

De universiteit en de arbeidsmarktpositie van haar afgestudeerden: Italië als een case-study

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Overview

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4. Data
5. Applied methodology
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1. Introduction

- Bologna process: declaration June 1999
 - European Higher Education Area 2010
- => harmonizing HE within Europe for a more competitive and attractive HE across Europe

Key elements of Bologna process

- common university system of degrees based on three cycles
 - promotion of mobility (Diploma Supplement and credit transfer)
 - European cooperation in quality assurance
- => to evaluate progress and support quality assurance crucial to think about valid evaluation system

Current HE evaluation systems

- International rankings
 1. Academic Ranking of World Universities (Shanghai)
 2. World University Ranking (Times Higher Education Supplement)
- National systems
 1. Germany: Centrum für Hogschulenentwicklung
 2. Italy: La Repubblica

Some criticisms

- International rankings: focus on academic research output
- International rankings: disadvantage social sciences and humanities; non-English speaking universities
- Use of unadjusted data

2. Purpose of the study

- contribute to the development of valid HE evaluation systems
- focus on labor market outcomes

Why labor market outcomes?

Increasing importance of the education-employment link in HE evaluation (Trinczek & West, 1999):

1. public expenditure on HE
2. different outcomes possible indication of quality
3. students' choices: introduction market principles

3. Research literature

Performance indicator:

“A summary statistical measurement on an institution or system which is intended to be related to the ‘quality’ of its functioning” (Goldstein & Spiegelhalter, 1996, p.385)

Goals PI

- Public accountability
- Allow consumers to make an informed choice
- Influence the behavior of the institution
- Inform policy makers (e.g. budget allocations, policy initiatives,...)

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- controversial and source of debate
 - consensus that the use of 'league tables' are not desirable; institutions cannot be held responsible for elements beyond their control => contextualization
 - some risks, unintended effects and limitations

Risks PI

- institutional damage by incorrect inferences
- process of 'naming and shaming', reinforcing the resulting ranking
- possible neglect of aspects that are not used as a PI

Limitations PI

- results always based on a prior group of students
- uncertainty about the exact position of the institution
- relevant, external factors that are not taken into account (incomplete contextualization)

Principles to be applied

1. contextualization: adjustment for external factors
2. uncertainty should be displayed (interval estimation)
3. use of multiple indicators
4. possibility of institutional response

Some previous research

- Bosker et al. (1997): Netherlands; considerable change in results when input variables are taken into account; hardly impact of the colleges on the labor market outcomes
- McGuinness (2003): UK; limited impact of the university attended
- Naylor et al. (2002): UK; impact of university on earnings, but again substantial difference between adjusted and unadjusted results

Italian university structure

Pre-Bologna:

- Laurea: at least 4 years
- Diploma Universitario: 3 years; limited fields and problems in valuing the diploma

Bologna:

- introduced 2001/2002
- 3-cycle system
- national credit + supplement
- national evaluation committee

4. Data

- ISTAT-survey 2004
- Italian University graduates 2001 (pre-Bologna)
- focus on labor market experiences since graduation
- extensive background information
- computer-assisted telephone interview

Sample

- target population: all *laurea* graduates in 2001
- stratified for gender, university and field of study
- response rate: 67% of initial sample of 39.000 students
- 26.006 in final sample

5. Methodology

- structure of the data needs to be reflected in the analyses
- multilevel-data (students within faculties within universities) => multilevel models applied (Snijders & Bosker, 1999)
- stepwise approach

Dependent variables

- employment status: 3 categories (a) student, (b) unemployed, (c) employed
- wage: (a) hourly wage, (b) monthly wage

Explanatory variables

- educational background respondent
- labor background
- demographic variables
- family background

6. Results employment status

- slightly reduced sample: 24.074 respondents in 490 faculties in 68 universities
- 19.72% students, 9.65% unemployed, 70.63% employed

	Field of study			
	N=24074	Student	Unemployed	Employed
<i>Science</i>	4.96%	18.91%	10.29%	70.79%
Chemistry-pharmaceutics	5.16%	14.64%	4.51%	80.85%
Geology-biology	4.80%	21.97%	11.07%	66.96%
Medicine	16.62%	61.49%	3.32%	35.18%
Engineering	14.18%	6.15%	4.34%	89.51%
Architecture	4.59%	5.06%	10.13%	84.81%
Agricultural engineering	3.73%	12.60%	11.48%	75.92%
Economics-statistics	14.08%	11.00%	9.44%	79.56%
Political-social sciences	5.09%	4.49%	10.20%	85.31%
Law	9.25%	24.53%	19.05%	56.42%
Literature	5.87%	9.84%	19.69%	70.47%
Linguistics	3.38%	3.94%	18.45%	77.61%
Teaching	3.60%	2.77%	13.28%	83.95%
Psychology	2.28%	10.93%	12.02%	77.05%
Education-physics	2.41%	2.76%	7.41%	89.83%

Multinomial logistic model

- categorical dependent variable
 - reference category: employed
- =>two simultaneously estimated equations:
student/employed and unemployed/employed
- interpretation parameters: exponential refers to multiplicative effect of a 1-unit increase on the odds => positive parameter refers to higher probability of being student (unemployed), negative parameter to lower probability

Empty model: variance components

Parameter	Student		Unemployment	
	Estimate	S.E.	Estimate	S.E.
FIXED				
Intercept	-1.861	0.062	-2.081	0.087
RANDOM				
University	0.000	0.000	0.368	0.086
Faculty	1.442	0.117	0.378	0.048
Respondent	n/a	n/a	n/a	n/a

Empty model: variance components

- comparison student-employed:
 - no variability attributable to the university
 - 34.5% situated at the faculty level
 - 65.5% related to characteristics of the respondent
- comparison unemployed-employed:
 - about 9% at the university and the faculty level
 - remaining 82% related to respondent characteristics

Adding field of study

- all faculty level variability in the data disappears for the unemployment part of the equation
- university level variability remains stable
- 87% of the faculty level variability in the data disappears for the student part

Adding region

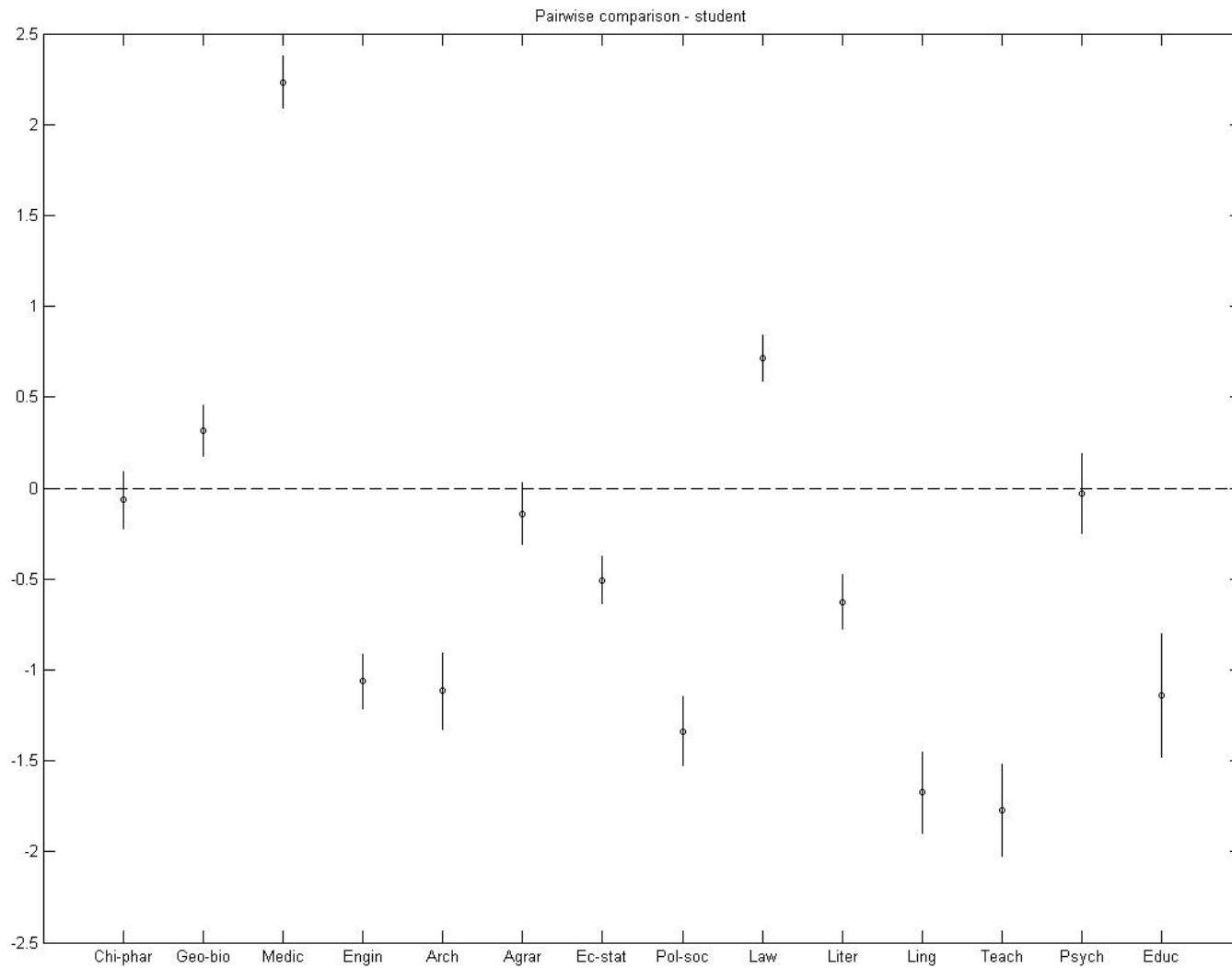
- with regard to unemployment about 90% of the university level variance could be explained by the region of residence => almost no variability at this level left
- further reduction of the faculty level variance: less than 10% of the original variability at this level is left

All explanatory variables included

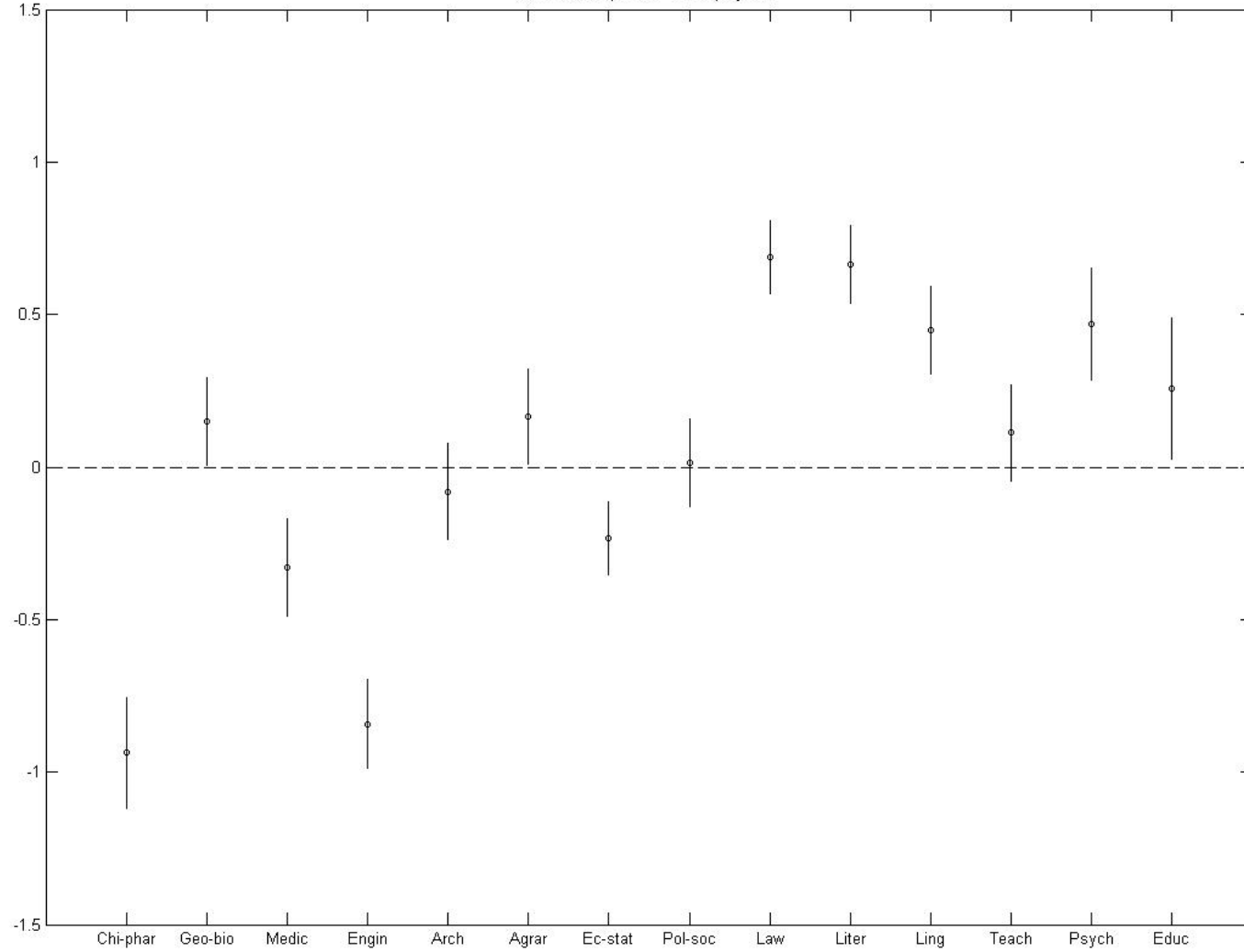
Parameter	Student		Unemployment	
	Estimate	S.E.	Estimate	S.E.
FIXED				
Intercept	-3.279	1.093	-2.145	0.768
RANDOM				
University	0.000	0.000	0.026	0.011
Faculty	0.116	0.020	0.000	0.000
Respondent	n/a	n/a	n/a	n/a

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- for unemployment the university level variance is further reduced => almost non-existing
 - for 'student' slight reduction in variance at the faculty level

Parameter	Field of study			
	Student		Unemployed	
	Estimate	S.E.	Estimate	S.E.
Chemistry-pharmaceutics	-0.066	0.157	-0.937***	0.182
Geology-biology	0.314*	0.141	0.149	0.144
Medicine	2.233***	0.145	-0.328*	0.160
Engineering	-1.063***	0.150	-0.842***	0.144
Architecture	-1.117***	0.207	-0.081	0.157
Agricultural engineering	-0.141	0.168	0.167	0.156
Economics-statistics	-0.506***	0.128	-0.233	0.120
Political-social sciences	-1.337***	0.189	0.015	0.144
Law	0.715***	0.127	0.689***	0.119
Literature	-0.626***	0.151	0.664***	0.128
Linguistics	-1.675***	0.220	0.449**	0.142
Teaching	-1.770***	0.253	0.113	0.158
Psychology	-0.028	0.219	0.469*	0.183
Education-physics	-1.140***	0.342	0.257	0.233



Pairwise comparison - unemployment



7. Results wages

- reduced sample: 13.979 respondents in 487 faculties in 67 universities
- descriptive statistics: included in report, slightly different composition of sample (e.g. medicine)

Empty model hourly wage: variance components

Parameter	Empty model 3L		Empty model 2L	
	Estimate	S.E.	Estimate	S.E.
FIXED				
Intercept	2.092	0.005	2.089	0.007
RANDOM				
University	-0.000	0.000	-	-
Faculty	0.015	0.001	0.014	0.001
Respondent	0.113	0.001	0.113	0.001
DEVIANCE	9847.096		9850.103	

Empty model hourly wage: variance components

- no significant university level variance
- 11.7% of the variability at the faculty level
- 88.3% related to characteristics of the respondent

Empty model monthly wage: variance components

Parameter	Empty model 3L		Empty model 2L	
	Estimate	S.E.	Estimate	S.E.
FIXED				
Intercept	1.172	0.010	1.172	0.009
RANDOM				
University	0.001	0.001	-	-
Faculty	0.024	0.002	0.025	0.002
Respondent	0.192	0.002	0.192	0.002
DEVIANCE	17223.380		17225.040	

Empty model monthly wage: variance components

- no significant university level variance
- 11.5% of the variability at the faculty level
- 88.5% related to characteristics of the respondent

Adding field of study

- 88% of the faculty level variability in the data disappears for the hourly wage
- 76% of the faculty level variability in the data disappears for the monthly wage
- respondent level variability remains stable for both hourly and monthly wage

All explanatory variables included

Parameter	Full model			
	Hourly wage		Monthly wage	
	Estimate	S.E.	Estimate	S.E.
FIXED				
Intercept	2.263	0.084	1.298	0.108
RANDOM				
University	-	-	-	-
Faculty	0.001	0.000	0.003	0.001
Respondent	0.106	0.001	0.176	0.002
DEVIANCE	8403.369		15565.890	

All explanatory variables included

- in total 92% of the faculty level variability in the data can be explained for the hourly wage
- in total 88% of the faculty level variability in the data can be explained for the monthly wage
- at the respondent level 6% explained for hourly wage and 8.3% for the monthly wage

All explanatory variables included

- educational background: longer duration of studies negative influence on both hourly and monthly wage; some other less consistent effects
- labor background: continuous work positive effect on both; national exam positive on hourly; occasional positive on monthly

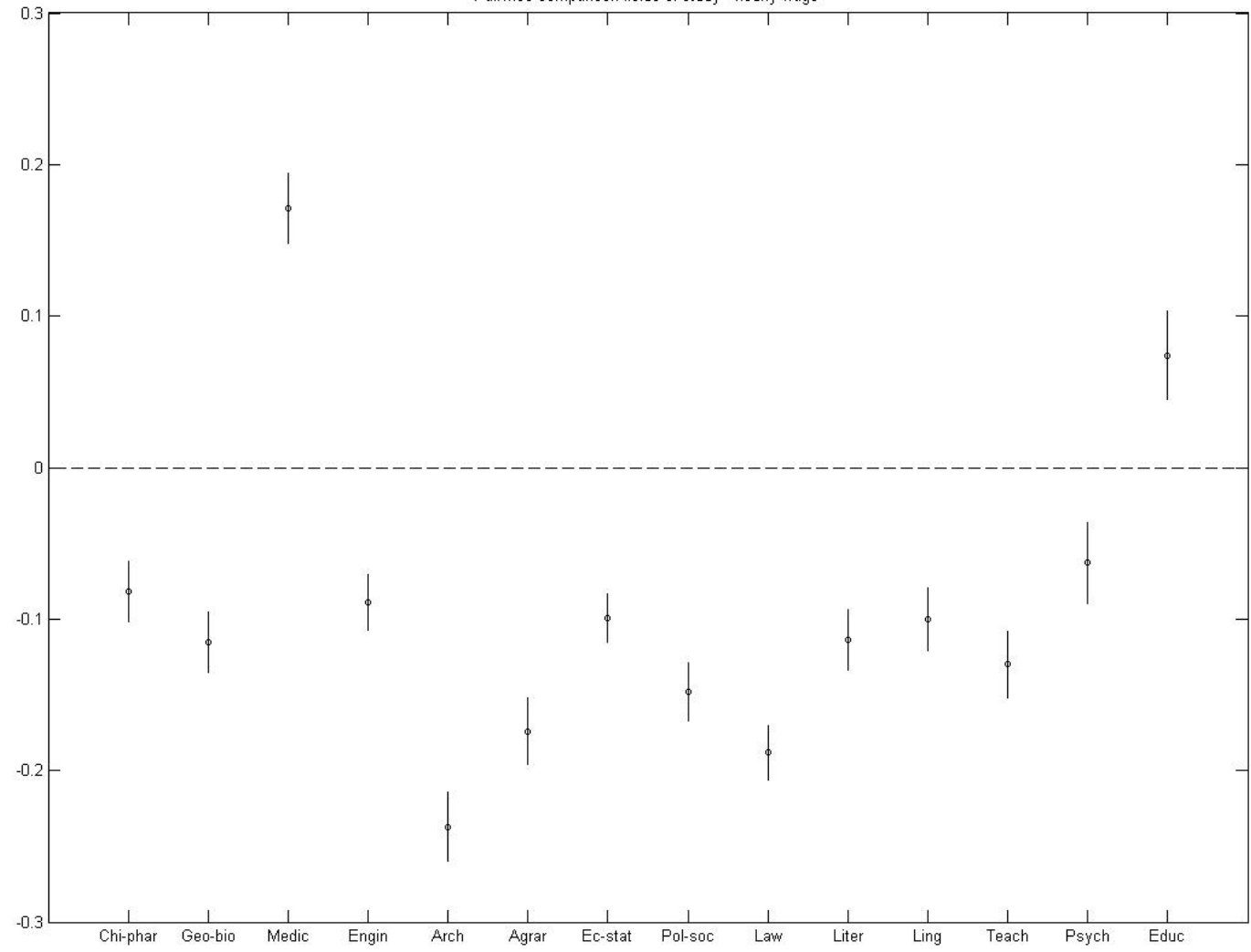
All explanatory variables included

- demographic variables: females lower wage level, both hourly and monthly; family situation (tax levels) and region considerable impact
- family background: hourly wage very limited; monthly wage some influence of education of the parents

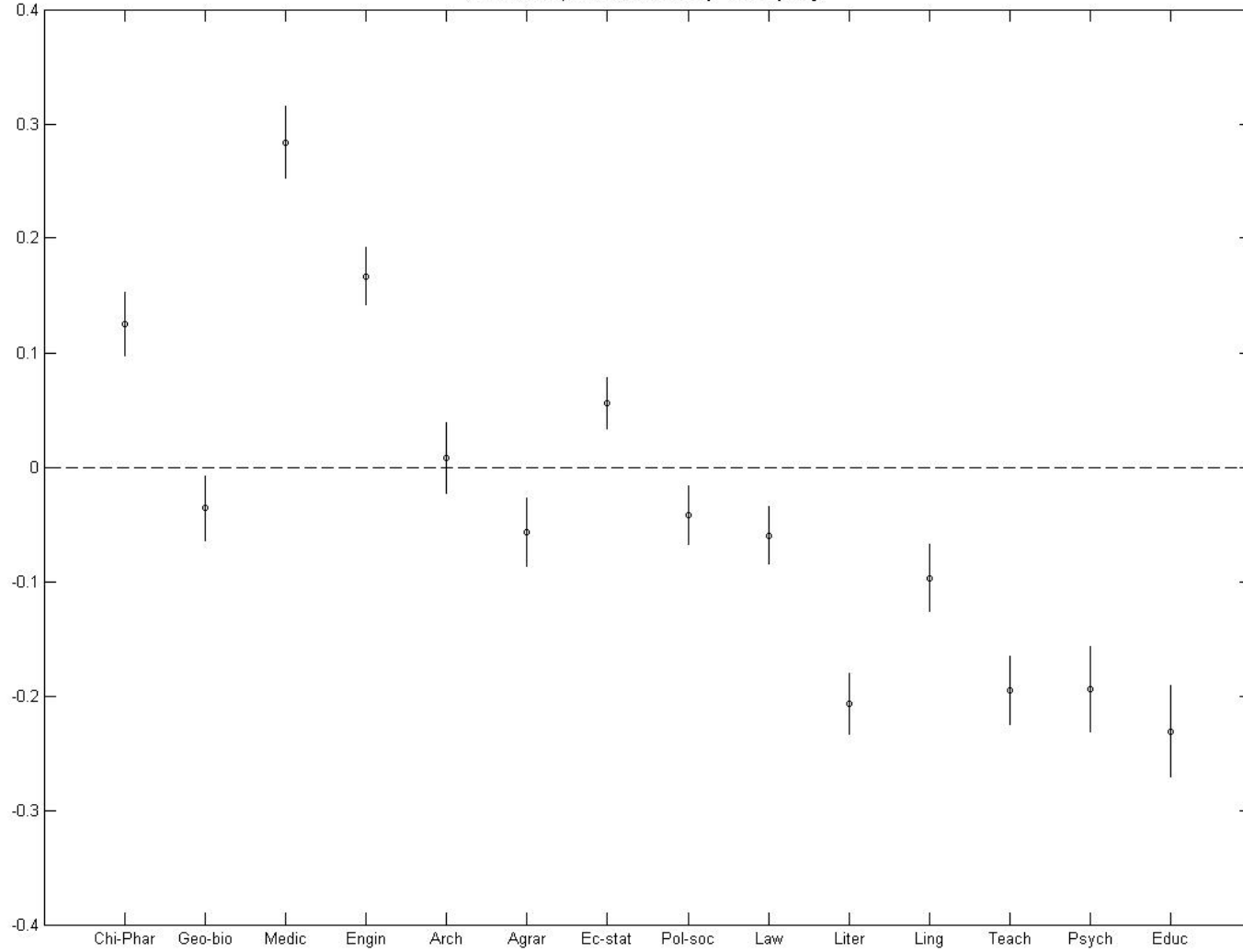
Fields of study

Parameter	Field of study			
	Hourly wage		Monthly wage	
	Estimate	S.E.	Estimate	S.E.
Chemistry-pharmaceutics	-0.082 ^{***}	0.020	0.125 ^{***}	0.028
Geology-biology	-0.115 ^{***}	0.020	-0.036	0.028
Medicine	0.171 ^{***}	0.023	0.284 ^{***}	0.031
Engineering	-0.089 ^{***}	0.018	0.167 ^{***}	0.025
Architecture	-0.237 ^{***}	0.023	0.008	0.031
Agricultural engineering	-0.174 ^{***}	0.022	-0.057	0.030
Economics-statistics	-0.099 ^{***}	0.016	0.056 [*]	0.022
Political-social sciences	-0.148 ^{***}	0.019	-0.042	0.026
Law	-0.188 ^{***}	0.018	-0.060 [*]	0.025
Literature	-0.114 ^{***}	0.020	-0.207 ^{***}	0.027
Linguistics	-0.100 ^{***}	0.021	-0.097 ^{***}	0.029
Teaching	-0.130 ^{***}	0.022	-0.195 ^{***}	0.030
Psychology	-0.063 [*]	0.027	-0.194 ^{***}	0.037
Education-physics	0.074 [*]	0.029	-0.231 ^{***}	0.040

Pairwise comparison fields of study - hourly wage



Pairwise comparison fields of study - monthly wage



8. Discussion and conclusions

- Employment status: major determinants are characteristics of the graduate, but region and field of study crucial as well; almost no impact of university attended
- Wages: no overall impact of the university; again the graduate's characteristics are the main determinants, with field of study considerable impact

Conclusions

- Limitations: selected group; only Italian universities; three years after graduation
- Use of multilevel models: enables to get a picture of the sources of variability
- Main determinant of the labor market position characteristics of the graduate; impact of university fairly limited (in line with Bosker et al. and McGuinness)

Conclusions

Raw ranking of institutions is a dangerous exercise

- Uncontextualized rankings disregard crucial factors that institutions cannot be held accountable for
- The vast majority of universities do not show any significant differences: at best per field a group of underperforming and better performing universities can be distinguished
- Multiple indicators allows a more detailed picture

Conclusions

From the tradition of schooleffectiveness research it is stated that the value of rankings mainly lies in the identification of institutions at the extremes that should be considered for further investigation; rankings considered as screening instrument (Goldstein & Spiegelhalter)