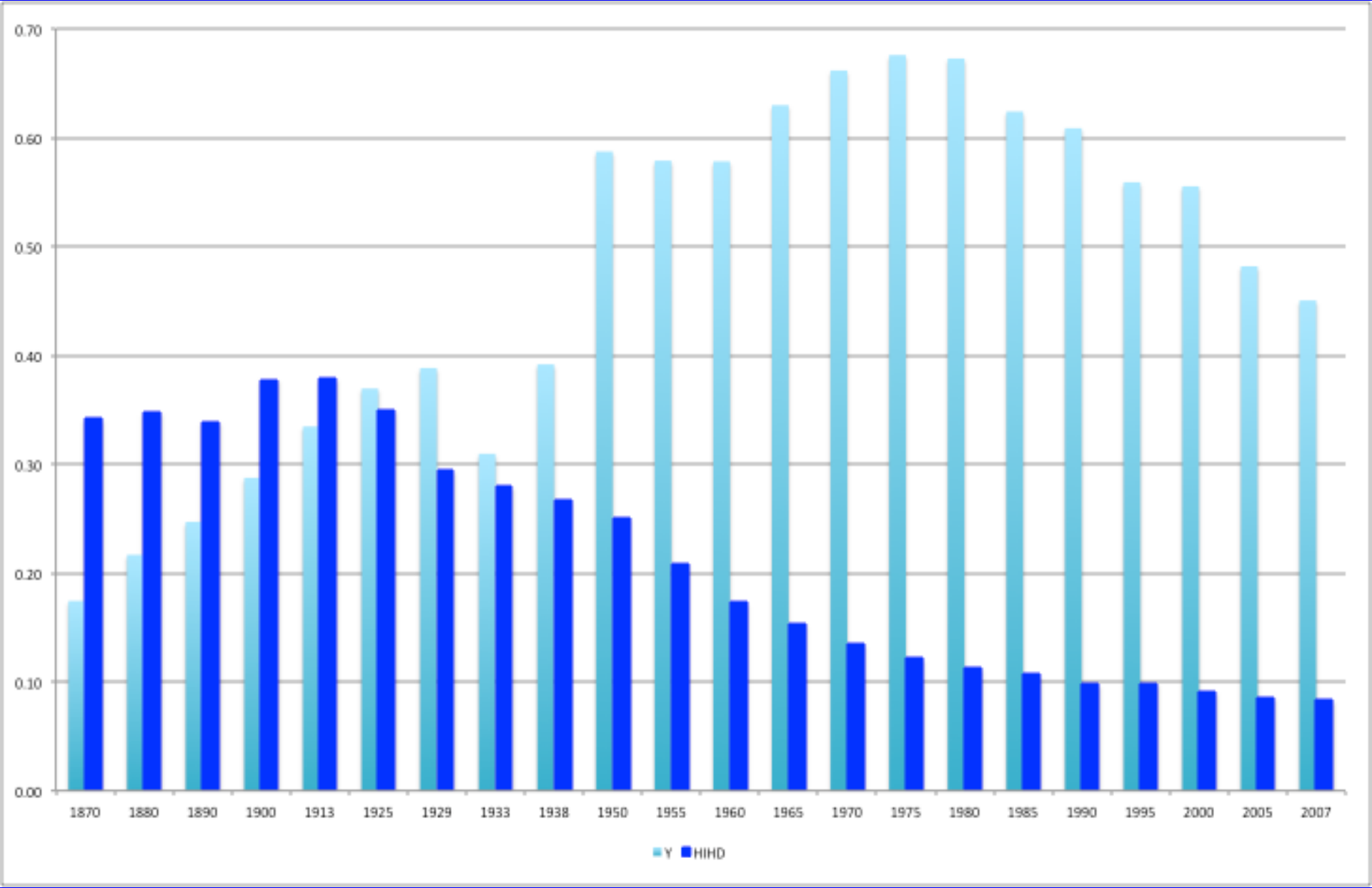
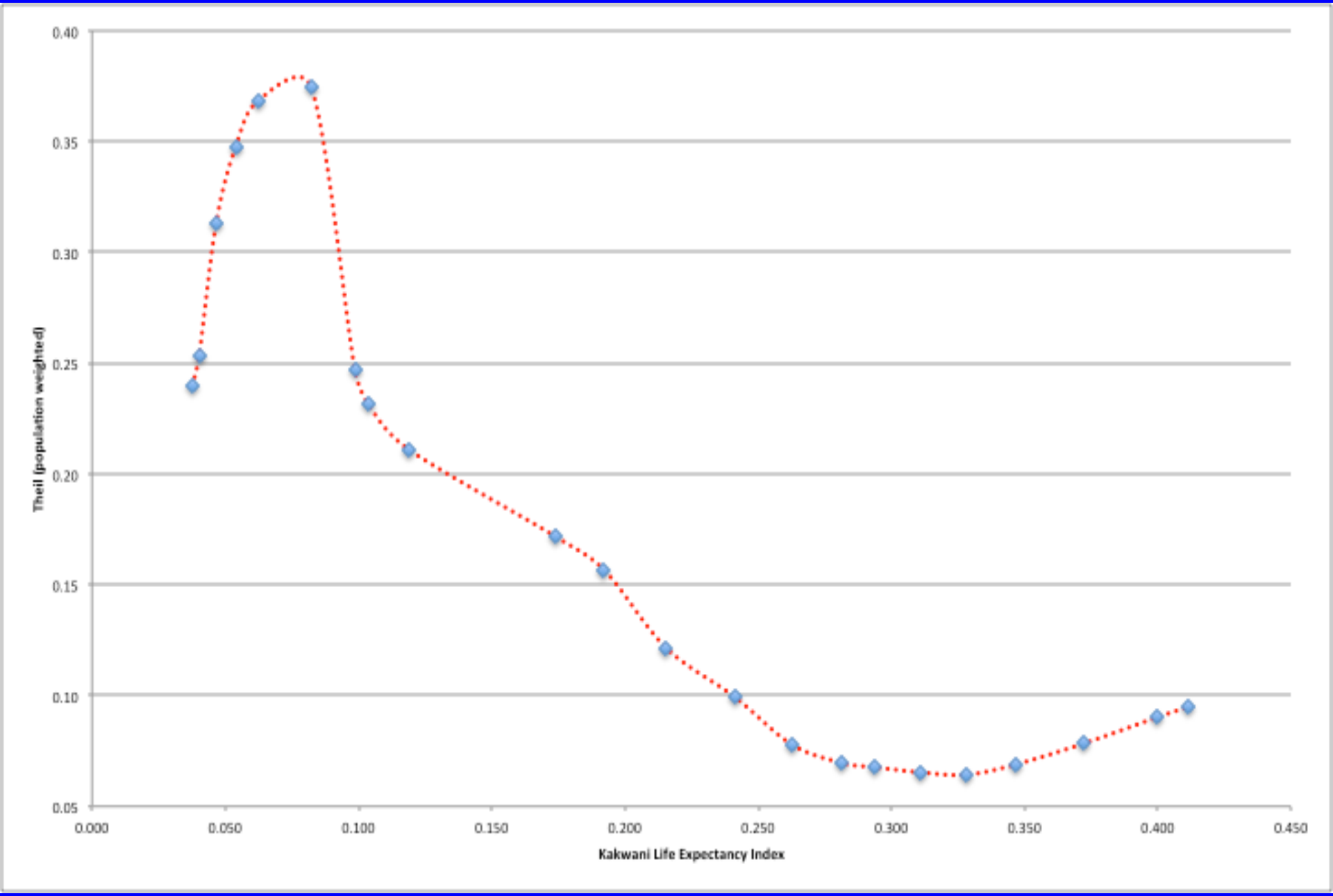
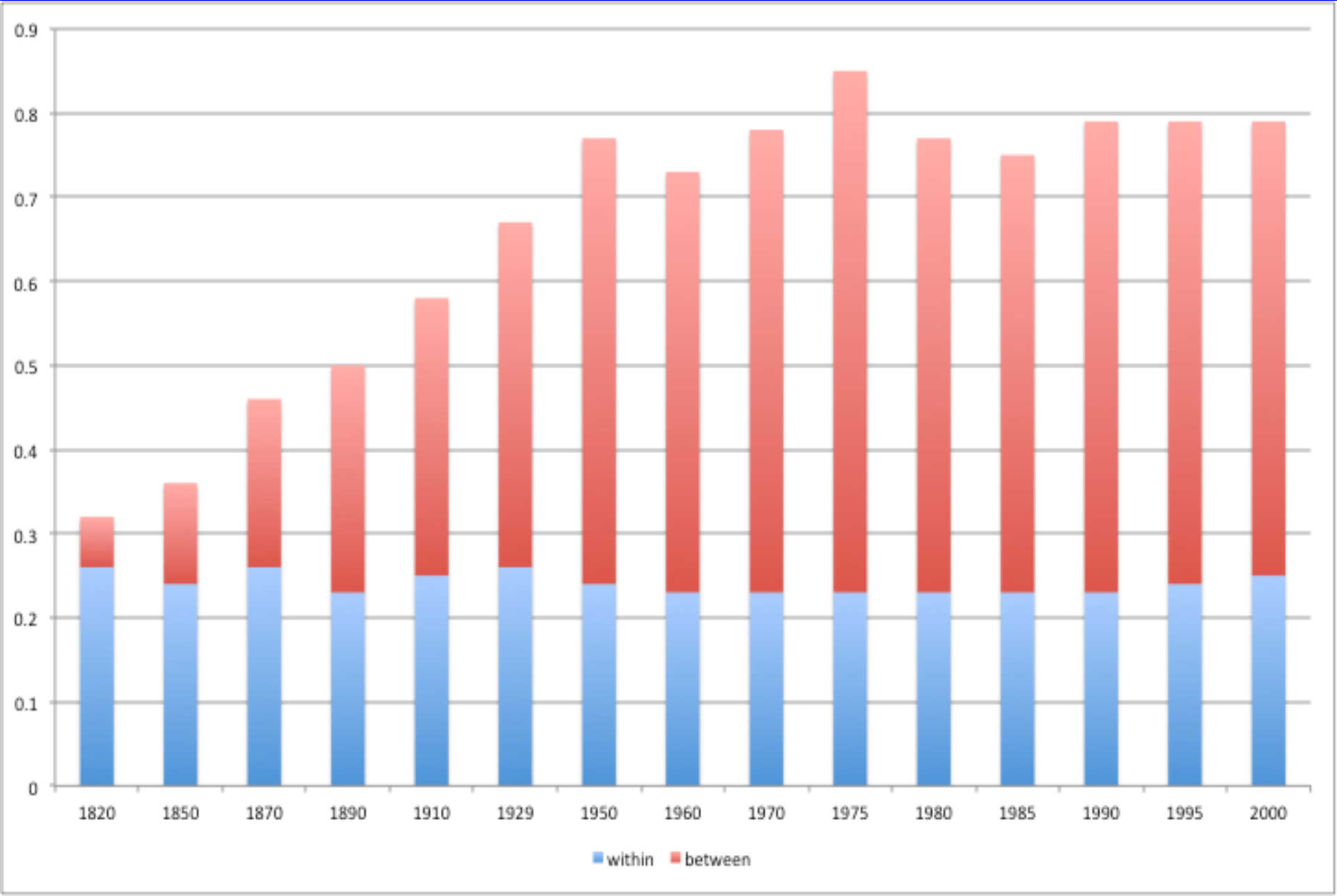
**MLD (population weighted)**



# *A Health Kuznets Curve?* Theil (population-weighted)

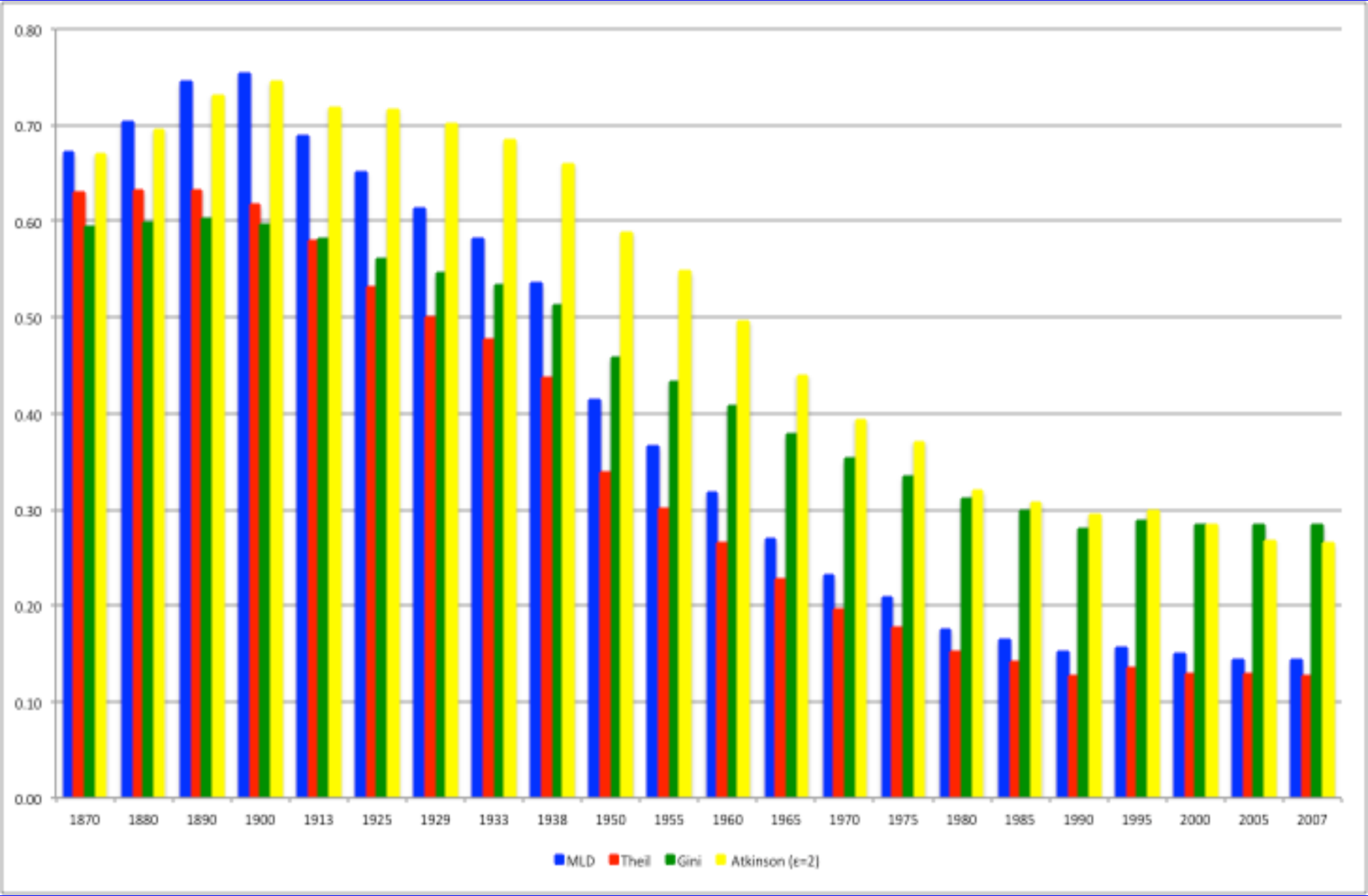


# *Global* Income *Inequality: Theil (van Zanden et al., 2013)*



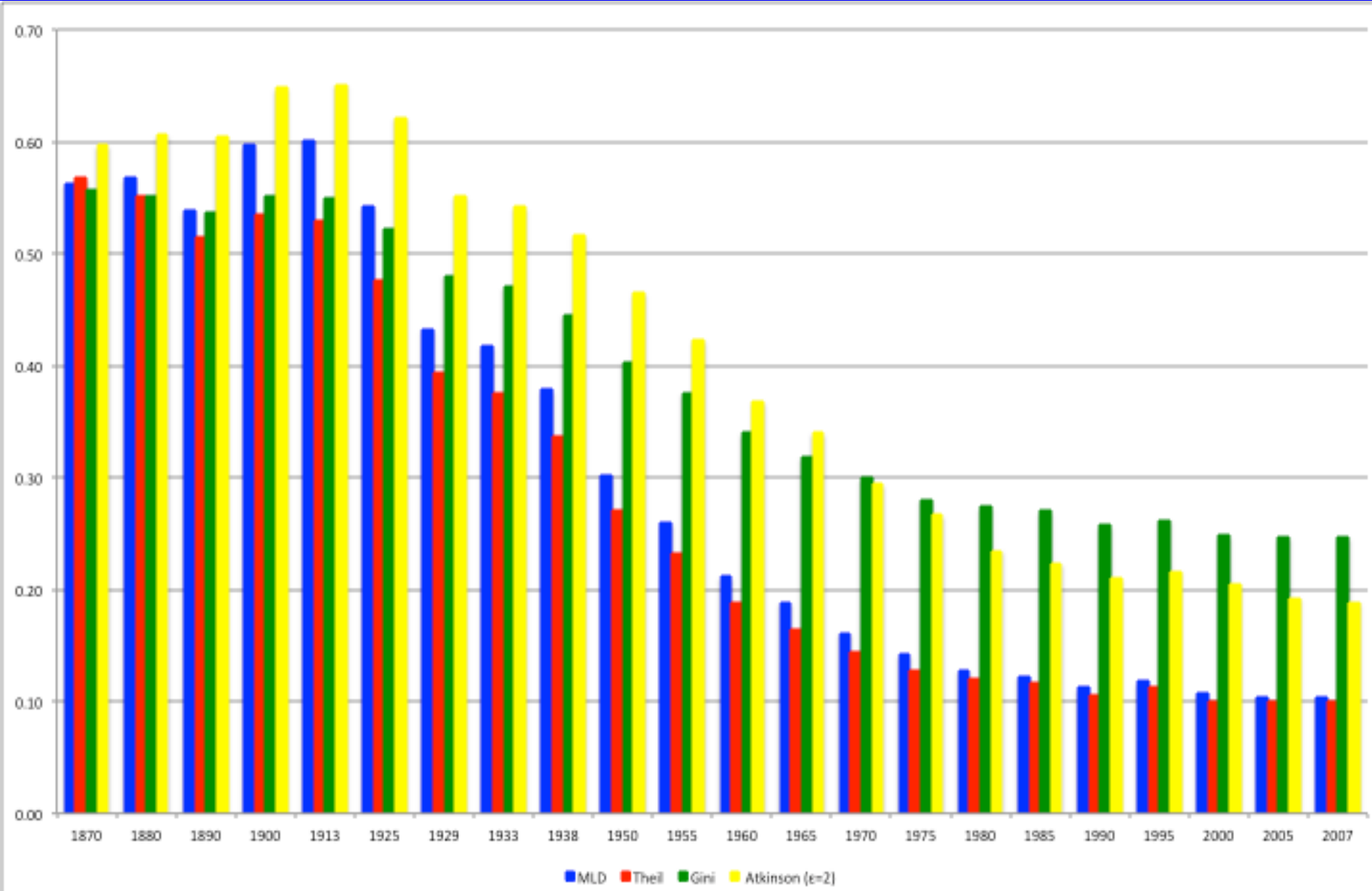
# *World Inequality in HIHD** (unweighted)

*** excluding the income dimension**



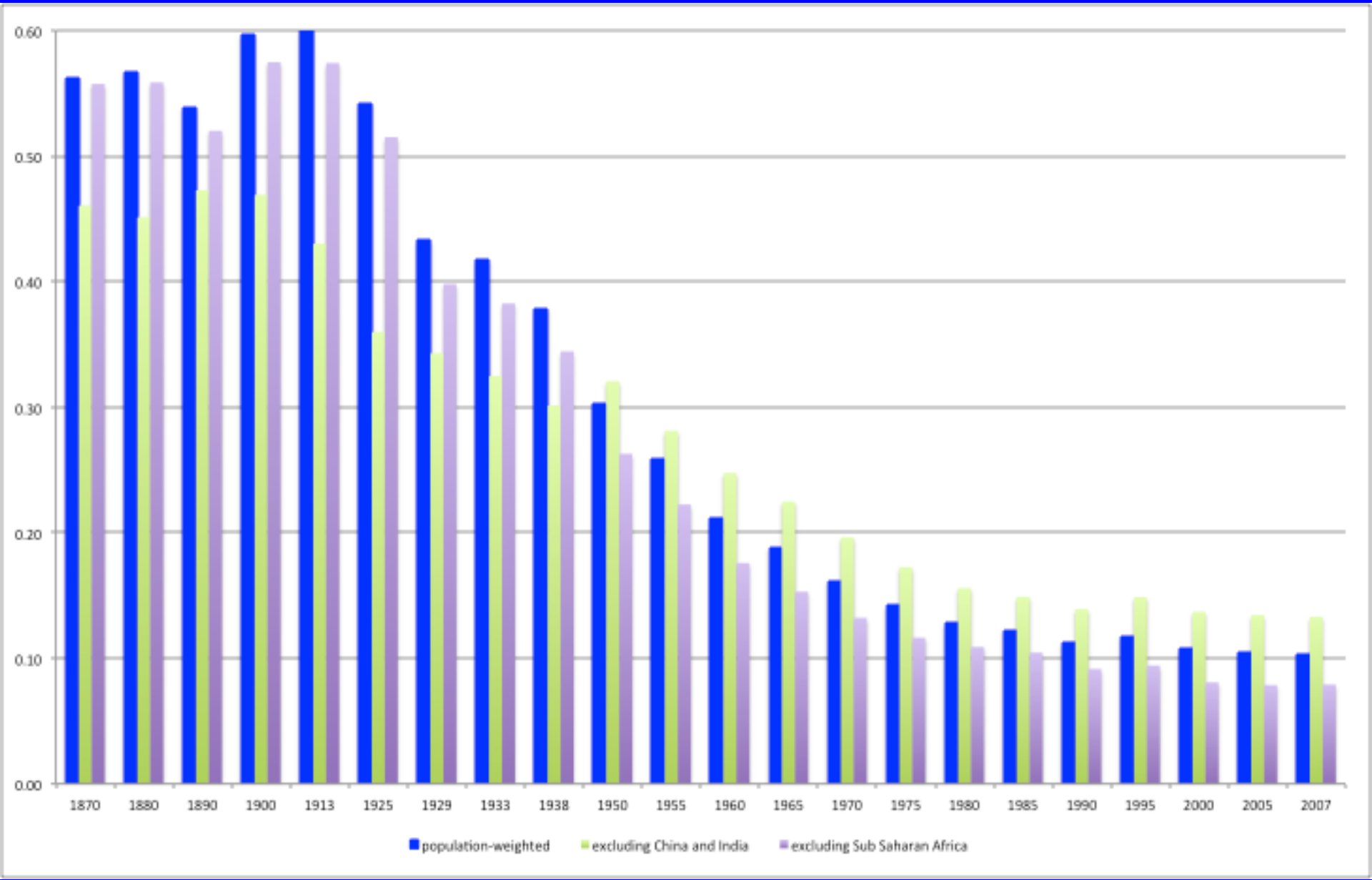
# *World Inequality in HIHD** (population unweighted)

*** excluding the income dimension**



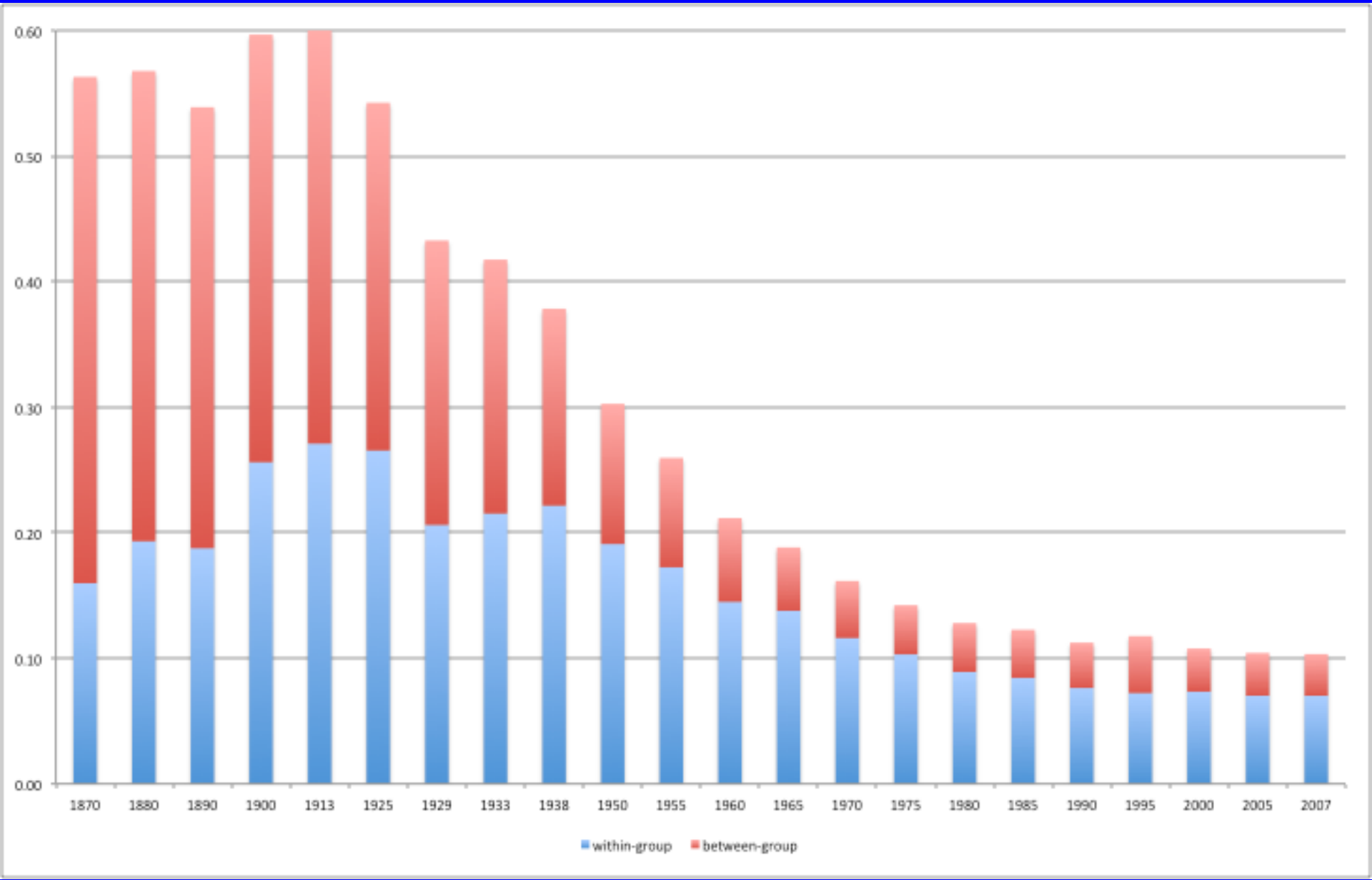
# *World Inequality in HIHD*:* MLD (pop weighted)

***excluding the income dimension *Contribution of China & India and SSA***



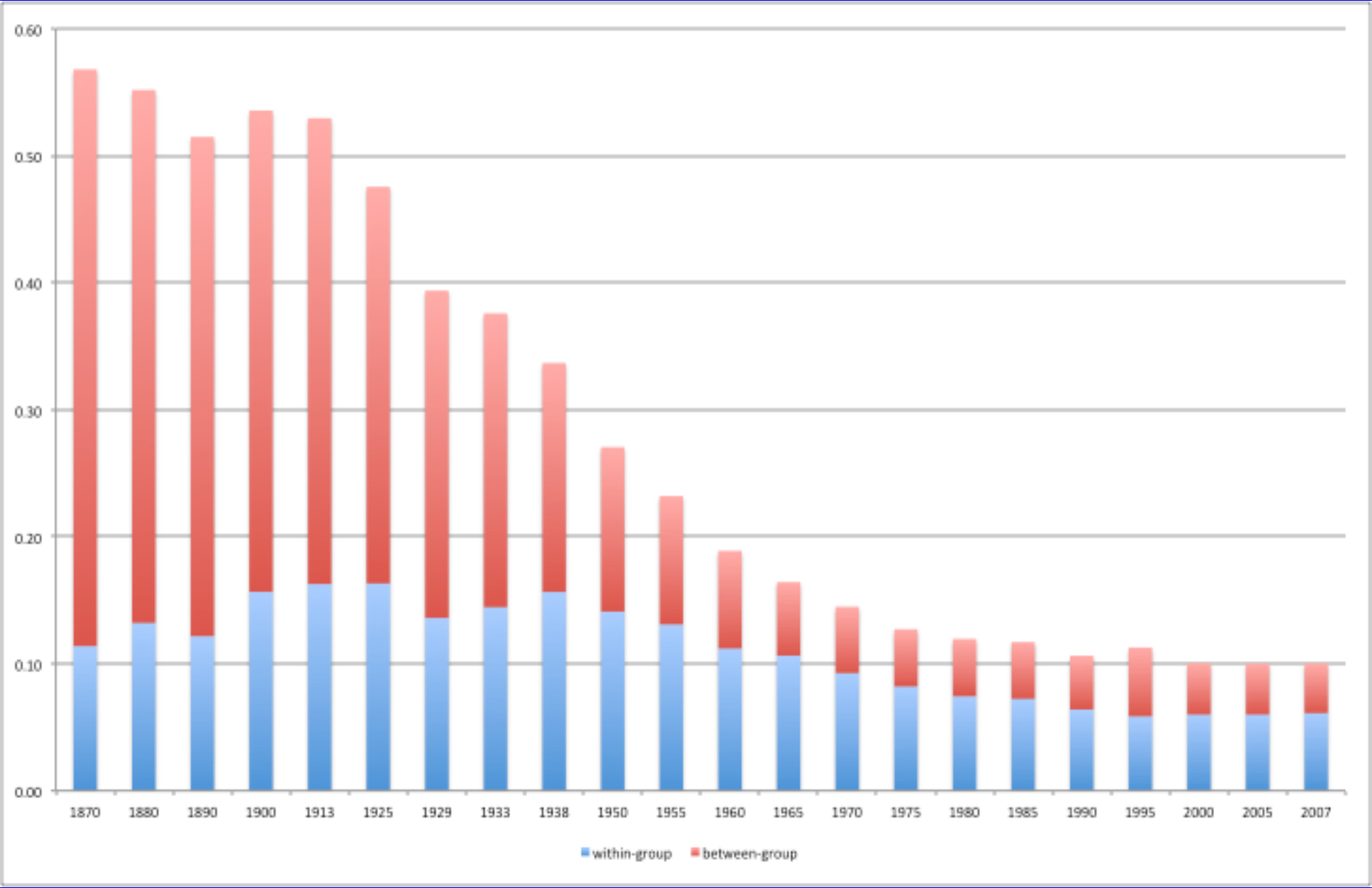
# *Decomposing World HIHD* Inequality:* MLD

*** excluding the income dimension (pop-weighted)**



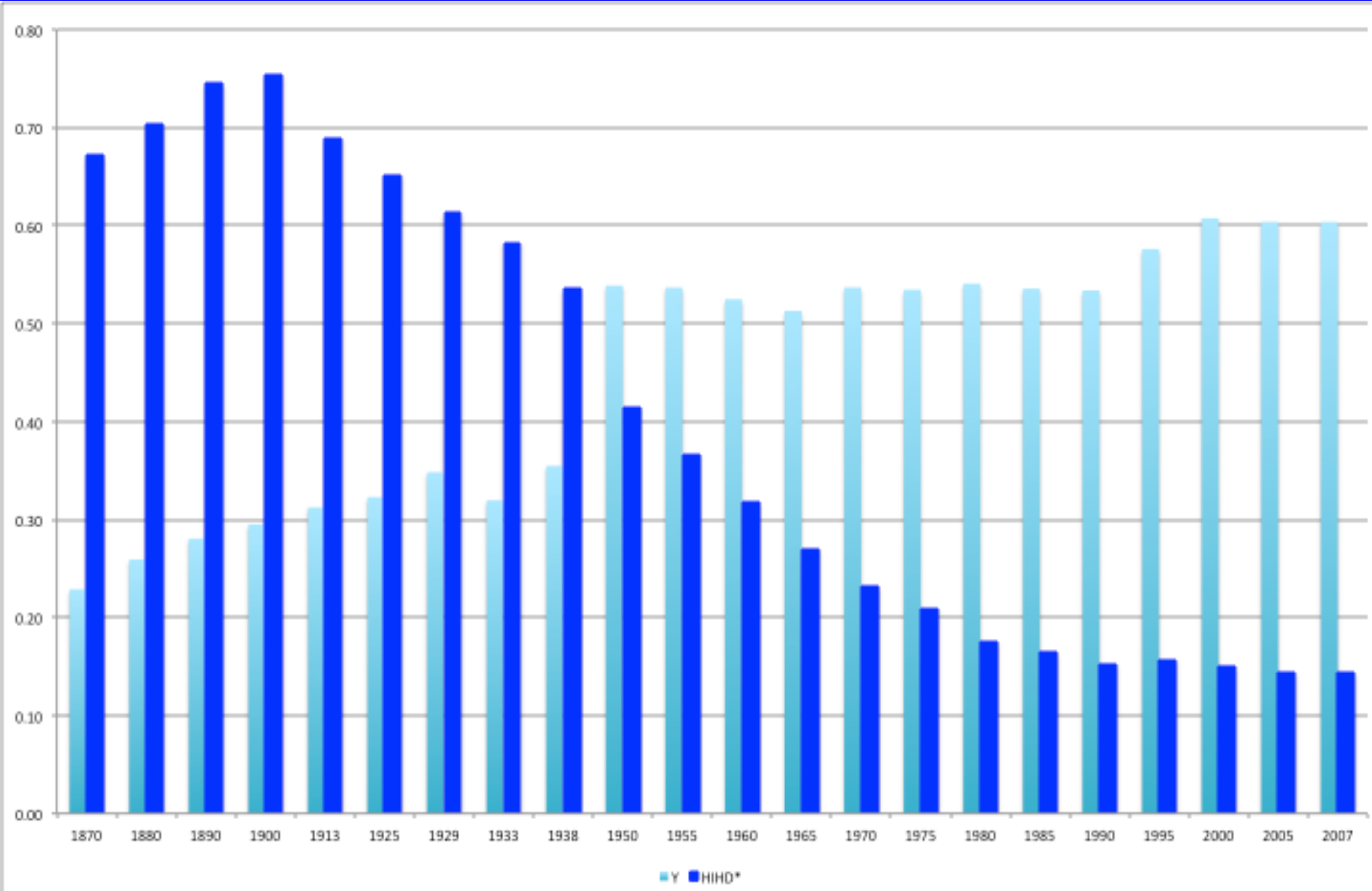
# *Decomposing World HIHD* Inequality:* Theil

*** excluding the income dimension (pop-weighted)**



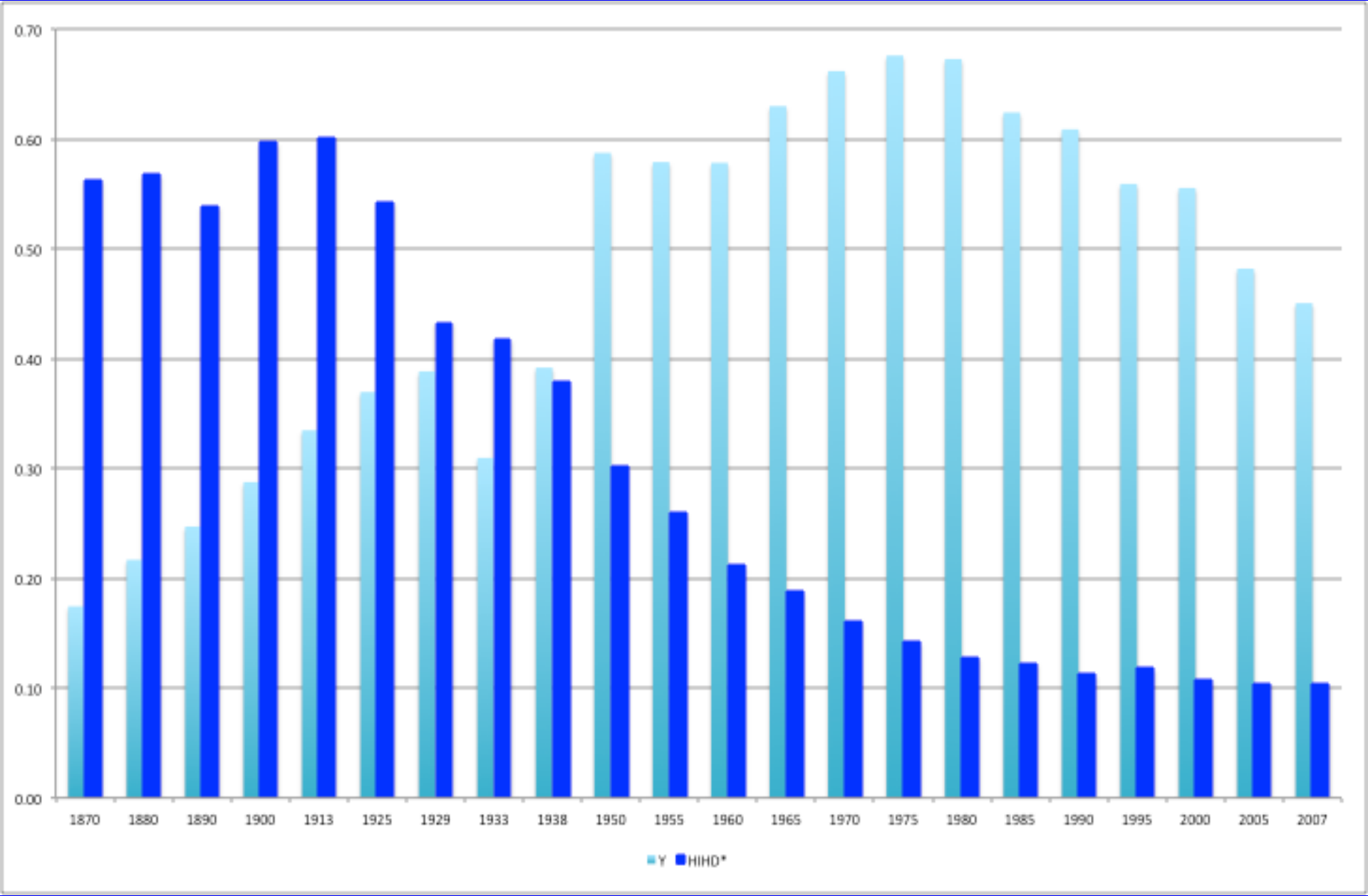
# *World Inequality in HIHD* and GDP per Head* MLD

**(unweighted)** ***excluding the income dimension**



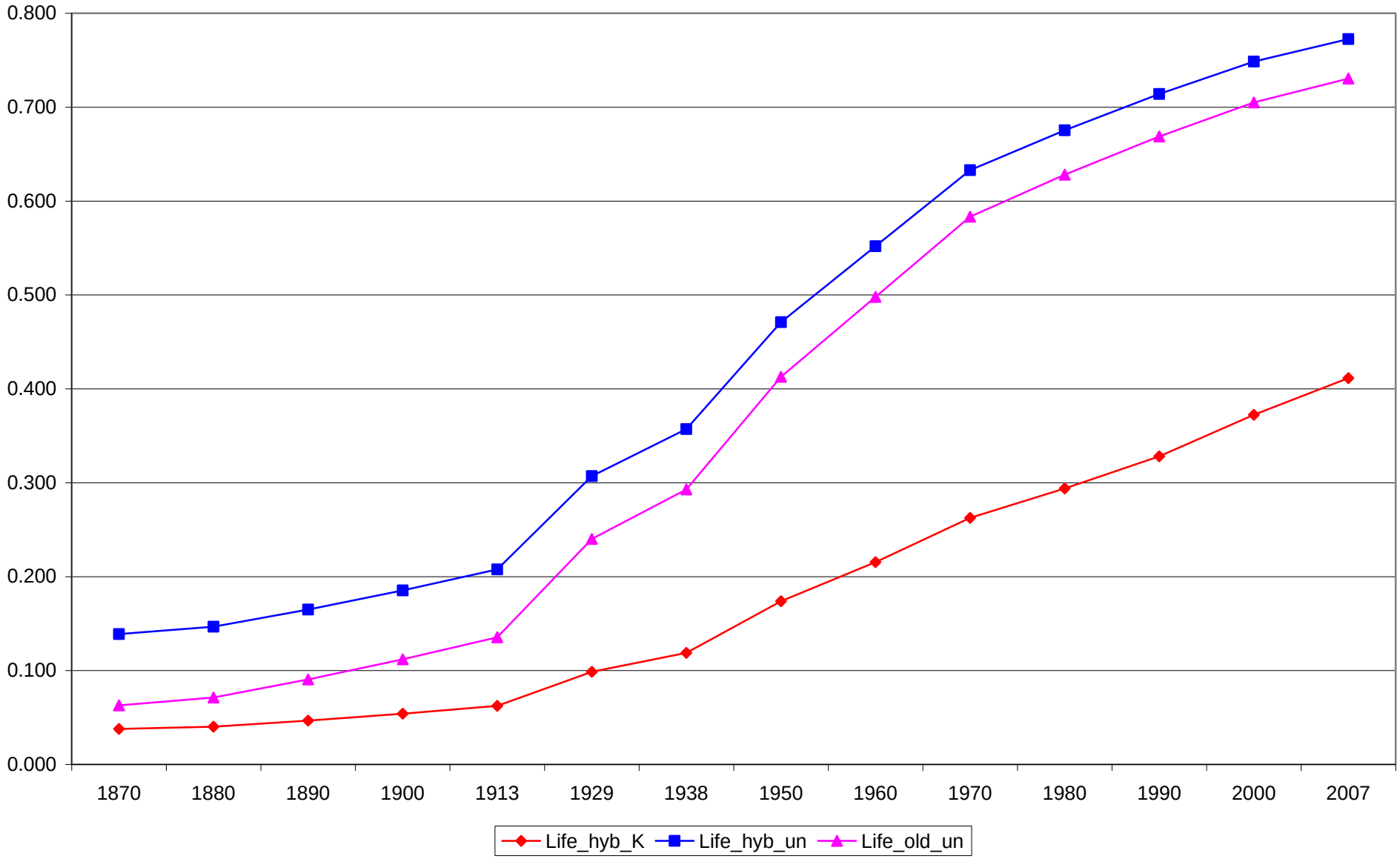
# *World Inequality in HIHD* and GDP per Head* MLD

**(population weighted)** ***excluding the income dimension**

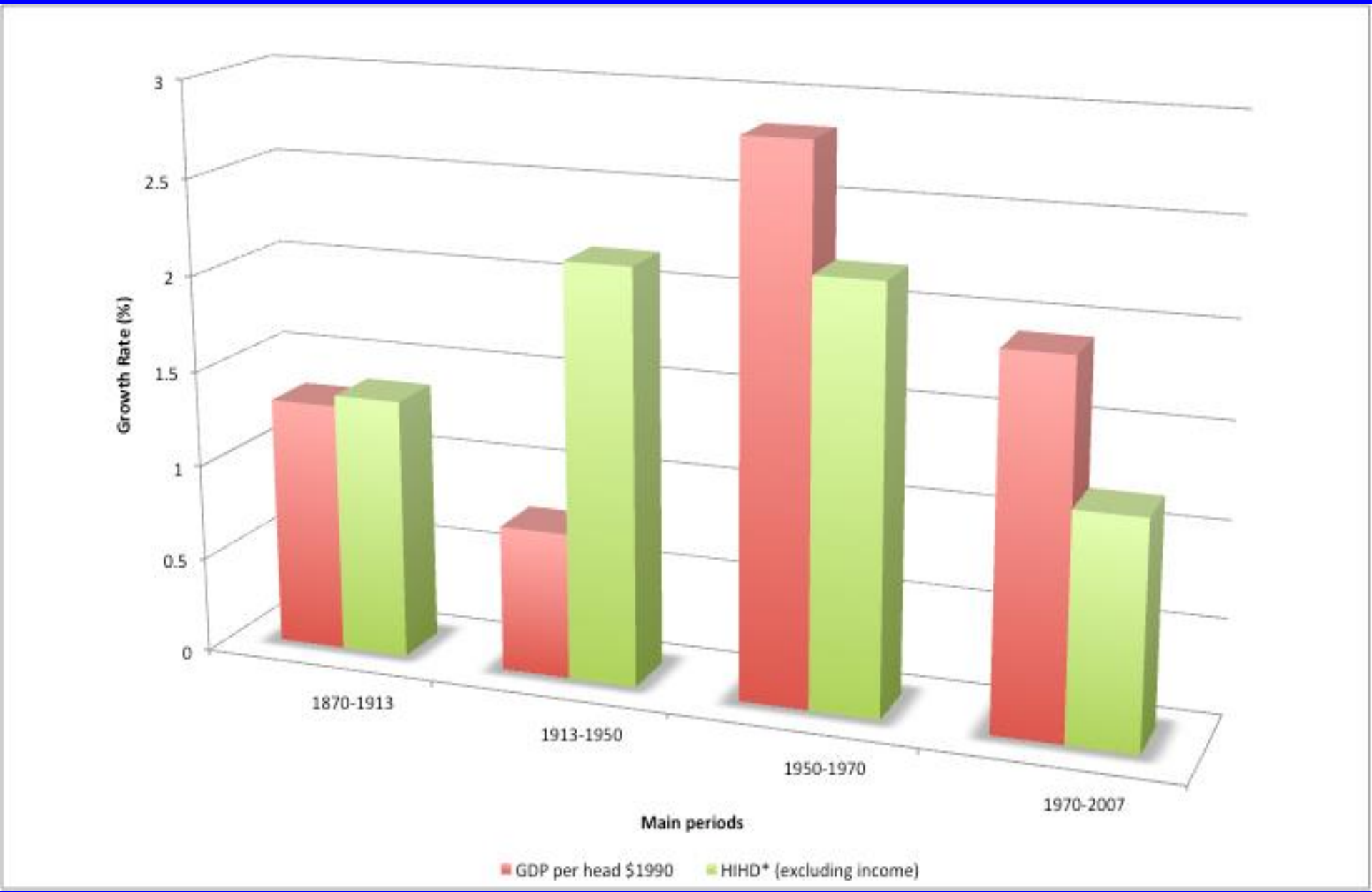


# *Life Expectancy in the World (1870-2007)*

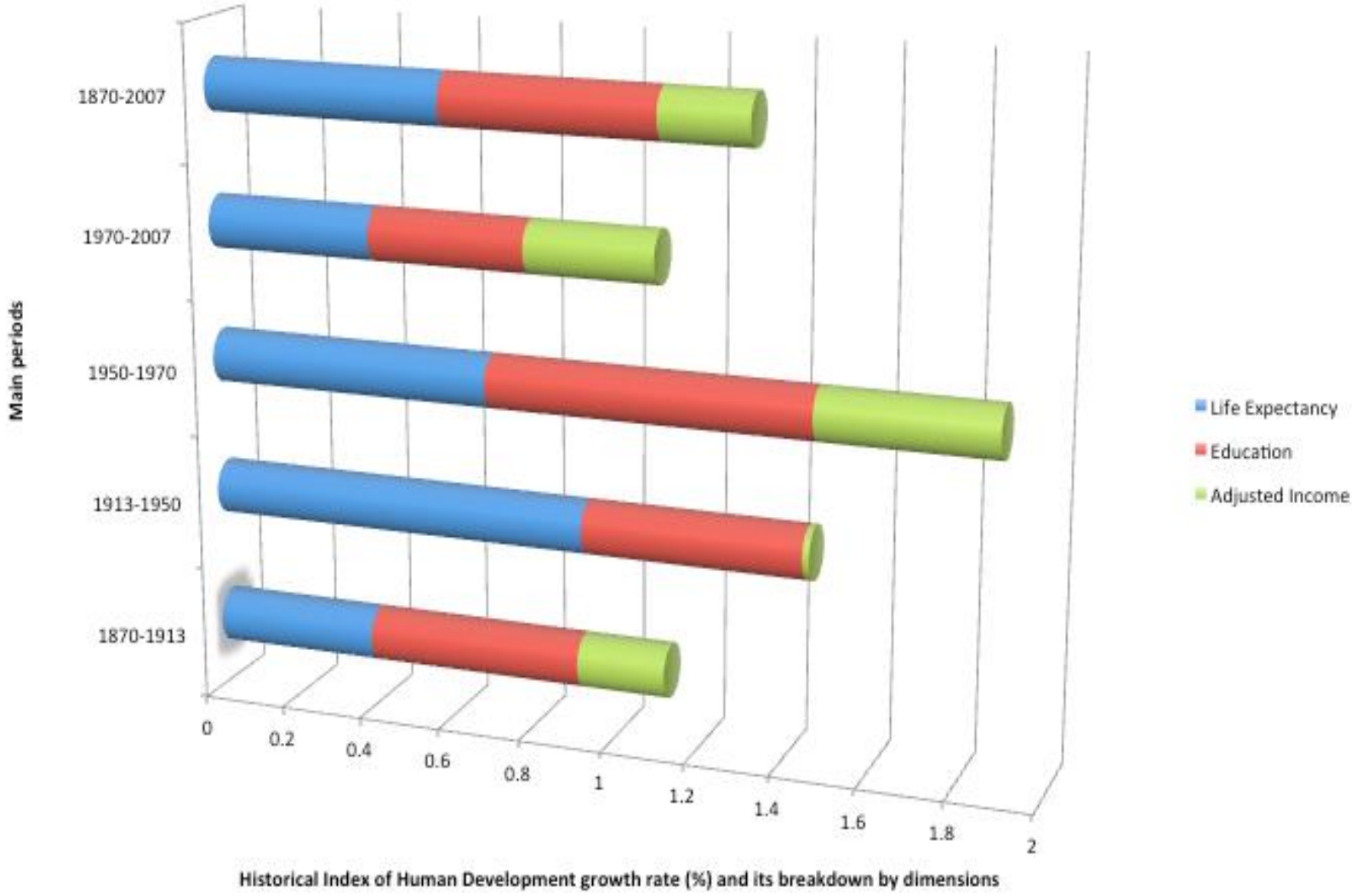
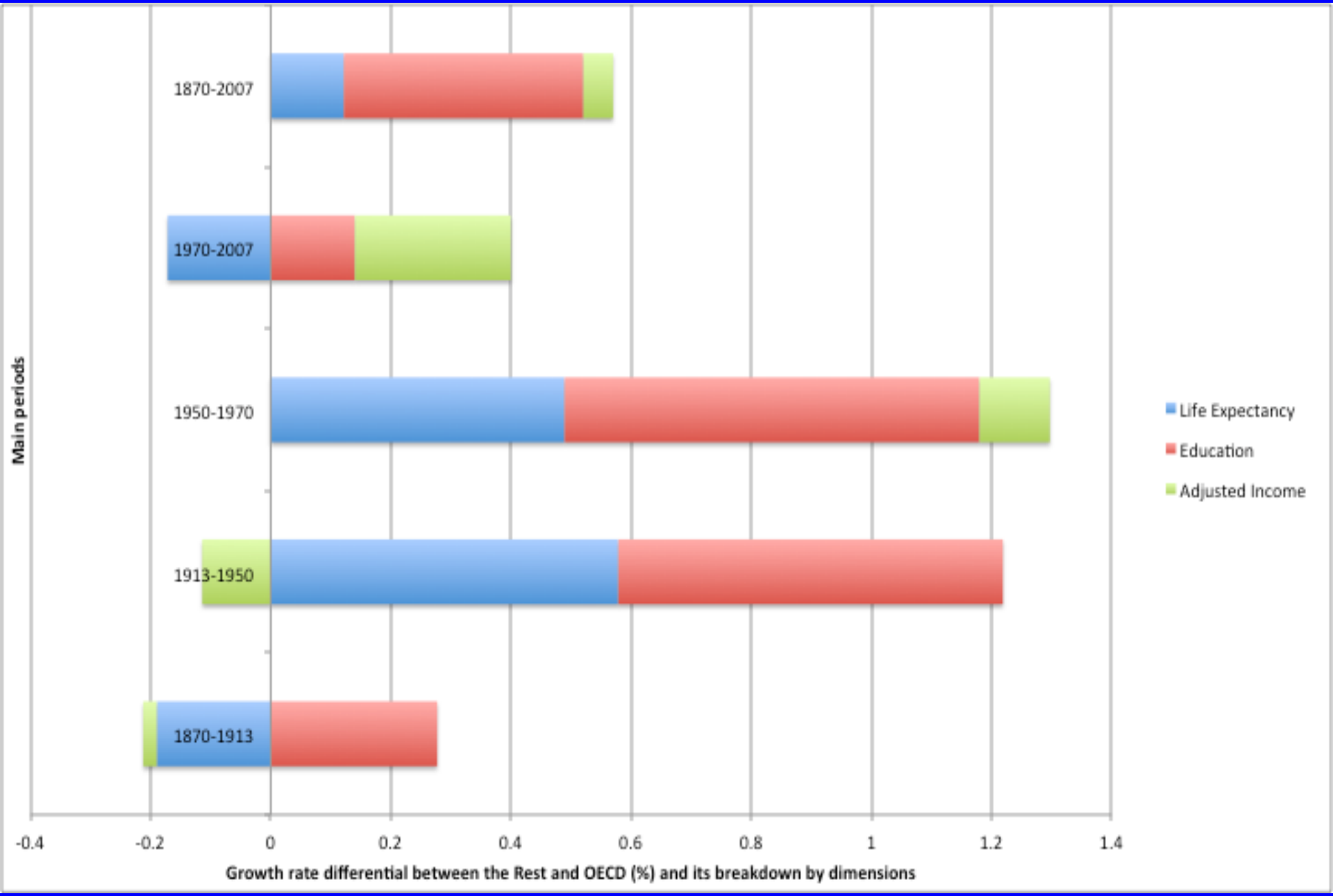
## *non-linear [Kakwani] versus linear [UNDP 'hybrid' and 'old'] indices*



# *Comparing Trends in HIHD and Per Capita GDP*



# *Drivers of World HIHD Growth (%)*



# *Drivers of Catching-up to OECD in the Rest (%)*