# "Uniting Souls" and Numeracy Skills. Age Heaping in the First Italian National Censuses, 1861-1881


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# Introduction and background

Debate on North/South gap at the time of the Unification (1861).

1. **GDP per capita**

→Daniele & Malanima (2007,2011) *vs.* Felice (2011)

2. General consensus on the existence of North/South Gap in **broader dimensions of living standards** (Life Expectancy, Literacy, Heights, HDI)

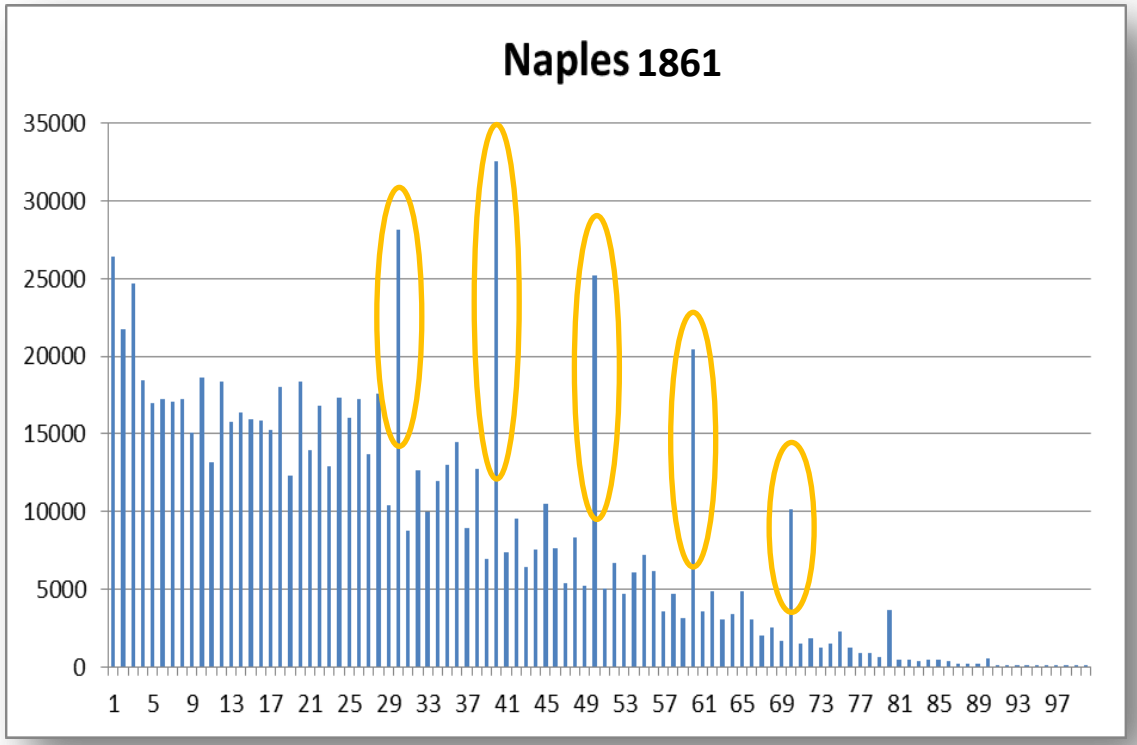
→Felice (2007) and Felice & Vasta (2012)

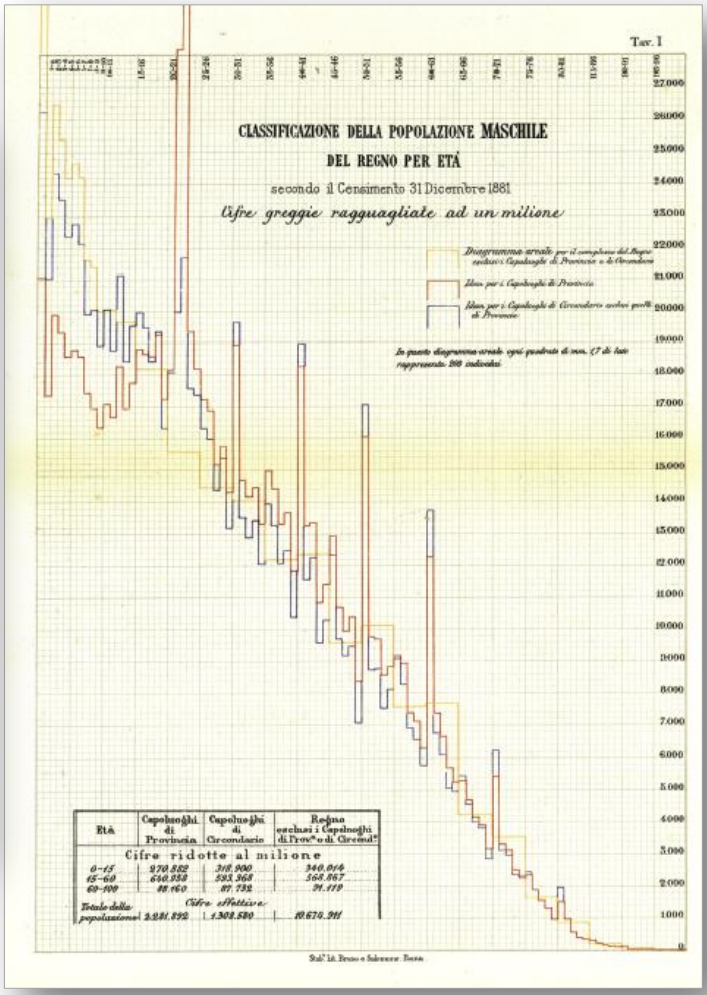
# Today's menu

- New estimates of age heaping for the period 1861-1881
- We consider age heaping as an indicator of relatively basic numeracy skills (A'Hearn,Baten &Crayen,2009)

→ Note also the debate between Lynn (2009) and Felice & Giuliano (2010) on *Intelligence* (see also Daniele & Malanima, 2011). Lynn argues that differences in IQ levels between North/South (reflecting genetic components) are responsible for the gap between regions

# Age heaping at first glance



# Measuring age heaping

Two main indicators:

1. Whipple Index: $W = \frac{(n_{25} + n_{30} + n_{35} + \ \ldots + n_{65} + n_{70})}{\frac{1}{5}\sum_{i=23}^{72} n_i} \times 100$

2. ABCC Index: $ABCC = \left\{1 - \frac{(W-100)}{400}\right\} \times 100 \; for \; W \geq 100$

$$ABCC = 100 \; elsewhere$$

Indicators are computed over [23,72] interval in order to limit spurious effects that can influence age awareness at specific moments in life.

# Data and Sources

Geographical scope: provincial level (similar to NUTS 3: 59 provinces in 1861; 69 in 1871 and 1881)

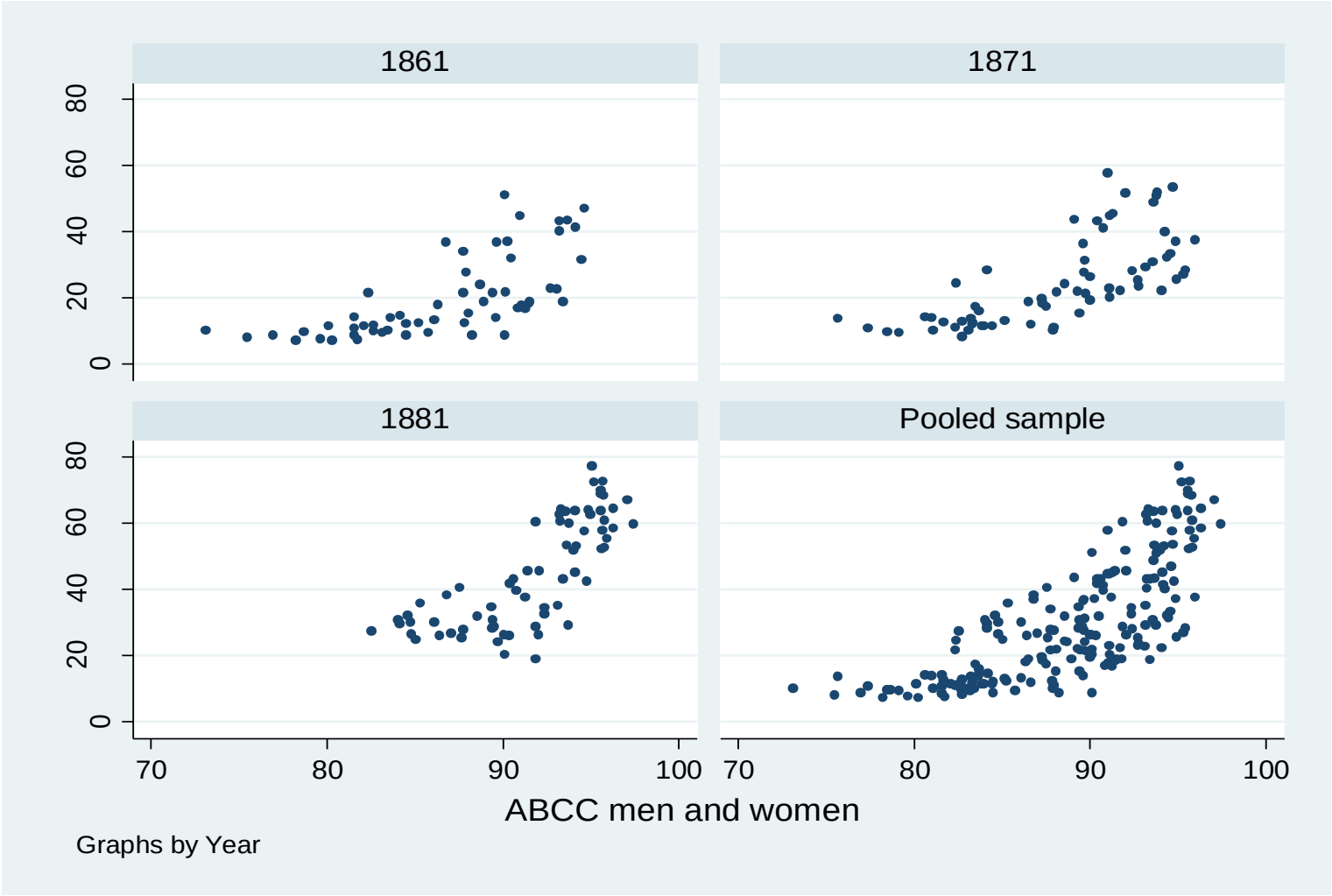
The first three national censuses:

- **1861**: MAIC - Ministero di Agricoltura, Industria e Commercio (1866). *Censimento generale, vol. II. Popolazione.*
- **1871**: MAIC - Ministero di Agricoltura, Industria e Commercio (1876). *Censimento della popolazione del Regno d'Italia al 31 dicembre 1871, vol. II. Popolazione classificata per età sesso, stato civile e istruzione elementare.*
- **1881**: MAIC - Ministero di Agricoltura, Industria e Commercio (1884). *Censimento della popolazione del Regno d'Italia al 31 dicembre 1881, vol. II. Popolazione classificata per età sesso, stato civile e istruzione elementare.*

- In **1891** the census was not carried out because of the financial difficulties of the country.
- The censuses for **1901** and **1911** do not report complete 1-year age distributions but 5-year age distribution
- In **1881**: 1-year age distributions are reported only for the province "capital"

Data were collected by self-enumeration. The head of the household was in charge of filling the census form; in case of illiteracy, (s)he could ask for help to a literate person .

# Age heaping and literacy (1)

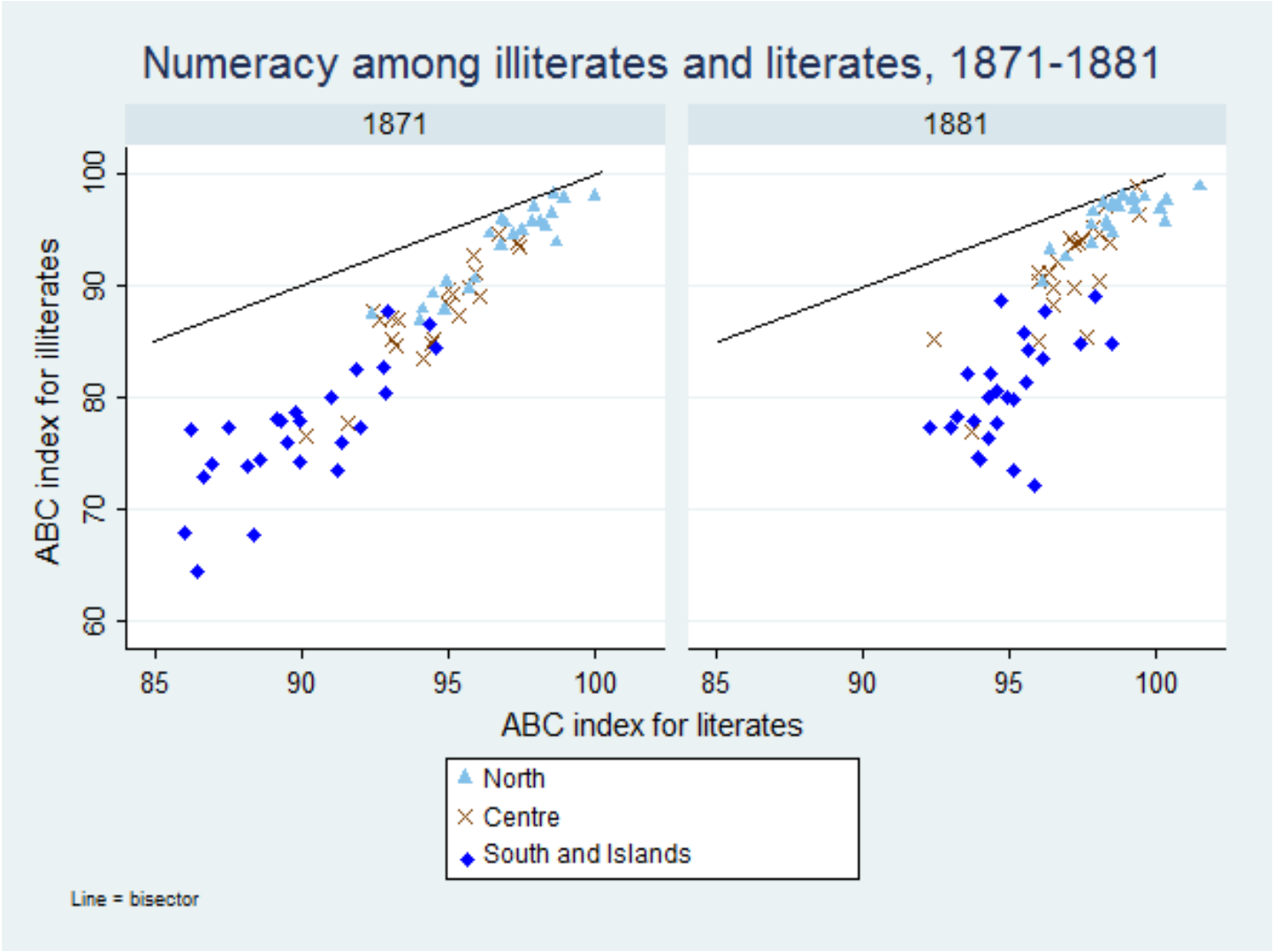


# Age heaping and literacy (2)

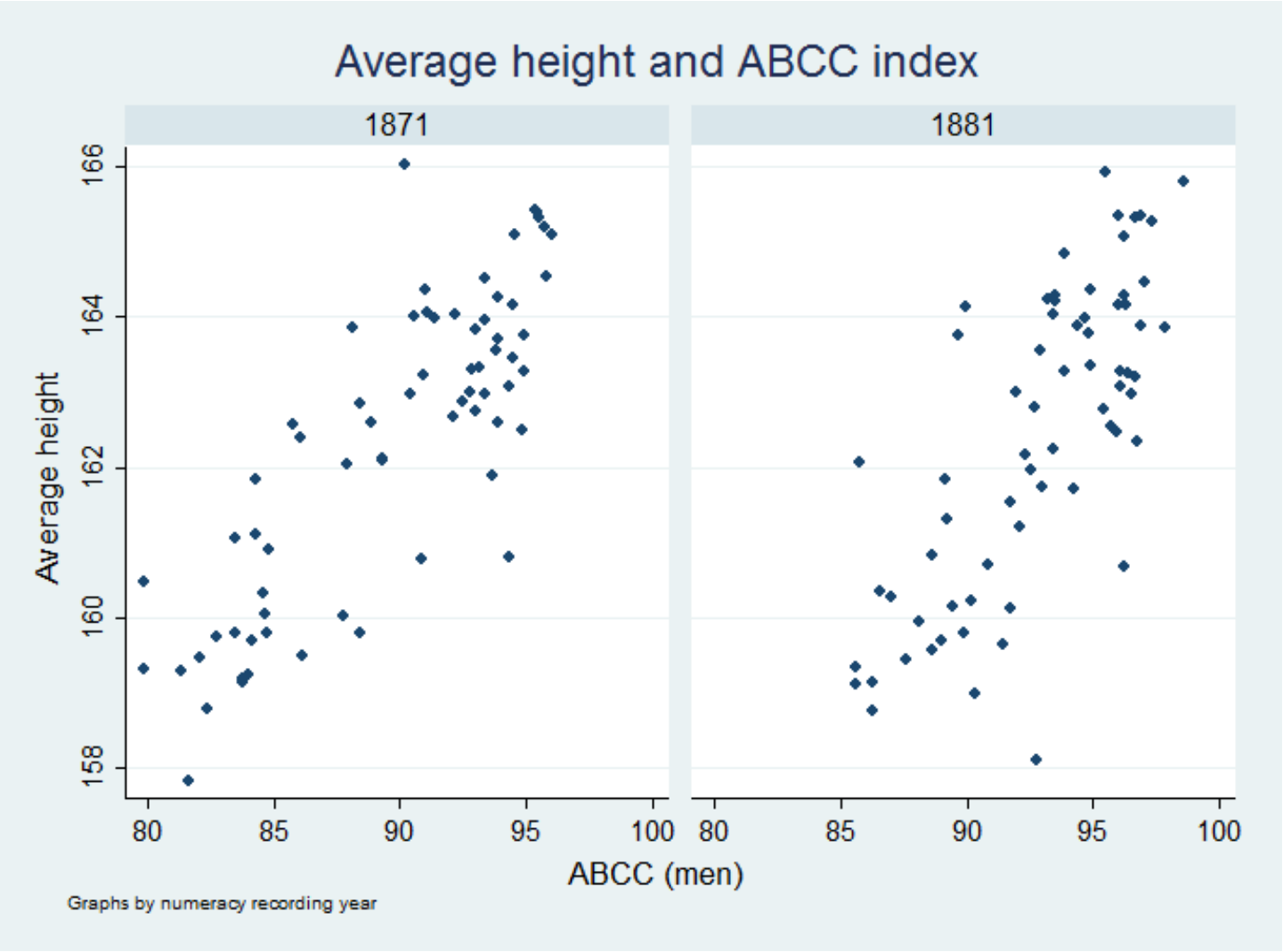
**Table 2: Literacy and Age-Heaping in Italian provinces, 1861-1881**

| Sample | ABCC coefficient | $R^2$ | Mean literacy | Mean Numeracy |
|---|---|---|---|---|
| Pooled sample (1861-1881) | 2.570*** | 0.554 | 30.44 | 88.97 |
| | (0.165) | | | |
| - Men | 2.889*** | 0.621 | 36.20 | 90.22 |
| | (0.162) | | | |
| - Women | 2.212*** | 0.474 | 24.82 | 87.72 |
| | (0.167) | | | |
| Census 1861 | 1.554*** | 0.453 | 19.88 | 86.75 |
| | (0.226) | | | |
| - Men | 1.839*** | 0.508 | 25.37 | 88.01 |
| | (0.240) | | | |
| - Women | 1.267*** | 0.381 | 14.37 | 85.48 |
| | (0.214) | | | |
| Census 1871 | 1.873*** | 0.506 | 25.10 | 88.26 |
| | (0.226) | | | |
| - Men | 2.273*** | 0.607 | 31.01 | 89.55 |
| | (0.224) | | | |
| - Women | 1.444*** | 0.365 | 19.24 | 86.96 |
| | (0.233) | | | |
| Census 1881 | 3.225*** | 0.580 | 44.82 | 91.60 |
| | (0.335) | | | |
| - Men | 3.446*** | 0.634 | 50.66 | 92.78 |
| | (0.320) | | | |
| - Women | 2.884*** | 0.541 | 39.33 | 90.38 |
| | (0.324) | | | |

# Age heaping and literacy (3)



# Age heaping and heights(1)



# Age heaping and heights(2)

**Table 3: Heights and Age Heaping, 1871-1881**

| | (1) | (2) | (3) |
|---|---|---|---|
| | Pooled sample (1871-1881) | 1871 | 1881 |
| Average Height | -6.577*** | -7.800*** | -5.230*** |
| | (0.512) | (0.648) | (0.565) |
| Constant | 1,203*** | 1,407*** | 978.2*** |
| | (83.09) | (105.2) | (91.72) |
| Observations | 136 | 68 | 68 |
| R-squared | 0.552 | 0.687 | 0.565 |

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

# What does age heaping really mean?

**To the extent, therefore, that the degree of age-heaping …[is]…correlated with other qualities such as arithmetical ability ("numeracy"), a respect for accuracy, or a more serious attitude toward time, age heaping measure valuable human attributes which have the potential to create important economic externalities and play a role in development**

(Mokyr, 1983, p. 246)

We find pieces of evidence supporting:

- Age heaping as an indicator of **individual numerical skills** ("arithmetical ability")

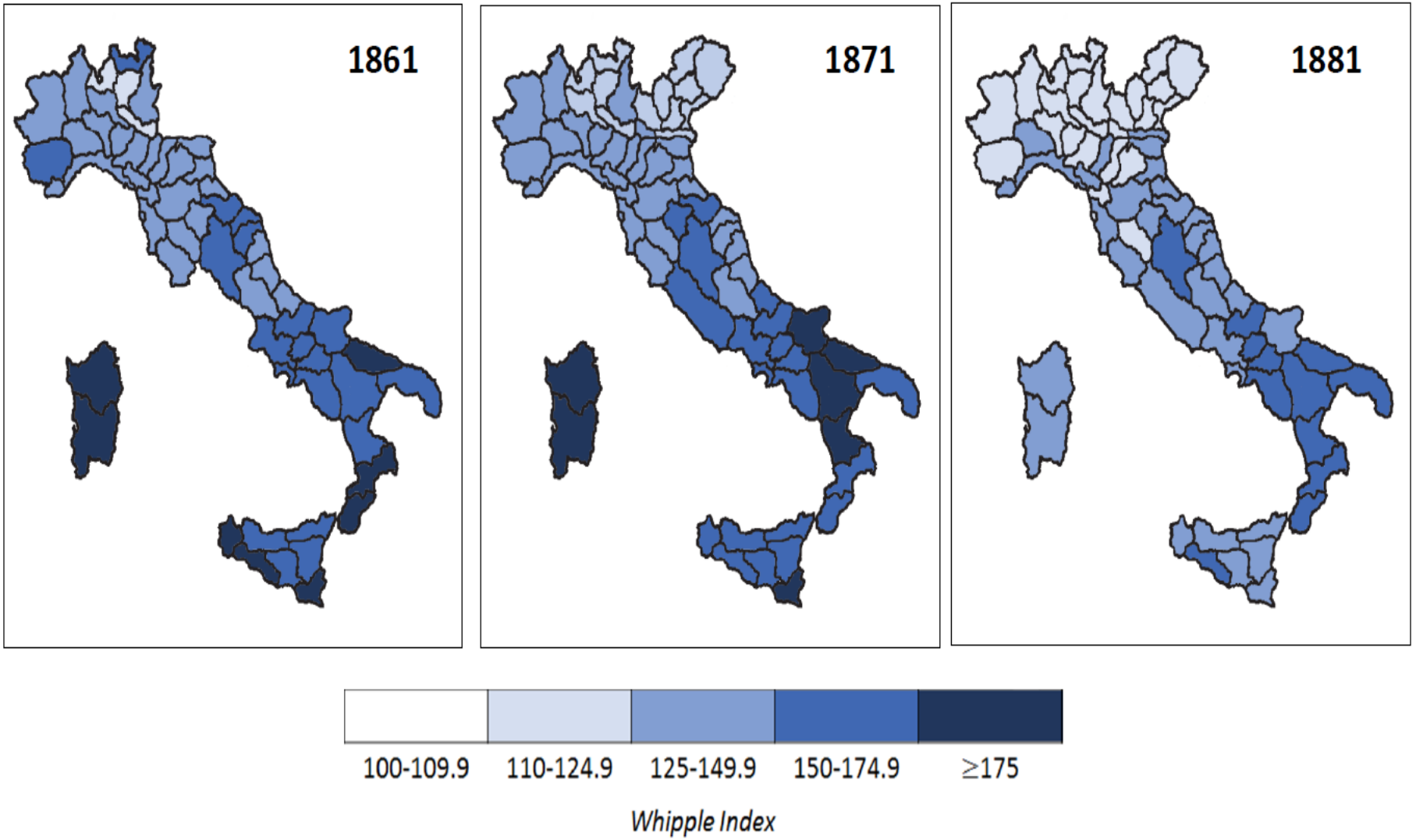
  →Correlation with literacy and heights

  → Considerable variation of age heaping for low literacy levels ("rudimentary capability")
- Age heaping as an indicator of **environmental or contextual factors** ("respect for accuracy")

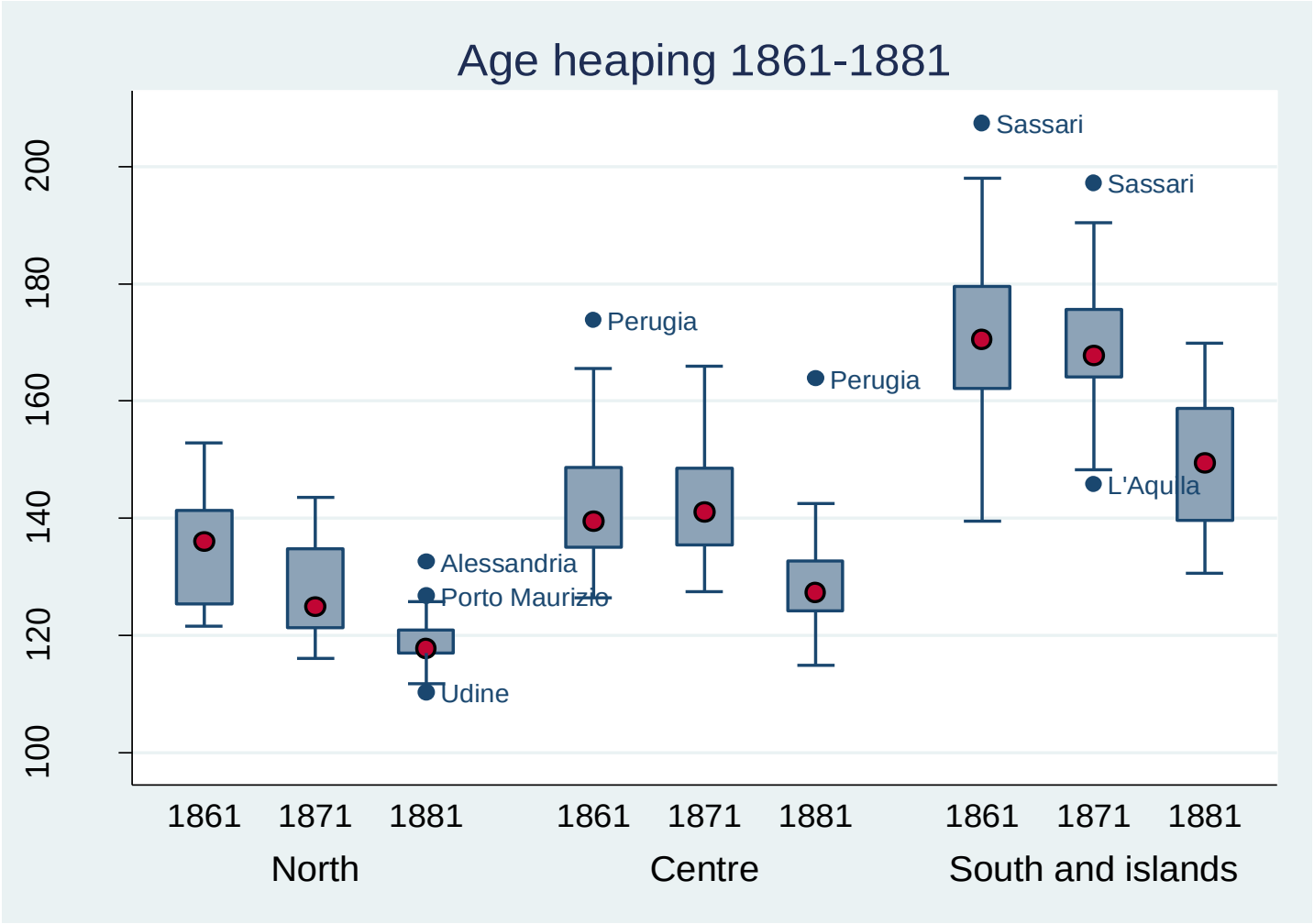
  → Age heaping among literates and age effects are higher in the South

In any case, age heaping is a proxy for (valuable) qualities either individual or social

# Numeracy in Italy: 1861, 1871, 1881



# Numeracy in Italy, 1861-1881



# In comparative perspective

According to Crayen and Baten (2010):

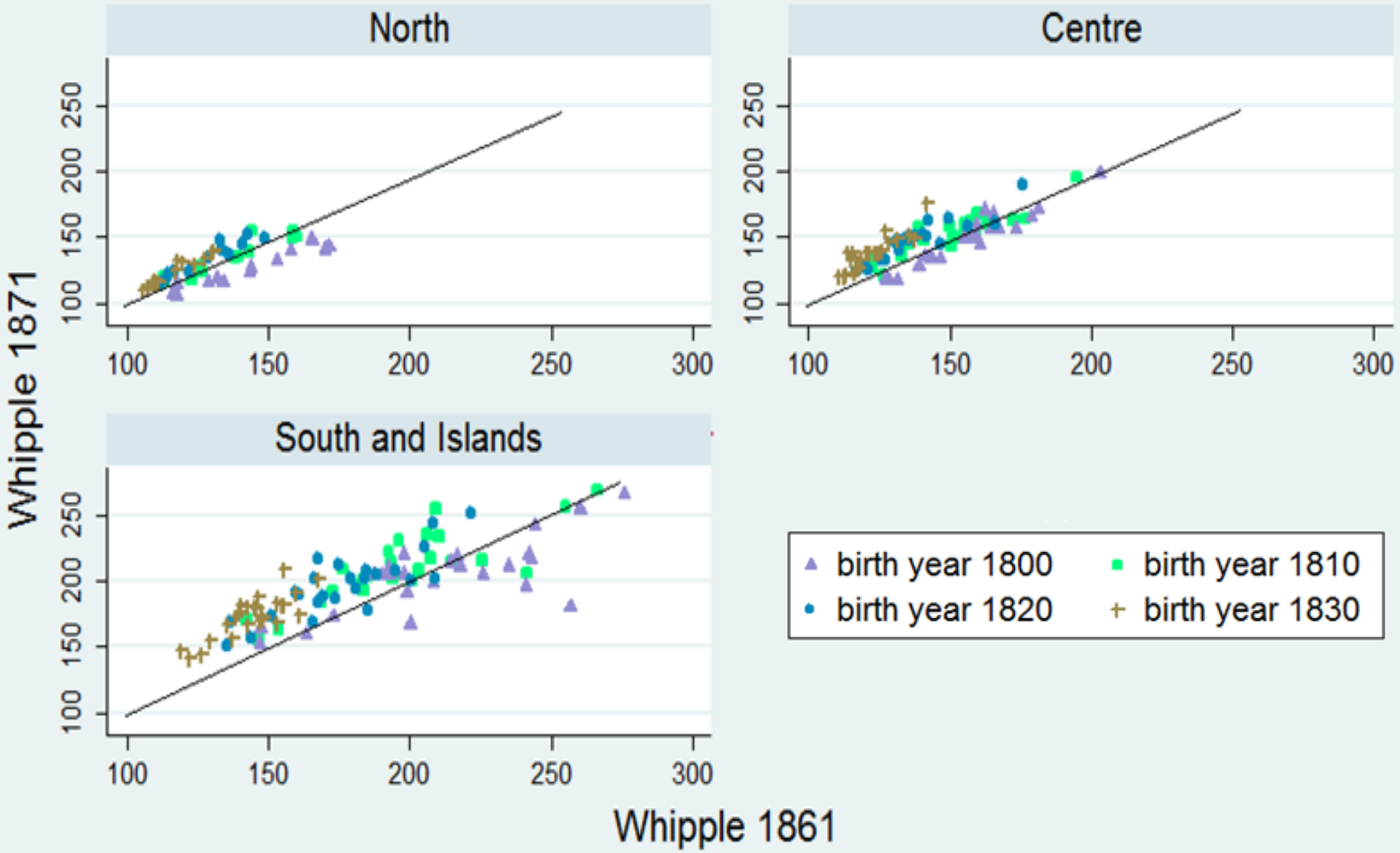
- "Advanced" countries in Europe (UK, Germany, Sweden, Netherlands) in 1800-1850 are characterized by Whipple Index <125
- Algeria-Tunisia in 1900-1920 are characterized by Whipple Index in the 150-200 range

# Before the Unification

It is possible to compute Whipple Indices across different age cohorts, stretching the time-coverage of the data (Crayen & Baten, 2010)

| 1861 Age cohort | Birth year | Birth decade |
|---|---|---|
| [23,32] | [1829-1838] | 1830s |
| [33,42] | [1819-1828] | 1820s |
| [43,52] | [1809-1818] | 1810s |
| [53,62] | [1799-1808] | 1800s |
| [63,72] | [1789-1798] | 1790s |

# Age effects across birth cohorts, 1861-1881

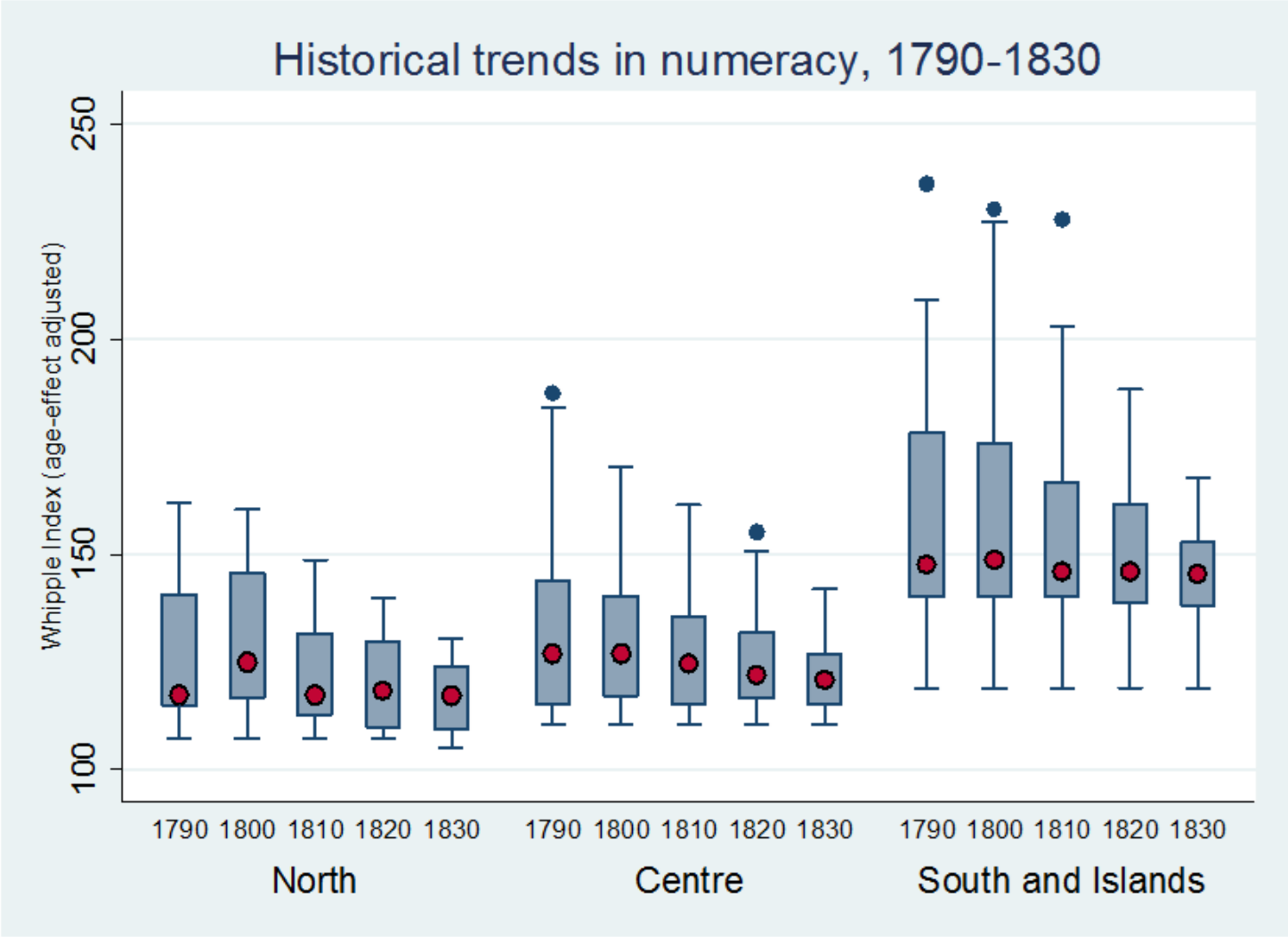


# The adjustment for age effects

1. We take as baseline the Whipple Index for the age cohort [23,32]
2. We use as adjustment the difference between the Whipple Index of the 1871 census and the 1861 census of corresponding age cohorts
3. We set these bounding constraints:
   - Whipple Index cannot improve

     (min. adjustment=0)
   - The adjusted Whipple cannot be lower than the baseline

# Historical trends in age heaping, 1790-1830



# Concluding remarks

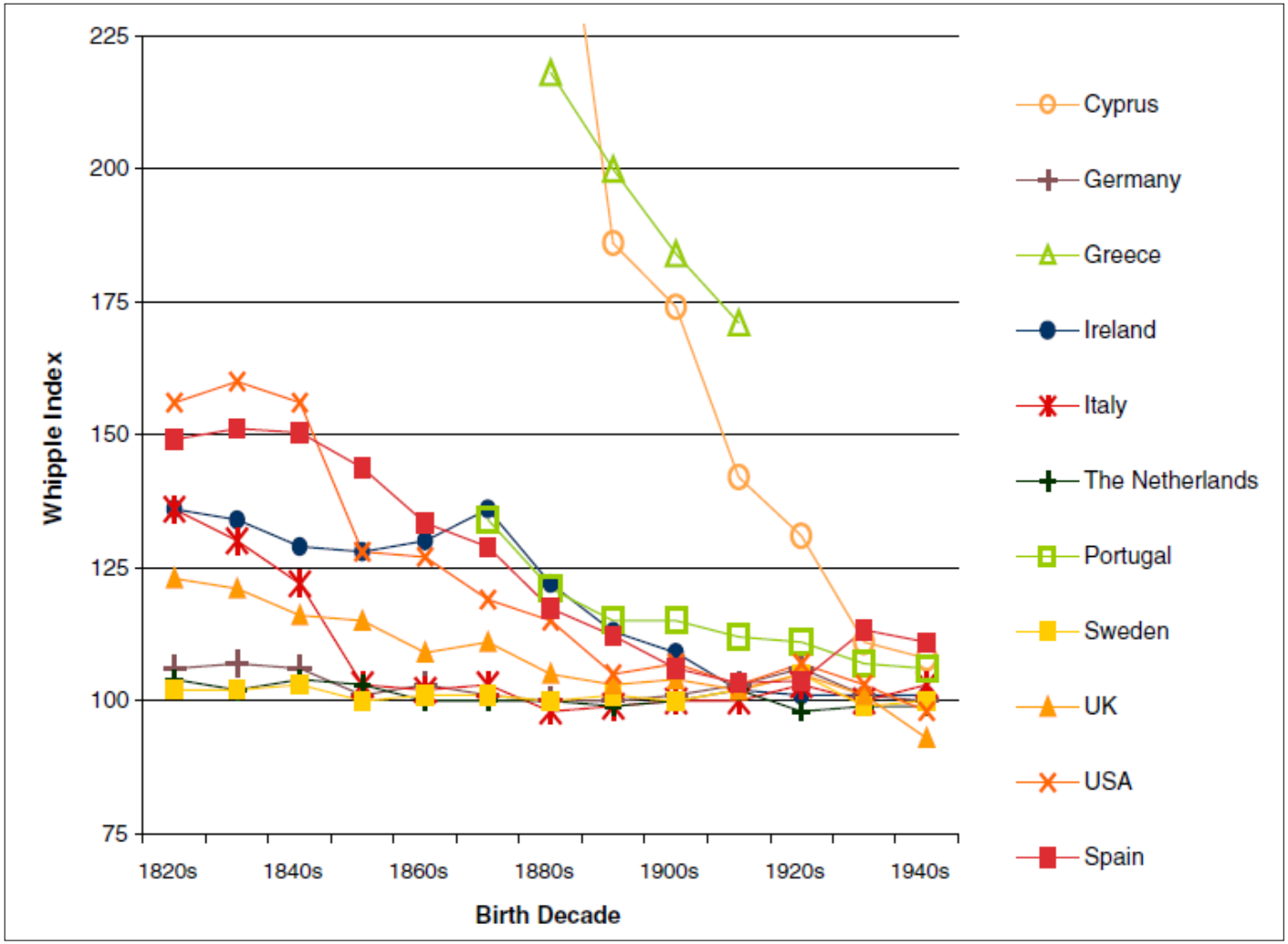
- We find a sizable gap in age heaping (basic numeracy skills) between North and South at the Unification
- This is consistent with gaps in other dimensions of living standards
- This can perhaps have even more implications than literacy for the diverging growth trajectories of the two regions

  Traditional view of the Kingdom of the Two Sicilies: "negation of God erected into a system of government" (Gladstone, 1850)

# Age effects adjustment: an example

| Age Cohorts | Birth year for 1861 cohorts | 1861 census | 1871 census | Age effect | Adjustment coefficient for [23,32] baseline | Adjusted Whipple |
|---|---|---|---|---|---|---|
| age group [23,32] | 1830 | 155 | | | | 155 |
| age group [33,42] | 1820 | 209 | 181 | 26 | 26 | 183 |
| age group [43,52] | 1810 | 214 | 202 | -7 | 26 | 188 |
| age group [53,62] | 1800 | 257 | 215 | 1 | 27 | 230 |
| age group [63,72] | 1790 | | 180 | -77 | 27 | 209 |

# Historical international trends
# Baten & Crayen (2010)



# Historical trends in literacy, 1790-1830