To Better Measure Social Science Performance: A Review of Existing Ranking Indicators

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IREG-5
6-8 October 2010, Berlin, Germany

Background

- Rankings (at institutional level) do not fully account for the difference in discipline mix that make each institution unique
- Many rankings are biased towards universities with strong hard sciences while against those specialized in social sciences and humanities
- Average performance on some indicators can vary significantly from one field to another

Aim & method of the study

- Examine indicators frequently used in major ranking systems to explore whether they have bias against social science fields or have significant discrepancies across different fields
- Compare per capita performance or other relative measure in different fields
- Based on empirical data either at institutional level or at national level
- The perimeter of field depends on the data provider

The Top American Research Universities

by The Center for Measuring University Performance

- **Total Research Expenditures**
- **Federal Research Expenditures**
- **Endowment Assets**
- **Annual Giving**
- **National Academy Members**
- **Faculty Awards**
- **Doctorates Awarded**
- **Postdoctoral Appointees**
- **SAT Scores**

Number of memberships in the National Academy of Sciences , the National Academy of Engineering or the Institute of Medicine

Postdoctorates in Science and Engineering

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Indicators not applicable to social science fields

- National/international awards that do not cover social sciences (e.g. Fields Medals)
- Memberships of National/International organizations that are not relevant to social sciences (e.g. Academician, IEEE fellow)
- Research output in Science, Engineering and Medicine fields (e.g. papers in Nature and Science, papers indexed in EI, ISTP…, patents)
- Others (e.g. National Key Labs)

Indicators that have bias against social science fields

- **Research income/expenditure**

Research income for 75 National Universities in China		
	Total (in Billions RMB)	Per academic staff (in Thousands RMB)
Science, Engineering and Medicine	20.2	371.1
Social Sciences and Humanities	1.6	95.5
Ratio	12.6 : 1	**3.2 : 1**

Source: Ministry of Education (2009). Statistics on Subordinate Universities of Ministry of Education of China, 2008

Indicators that have bias against social science fields

- **Publications and citations in ISI databases**

Number of papers and citations per faculty member for 3,634 doctoral programs at 274 institutions in US		
	Papers per faculty	**Citations per faculty**
Biological Sciences	7.62	59.62
Physical Sciences and Mathematics	6.39	31.94
Engineering	6.04	17.83
Social and Behavioral Sciences	2.14	5.47
Arts and Humanities	Unknown	Unknown

Source: National Research Council & National Academy of Sciences (1995). Research-Doctorate Programs in the United States: Continuity and Change. Washington, D.C. , National Academy Press.

Indicators that have bias against social science fields

- **Publications and citations in ISI databases**

Citations per paper for 3,634 doctoral programs at 274 institutions in US	
	Citations per paper
Biological Sciences	7.82
Physical Sciences and Mathematics	5.00
Engineering	2.95
Social and Behavioral Sciences	2.56
Arts and Humanities	Unknown

Source: National Research Council & National Academy of Sciences (1995). Research-Doctorate Programs in the United States: Continuity and Change. Washington, D.C. , National Academy Press.

Indicators that have discrepancies across fields

- **Percentage of International Students**

Percentage of Int'l Students by Field in US			
Field	**% of Int'l Students**	**N. of Int'l Students (In Thousands)**	**Total Enrollment (In Thousands)**
Engineering	**7.4%**	95	1283
Physical &Life Sciences	**6.5%**	45	691
Mathematics & Computer	**6.1%**	68	1112
Agriculture	**4.7%**	7	153
Fine & Applied Arts	**4.0%**	32	790
Business & Management	**2.9%**	109	3714
Humanities	**2.9%**	17	569
Social Sciences	**2.7%**	54	1921
Health professions	**1.0%**	26	2672
Education	**0.8%**	16	1951
Others	2.2%	60	2693
Undeclared	0.7%	29	4328

Chi-Square=347.698, df=11, Sig.<0.01

Source: National Center for Education Statistics(2009). Digest of Education Statistics 2009 (2004 data)
Institute of International Education (2004). Open Doors: Report on International Educational Exchange

Indicators that have discrepancies across fields

- **Percentage of International Students**

Percentage of Int'l Students by Field in China			
Field	% of Int'l Students	N. of Int'l Students (In Thousands)	Total Enrollment (In Thousands)
Literature and Arts	4.5%	143.3	3212
Philosophy	2.5%	0.6	24
Medicine	1.7%	28.7	1655
History	1.3%	1.0	74
Economics	1.0%	11.3	1088
Science	0.8%	10.0	1314
Law	0.6%	4.7	787
Education	0.3%	3.4	1087
Management	0.3%	10.7	4105
Agriculture	0.2%	0.7	412
Engineering	0.1%	9.1	7734

Chi-Square=471.698, df=10, Sig.<0.01

Source: : Ministry of Education (2009). Education Statistics 2008

Indicators that have discrepancies across fields

- **Percentage of International Students**

Top 10 and Bottom 10 Universities on Percentage of Int'l Students among 75 National Universities in China	
Top 10	**Bottom 10**
Beijing Language & Culture U	U Electronic S&T
Fudan U	U S&T China
Peking U	U Geosciences
Beijing U of Chinese Medicine	Northwestern Polytechnic U
Tsinghua U	China Agriculture U
Renmin U	Lanzhou U
Wuhan U	Dalian U S&T
Beijing Normal U	Beijing U Post & Telecommunication
U Int'l Business & Economics	Nanjing U S&T
Zhejing U	Hunan U

Source: Ministry of Education (2009). Statistics on Subordinate Universities of Ministry of Education of China, 2008

Indicators that have discrepancies across fields

- **Unemployment / Employment Rate**

Unemployment Rate of 2009 Bachelor's Degree Recipients (2 months after graduation) in China		
Field	N. of Bachelor's Degree Recipients (In Thousands)	Unemployment Rate
Science, Engineering and Medicine	1229	17.2%
Social Sciences	752	19.9%
Arts and Humanities	477	20.2%

Chi-Square=0.115, df=2, Sig.=0.94

Source: Ministry of Education (2010). Employment Statistics of Undergraduate Graduates, 2009

Indicators that have discrepancies across fields

- **Unemployment / Employment Rate**

Unemployment Rate of 1999-2000 Bachelor's Degree Recipients (1 year after graduation) in US	
Field	Unemployment Rate
Education	2.6%
Mathematics and physical sciences	2.8%
Engineering	2.9%
Business and management	2.9%
Health professions	3.1%
Public affairs and social services	3.5%
Psychology	3.9%
Humanities	4.9%
Social sciences	6.1%
History	7.2%
Biological sciences	8.6%

Source: National Center for Education Statistics(2009). Digest of Education Statistics 2009 (2003 data)

Indicators that have discrepancies across fields

- **Student / Faculty Ratio**

Student/Faculty Ratio by Field in China			
Field	N. of Students (In Thousands)	N. of Faculty (In Thousands)	Student/Faculty
Science, Engineering and Medicine	11070	604	18.3
Social Sciences	7062	318	22.2
Arts and Humanities	24750	1553	15.9

Chi-Square=30.867, df=2, Sig.<0.01

Source: Ministry of Education (2009). Education Statistics 2008

Indicators that have discrepancies across fields

- **Ratio of undergraduate to graduate students**

Undergraduates/Graduates Ratio at 976 Doctoral-Level Institutions in US		
Field	**Total Enrollment** (In Thousands)	**Undergraduates/ Graduates**
Education	719	**0.8**
Mathematics & Physical sciences	199	**2.0**
Engineering	478	**2.8**
Business & Management	1311	**2.9**
Biological sciences	388	**4.4**

Chi-Square=266.970, df=4, Sig.<0.01

Source: IPEDS (2010). Fall Enrollment (2008 data)

Indicators that have discrepancies across fields

- **Faculty Salary**

Average Faculty Salaries by Field at 4-Year Colleges and Universities in US (2009-10)							
Top 5				Bottom 5			
Field	Prof.	Assoc. Prof.	Assist. Prof.	Field	Prof.	Assoc. Prof.	Assist. Prof.
Legal professions	$134,146	$101,045	$83,991	Theology	$71,473	$59,979	$51,605
Engineering	$112,679	$86,031	$75,226	Visual arts	$79,098	$62,197	$51,480
Business	$109,919	$92,573	$85,996	English	$79,372	$61,684	$51,502
Computer	$101,219	$82,230	$70,791	Parks, recreation	$80,513	$64,126	$53,246
Air transportation	$99,803	$71,605	$59,434	Communications technologies	$81,269	$63,907	$56,041

Cited from: http://chronicle.com/article/Chart-Average-Faculty/64500/

More indicators need to be examined

- Expenditure per student
- Quality of intake students
- Faculty awards, mixed
  - The Top American Research Universities, 24 awards
  - Maclean's University Ranking, more than 40 awards
- Students evaluation
  - Cashin, W. E. (1990). Students do rate different academic fields differently. New Directions for Teaching and Learning, 43, 113-121.
- ……

Final Remarks

- Record the field information of target data whenever possible
- Field ranking & overall ranking
- Field-normalization
  - By field average, e.g. CPP/FCSm
  - By national share or world share

THANK YOU FOR YOUR ATTENTION !