

Understanding the Dynamics of the Shanghai Ranking

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Outline of the Talk

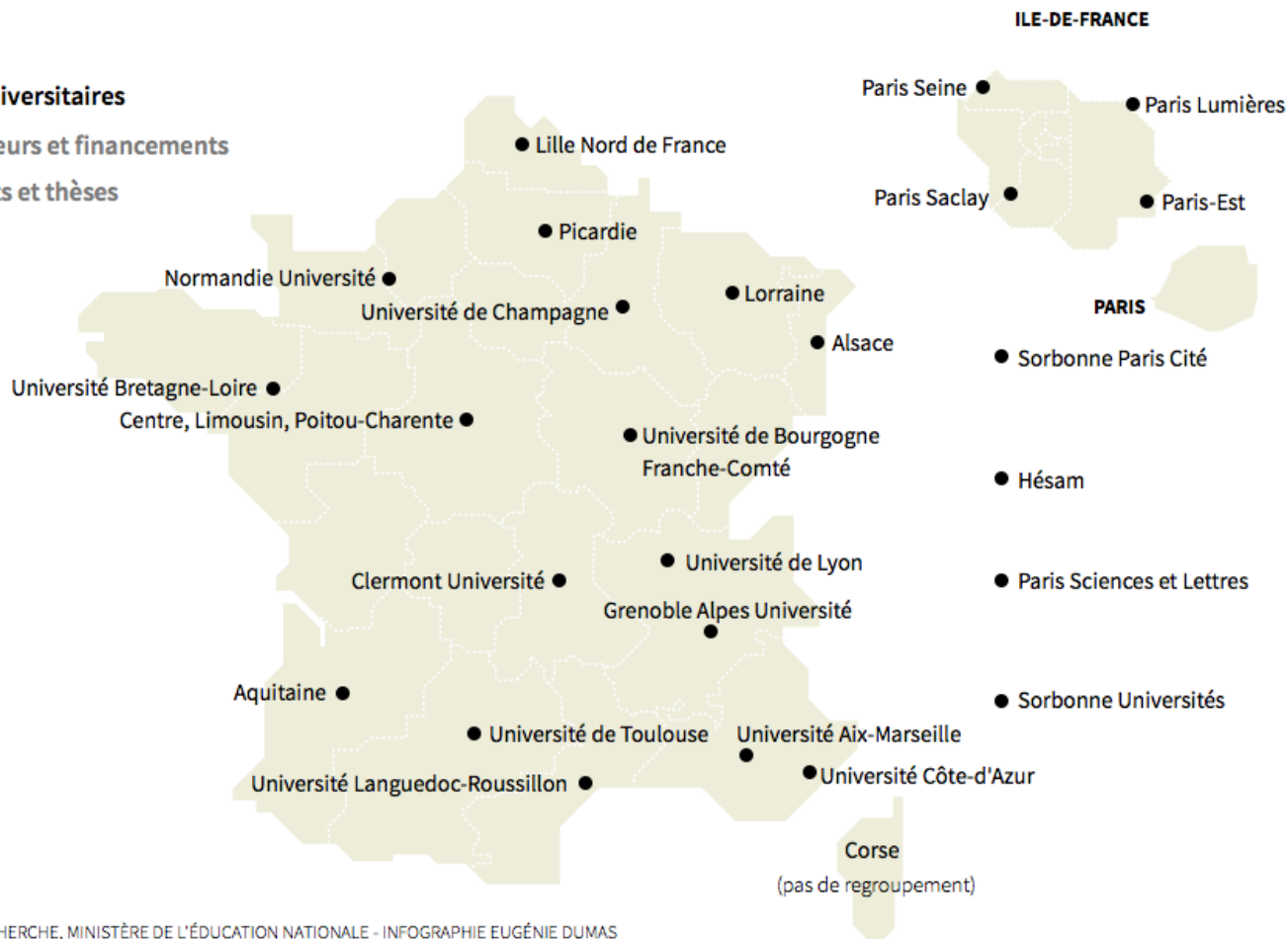
- **Who cares about rankings?**
- **Shanghai Ranking (ARWU), Why?**
- **Dynamics of the Shanghai Ranking.**
- **Social Sciences in the ARWU.**
- **ARWU as a benchmarking tool**
- **Australian Universities in ARWU and the Times Higher Education Ranking.**

Impact of the Shanghai Ranking

- German's perception of its universities was shattered with the first release of the SJT rankings in 2003 (Hazelkorn)
- Exzellenzinitiative, 2005 (€1.9b) to reclaim Germany's historic leadership position in research (Chambers).

Indicateurs de la recherche sur les regroupements universitaires

- ▶ Regroupements universitaires
- ▶ Effectifs de chercheurs et financements
- ▶ Effectifs d'étudiants et thèses



SOURCES : ORGANISMES DE RECHERCHE, MINISTÈRE DE L'ÉDUCATION NATIONALE - INFOGRAPHIE EUGÉNIE DUMAS



Rankings will not evaporate

- **All current university rankings are flawed to some extent; most, fundamentally, but rankings are here to stay, and it is therefore worth the time and effort to get them right (Alan Gilbert, 2007).**

The Shanghai ranking conundrum

- **Irreproducibility of the Shanghai Academic ranking results (Scientometrics, 2005).**
- **A simple calculation shows that merging the universities in Paris that are mainly oriented towards 'hard sciences' and Medicine, would lead to an institution that would roughly be at the level of Harvard (Famous diatribe published in Scientometrics in 2009).**

Up there

World	Institution	Ctry	Total	alu	awd	hici	s&n	pub	PCP
1	Harvard University	USA	100	100	100	100	100	100	71.1
2	Stanford University	USA	72.8	38.0	79.7	88.9	71.6	69.6	49.2
3	Massachusetts Institute of Technology	USA	71.8	69.0	83.2	68.2	69.2	61.6	64.1
4	University of California, Berkeley	USA	71.6	67.5	80.9	69.7	68.5	68.1	53.4
5	University of Cambridge	UK	69.8	80.3	97.2	54.6	55.0	65.9	52.1
6	California Institute of Technology	USA	64.1	48.5	68.8	57.4	64.8	46.2	100
7	Princeton University	USA	62.1	52.3	91.3	62.2	44.4	44.5	66.3
8	Columbia University	USA	60.1	64.2	68.0	57.4	51.2	67.8	31.0
9	University of Chicago	USA	57.2	61.8	85.3	52.2	40.6	49.2	38.9
10	University of Oxford	UK	56.1	51.2	56.6	48.9	52.1	68.9	40.3
11	Yale University	USA	54.8	45.7	45.5	59.7	58.0	62.3	35.9
12	University of California, Los Angeles	USA	52.2	27.7	43.4	57.7	51.5	72.2	30.1
13	Cornell University	USA	50.8	38.7	51.3	54.9	47.0	55.5	37.2
14	University of Pennsylvania	USA	50.5	33.4	34.9	57.9	49.3	67.9	37.0
15	University of California, San Diego	USA	49.6	20.3	36.6	60.3	52.8	64.0	34.1
16	University of Washington	USA	48.4	22.4	32.5	55.1	51.2	71.3	27.2
17	The Johns Hopkins University	USA	47.4	39.9	34.6	42.2	49.9	69.5	28.3
18	University of California, San Francisco	USA	46.6	0.0	41.2	53.7	54.1	60.6	33.1
19	University of Wisconsin - Madison	USA	45.4	32.5	35.9	52.1	39.8	64.2	24.7
20	The University of Tokyo	JPN	43.8	32.5	14.6	42.5	52.0	73.7	27.7

From raw data to ARWU scores

“For each indicator, the highest scoring institution is assigned a score of 100, and other institutions are calculated as a percentage of the top score”.

The statement arguably points to a linear relationship between absolute and relative (to the highest achiever) scores.

Unfortunately, nothing seems to be linear in ARWU 😊

The Knot

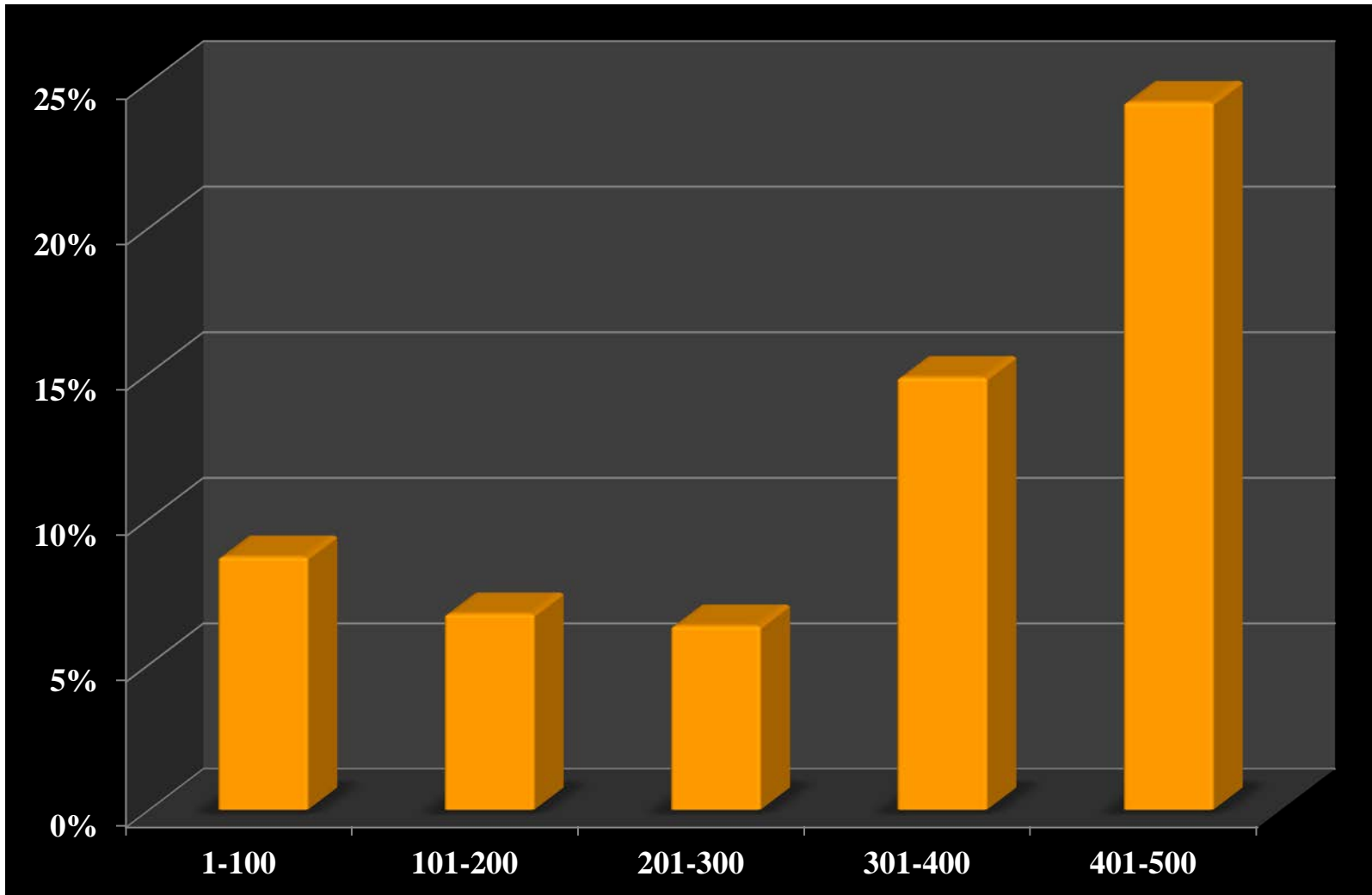
University	HCR	HiCi
James Cook University	1	10
Macquarie University	4	20
University of Copenhagen	9	?
Swiss Fed Inst of Technology Zurich	???	40
University of Washington	~25	~50
University of California, Berkeley	~36	~60
Stanford University	~49	~70
Harvard University	100	100

$$\text{score} = 100 \sqrt{\frac{\text{pts}}{H}}$$

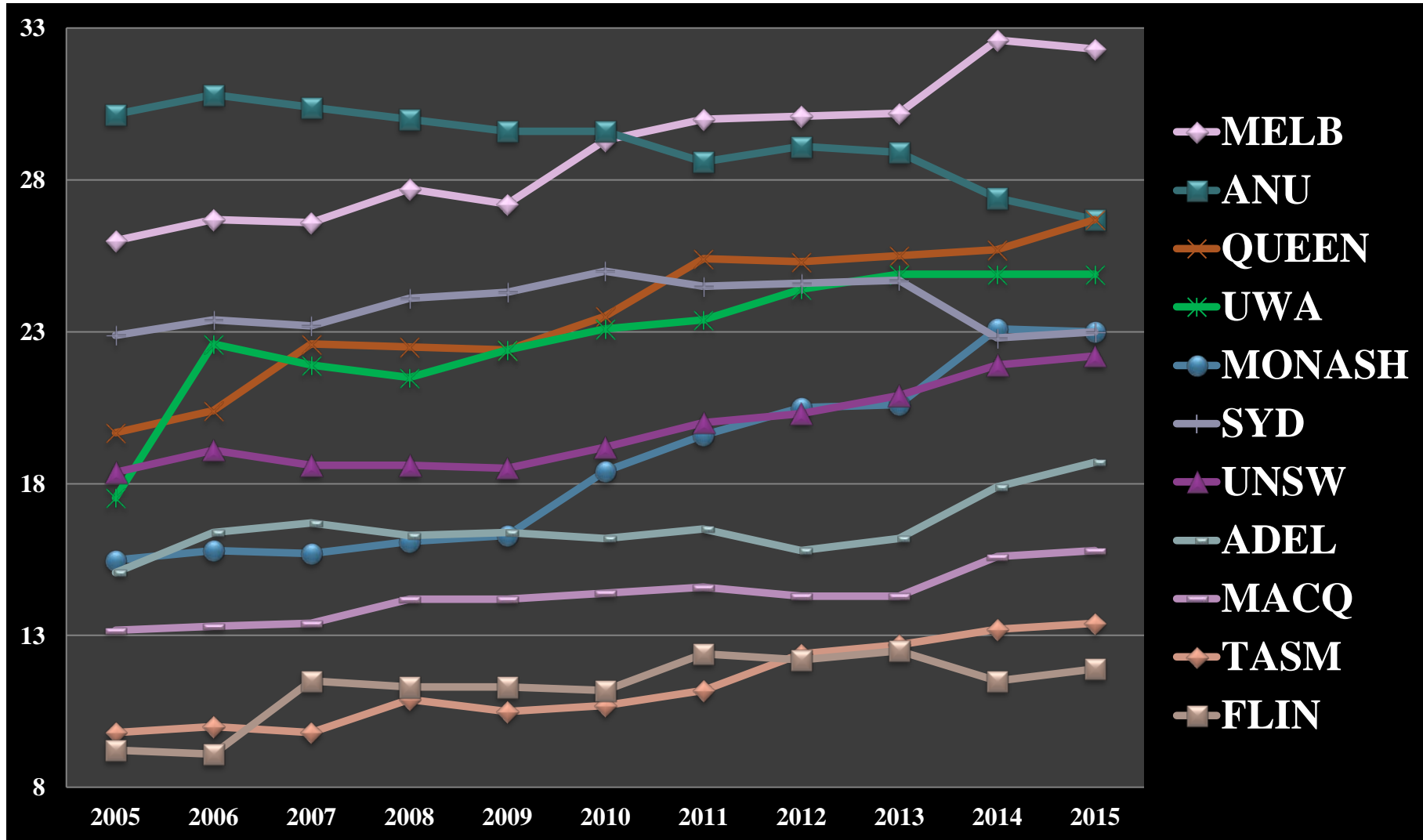
Dynamics of a scoring system

When improvements become more difficult (easier) closer to the maximum performance ever achieved, a progressive (regressive) scoring table should reward improvement with relatively larger (shorter) increments at the highest levels of performance

ARWU scores evolution 2005-2015



ARWU SCORES AUSTRALIA



The PUB Indicator

- **PUB**: Number of articles indexed in the SCI-Expanded and the SSCI on the previous year.
- A **special weight of two** was introduced for articles indexed in the Social Science Citation Index.

PUB Indicador computation

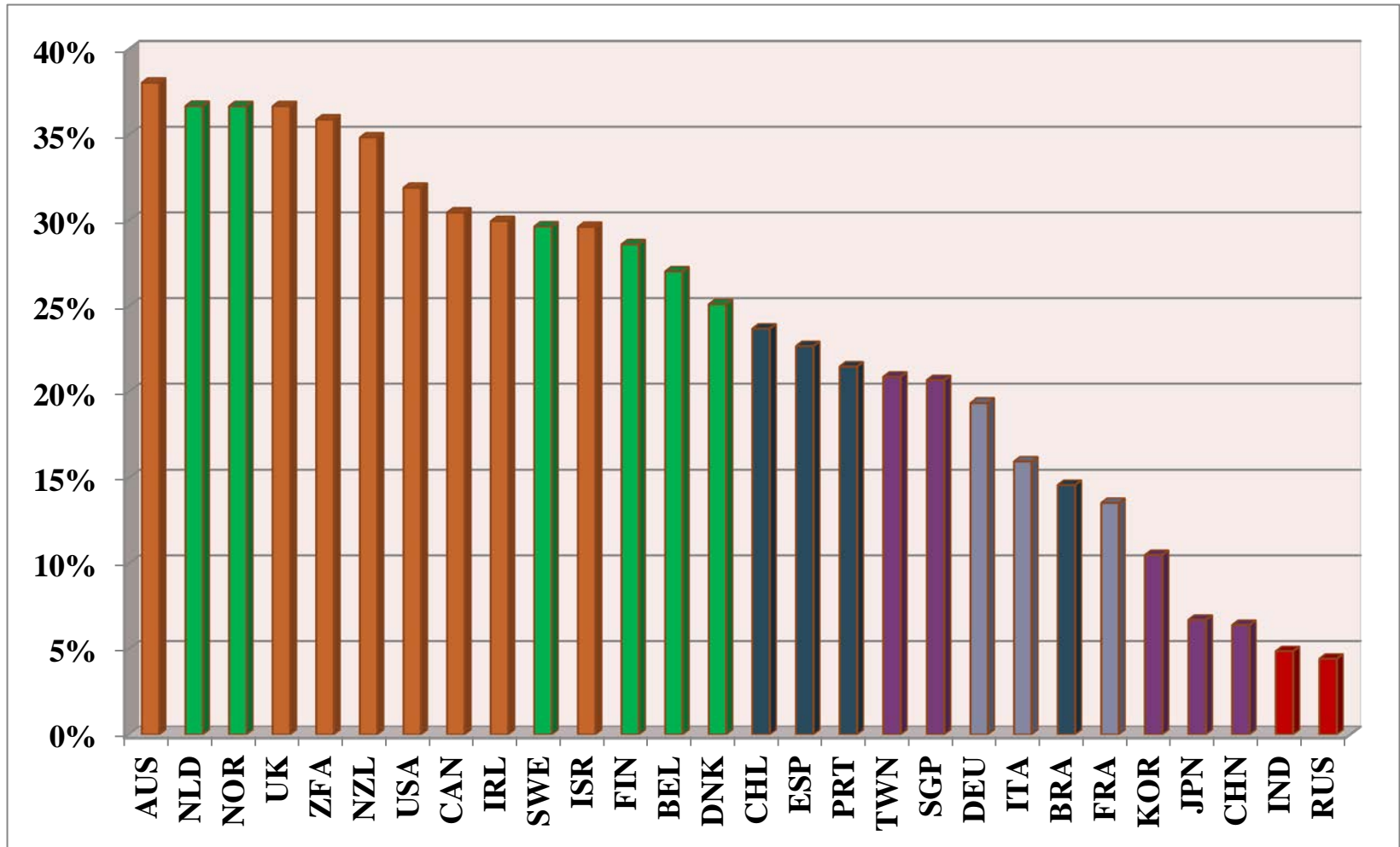
Special weight applied to SSCI papers:

- **oc**: Papers listed only in the SCIE.
- **cs**: Papers listed both in SCIE and SSCI.
- **os**: Papers listed only in SSCI.

The weighting scheme could be one of the two extremes: (1,1,2) or (1,2,2), or be rather “special”.

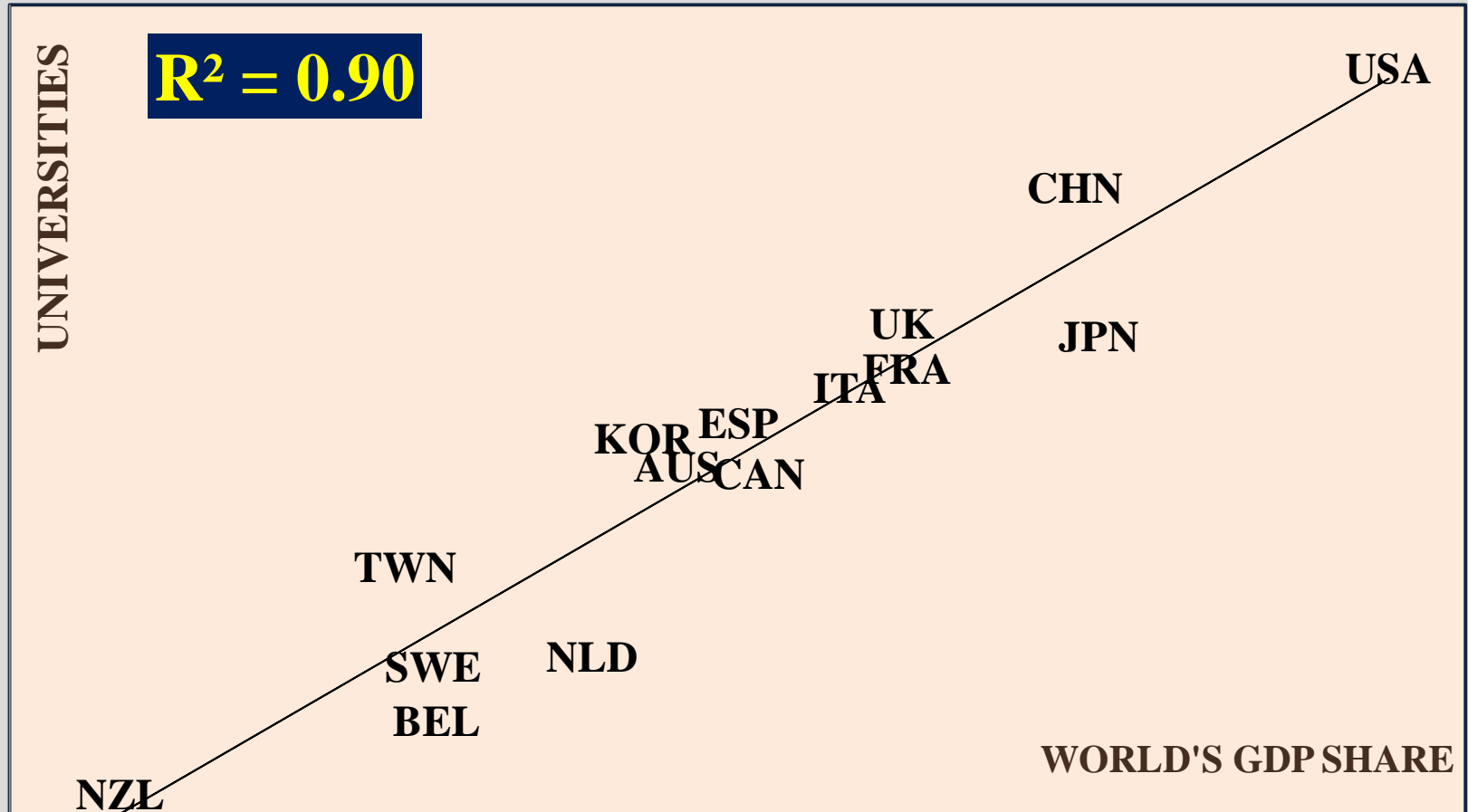
It is indeed special: (1,1.5,2)

Social Science in ARWU 2015: the language divide



We are not that different

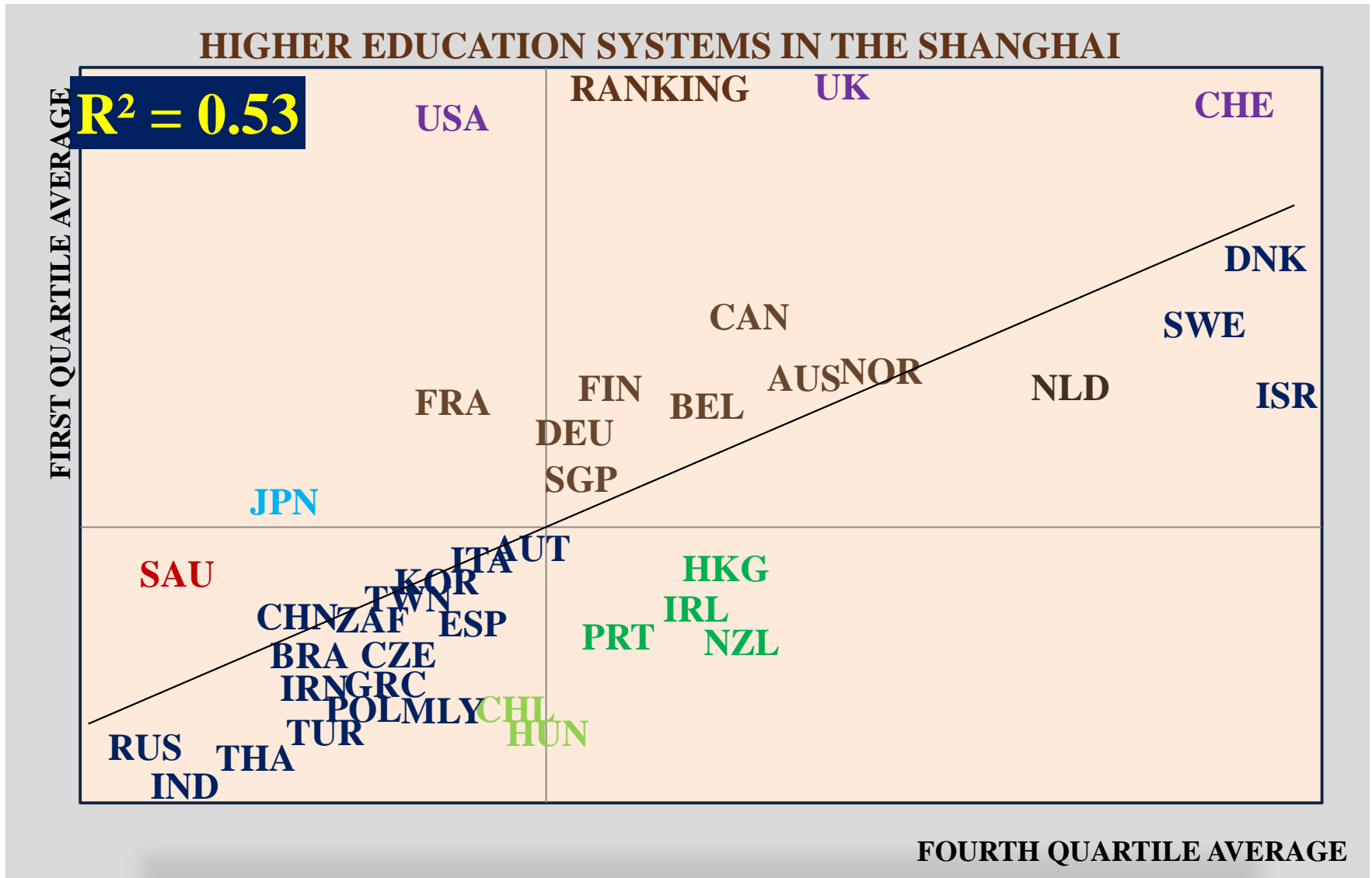
NUMBER OF RESEARCH UNIVERSITIES vs GDP



Comparative Analysis of Higher Education Systems

NUM UNIV f(GDP 2004-11)			
COUNTRY	FIRST QUARTILE	LAST QUARTILE	
USA	43	129	170
China	23	92	113
Japan	13	39	51
Germany	9	27	34
UK	7	21	27
Korea	4	13	16
Australia	3	9	11
Portugal	1	4	4

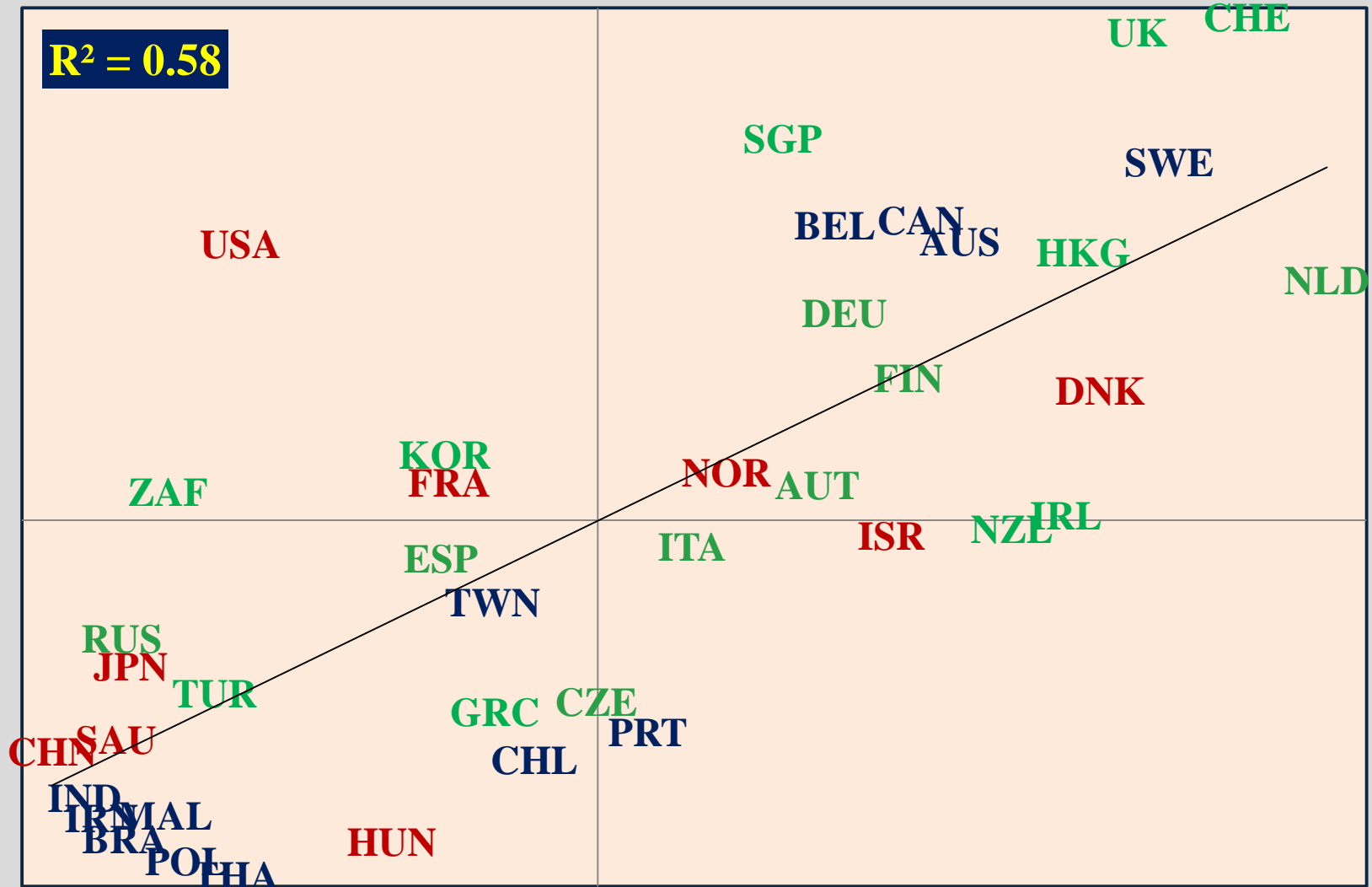
And yet we are different



HIGHER EDUCATION SYSTEMS: THE RANKING

FIRST QUARTILE AVERAGE

$R^2 = 0.58$



FOURTH QUARTILE AVERAGE

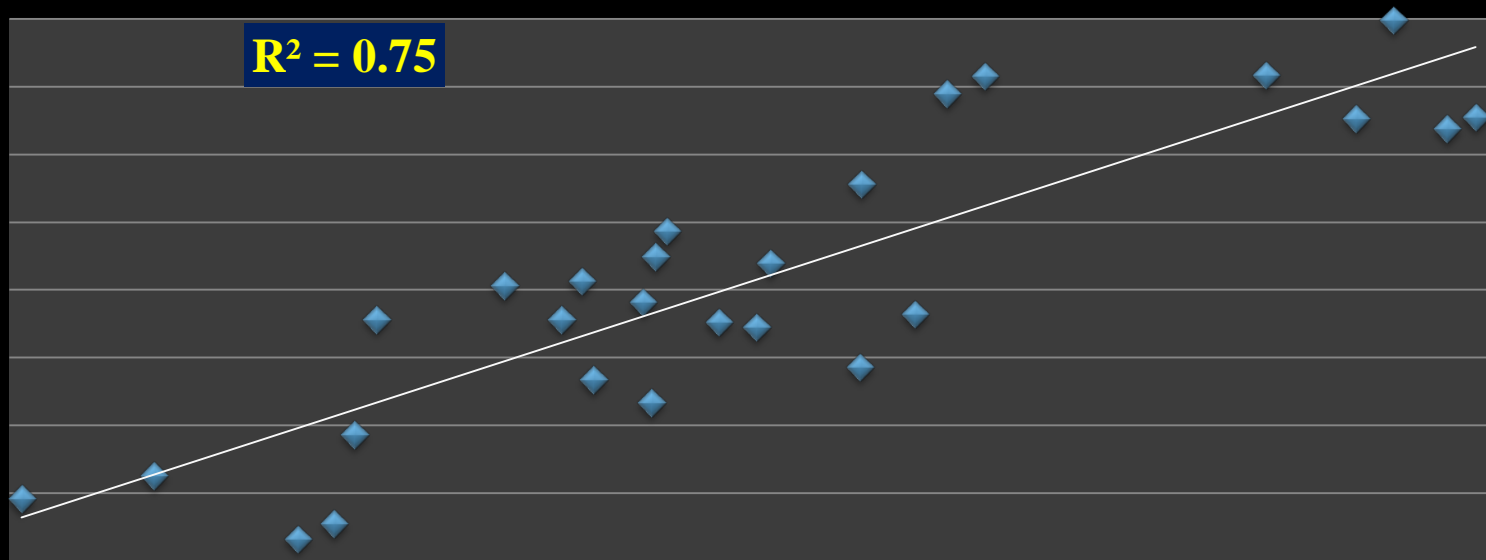
ARWU 500 vs THE 500

THE RECKONING	DIFF	THE	ARWU
United Kingdom	20	57	37
Italy	13	33	20
Australia	7	27	20
Republic of Ireland	3	6	3
New Zealand	3	5	2
Germany	-3	36	39
France	-3	19	22
Spain	-4	9	13
Japan	-7	11	18
China	-21	10	31
United States of America	-24	122	146

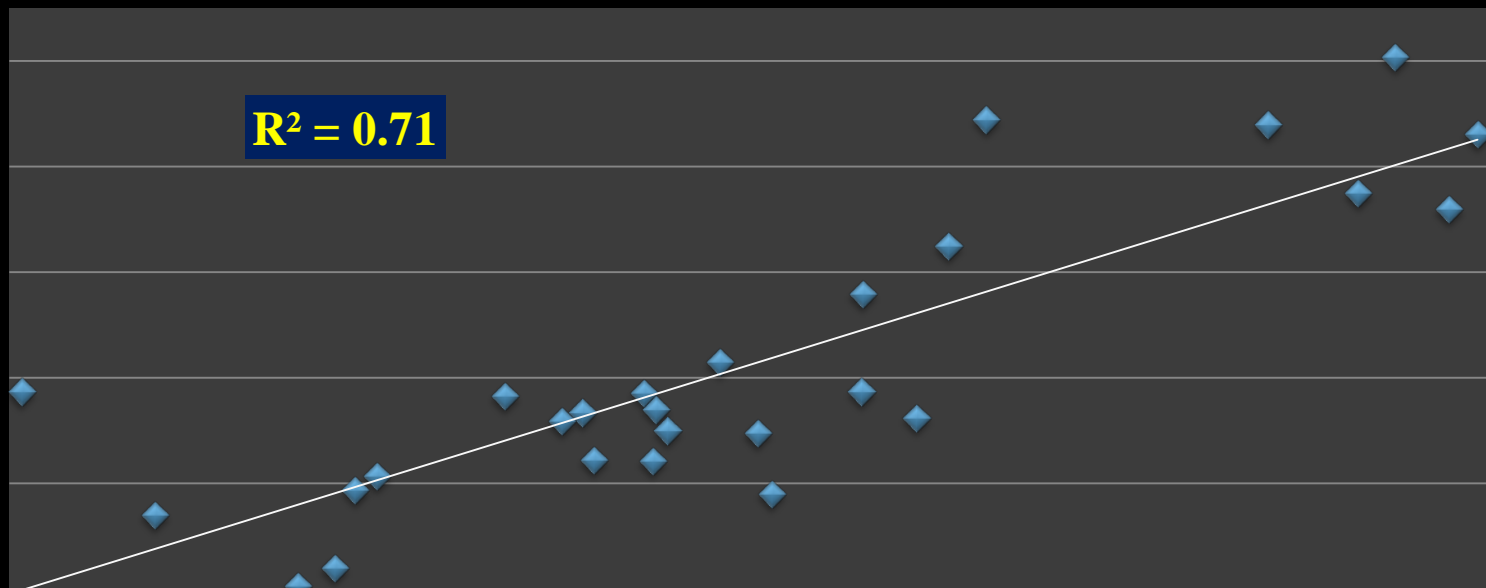
Universities	ctry	hici	S&N	PUB	pcp	score	fte
Swinburne University of Technology	AUS	11.3	10.3	22.6	22.7	11.4	303
University of New England	AUS	8.6	5.7	19.5	21.1	9.1	231
Murdoch University	AUS	3.6	4.9	20.0	18.1	7.7	288
Southern Cross University	AUS	3.6	2.5	16.6	19.7	6.7	167
Charles Darwin University	AUS	0	2.5	16.1	23.0	6.2	105
University of Waikato	NZL	5.1	0	17.4	15.2	6.2	320
University of The Sunshine Coast	AUS	0.0	2.5	15.0	20.5	5.7	115
Edith Cowan University	AUS	0	2.1	17.7	15.6	5.7	274
Charles Sturt University	AUS	0.0	1.5	18.7	15.5	5.7	306
University of Canberra	AUS	0	1.5	17.1	15.7	5.4	250
Victoria University of Melbourne	AUS	0.0	0	18.1	15.7	5.3	279
Australian Catholic University	AUS	0	0	17.7	14.8	5.1	300
Federation University Australia	AUS	0.0	1.5	12.6	17.9	4.7	105
Lincoln University	NZL	5	0	11.9	12.4	4.7	261
University of Southern Queensland	AUS	0.0	2.1	12.7	12.7	4.3	214

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$R^2 = 0.75$



$R^2 = 0.71$



	SURVEY	50%	60%					
	RELATIVE WEIGHT	30%	30%	30%	7.5%	2.5%		
	THE RANKING	TEACH	RES	CIT	INTER	INDUS	score	rkg
University of Technology, Sydney		27.0	35.1	66.9	90.1	42.3	46.5	201-250
Queensland University of Technology		28.8	35.6	56.0	76.0	73.7	43.8	251-300
Charles Darwin University		17.8	22.6	85.9	63.7	43.2	43.7	251-300
University of Newcastle		27.4	26.5	67.2	75.9	64.4	43.6	251-300
James Cook University		19.0	22.8	81.4	70.4	40.7	43.3	251-300
University of Wollongong		25.8	28.4	59.3	86.8	57.9	42.0	251-300
University of Tasmania		21.8	25.7	68.0	79.1	42.7	41.7	251-300
Griffith University		22.5	25.2	66.3	81.7	34.6	41.2	251-300
Flinders University		21.4	25.7	69.5	64.7	41.7	40.9	251-300
Macquarie University		28.5	27.2	52.3	90.0	33.1	40.0	301-350
Deakin University		22.4	21.9	66.8	76.9	30.0	39.8	301-350
La Trobe University		27.0	28.5	45.4	78.0	43.7	37.2	351-400
University of South Australia		26.4	26.7	41.2	89.0	85.9	37.1	351-400
Swinburne University of Technology		21.5	20.2	53.4	84.8	32.2	35.7	351-400
Murdoch University		18.7	19.6	51.2	88.3	36.5	34.4	401-500
Southern Cross University		18.9	18.3	53.3	52.7	37.7	32.0	401-500
Edith Cowan University		18.9	16.1	35.0	68.7	34.5	27.0	501-600
University of Canberra		18.4	19.3	29.8	54.6	36.2	25.3	501-600

Conclusion

- **We now understand the dynamics of the Shanghai Ranking.**
- **Evidence based rankings may offer help as institutional benchmarking tools.**
- **Ignoring them is no longer an option for research universities.**