

Human capital-specific old-age dependency ratio

the case of Italy

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Research topic:

related to the more general thought that rise in human capital boosts economic growth and hence is expected to alleviate (negative) economic consequences of ageing

Research Questions:

- How do changes in the educational composition of a population influence population ageing?
- How can these changes be measured?
- In this presentation the age composition is considered.

Note: to fix ideas pay-as-you-go assumed; private pensions not considered.

Method of measurement:

start with the conventional OADR and make it education-specific (Ed-OADR)

Conventional OADR = $P(65+) / P(20-64)$

Assumptions underlying the conventional OADR:

- Cutting ages: we keep it
- Denominator indicates production, numerator indicates consumption, i.e. everyone in the denominator works, everyone in the numerator consumes (gets a pension): we keep it
- ...

Assumption:

-One person aged 20-64 contributes one person-year to the denominator; one person aged 65+ contributes one person-year to the numerator.

We change this assumption:

1. A worker contributes to the denominator a number of person-years in accordance with his/her educational degree *measured with income* (pre-tax)
2. An elderly contributes to the numerator a number of person-years according to the level of education *measured with the public pension* received.

	Median values			
Level of education	Labour Income (20-64)		Public Pensions (65+)	
ISCED 0-2	18 900	1	10 700	1
ISCED 3-4	22 300	1.18	19 500	1.81
ISCED 5-6	27 800	1.47	27 500	2.55

Source: EUSILC

Population – initial distribution (2007)

	Age group 20-64		Age group 65 and higher	
Level of education	Number (th)	%	Number (th)	%
ISCED 0-2	16,714	46%	10,033	85%
ISCED 3-4	13,140	41%	712	11%
ISCED 5-6	4,718	13%	282	4%

Source: ISTAT

Projections

Multi-state method;

Assumptions based on ISTAT medium variant:

TFR: 2007-8: 1.39 [ISCED 0-1: 1.7 ; ISCED 2-6: 1.37]

2056-7: 1.60 [ISCED 0-1: 1.95; ISCED 2-6: 1.58] (constant afterwards)

Net number of migrants to Italy

(following ISTAT assumptions over the next 50 years)

Life expectancy at birth (no differentials by education):

2007-8: Male 78.6; Female 84.1; 2056-7: Male 85.0; Female 90.0

Note: assumptions about fertility and migration are less relevant for our study

Period of projection: 50 + 50 years; after 2057
all components of change remain constant

Two scenarios:

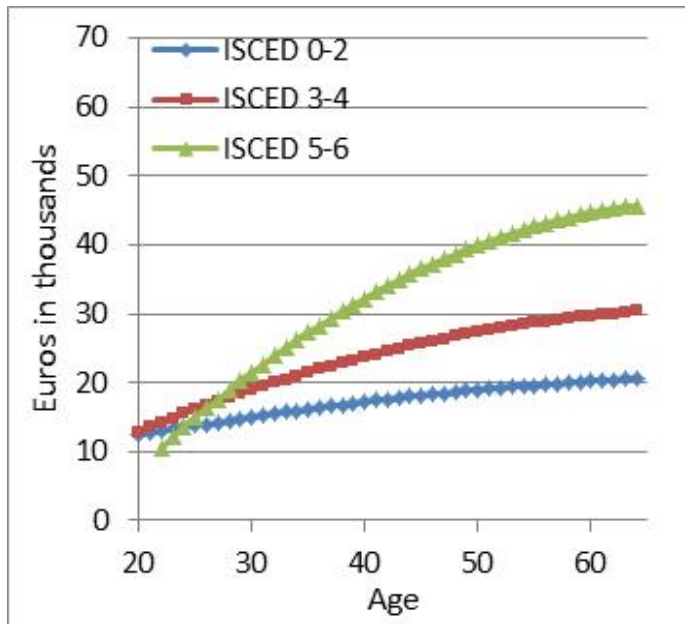
- Constant:** transition rates as in 2004-2007
- Trend:** transition rates follow a trend outlined by observations for 1995-1999, 2000-2003, and 2004-2007

Distribution of the population by 3 levels of education 2057

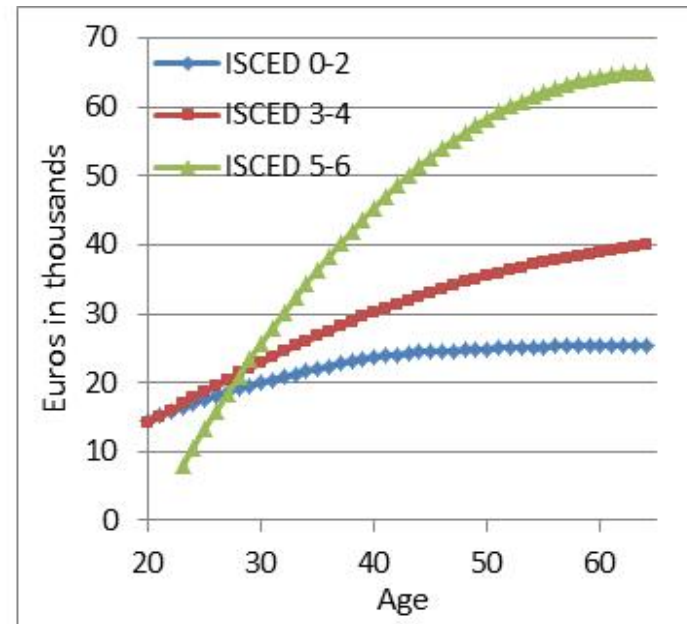
	Constant Scenario		Trend Scenario	
Level of education	Age group 20-64	Age group 65 and higher	Age group 20-64	Age group 65 and higher
ISCED 0-2	29%	37%	18%	37%
ISCED 3-4	53%	45%	21%	43%
ISCED 5-6	18%	18%	61%	20%

Improving age composition by education: use of HC function:

$$E(\text{Labour income}) = \text{Education} + \text{Age} + \text{Age} * \text{Age}$$

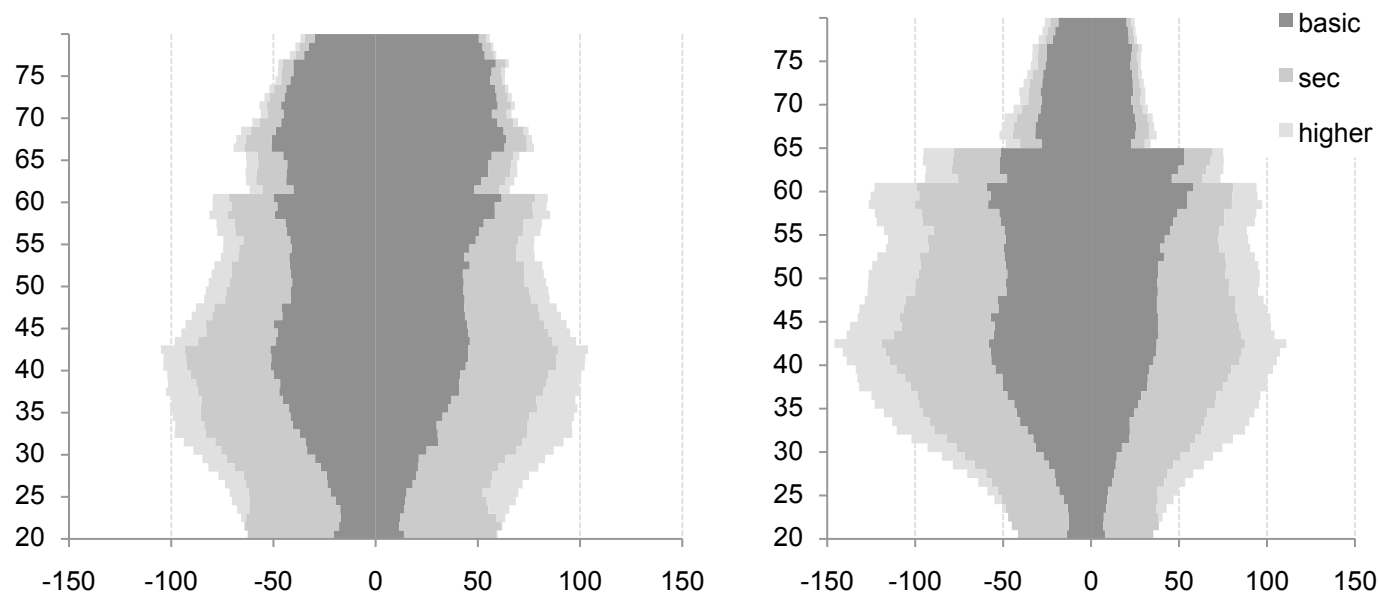


Women

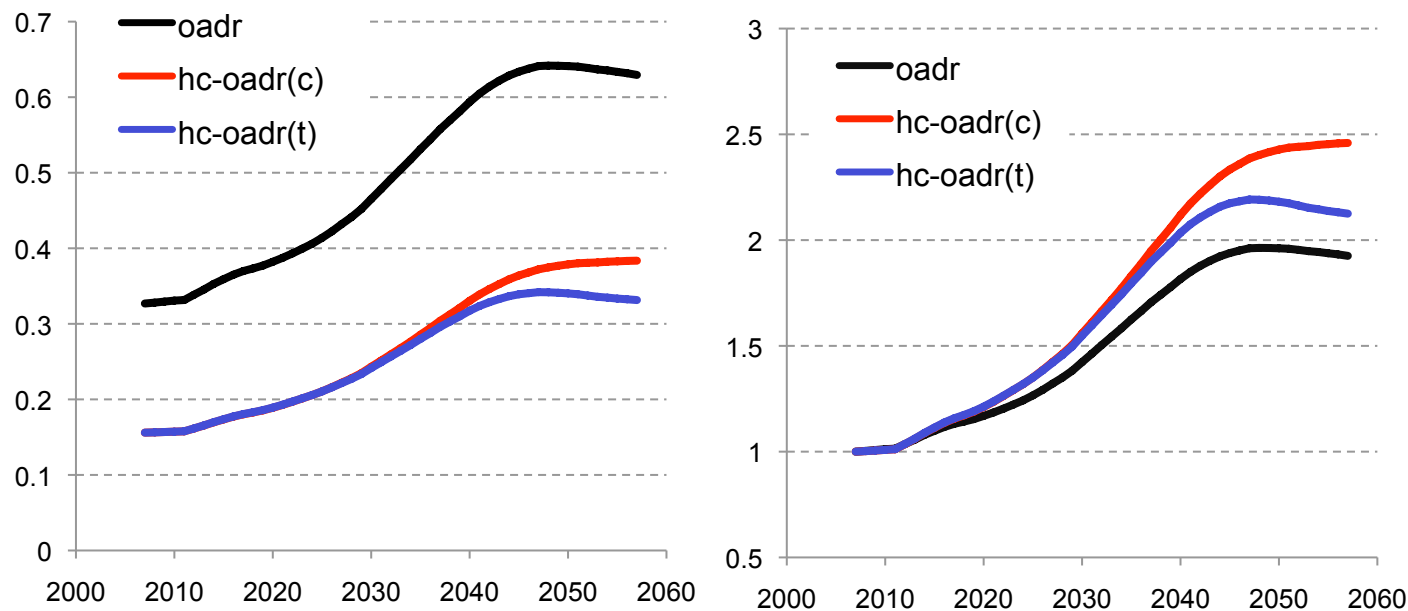


Men

Basic unit: woman, 20-years old, ISCED 0-2



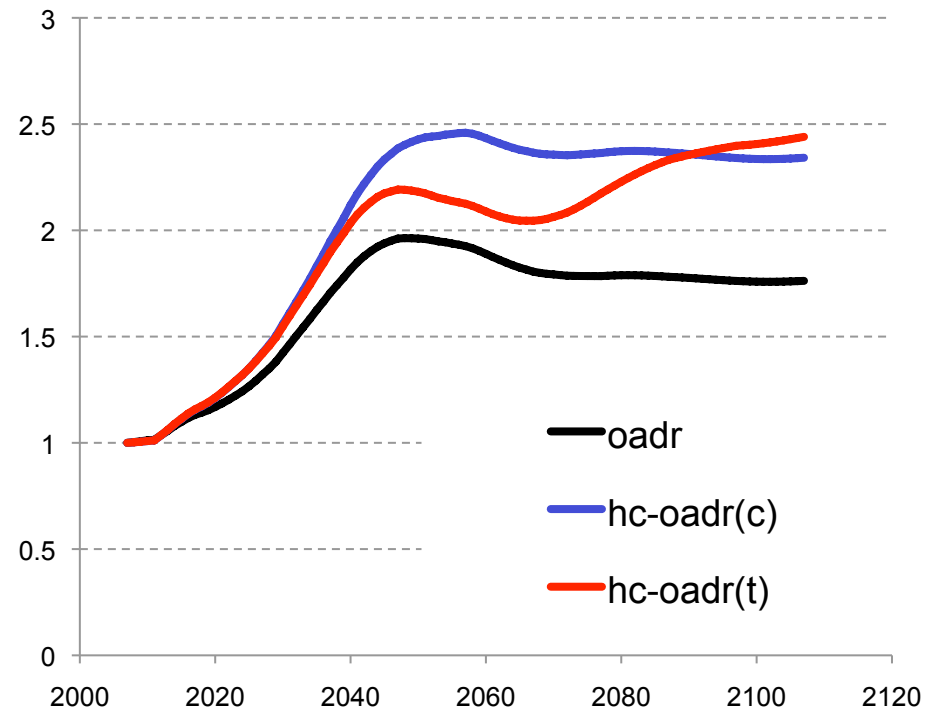
Age composition between ages 20 and 80 of the observed population distributed by sex and education (left), and of the human capital-specific population (right), Italy 2007



Trends in the conventional OADR and the HC-OADR, 2007-2057, absolute values (left) and relative values (right).

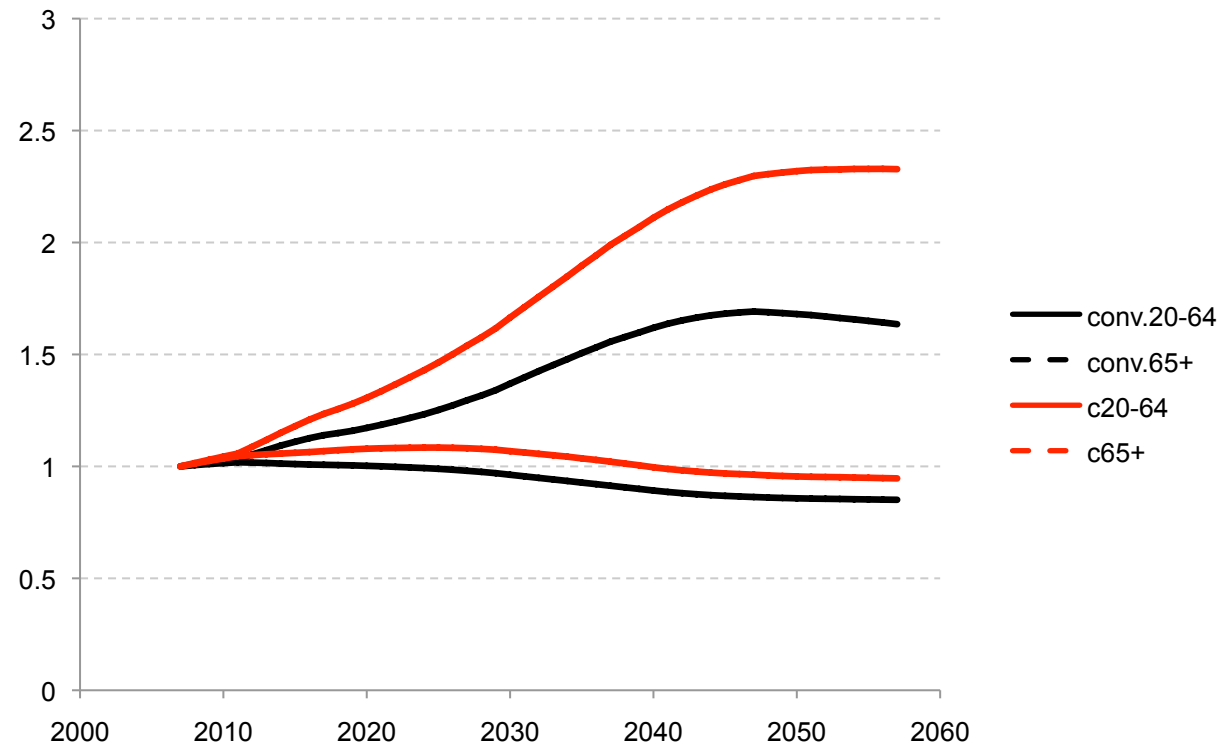
HC-OADR(c) = constant scenario

HC-OADR(t) = trend scenario



In the long term: towards stability

Understanding the results (constant scenario): changes in numerator and denominator



Change in population aged 65+

	2007	2057 const.	2057 trend
ISCED 0-2	85	37	37
ISCED 3-4	11	45	43
ISCED 5-6	4	18	20
	100 %	100 %	100 %

Note: understanding results through schooling reforms in Italy towards increase in secondary education

Alternative measurement of HC

- Consider length of schooling only: not income, nor length of practice
- Suppose lower education = 8 years, secondary = 12 years, and higher = 16 years
- The ratio of 1 : 1.5 : 2.0 can be used.
- Estimates lead to similar findings

Conclusions (I)

- In Italy, population aging is faster when effect of changes in human capital are considered
- Increase in education can aggravate, not mitigate, consequences of aging.
- The unexpected result is due to age-specific changes in the population age structure when HC is specified by age

Conclusions and further research (2)

- *We discussed public pensions; yet economic consequences of ageing include problems related to health and care for the elderly; they are independent of education...*
- ... *Or: higher education implies increased demand for higher-quality, hence more expensive, services.*
- *Use of age-specific national transfer accounts specified by education can be informative*

Conclusions and further research (3)

- *Towards human-capital population dynamics*
- *What inferences about other countries?*
- *Relevance to the 2nd demographic dividend?*