

**The 4th Annual International Symposium on University  
Rankings and Quality Assurance 2012**

# **Creating Effective European Data System and Indicators on Universities**

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## Outline


1. Are rankings enough for the strategic management of universities?
2. Towards research benchmarking- particularly for European universities
3. Fast Europe?



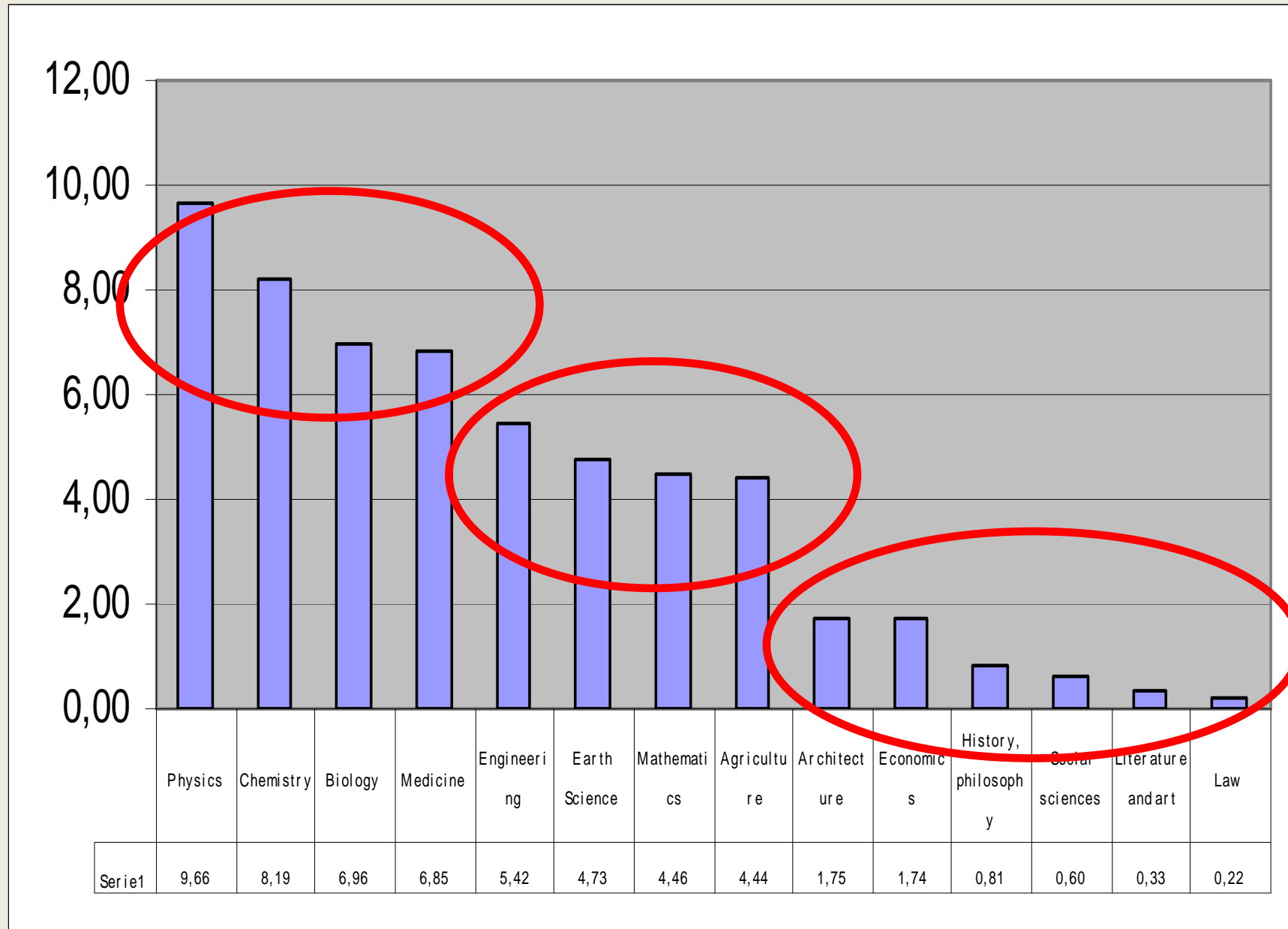
## Rankings and strategic management of universities

- Strategy implies positioning making reference to:
  - competitors
  - internal resources
- No strategy without measurement
- But measures must convey the complexity of positioning in the environment
- Measures that collapse many variables into a single ranking must demonstrate they use sufficient statistics
- False analogy with companies (e.g. market capitalization). Companies work with tradable goods and their shares are sold in liquid markets, hence the monetary value is (under certain conditions) a sufficient statistics. Universities work with non tradable goods and are illiquid.

## Composition effect

- Universities as collections of departments
  - Departments (=disciplines) have different profiles with respect to
    - publication intensity
    - citation intensity
    - media
    - language
    - ISI/Scopus coverage
    - highly cited scientists, Nobel prizes,
  - Universities with largely different subject mixes cannot be compared in a rigorous way, e.g.
    - specialist universities
    - universities with significant activity in Humanities and Social Sciences vs. S&T and Medicine
- 

## Average H-index by discipline in Italian disciplinary fields (SDS)



Source: ANVUR research on Google Scholar data compiled by [www.italianscientists.blogspot.it](http://www.italianscientists.blogspot.it)

## Correlation effect

- In order to rank high in international comparisons, a university must be competitive in (almost) *all* its departments
- *Low variability* (or high correlation) across departments in indicators of research quality
- However, variability in research quality across individual scientists is an intrinsic property of science (Lotka's law)
- Universities may have low internal variability across departments *if and only if* they can follow consistent recruitment policies over time

## Correlation effect/2

- But a consistent recruitment policy over time requires:
  - autonomy of universities with respect to Ministry
  - balance of power with respect to academic communities (collegiate vs presidential model)
  - mobility of researchers
  - steady supply of positions
- There is evidence that this is *not* the case for many European countries

## Correlation effect/3

Excellent researchers are spread across many universities and do *not* agglomerate in top ranking institutions

**Variability in research quality within universities is larger than variability between universities**

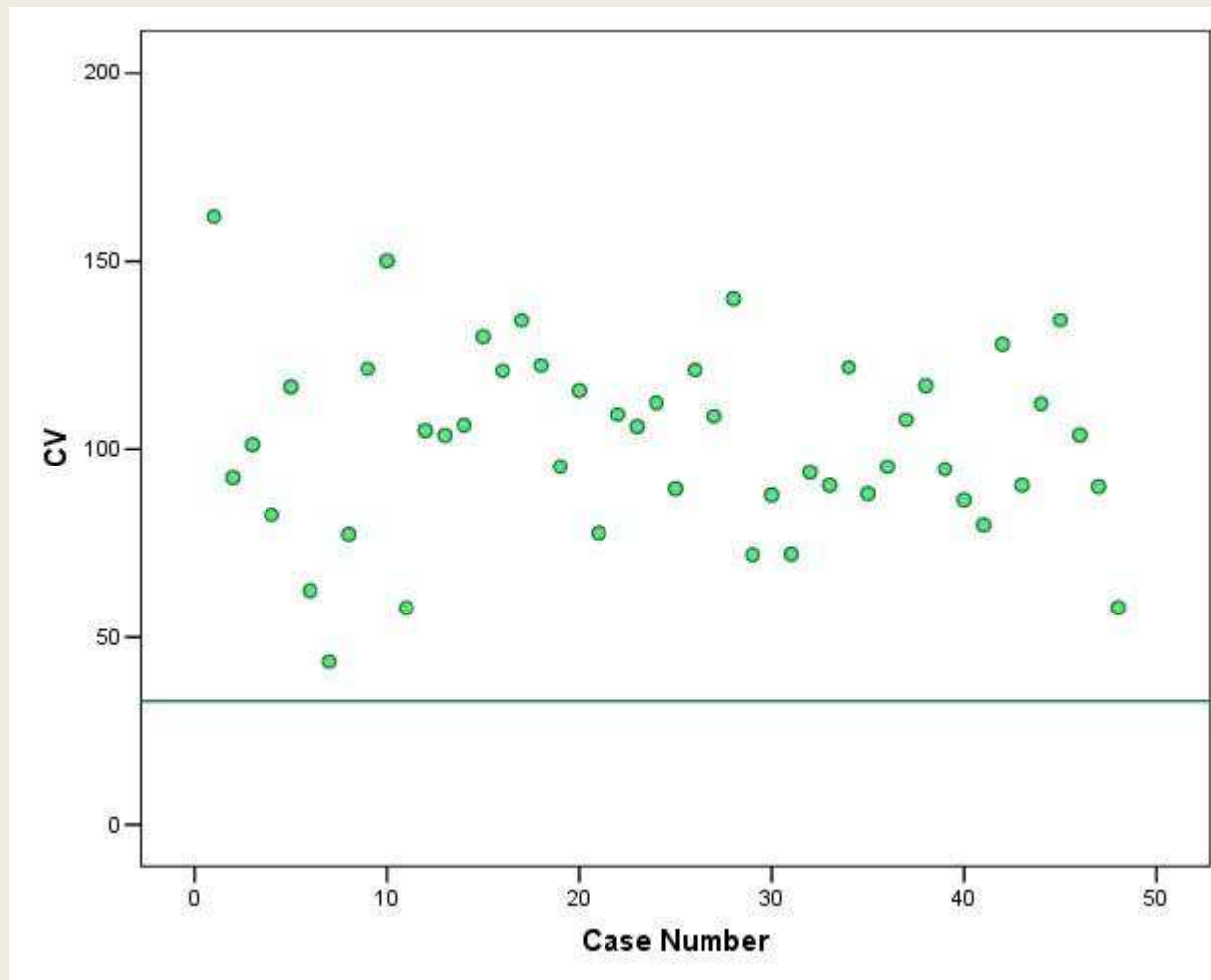
This decreases the international visibility of the university as a whole

Looking only at international rankings does not offer a clue to strategic decision making



## Variability within universities is much larger than between universities

Coefficient of variation of publications in Physics within universities (dots) and between universities (line) in Italy (2004-2008)



Source: Abramo, Cicero, D'Angelo (2011)

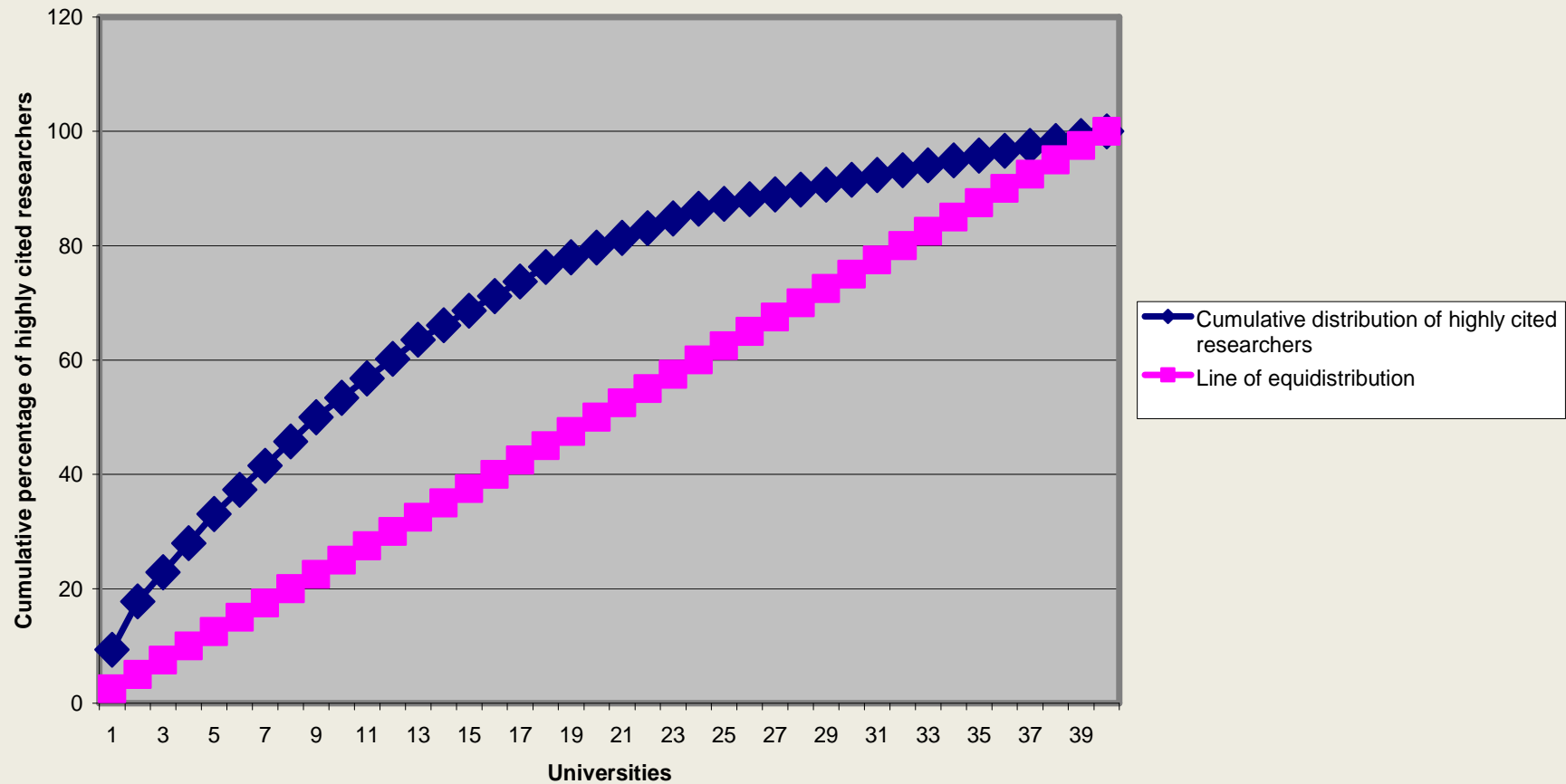
Coefficient of variation of citations (Scientific Strength) in all disciplines within and between Italian universities

Discipline	Variability within			Variability between
	Min	Max	Median	
Agricultural and veterinary sciences	81%	245%	159%	44%
Biology	54%	297%	159%	58%
Chemistry	71%	303%	125%	33%
Civil engineering and architecture	74%	346%	160%	85%
Earth sciences	61%	236%	129%	58%
Industrial and Information engineering	74%	267%	161%	37%
Mathematics and computer sciences	87%	295%	159%	55%
Medicine	68%	313%	190%	59%
Physics	51%	204%	136%	45%

Source: Abramo, Cicero, D'Angelo (2011)

Even highly cited scientists are not concentrated in a few excellent institutions but distributed across many universities

### Concentration of German highly cited researchers by university



Source: Bonaccorsi (in preparation)

## The solitude of stars

University	Number of highly cited researchers	Rank in Shanghai ranking
Technische Universität München	11	56
U. Würzburg	10	102-150
Johann Wolfgang Goethe-Universität Frankfurt am Main	6	102-150
Johannes Gutenberg-Universität Mainz	6	151-202
Ruprecht-Karls-Universität Heidelberg	6	65
U. Hamburg	5	102-150
Ludwig-Maximilians-Universität München	5	53
Albert-Ludwigs-Universität Freiburg	5	94
Eberhard Karls Universität Tübingen	5	102-150
U. Bielefeld	4	305-402
Georg-August-Universität Göttingen	4	87
U. Konstanz	4	305-402
Rheinische Friedrich-Wilhelms-Universität Bonn	4	99
Heinrich-Heine-Universität Düsseldorf	3	305-402
Philipps-Universität Marburg	3	203-304
Technische Universität Berlin	3	203-304
Westfälische Wilhelms-Universität Münster	3	N.R.
Humboldt-Universität zu Berlin	3	N.R.

Source: A. Bonaccorsi (in preparation) The solitude of stars. Highly cited researchers in European universities

University	Number of highly cited researchers	Rank in Shangai ranking
Bergische Universität Wuppertal	2	N.R.
Christian-Albrechts-Universität zu Kiel	2	151-202
Friedrich-Alexander Universität Erlangen-Nürnberg	2	N.R.
U. Karlsruhe	2	203-304
Ruhr-Universität Bochum	2	203-304
U. Stuttgart	2	305-402
U. Bayreuth	1	305-402
U. Dortmund	1	N.R.
Ernst-Moritz-Arndt-Universität Greifswald	1	305-402
U. Essen	1	305-402
U. Hannover	1	403-510
U. Hohenheim	1	N.R.
Justus-Liebig-Universität	1	N.R.:
U. Köln	1	151-202
Martin-Luther-Universität Halle-Wittenberg	1	203-304
U. Regensburg	1	305-402
U. Rostock	1	403-510
Technische Universitaet Hamburg - Harburg	1	N.R.
Technische Universität Carolo-Wilhelmina zu Braunschweig	1	N.R.
Technische Universität Dresden	1	305-402
Technische Universität Kaiserslautern	1	N.R.
U. Ulm	1	305-402

Between 35% and 45% of European PhD students attend courses  
in non-ranked universities

	Absolute value			Percentage		
	N. of HEIs	Students ISCED6	Doctorate Degrees Awarded	N. of HEIs	Students ISCED6	Doctorate Degrees Awarded
<b>EUMIDA Universities *</b>	<b>938</b>	<b>530.343</b>	<b>92.631</b>	<b>100,0</b>	<b>100,0</b>	<b>100,0</b>
<b>EUMIDA Universities in Shanghai WR</b>	<b>181</b>	<b>291.545</b>	<b>60.585</b>	<b>19,3</b>	<b>55,0</b>	<b>65,4</b>
1-100	28	72.660	16.391	3,0	13,7	17,7
101-200	40	63.806	15.859	4,3	12,0	17,1
201-300	38	67.160	11.726	4,1	12,7	12,7
301-500	75	87.919	16.609	8,0	16,6	17,9
<b>EUMIDA Universities in Leiden crown indicator WR</b>	<b>219</b>	<b>344.257</b>	<b>67.575</b>	<b>23,3</b>	<b>64,9</b>	<b>73,0</b>
1-100	20	39.068	7.434	2,1	7,4	8,0
101-200	51	76.793	19.667	5,4	14,5	21,2
201-300	55	83.781	17.376	5,9	15,8	18,8
301-500	93	144.615	23.098	9,9	27,3	24,9

Source: EUMIDA



# Global Research Benchmarking System (GRBS)

- Provides flexible analytical tools that permit each user to focus on aspects of university research performance most relevant to his/her needs.
- Designed to provide insight to support diversity of university research.
  - By highlighting the performance of universities with particular niche strengths, GRBS is able to expand focus beyond the largest and most comprehensive institutions.

# Supports universities to

- Determine their own research profile and identify niche areas in which they can excel.
- Make more rational strategic and resource allocation decisions.
- Publicize program strengths to attract top students, faculty, and funding.
- Identify potential research collaborators to compliment their research strengths.



# Coverage

- Over 24,000 source titles of types Journal, Conference Proceedings, and Book Series from Elsevier's Scopus database.
- The 2011 release
  - Over 250 disciplinary and interdisciplinary subject areas.
  - 729 universities in Asia-Pacific, US, and Canada
  - Coverage of Europe coming in May

# Rating Indicators

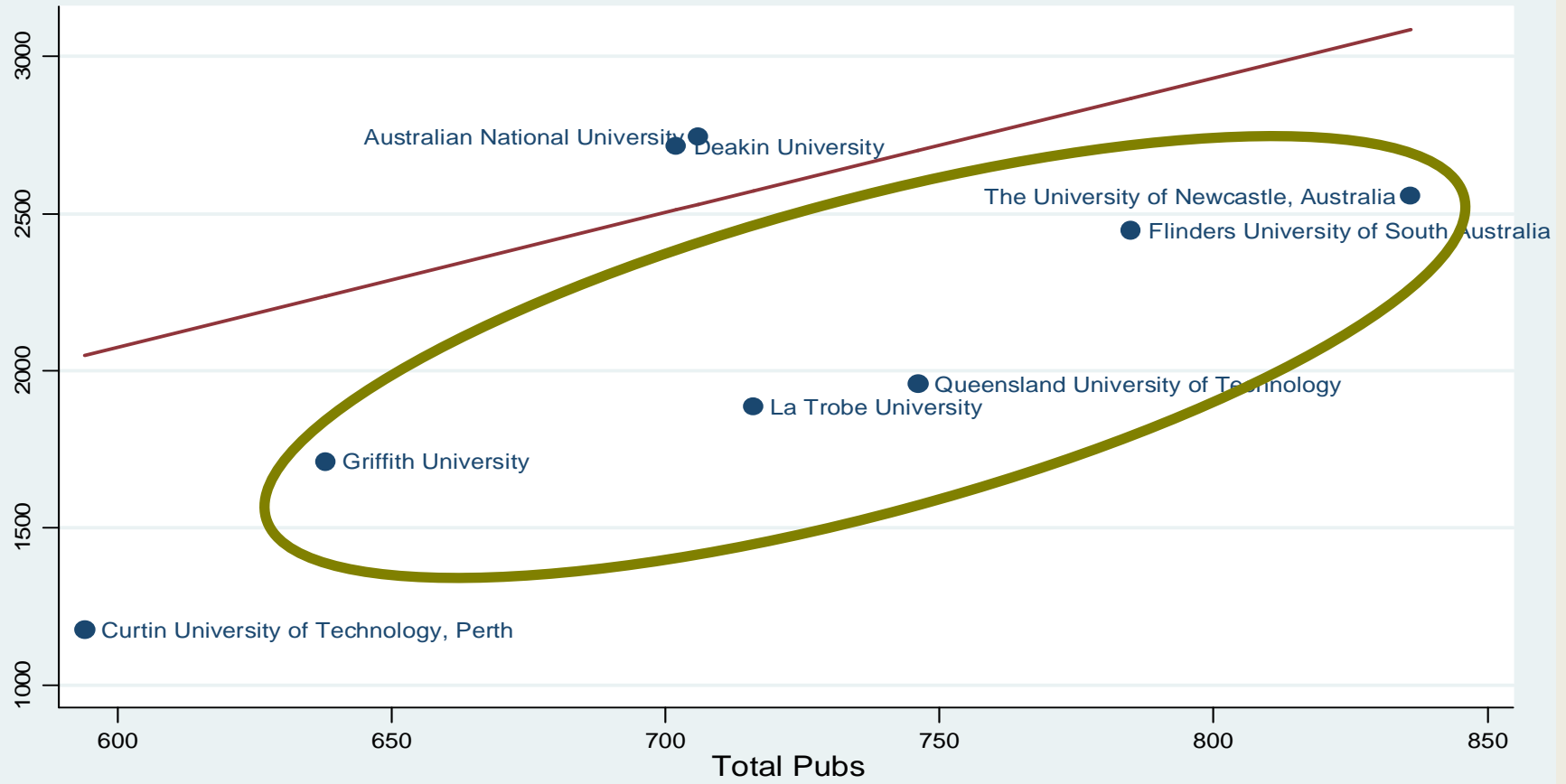
- Indicators chosen to provide a balanced measure of key dimensions of research performance: output, scholarly impact, volume, quality.
  - Number of publications by subject area
  - Percentage publications in top source titles
  - Number of citations
  - Percentage of citations from top source titles
  - H-index
- Top source titles are determined by their SNIP values

AUSTRALIA  
Medicine

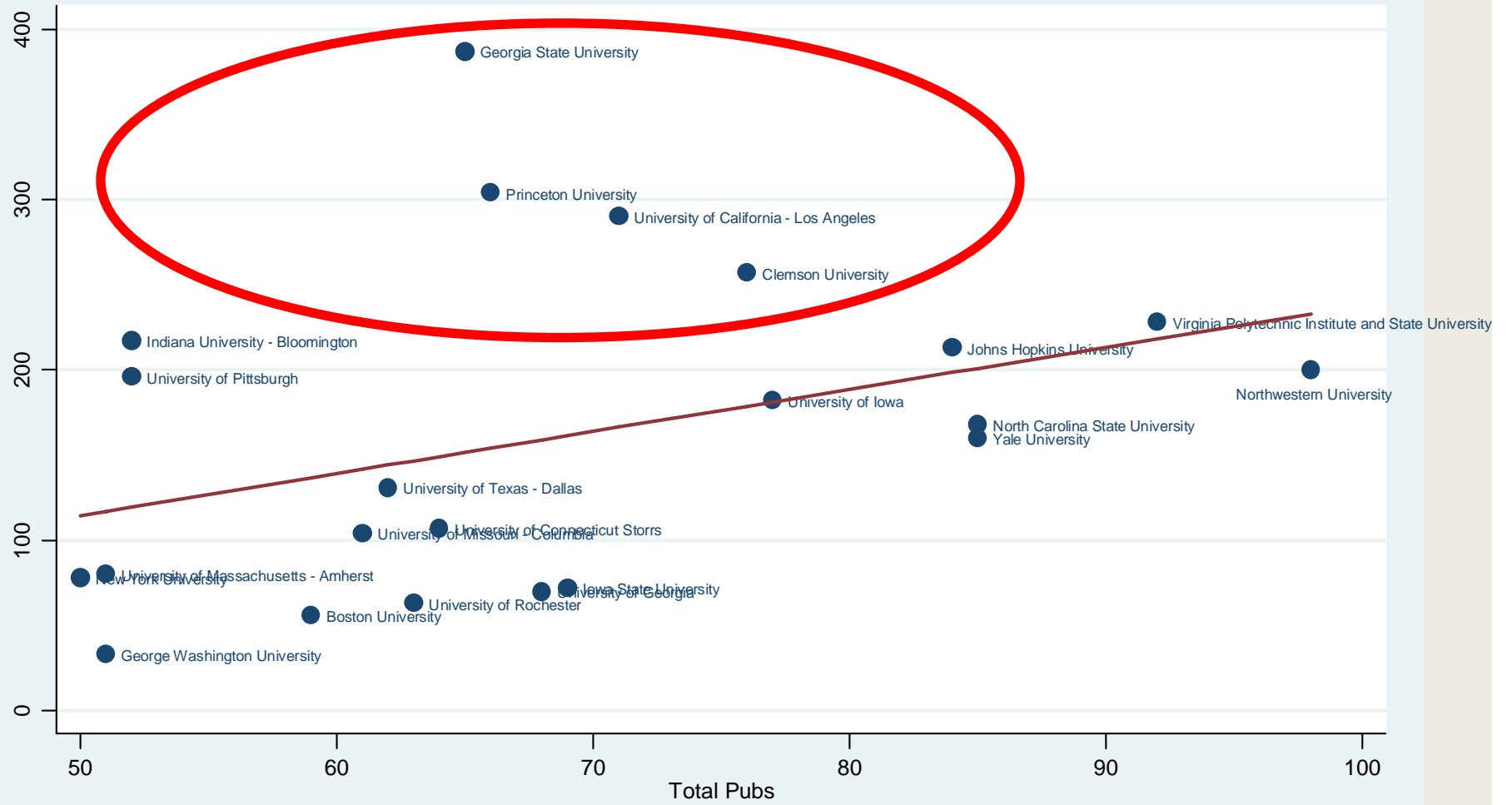


Source: ANVUR research on GRBS data

# AUSTRALIA Medicine

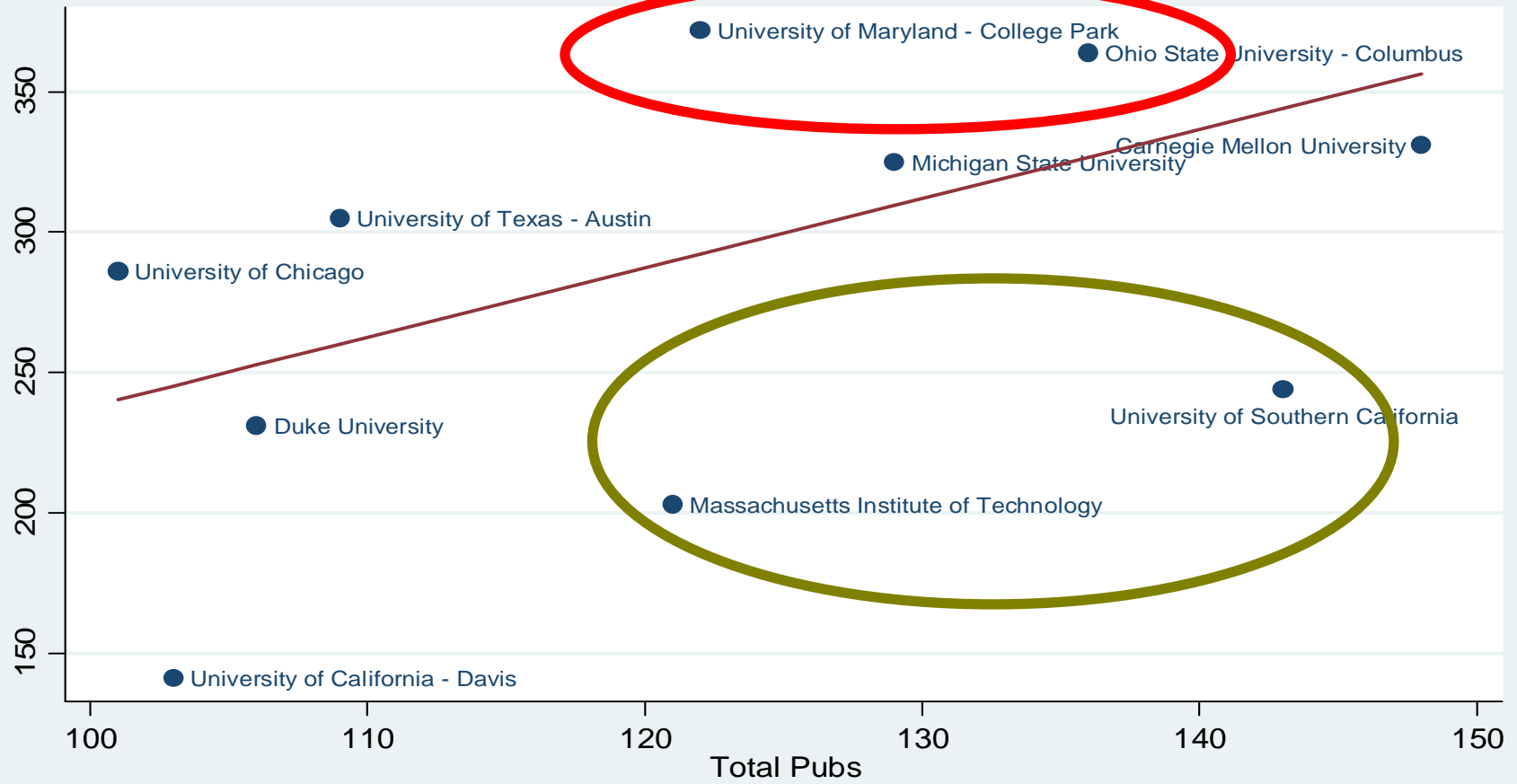


# UNITED STATES Decision Sciences



# UNITED STATES

## Decision Sciences



# Banded Rating

- Banding identifies peer groups
- Normalize each indicator value so range is 0-100
- Compute the weighted sum of the normalized indicator values
- Use 10% ranges for bands
  - Band 1: 90 to 100
  - Band 2: 80 to 90
  - Band 3: 70 to 80
  - etc

# Benchmarking Indicators (additional)

- International collaboration
- International citations
- Research funding (currently only for US universities)
- Experimental Indicators
  - International Impact
  - Efficiency
    - Indicators normalized by publication active researchers



# GRBS Website

The screenshot shows the homepage of the GRBS website. At the top left, there are logos for the United Nations University and UNU-IIST (International Institute for Software Technology). To the right is the logo for MUP (The Center for Measuring University Performance). Below these logos is a navigation menu with links: Home, Overview, Functionality, Methodology, Coverage, Future Extensions, People, and Contact Us. There is also a search bar with a 'Search' button and links for 'Login' and 'Sign Up'. The main content area features a large banner with the text 'Supporting Quality and Fostering Diversity of University Research Globally'. Below the banner are three main sections: 'RATING' (with a line graph and an upward arrow), 'BENCHMARKING' (with a line graph over a world map), and 'DISCUSSION FORUM' (with a circular diagram). On the left side of the main content area, there is a logo for 'GLOBAL RESEARCH BENCHMARKING'.

[www.researchbenchmarking.org](http://www.researchbenchmarking.org)

# Fast Europe?

- In 2008 the Lisbon Council published *University Systems Ranking: Citizens and Society in the Age of Knowledge*
- In the same year the French Presidency of the European Union announced the creation of a European university ranking system
- The U-map (2010) and U-multirank (2011) studies delivered a full scale feasibility study on a survey-based multidimensional analysis of European universities
- In 2009 the EUMIDA Consortium was awarded a contract to explore the feasibility of a Census of higher education institutions. The study was delivered in 2010
- In 2012 there is still no decision about the creation of a European statistical system on universities
- The U-multirank will go ahead (full scale implementation will require some time)

# Fast Asia !

- Meanwhile in Asia:
- In 2011 the United Nations University- International Institute for Software Technology based at Macau has launched the Global Research Benchmarking System (GRBS)
- Between 2011 and 2012 UNU-IIST has made a number of agreements with Asian countries to support the creation of benchmarking exercises based on GRBS
- In May 2012 GRBS will present data on all European universities