

Understanding the Dynamics of the Shanghai Ranking

Domingo Docampo

Doc_TIC Workshop for PhD Advisors
University of Vigo, July, 13, 2016

AtlantTIC

UniversidadeVigo



Summary

- **On the reproducibility of the Shanghai Ranking (ARWU) results.**
- **Dynamics of the Shanghai Ranking.**
- **The University of Vigo in the Shanghai ranking(s).**

First, a caveat

- **It is a mistake to judge all Higher Education institutions using the tools and standards that enable a classification of the elite research universities.**
- **However, in our institutional culture, academic distinction and research performance are inseparable.**

¿What are the main differences among international classifications?

- **The number of dimensions taken into account as well as the objectivity and reliability of the data.**
- **Transparency: very important to know :**
 - **The raw information to compose the scores on the different indicators.**
- **Even more important, to understand :**
 - **How the raw information is processed.**

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).**

From raw data to 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☺

Wasn't it obvious?

University	HCR	HiCi
Toulouse School of Economics	1	10
Stockholm University	4	20
University of Copenhagen	9	?
ETH 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) the closer one comes to the maximum performance ever achieved, an acceptable progressive (regressive) scoring table should reward improvement with relatively larger (shorter) increments at the highest levels of performance

Research Output: Quantity

- **PUB**: Number of papers indexed in the Science Citation Index-Expanded and the Social Science Citation Index on the previous year.
 - Only papers of type article are considered.
 - When calculating the total number of papers of an institution, a **special weight of two** was introduced for papers indexed in the Social Science Citation Index.

PUB Indicador computation

Special weight applied to SSCI papers:

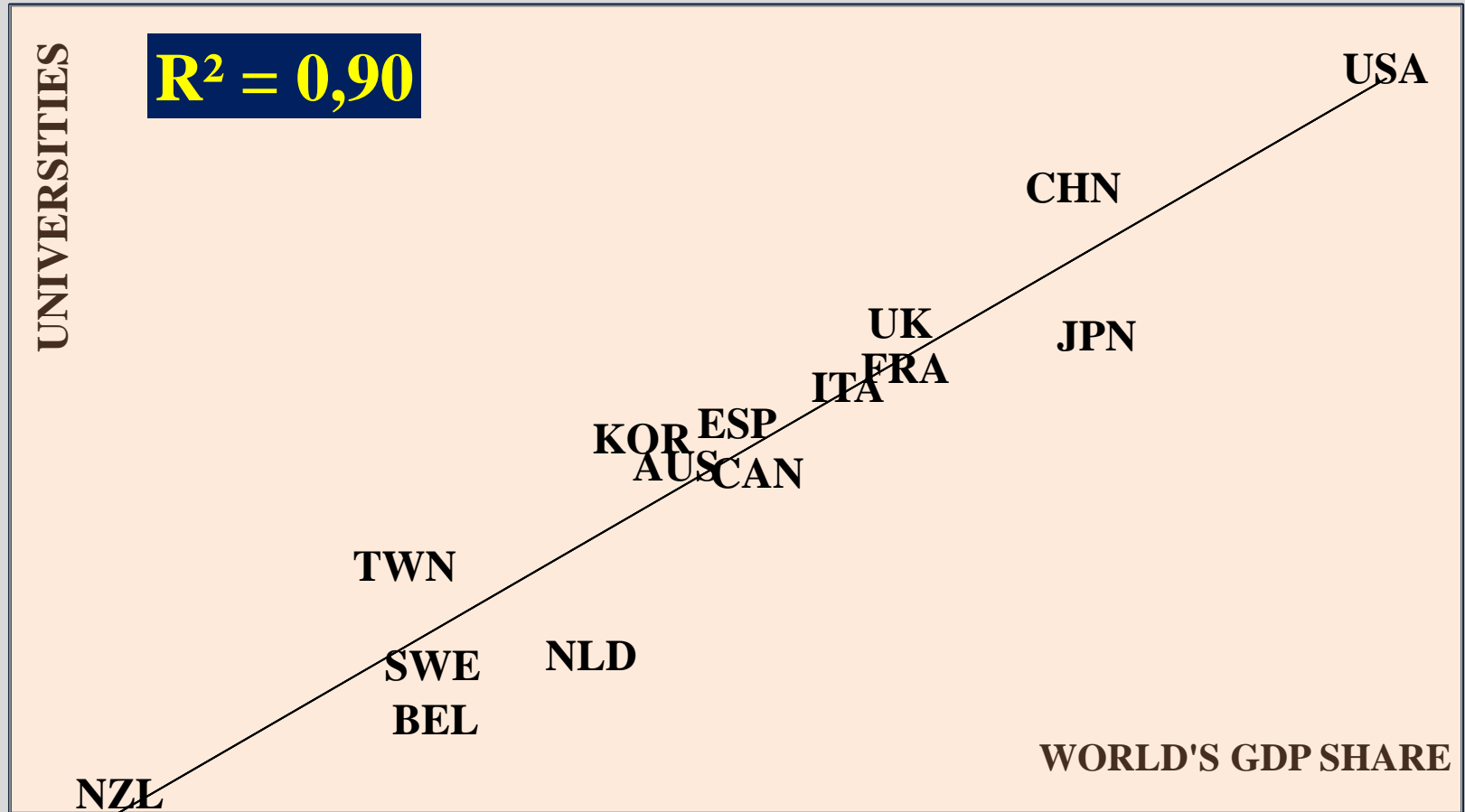
- **oc**: Papers listed only in the SCIE.
- **cs**: Papers listed both in SCIE and SSCI.
- **os**: Papers listed only in SSCI.

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)

We are not that different

NUMBER OF RESEARCH UNIVERSITIES vs GDP

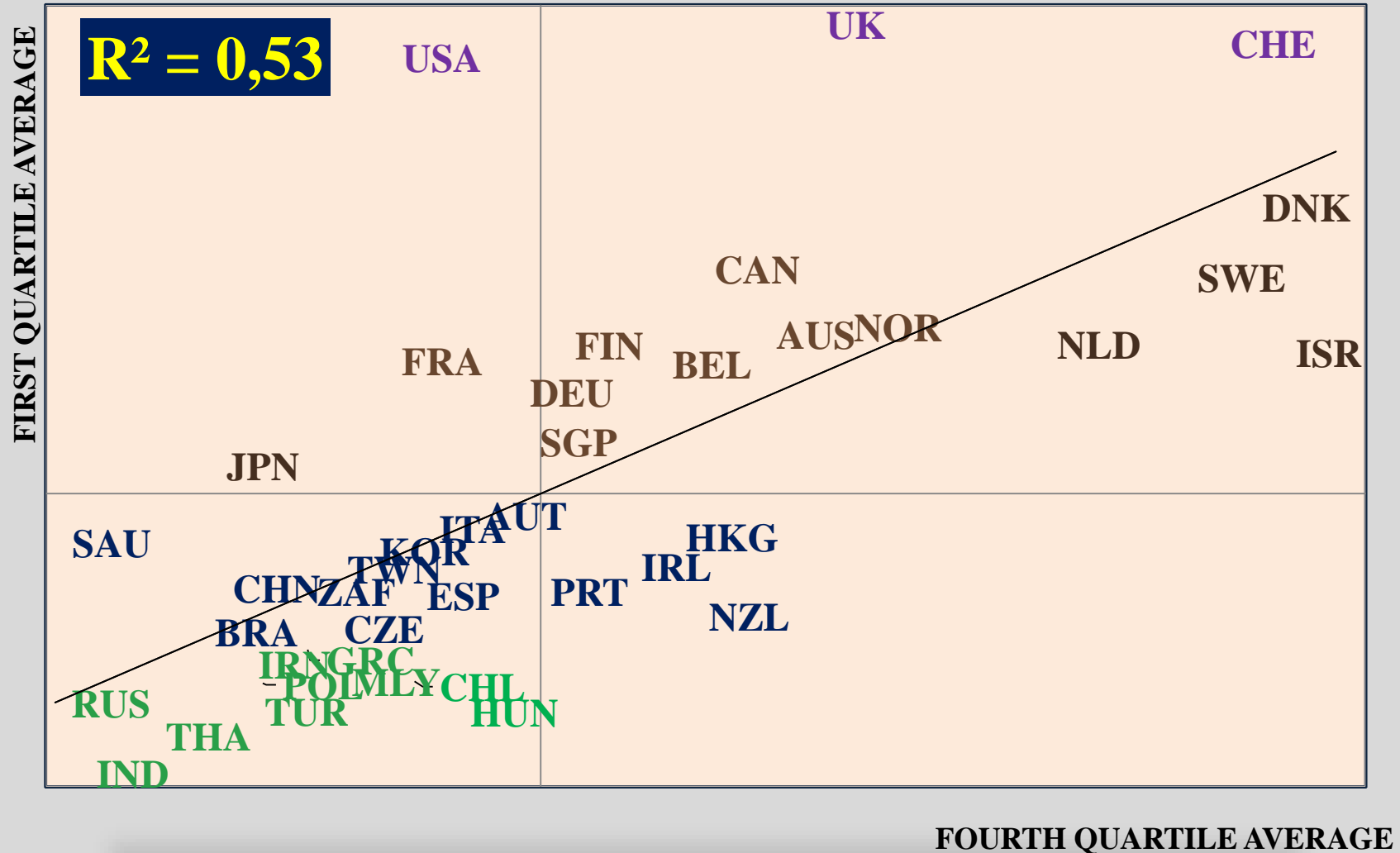


Comparative Analysis of Higher Education Systems

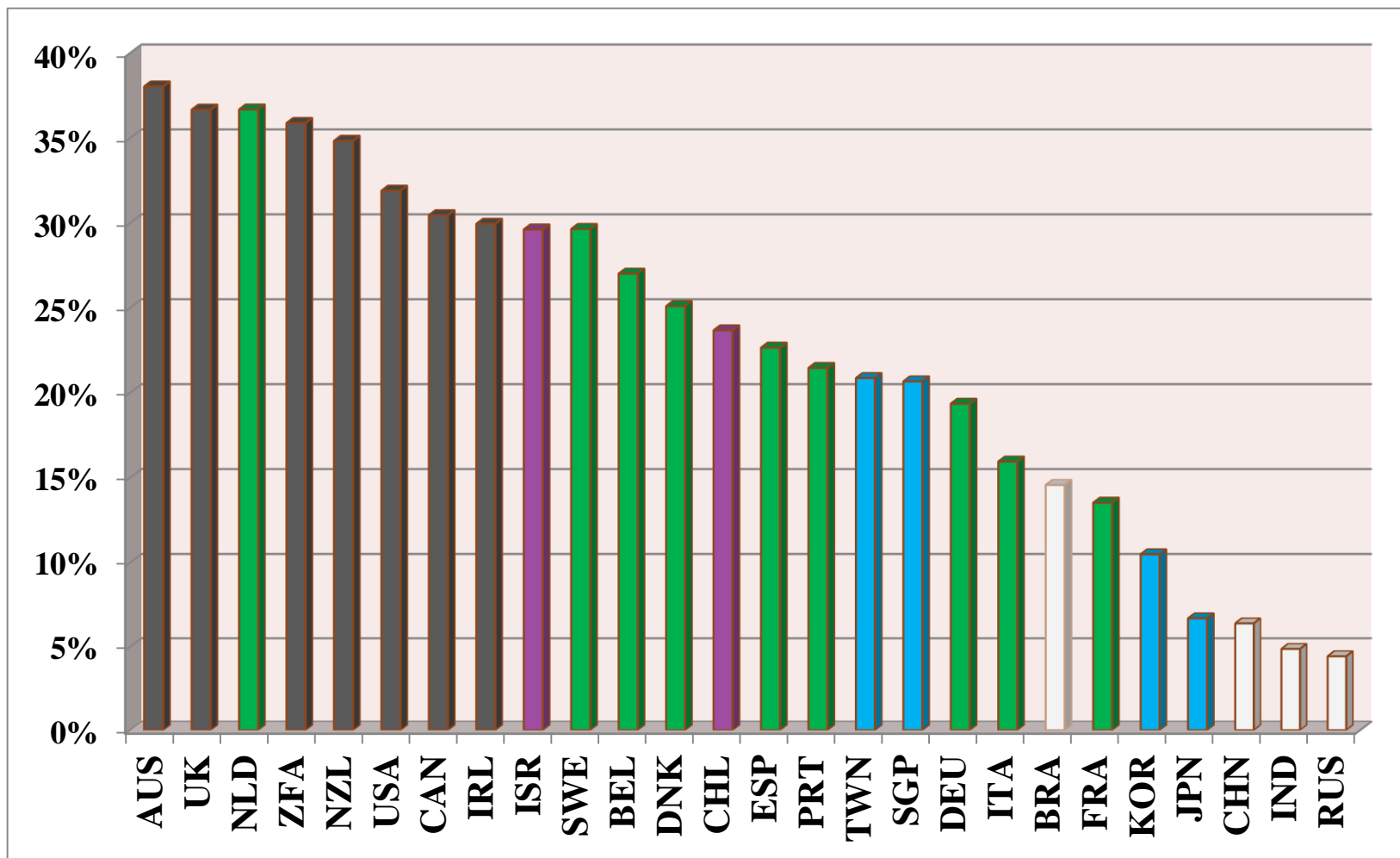
NUM UNIV f(GDP 2004-11)		
COUNTRY	FIRST QUARTILE	LAST QUARTILE
USA	47	139 185
China	30	89 118
Japan	14	41 54
Germany	10	30 39
Francie	8	22 29
UK	7	21 27
Italy	7	20 26
Korea	5	13 17
Spain	5	15 19
Australia	3	9 11
Switzerland	2	4 5
Portugal	1	4 4

And yet we are different

HIGHER EDUCATION SYSTEMS: SHANGHAI RANKING



Social Science in ARWU 2015



Vigo in ARWU Subject: Computer Science 2016

rkg	Institution	alu	awd	hici	pub	top	score
181-190	Simon Fraser University	0	0	0.0	38.8	78.4	36.0
181-190	University of Bonn	0	0	0.0	31.3	85.9	36.0
181-190	Chalmers Univ Technology	0	0	12.4	37.0	67.7	36.0
181-190	University of Lisbon	0	0	0.0	50.6	66.4	35.9
181-190	Univ California, Riverside	0	0	12.4	30.3	74.3	35.9
181-190	Clemson University	0	0	12.4	31.9	72.6	35.9
181-190	University of Vigo	0	0	21.3	26.7	68.9	35.9
181-190	University of Trento	0	0	0.0	39.3	77.5	35.9
181-190	Univ Tennessee - Knoxville	0	0	8.8	34.1	73.7	35.8
181-190	KU Leuven	0	0	0.0	52.7	63.4	35.7

Univ Vigo ARWU Subject 2016

rkg	Mathematics	alu	awd	hici	pub	top	score
200	Tianjin University	0	0	0.0	51.9	65.8	34.8
205	The University of Newcastle	0	0	11.6	36.2	66.4	33.8
215	The University of Western Australia	0	0	11.6	39.0	59.8	32.6
220	University of Murcia	0	0	0.0	34.8	72.4	31.7
225	University of Vigo	0	0	0.0	33.6	69.4	30.4
rkg	Chemistry	alu	awd	hici	pub	top	score
200	University of Montpellier	0	0	0.0	45.4	83.4	40.7
205	University of Milan	0	0	0.0	45.9	80.5	39.9
215	University of Lille 1	0	0	0.0	41.3	77.6	37.6
220	University of Wollongong	0	0	0.0	32.9	81.7	36.2
225	University of Vigo	0	0	0.0	33.3	76.8	34.8
Subject		alu	awd	hici	pub	top	score
Physics	University of Vigo	0	0	0.0	14.7	86.8	
Economics		0	0	0.0	32.0	29.1	17.0

Univ Vigo ARWU 2016

COMPUTER SCIENCE	total	top20
ATLANTIC	33.1	9
INFORMATICA	15.9	6.5
INDUST-MINAS	15.9	1.9
CIENCIAS	6.2	3.2
MATEMATICAS	5.7	2.3

ENGINEERING	total	top20
INDUST-MINAS	97	52
ATLANTIC	91	41
CIENCIAS	46	26
MATEMATICAS	27	11
INFORMATICA	17	7

Vigo ARWU Field Engineering 2015

RAW PUB=370<465

rkg	Institution	hici	pub		top		score	
			EST	TRUE	EST	TRUE	EST	TRUE
109	Granada	23.4	35.4	34.6	86.9	85.6	56.1	55.3
117	Politécnica de Catalunya	16.5	48.5	47.4	79.5	76.6	55.5	54.1
	Vigo	16.5	25.2		86.7		49.4	
190	Politécnica de Valencia	0.0	46.4	47.1	78.6	76.9	48.1	47.7
	Jaén	16.5	20.7		85.9		47.4	
199	Politécnica de Madrid	0.0	46.1	47.5	73.3	73.9	46.0	46.7
	THRESHOLD		29.0	476				
	UAB		29.5	511				
	Castilla La Mancha		29.0	476				
	Vigo		25.2	370				