Employability of graduates and development of competencies: mind the gap and mind the step! Empirical evidence for Italy

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Globalization, continuous innovation, ICT and uncertainty

- Growing gap between:

competencies required by firms

and

competencies held by graduates

Required competencies: what for? (1)

- Lester and Piore (2004):
  - '**analytical processes**' are at work when the alternative outcomes are well understood and can be clearly defined and distinguished from each other
  - '**interpretative processes**' are activated when possible outcomes are not known, i.e., when the task is precisely to create the results and determine their properties.

Required competencies: what for? (2)

- Cainarca and Zollo, 2001:
  - *cognitive* activity (.....)
  - *communicative* activity (....)

    as a distinctive competence in the sphere of analyses and interpretations of economic production facts*

* (flow of new products/services, improvement of old ones and more efficient ways to produce them)

Answer: *Bologna Process* and the *Dublin Descriptors:*

- attempt to change the university's mission and unit of measure
- from the transfer of knowledge by the teacher to learning by the student, and from disciplinary knowledge to competencies

A parenthesis on “Competencies”

- ***Human behaviours have scalar properties:*** they can be measured in terms of a progression from lower to higher levels
- ***Human behaviours have polyhedric properties:*** they can have several ‘dimensions’ (e.g.: extension, degree of efficacy, degree of complexity, etc.)
- ***Human behaviours are the result of a set of personal characteristics***:
  - disciplinary knowledge
  - implementation of knowledge
  - structure of cognitive thinking
  - organizational-managerial abilities/skills
  - interpersonal relationship skills (emotional intelligence)

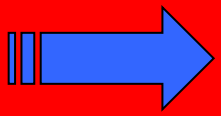
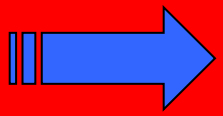
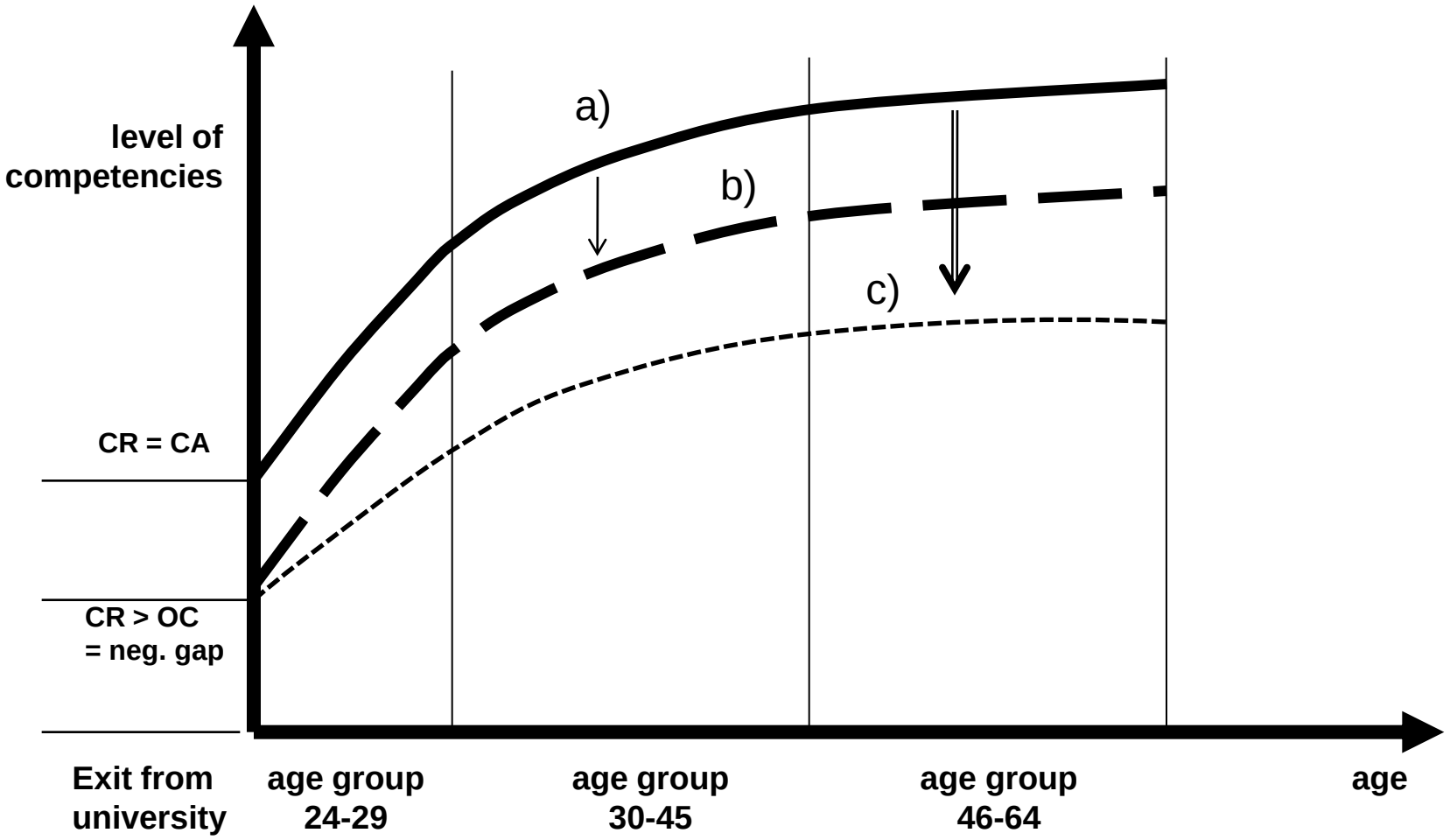
Personal characteristics  **action**  **performance**

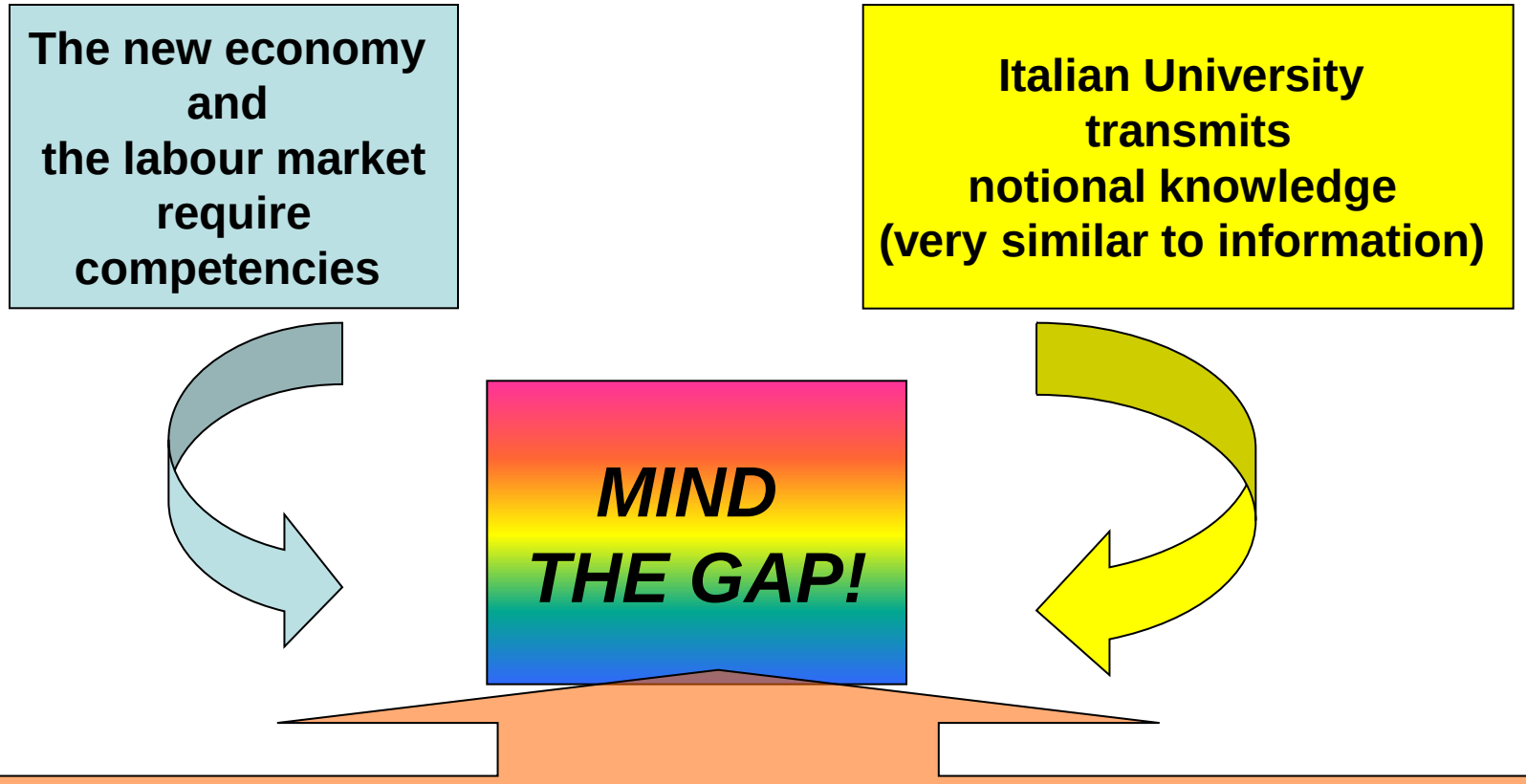
Figure 1 – Development of competencies in the life-cycle, depending on the possible gap between requested competencies (RC) and owned and expressed competencies (OC)



MIND THE GAP!

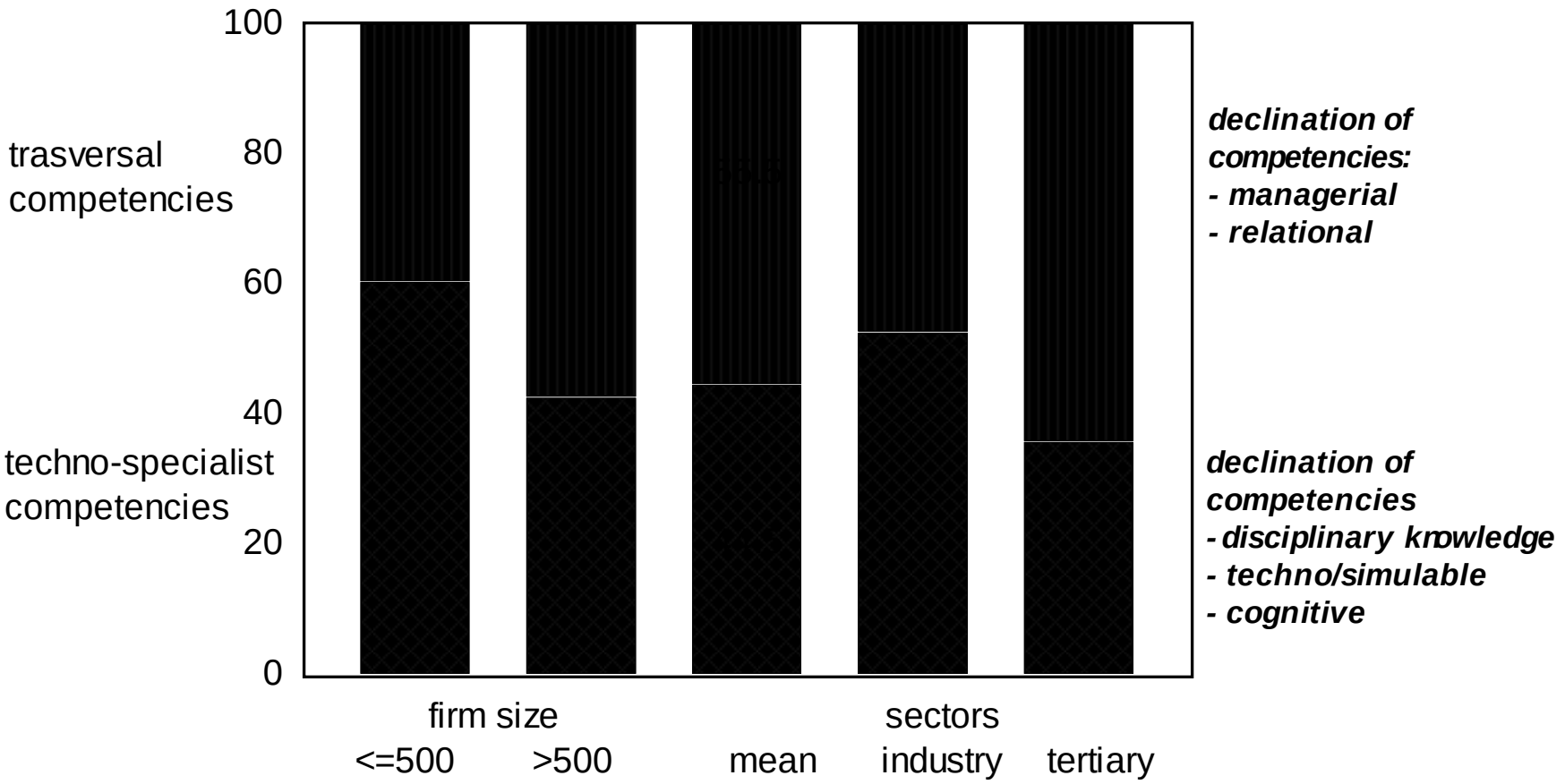
COMPETENCIES REQUESTED BY THE LABOUR MARKET
AND
COMPETENCIES HELD BY GRADUATES

Labour demand and supply



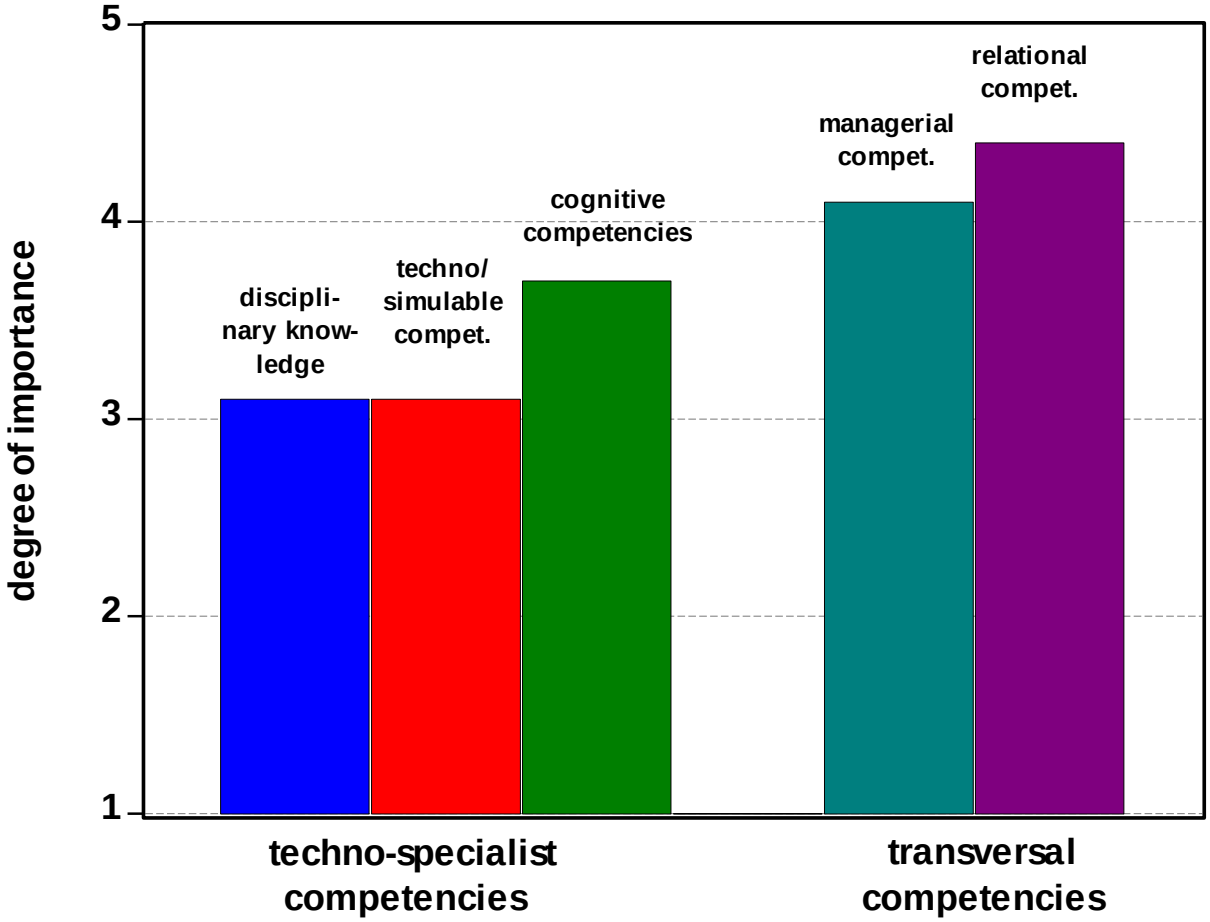
Should the *Bologna Process* not have transformed the Italian University from a University of disciplinary knowledge into a University of competencies?

Figure 2 - Competencies requested of new-graduates by firms at selection interviews (weighted data)



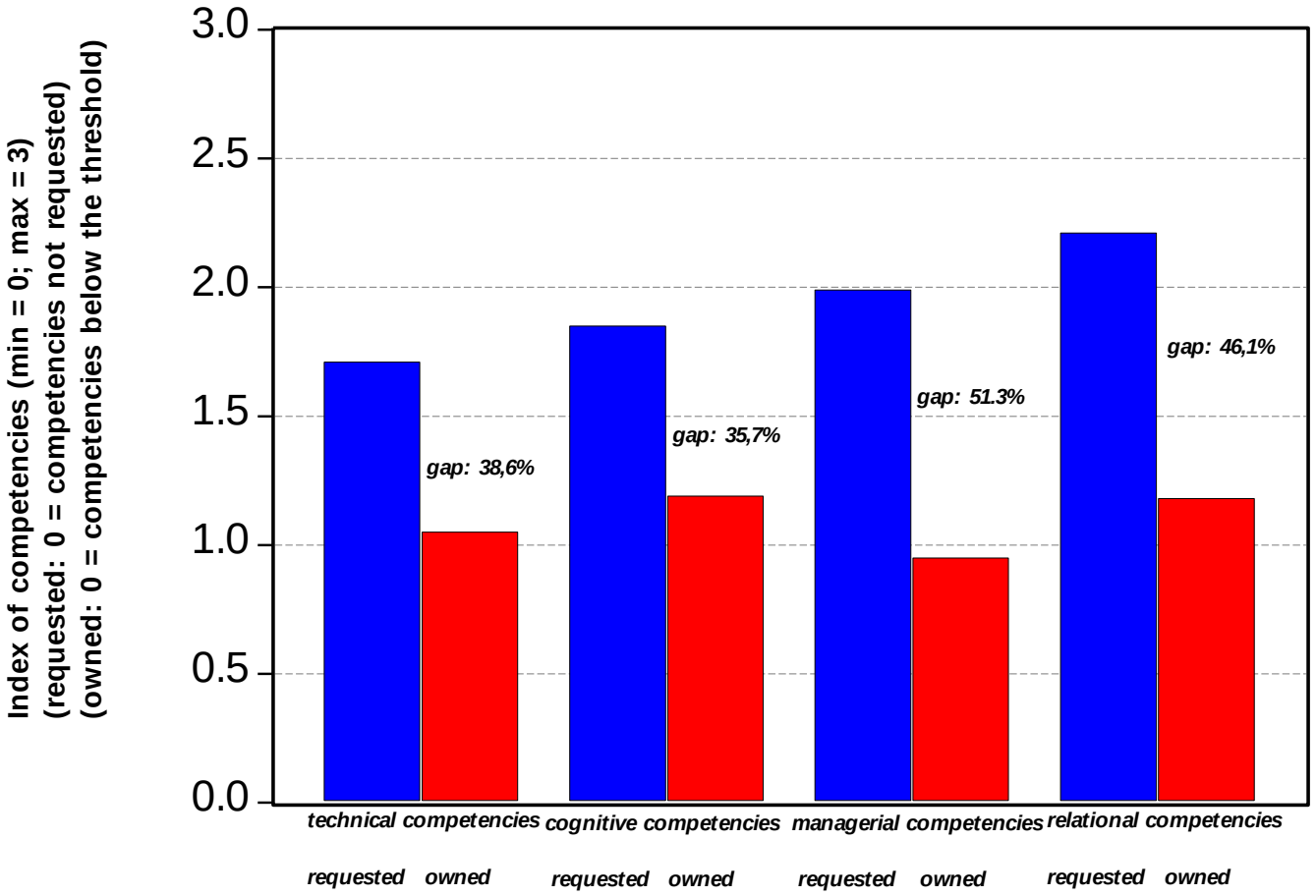
Source: Leoni and Mazzoni, 2006

Figure 3 – Ranking of competencies 'requested' of new-graduates by firms at selection interviews.
Overall firm sample (weighted mean data)



Source: Leoni and Mazzoni, 2006

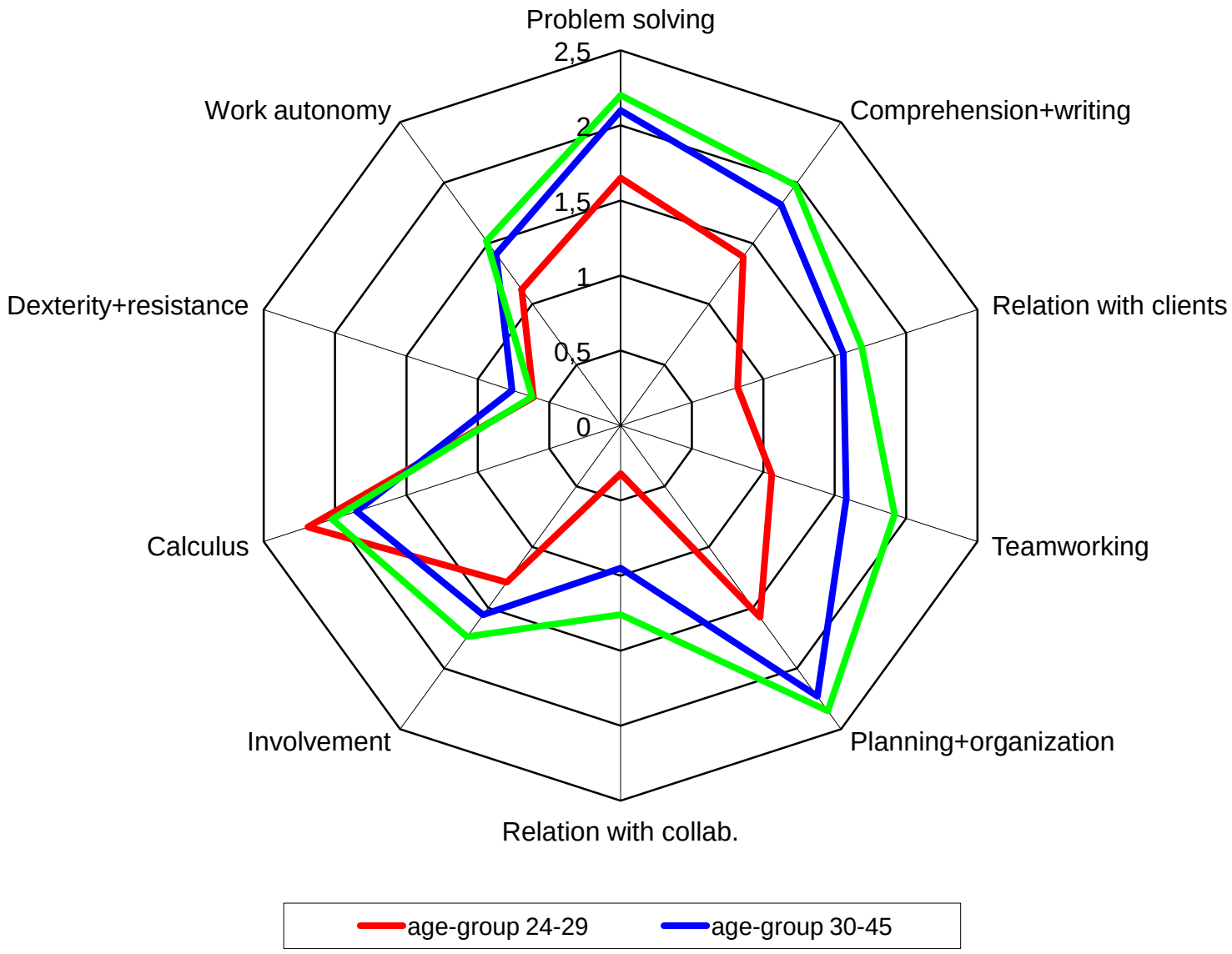
Figure 4 – Comparison between the mean requested competencies and the mean owned competencies



Source: Leoni and Mazzoni, 2006

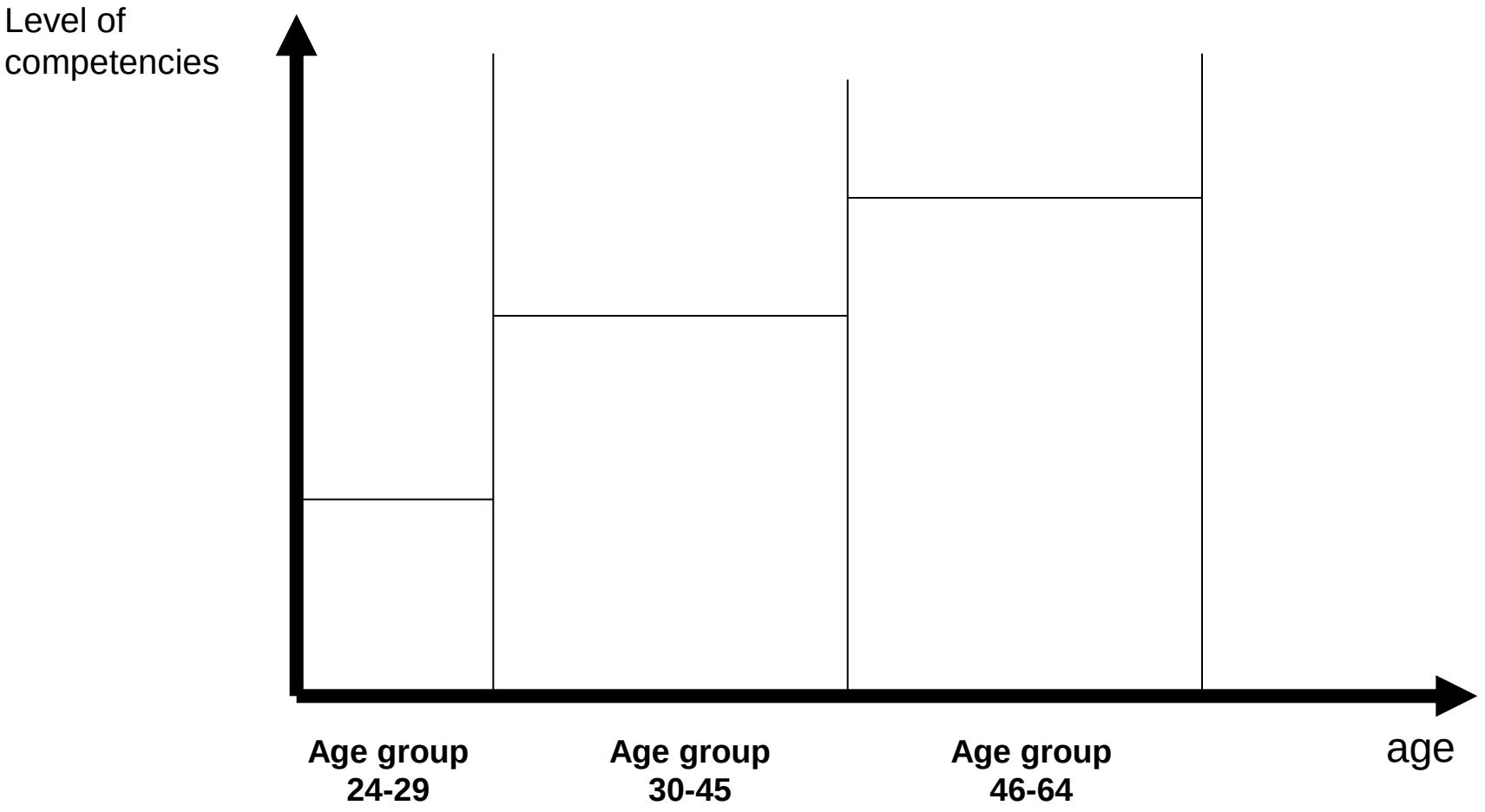
Mind the step!

Figure 5 - Levels and polyhedricity of competencies of graduates (mean values by age-groups). Italian national survey: year 2004

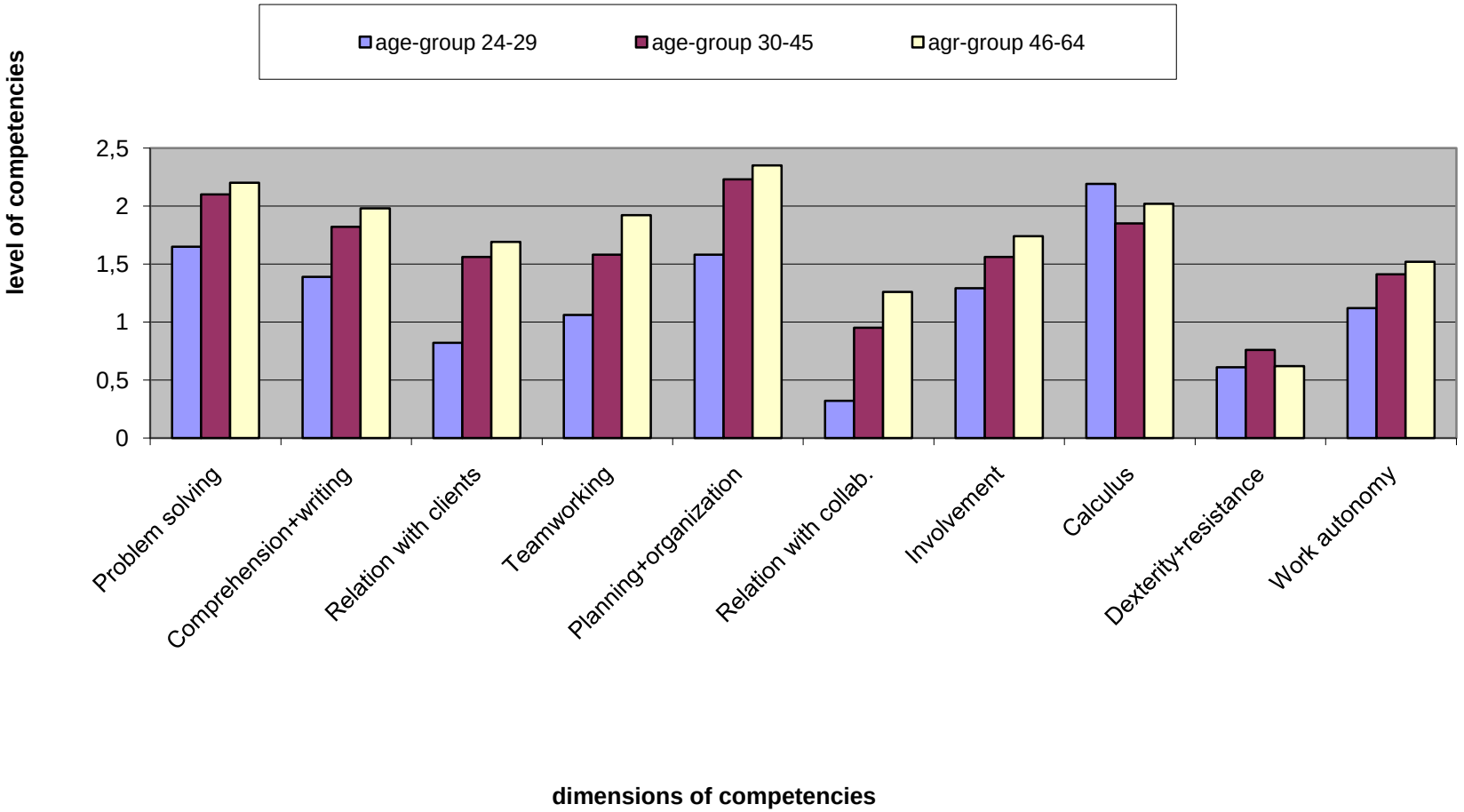


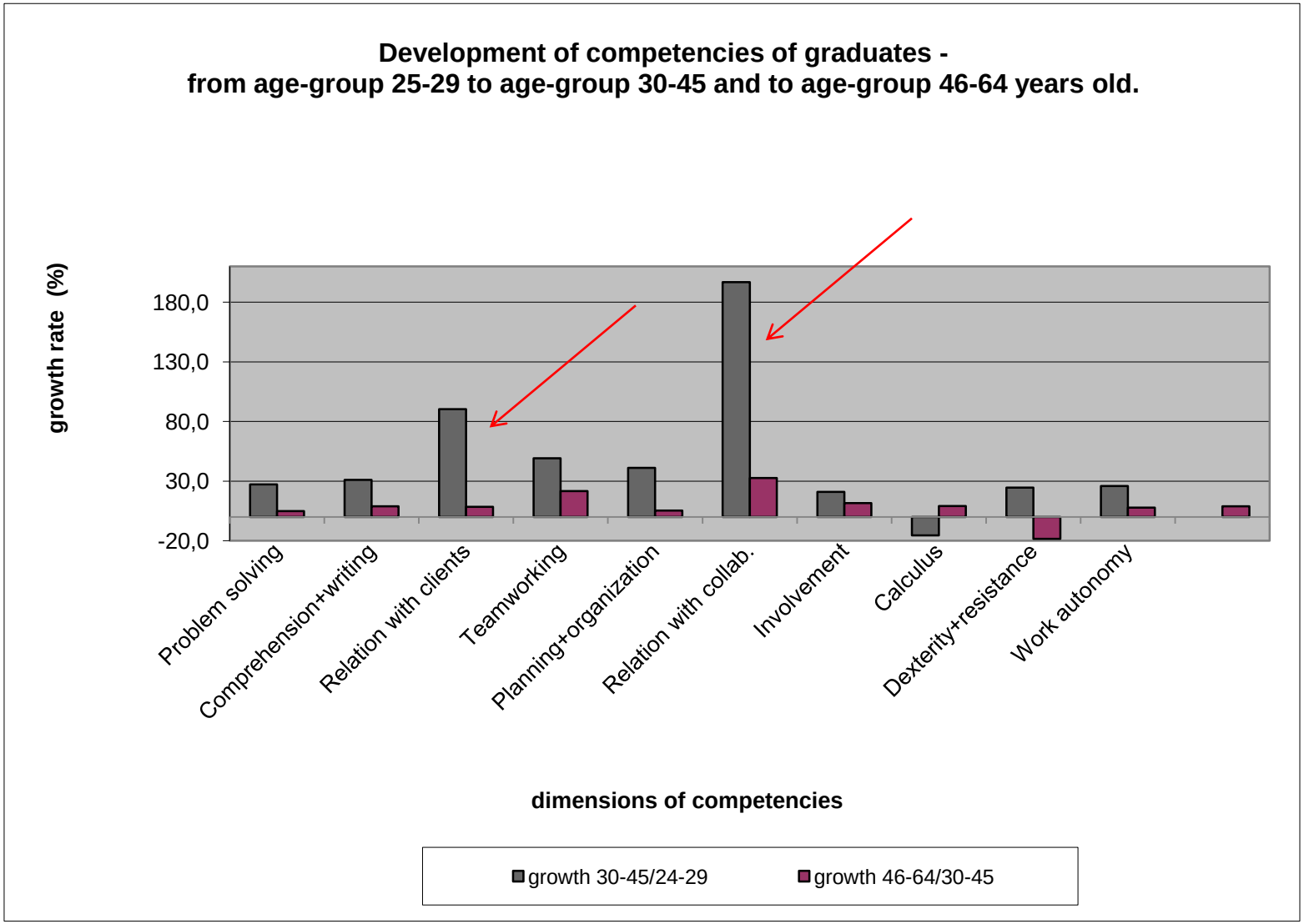
Source: Tomassini, 2006.

Development of competencies in the working life cycle. An age group perspective

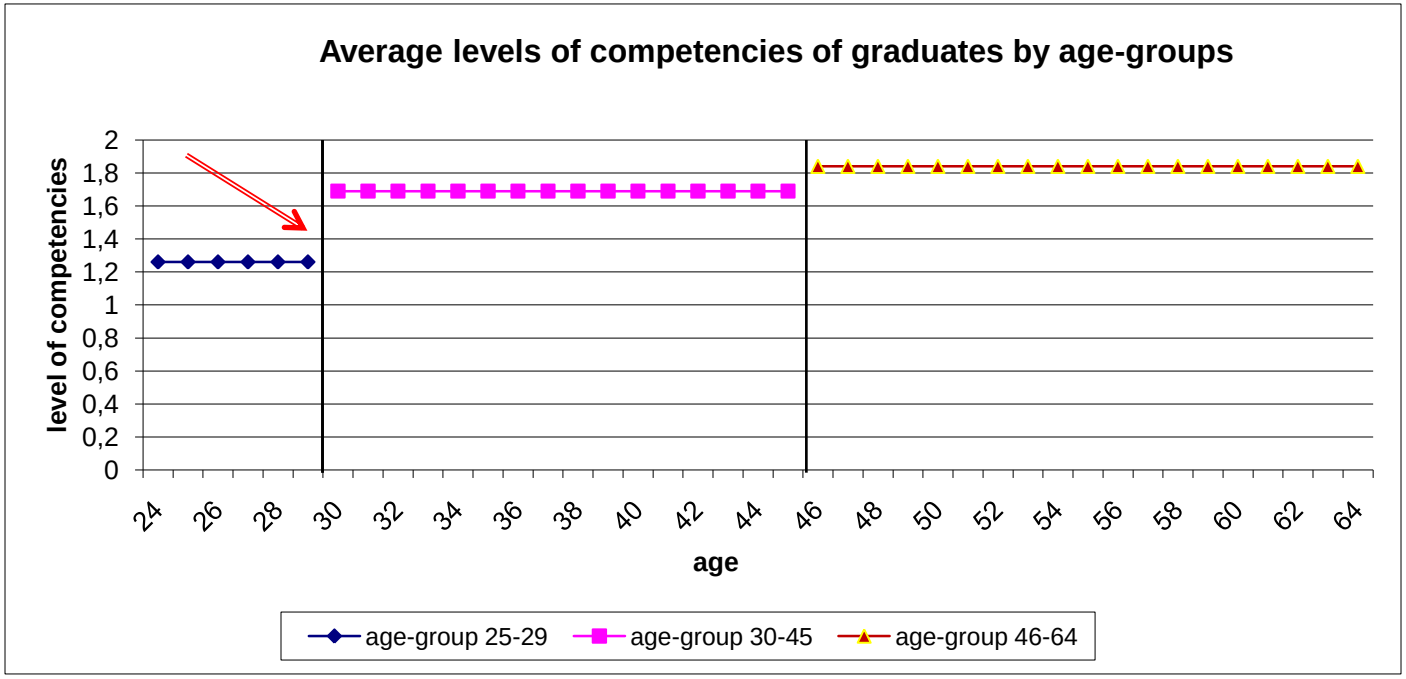


Level of competencies of graduates by age-groups



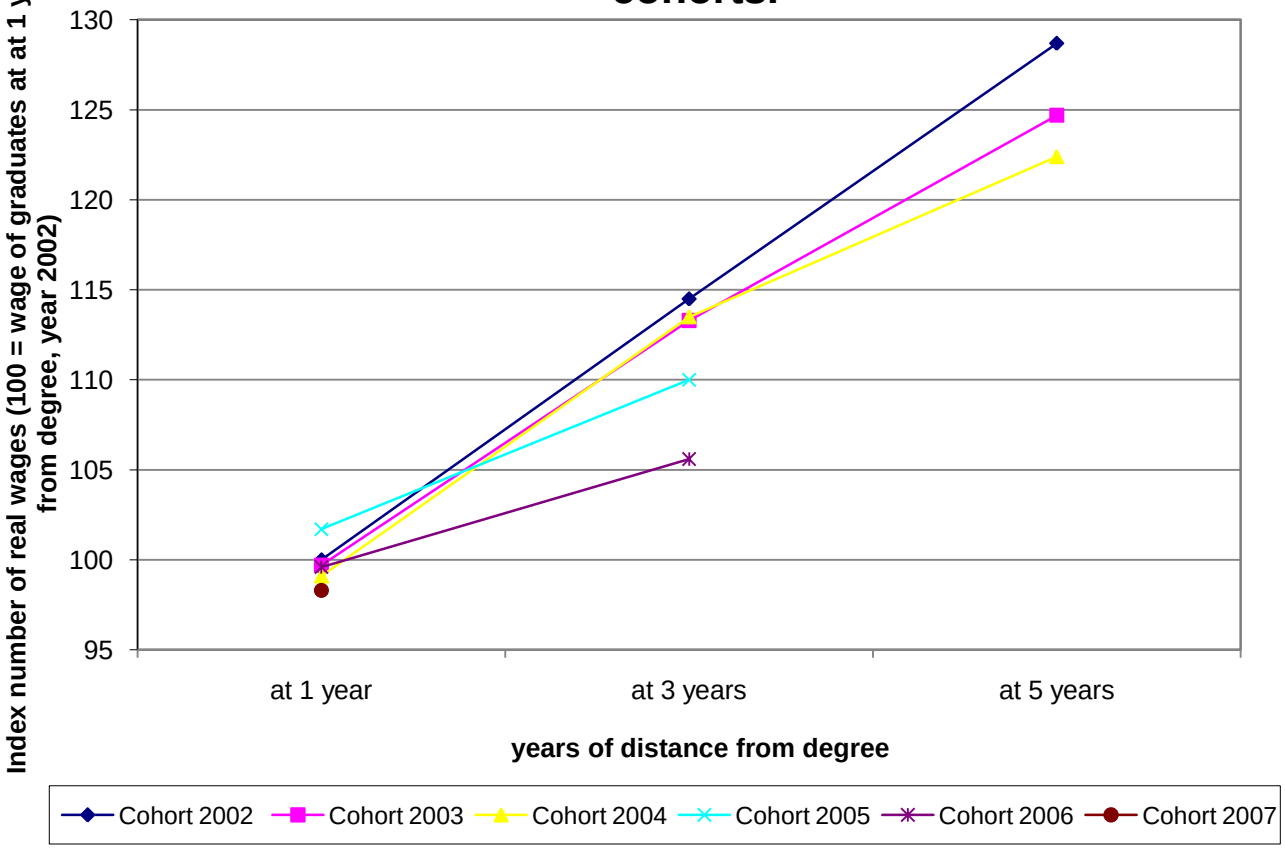

Development of competencies of graduates -
from age-group 25-29 to age-group 30-45 and to age-group 46-64 years old.
growth rate (%)
180,0
130,0
80,0
30,0
-20,0
Problem solving
Comprehension+writing
Relation with clients
Teamworking
Planning+organization
Relation with collab.
Involvement
Calculus
Dexterity+resistance
Work autonomy
dimensions of competencies
growth 30-45/24-29
growth 46-64/30-45

Mind the step !



Are competencies paid for by the market?

Figure 6 - Trends of real wages of graduates, by cohorts.



Source: AlmaLaurea (several years)

Utilization (in %) of acquired competencies (during university study)
Year of survey: 2008 (pre-reform degree)
(database: AlmaLaurea, national survey)

Level of competencies utilized:	Cohort at 1 year from degree	Cohort at 3 years from degree	Cohort at 5 years from degree
At high level	44.7	47.8	52.2
At reduced level	37.4	39.6	38.6
Not at all	17,8	12.5	9.1

Wage equation of graduates: the key role of acted (or expressed) competencies

Hedonic functions of earnings by graduates
(dependent variable: log of net average monthly earnings)

Independent variables:	**[1] OLS**	**[2] OLS**	**[3] 2SLS[+,++]**	**[4] OLS**
Official years of schooling	0.157 ***	0.136 ***	0.988	
Traineeship during study (1=yes; 0=no)		0.031 ***	- 0.036	0.044 ***
Post-degree traineeship (1=yes; 0=no)		- 0.074 ***	- 0.247	- 0.044 ***
Post-graduate school (1=yes; 0=no)		0.022 **	0.028	0.018 *
Additional years of study to get a degree (+*)		- 0.008 ***	0.008	- 0.009 ***
Potential experience in the labour market : years	- 0.022 ***	0.018 ***	- 0.690	0.025 ***
Potential experience in the labour market : years^2	0.001 ***	0.000	0.024	- 0.001 *
High level of utilization of competencies acquired during academic formation (1=high level; 0=reduced level/not at all)		**0.019 *****	**0.025 ****	**0.019 *****
Educational qualification of parents (at the most, a parent with a degree) (*default*)				--------
Educational qualification of parents (at the most, a parent with a high school diploma)				- 0.022 ***
Educational qualification of parents (at the most, a parent with a secondary school diploma)				- 0.028 ***
Part-time job (1=part time; 0= full time		- 0.518 ***	- 0.599 ***	- 0.508 ***
Atypical work (1=yes; 0=no)		- 0.123 ***	- 0.135 ****	- 0.122 ***
Work started after the degree (default)		--------	--------	--------
The respondent works but does not continue the work she/he did before the degree		0.040 ***	0.027	0.044 ***
The respondent works and is continuing the work she/he did before the degree (1=yes; 0=no)		0.115 ***	0.165 ***	0.118 ***
Controls	no	yes	yes	yes
Constant	4.458 ***	4.691 ***	- 6.769	6.996 ***
Number of observations	*16311*	*14288*	*14043*	*14013*
R^2	*0.038*	*0.359*		*0.353*
F	*212.161 ****	*362.523 ****		*331.548****
Wald Chi^2 (22)			*2931.98*	
Prob > Chi^2			*0.0000*	
Testing for regressor endogeneity: parents' years of schooling =0; age = 0; age^2 =0				
1° stage: years of schooling F (3. 14020) (Prob>F)			*77.1 (0.0000)*	
1° stage: labour market experience F (3. 14020) (Prob>F)			*9717.8(0.0000)*	
1° stage: labour market experience^2 F (3. 14020) (Prob>F)			*472.7 (0.0000)*	
Formal tests for weak instruments				
- Official years of schooling				
Partial R^2			*0.126*	
Robust F (3.14020)			*77.097*	
Prob >F			*0.0000*	
Shea's partial R^2			*0.0004*	
- Experience in LM				
Partial R^2			*0.945*	
Robust F (3.14020)			*9717.85*	
Prob >F			*0.0000*	
Shea's partial R^2			*0.0008*	
- Experience^2 in LM				
Partial R^2			*0.892*	
Robust F (3.14020)			*472.70*	
Prob >F			*0.0000*	
Shea's partial R^2			*0.0009*	

Key: p_value *** ≤ 1%, ** ≤ 5%, * ≤ 10%.
[+] : instrumented variables: official years of schooling, experience and experience-squared.
instruments: parents' years of schooling, age and age-squared (at the time of interview).
[++] function has been re-estimated by GMM estimator without obtaining different statistical results (these can be obtained on request from the author).
(+*) Additional years of study, the student having failed to get a degree within the prescribed time
Controls variables: dummies relative to i) gender, ii) work area (North-West, North-East, Centre, South-Islands, Abroad), sectors (agriculture, industry, private services, public services), iv) Ph.D. and v) scientific degrees.

Source: AlmaLaurea. Cohorts of graduates 2004, interviewed at 1° October 2009.

Wage equation of graduates: the key role of acted (or expressed) competencies

Hedonic functions of earnings by employee graduates
Age group: 25-45 years old. Year: 2004
(dependent variable: log of net average monthly earnings)

Independent variables	Weighted OLS, with robust S.E. [1]	*Standardized Beta-coefficients*	Weighted 2SLS, with robust S.E. [2]	Weighted GMM, with robust S.E. [3]
Gender (1=F, 0=M)	-0.183***	*-0.225*	**-0.181*****	-0.162***
Establishment size	0.028***	*0.131*	**0.027*****	0.028***
Temporary contract (1=yes, 0=no)	-0.00009	*-0.00009*	**0.009**	-0.001
Part time (1=yes, 0=no)	-0.491***	*-0.383*	**-0.501*****	-0.498***
Years of schooling	4.083	*6.246*	**3.943***	3.415
Years of schooling^2	-0.102	*-6.240*	**-0.098***	-0.085
Years of experience in LM	0.018***	*0.219*	**0.023****	0.027**
Seniority	0.008	*0.079*	**0.003**	0.001
Level of overall expressed competencies	**0.202*****	***0.261***	**0.205*****	**0.184*****
Constant	-34.217	*0.261*	**-32.843**	-27.676
Number of observations (population weight)	*238 (374.000)*		*238 (374.000)*	*238 (374.000)*
F (24,213)	*26.13*			
Wald chi^2 (24)			*685.656*	*703.672*
p_value	*0.0000*		*0.0000*	*0.0000*
R^2	*0.743*			
Sergeant test			*2.419 (p_v=0.120)*	
Hansen J test				*1.397 (p_v=0.237)*
Shea's partial R^2				
Experience			*0.414*	*0.414*
Seniority			*0.552*	*0.522*
Competencies			*0.941*	*0.941*
Endogenous variables: *experience in LM, seniority and overall competencies* *Instruments:* *age, dev_seniority from the sectoral mean, dev_seniority, dev_competencies from the mean of professional occupations.*				

Key: p-value *** ≤1%, ** ≤5%, * ≤10%

Control variables: dummies relative to i) sectors (traditional manufacturing, scale-intensive manufacturing, science-based manufacturing, commerce/hotels, transports/warehousing, communication/ICT, monetary and financial intermediaries, real estate/renting), ii) occupations (manager, professionals, associated professional & technicians, clerical & secretarial occupations, craft & related occupations, personal & protective services, sale occupations, plants & machine operatives, other occupations), iii) work area (North-West, North-East, Centre, South-Islands).

Source: ISFOL database (Tomassini, 2006).

Thank you!