

“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)

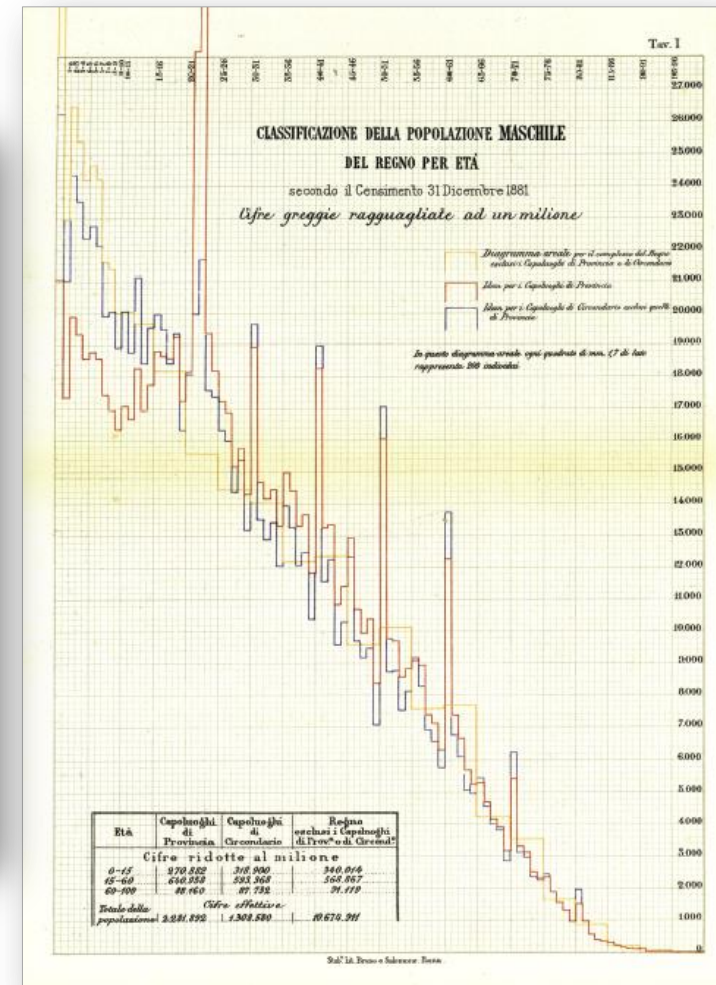
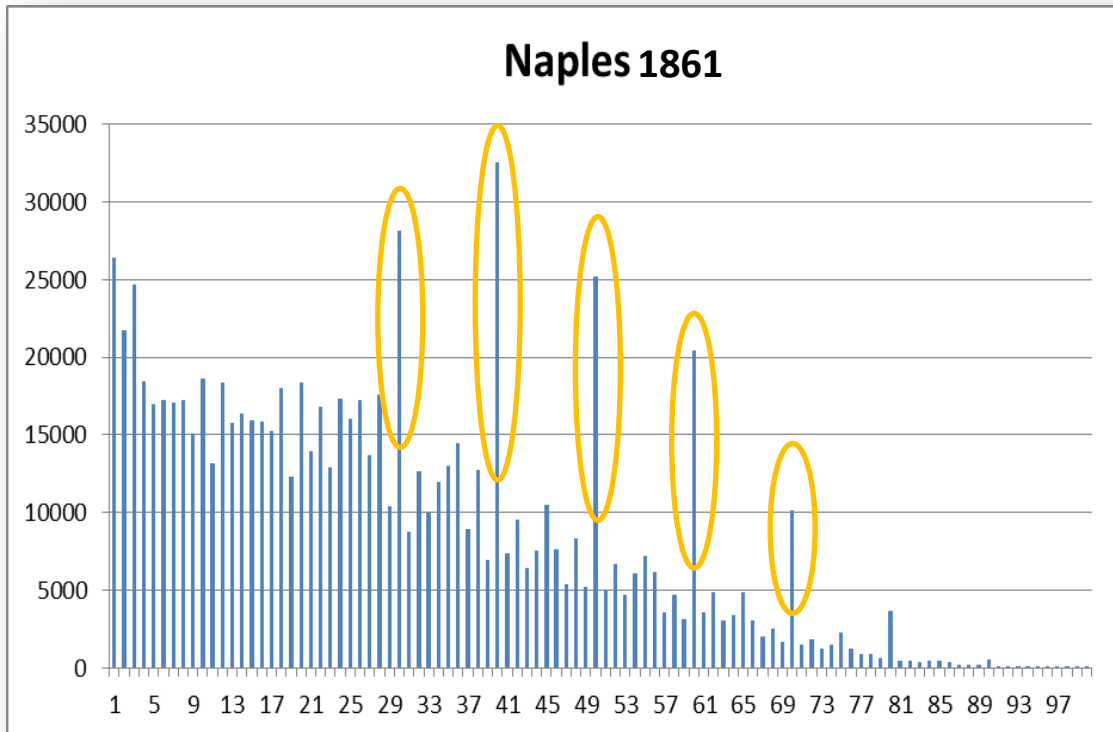
2. General consensus on the existence of North/South Gap in **broader dimensions of living standards** (Life Expectancy, Literacy, Heights, HDI)

→ 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



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Measuring age heaping

Two main indicators:

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

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

$$ABCC = 100 \text{ elsewhere}$$

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

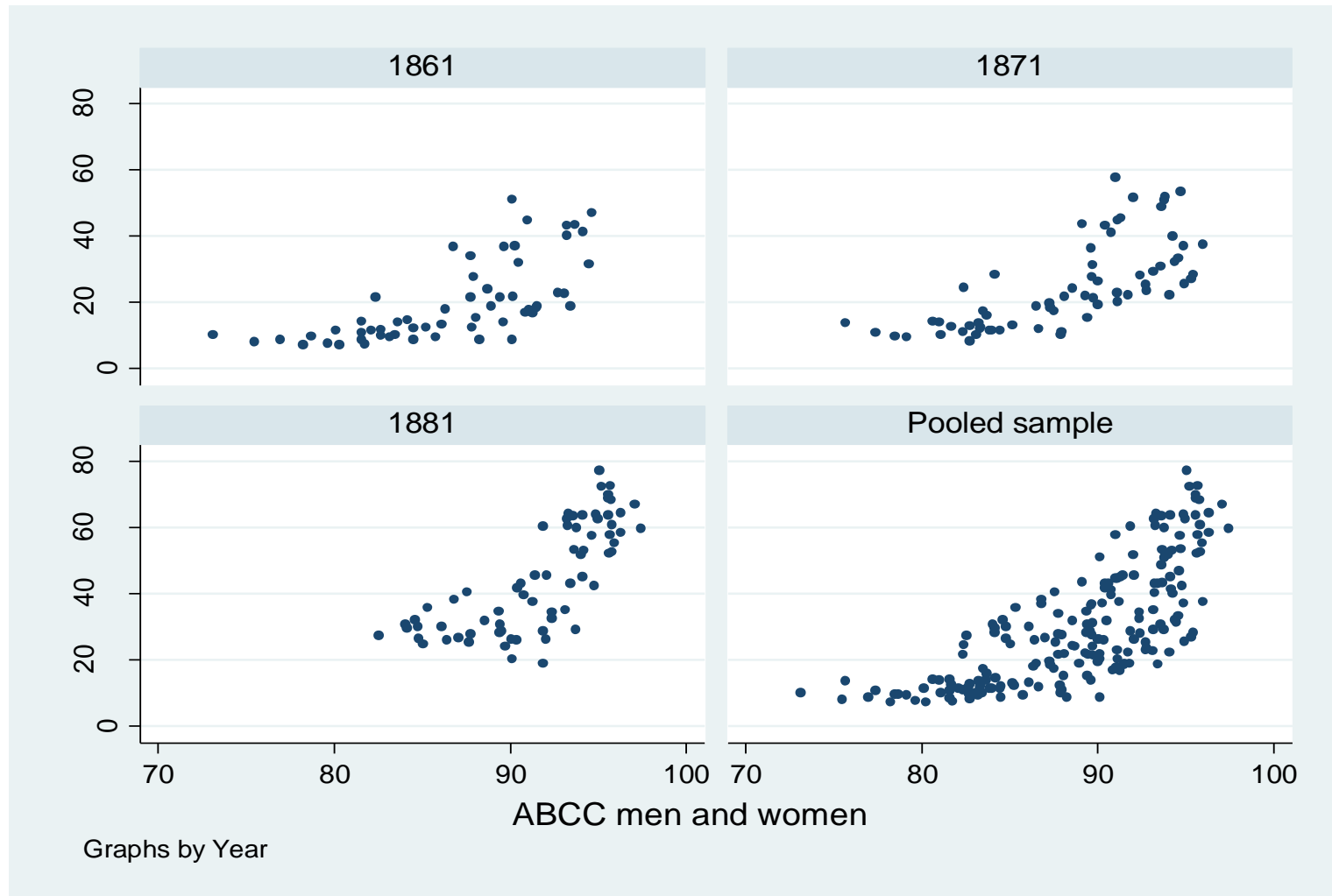
Geographical scope: provincial level (similar to NUTS 3: 59 provinces in 1861; 69 in 1871 and 1881)

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)

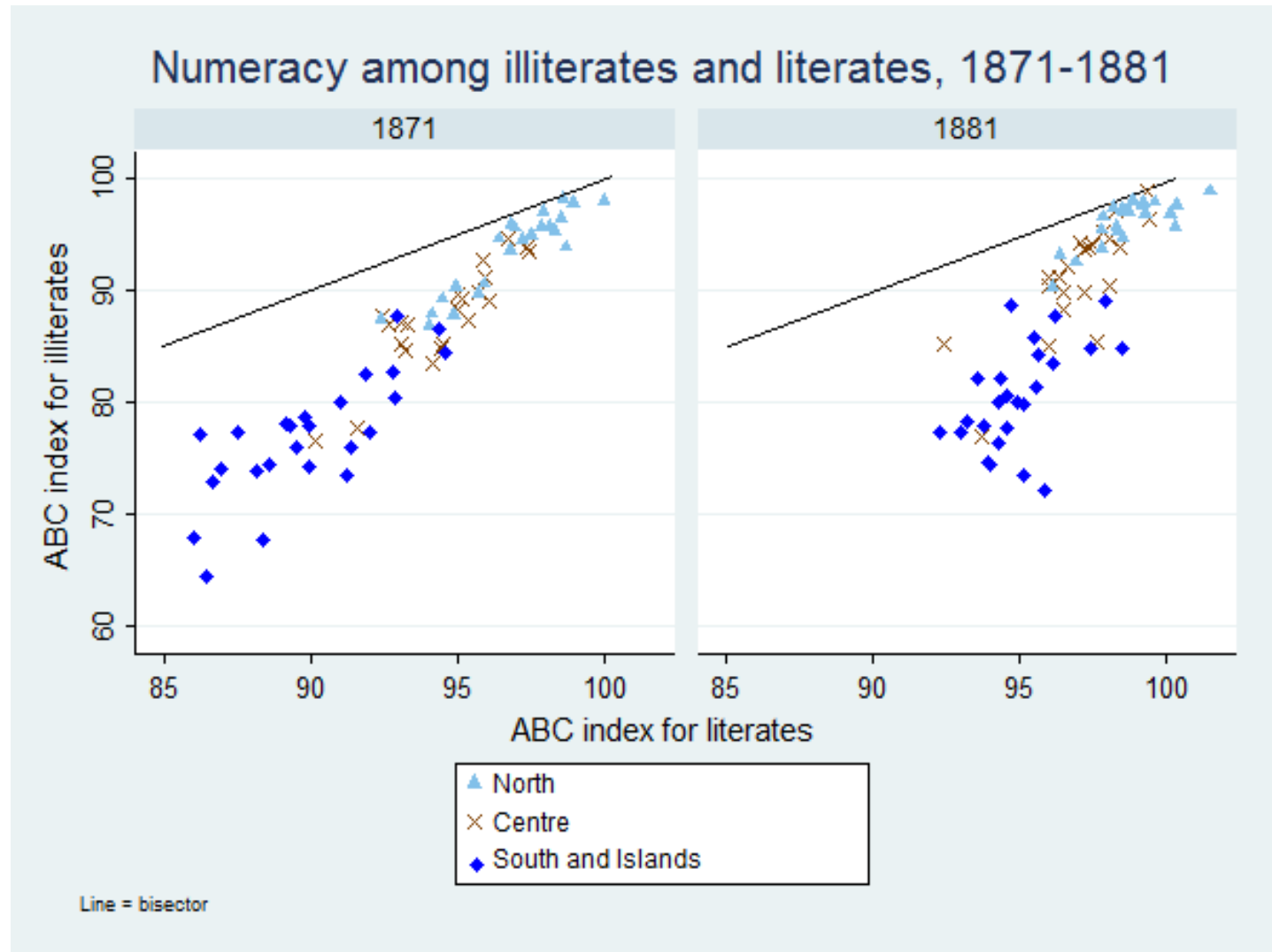


Age heaping and literacy (2)

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

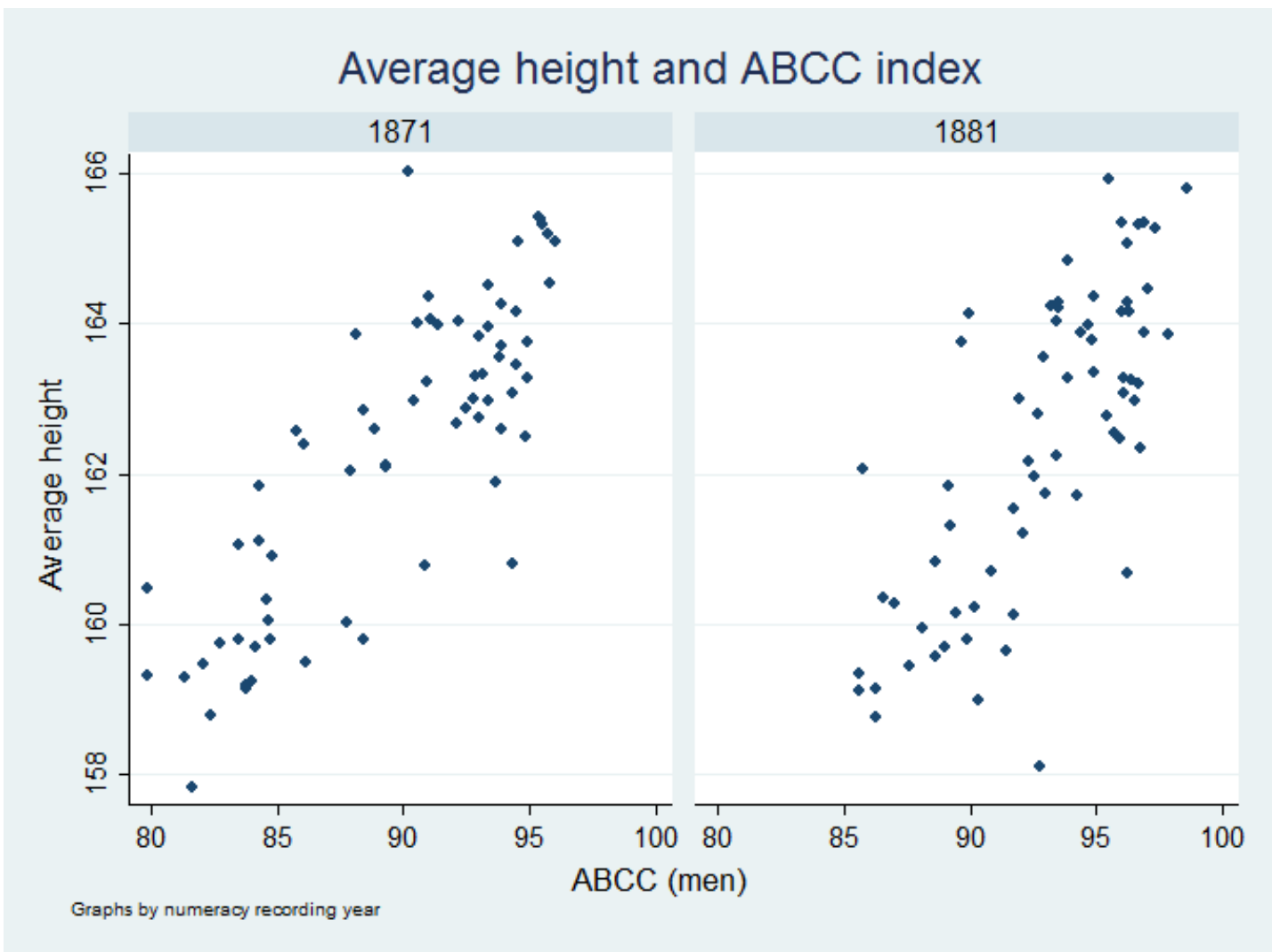
Age heaping and literacy (3)



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Age heaping and heights(1)



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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*** (0.512)	-7.800*** (0.648)	-5.230*** (0.565)
Constant	1,203*** (83.09)	1,407*** (105.2)	978.2*** (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

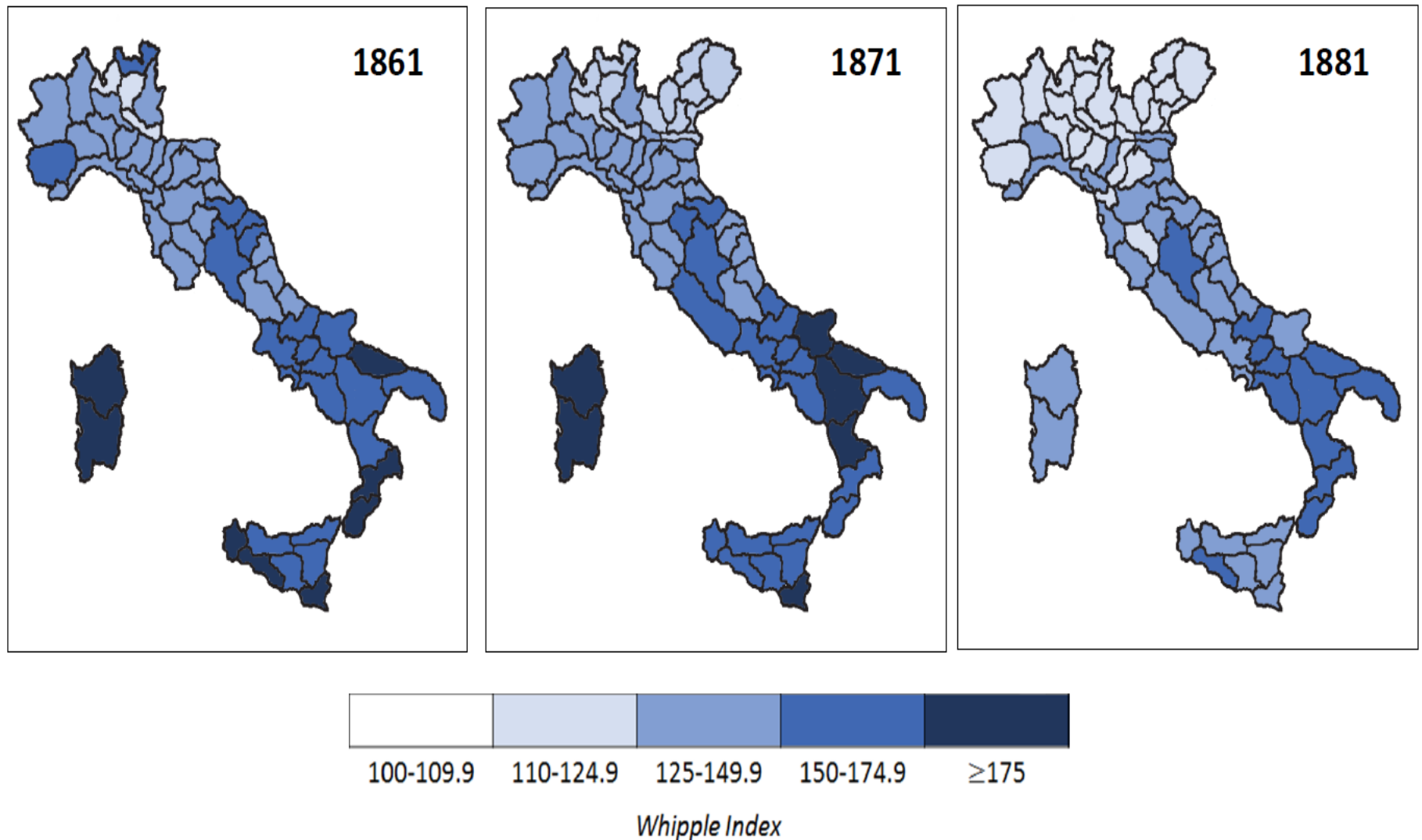
(Mokyr, 1983, p. 246)

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

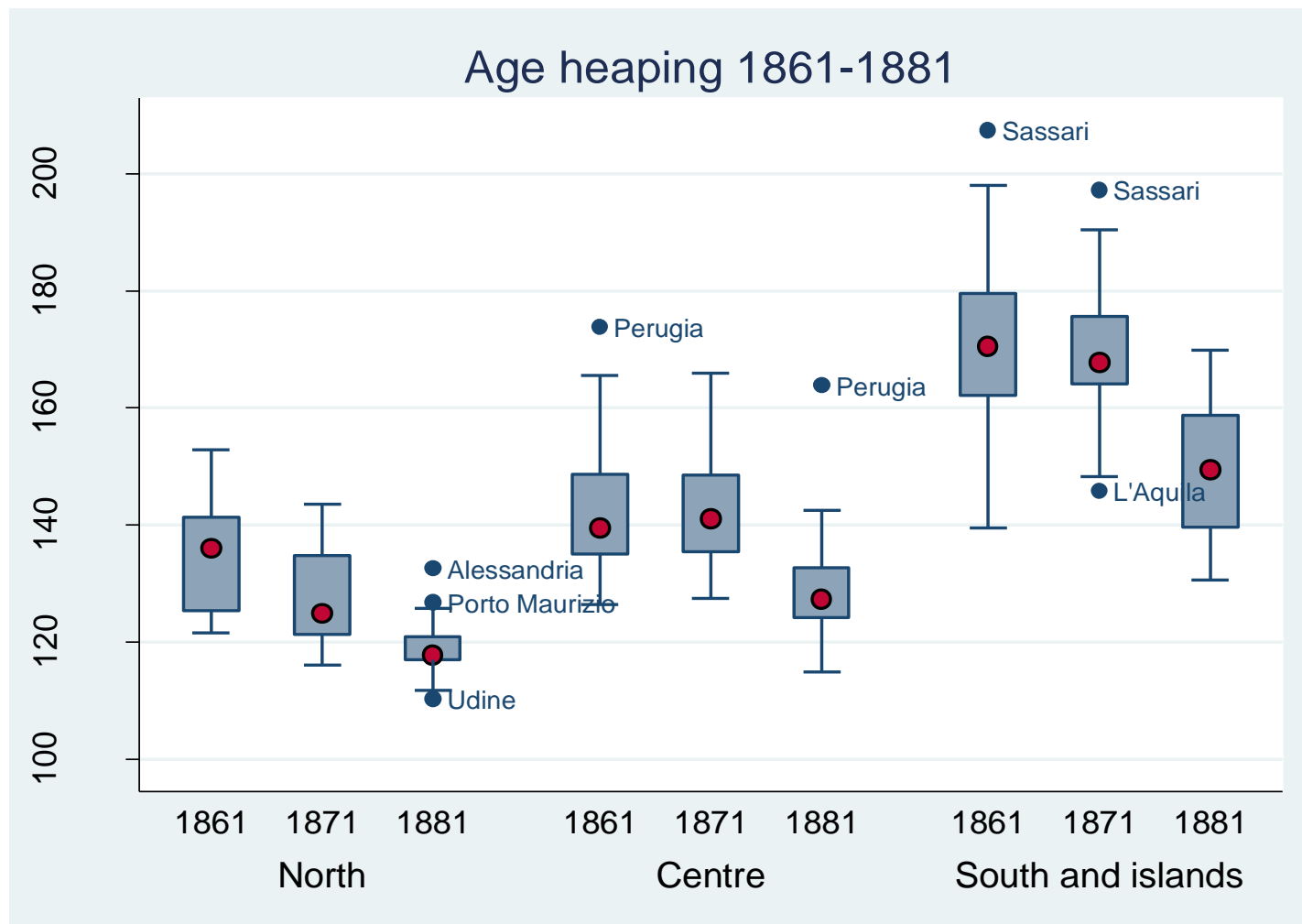
Numeracy in Italy: 1861, 1871, 1881



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Numeracy in Italy, 1861-1881



In comparative perspective

According to Crayen and Baten (2010):

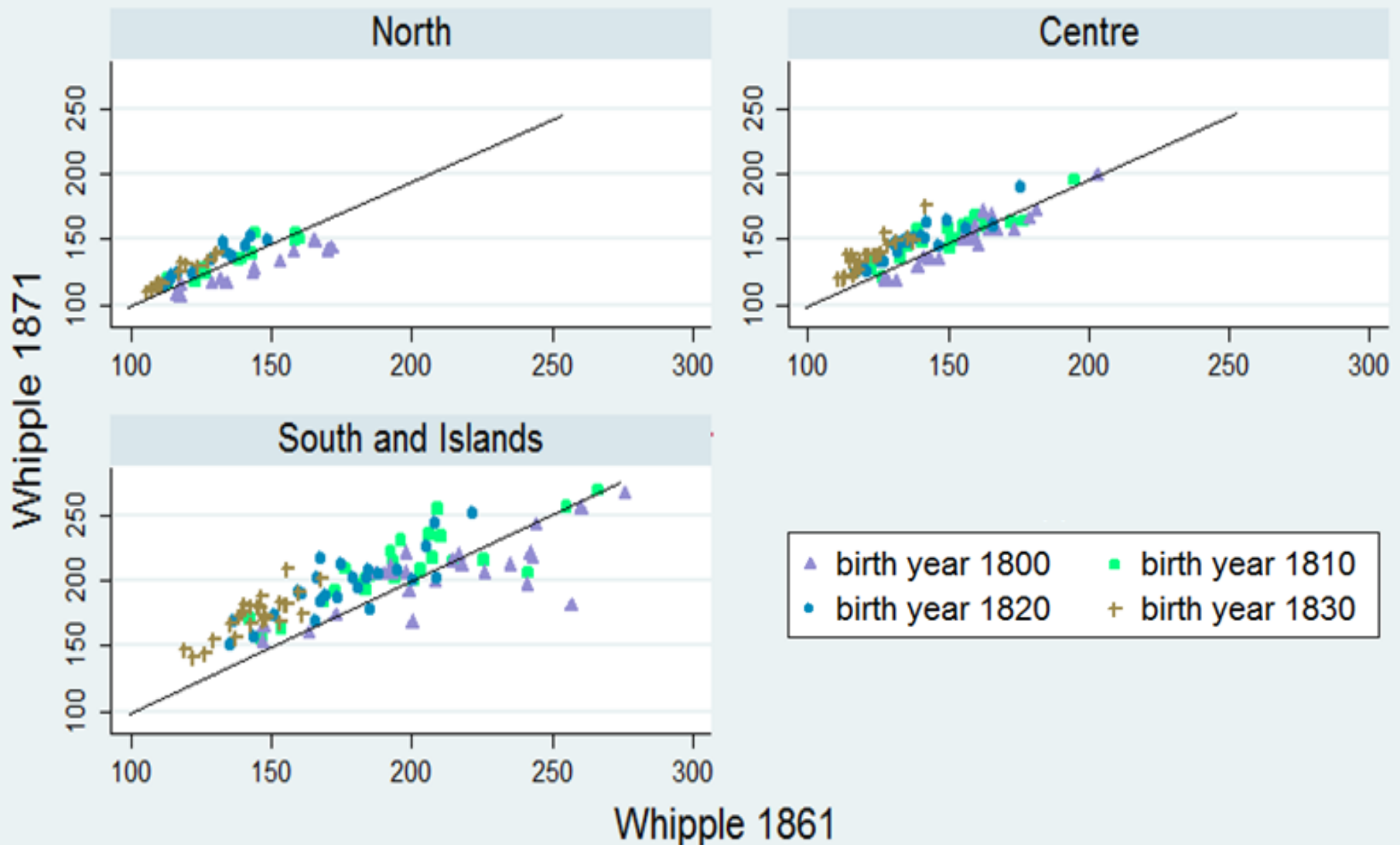
- “Advanced” countries in Europe (UK, Germany, Sweden, Netherlands) in 1800-1850 are characterized by Whipple Index <125
- Algeria-Tunisia in 1900-1920 are characterized by Whipple Index in the 150-200 range

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



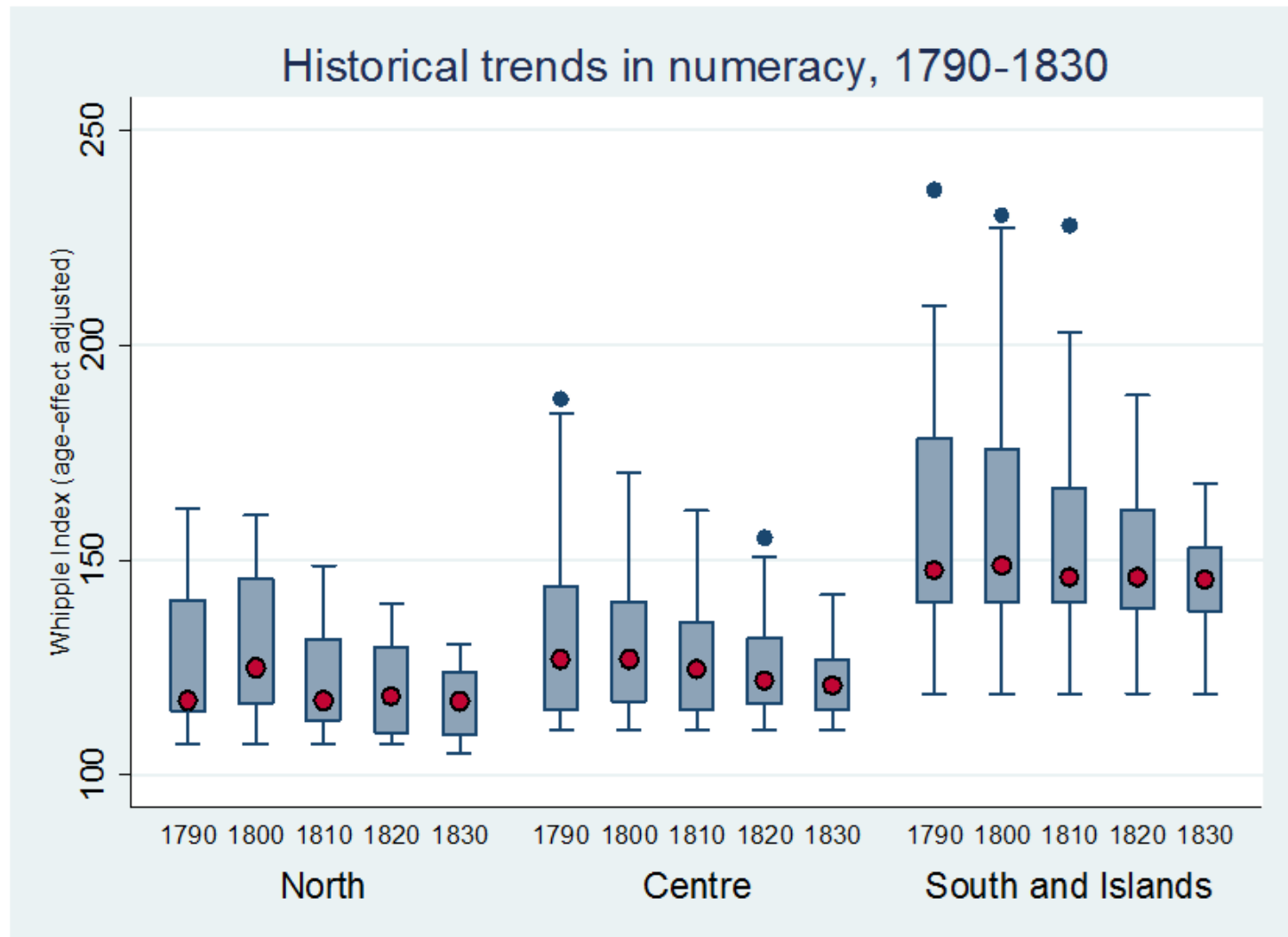
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The adjustment for age effects

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



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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

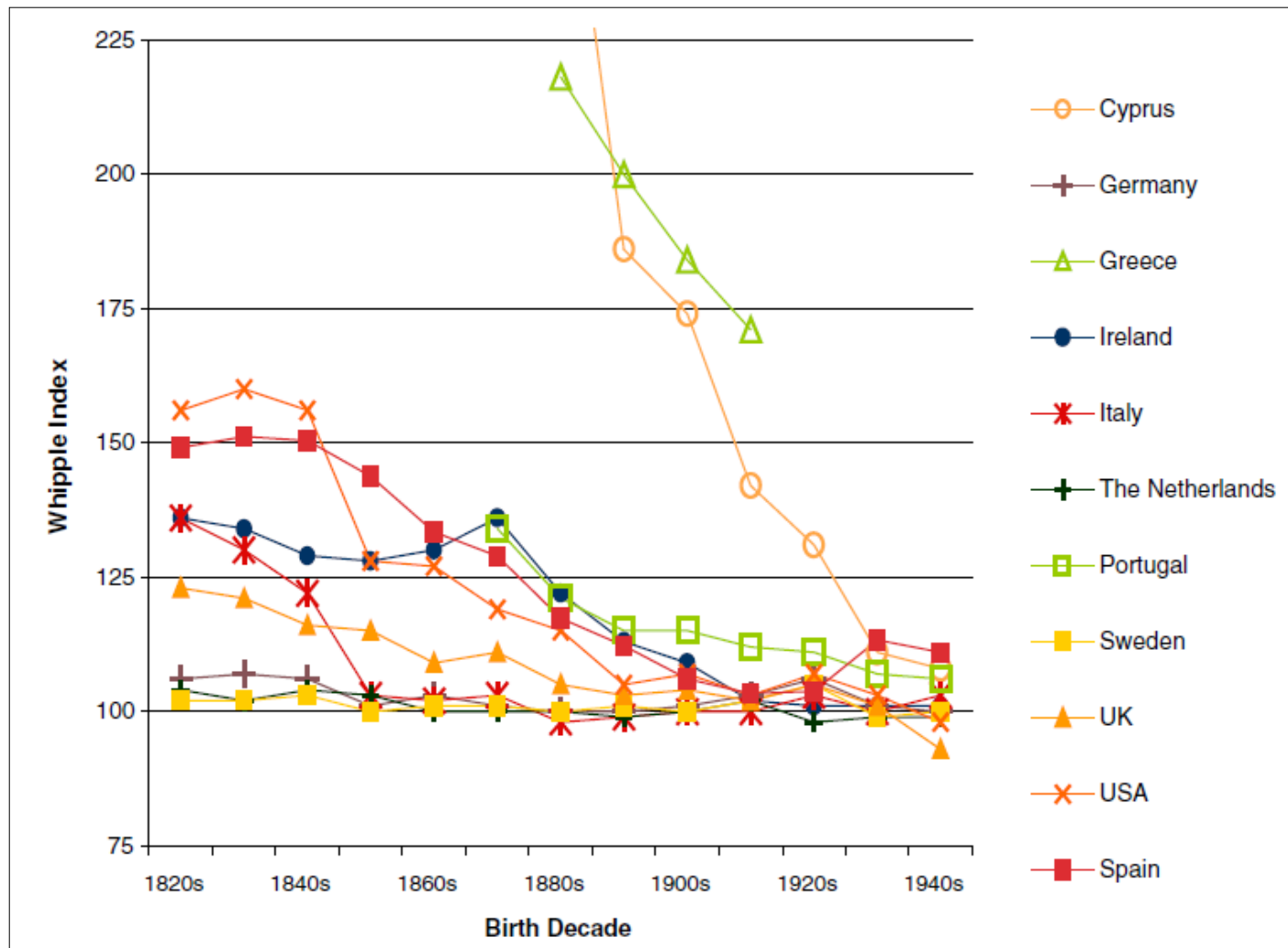
Traditional view of the Kingdom of the Two Sicilies:
“negation of God erected into a system of government”
(Gladstone, 1850)

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

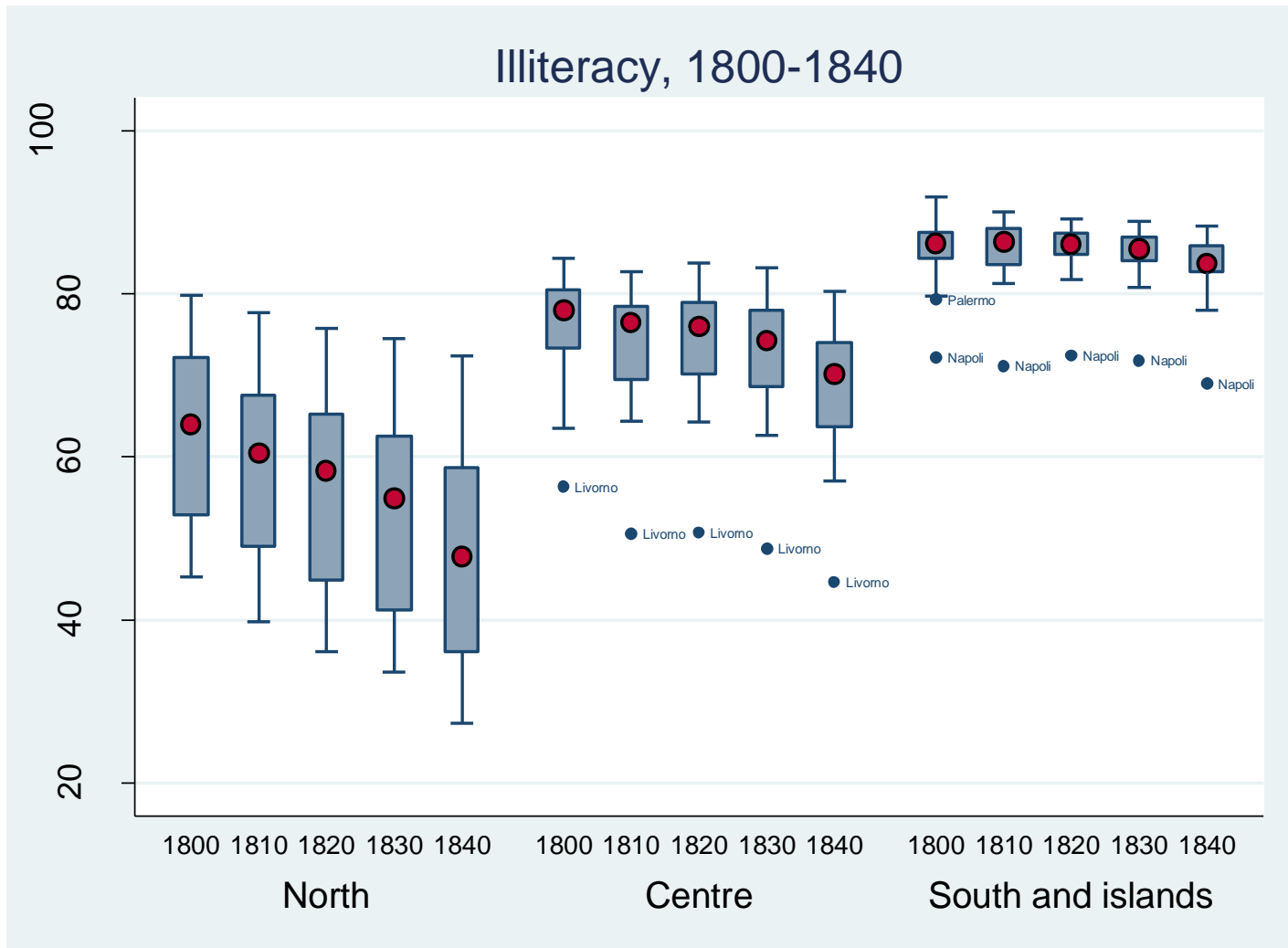
Baten & Crayen (2010)



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Historical trends in literacy, 1790-1830



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