

# RISIS



RESEARCH INFRASTRUCTURE FOR SCIENCE  
AND INNOVATION POLICY STUDIES

## Best universities, behind rankings

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**Brussels, RISIS policy meeting**

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# Questions behind rankings

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## Academic Ranking of World Universities 2019

Top 1000 Methodology Statistics					
World Rank	Institution*	By location	National/Regional Rank	Total Score	Score on Alumni
		All			
1	Harvard University		1	100.0	100.0
2	Stanford University		2	75.1	45.2
3	University of Cambridge		1	72.3	80.7
4	Massachusetts Institute of Technology (MIT)		3	69.0	72.0
5	University of California, Berkeley		4	67.9	67.1
6	Princeton University		5	60.0	59.6
7	University of Oxford		2	59.7	48.9
8	Columbia University		6	59.1	61.4
9	California Institute of Technology		7	58.6	52.3
10	University of Chicago		8	55.1	59.6
11	University of California, Los Angeles		9-10	50.8	28.6
11	Yale University		9-10	50.8	47.6
13	Cornell University		11	49.8	43.8
14	University of Washington		12	48.7	24.4
15	University College London		3	47.9	26.9

- What do international rankings mean? Is it about excellence or about wealth?
- Where does US dominance come from?
- What Europe should do in order to get universities in the top-places of such rankings?

# Goal of this study

- Analyze the association between universities' level of revenues and their bibliometric output
  - How tight it is?
  - Is it super-linear?
- Compare US and European universities in terms of
  - Position in bibliometric rankings
  - Level and distribution of revenues
- Derive implications for
  - Public policies
  - University managers

A major limitations of bibliometric studies is to disregard organizational size/resourcing by using internally normalized indicators, such as MNCS.

Lepori, B., Geuna, A., & Mira, A. (2019). Scientific output scales with resources. A comparison of US and European universities. *PloS one*, 14(10).

- HEIs delivering at least a bachelor in the US (3,287 HEIs) and in Europe (2,243)
  - Subpopulation of ‘doctoral universities’ with more than 20 PhD degrees and not focused on a single subject (US: 366, Europe: 564).
- Institutional data (revenues, staff) from the European Tertiary Education Register ([www.eter-project.com](http://www.eter-project.com)) and from IPEDS (<https://nces.ed.gov/ipeds/>)
- Bibliometric data from CWTS Web of Science version, thanks to matching with ETER and IPEDS.

Data integration as part of the RISIS2 European Infrastructure (Horizon2020; [risis2.eu](http://risis2.eu)).

# Core variables

- Total current revenues in PPPs euros
- Breakdown of revenues in basic government allocation, private core, third-party, tuition fees
- Academic staff in FTEs
- Students enrolled (bachelor, master, PhD)
- Publications (WoS)
- Field-normalized citations

Input: 2013. Output: 2014-2017.

Extensive work on data comparability, especially for input data!

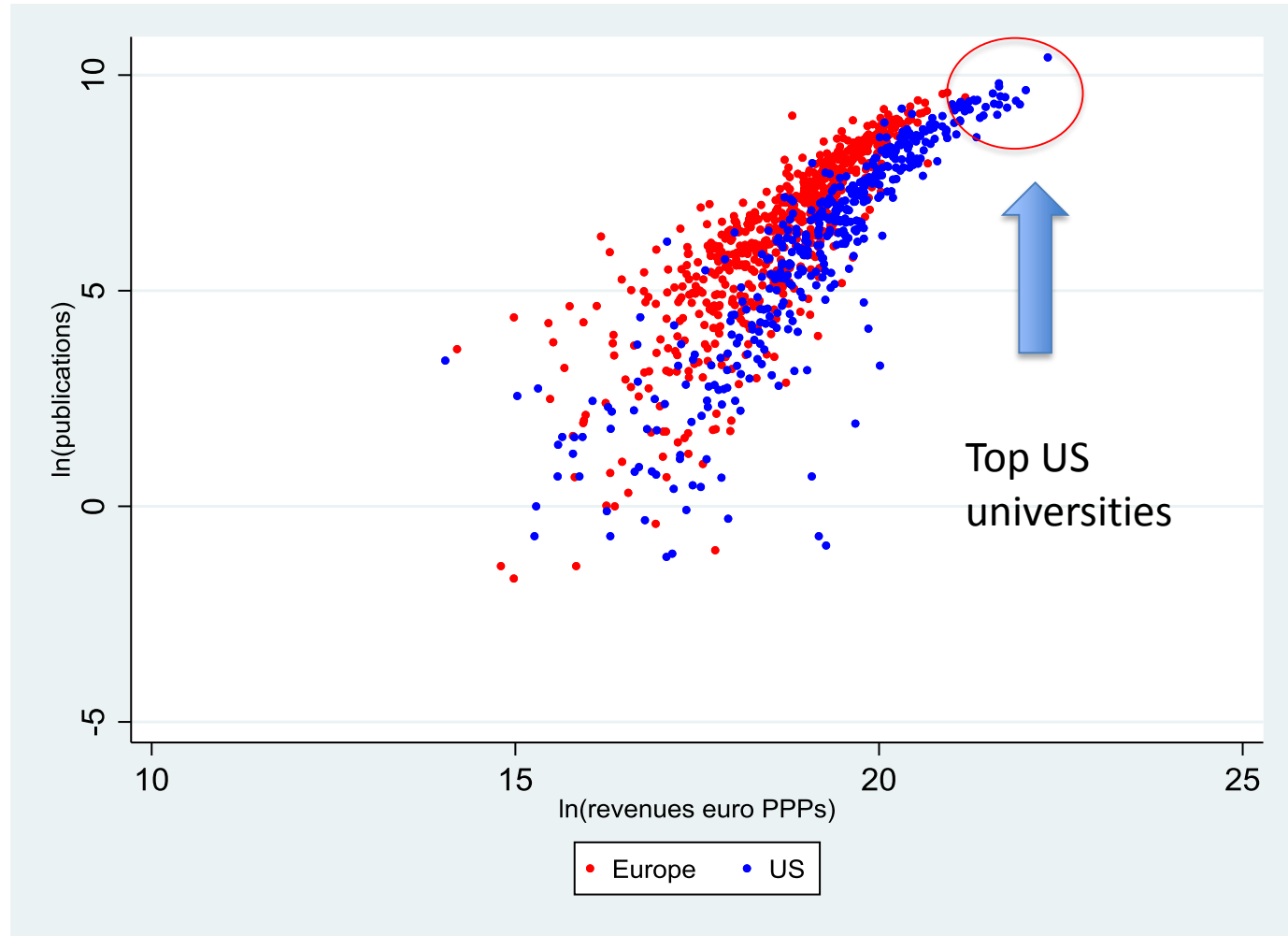
# The results in a nutshell



- Very tight coupling between university revenues and publications/citations
  - Rsquare: 0.80 on a log-log scale
  - Super-linear scaling (slope  $> 1$ )
  - No significant differences between Europe and US, except for revenues distribution
- Results are statistically robust
  - Coupling is tighter at the top of the pile

# Publications vs. revenues

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- Two paths from revenues to output
  - Through increase in the number of staff
  - Through more resources per staff
- Direct path account for most of the effect
  - ‘richer HEIs’ have more resource **per** staff
- Increasing number of students
  - More staff, but less output.

A funding model decoupled from students is key for increasing bibliometric output.

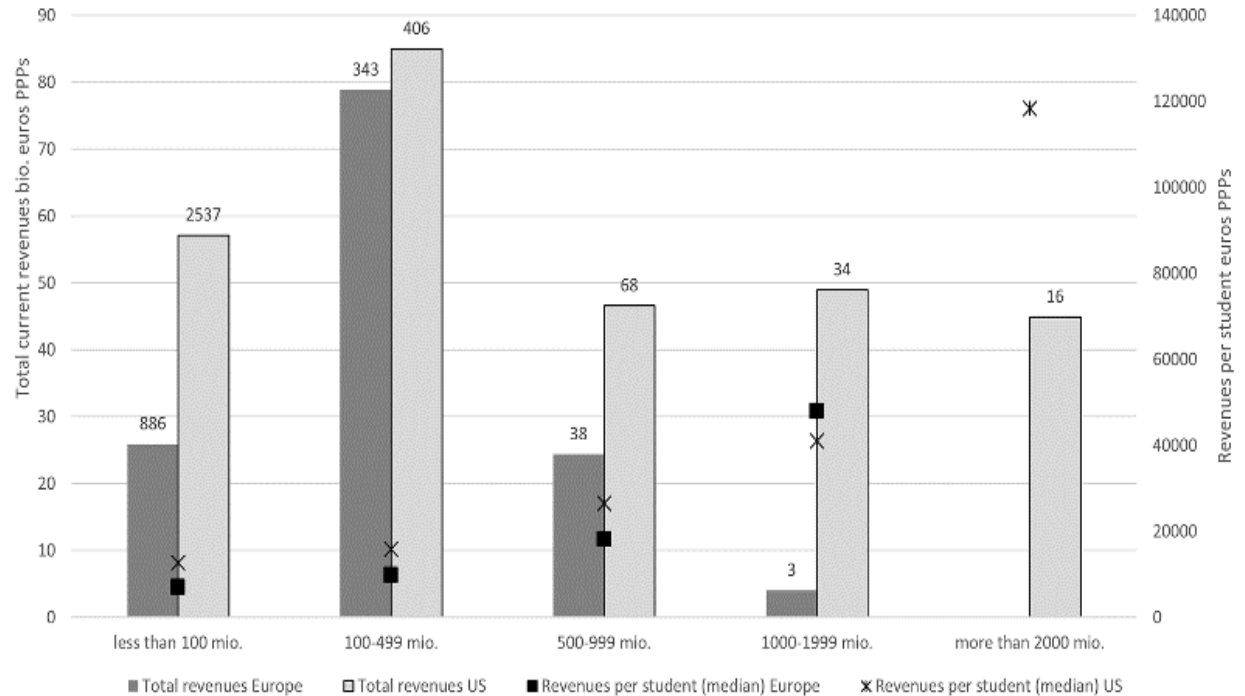


- Rankings are by and large **associated** with differences in wealth
  - And especially in the amount of resources per unit of staff, respectively per student
- Super-linear scaling implies that ‘quality indicators’ (MNCS, top 10%) are size dependent
  - Rankings cannot be interpreted in a meaningful way without a measure of wealth
- No visible difference in ‘productivity’ between US and Europe
  - But in the distribution of resources

# Revenue distribution



- Distribution of HEI revenues is much more skewed in the US
- A group of US universities with extremely large revenues, which does not exist in Europe
- Strong association with top-positions in international rankings



# US vs Europe

- Higher level of resources at the system level
  - About two times in the US vs. Europe
- More students in colleges
  - Saving resources for research universities
- Differentiation of revenues sources
  - Multiple funding sources (fees, stats, grants, donations)
  - Large differences between types of HEIs
  - US top-universities receive most of their funds from private donations (**not** grants or fees).
  - No similar mechanisms in Europe (except the UK), where public HEIs all depend on basic governmental allocation.
- Stronger concentration of resources and output also among research universities
  - European universities 'scale up' with enrolments, US top-universities have much more resources per student

# Revenue structure

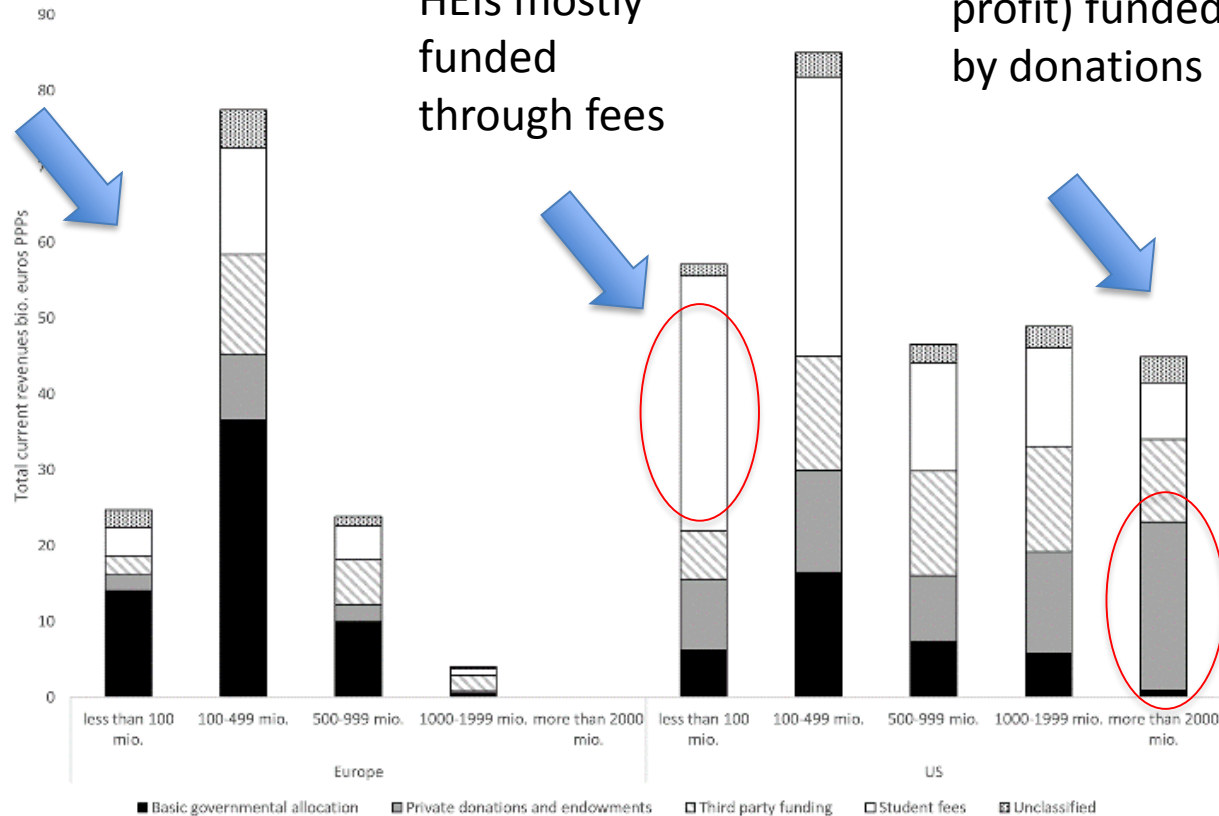
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Most public HEIs are mostly funded through basic governmental allocation

Smaller educational HEIs mostly funded through fees

Top-ranked (private non profit) funded by donations



- Universal measures of excellence generate accumulation mechanisms
  - Wealth ‘generates’ excellence which generates ‘wealth’
  - Funders following ‘excellence’ signals
- High staff endowments are the main driver of this process
  - Competing for high-quality researchers
- Works only if resources follow ‘excellence’ measures without having more students
  - US: private donations
  - UK: REF



- Rankings provide misleading information
  - Cannot interpreted without a measure of size
  - Huge variation in resourcing
  - Need to compare with peers in terms of size/resources
- Being at the top of rankings requires a lot of money
  - 1-2 bio. euros per university
  - Independently from students

- HE policies should be mostly concerned with the largest part of the system
  - Delivering education and services for most of the society
  - The traditional focus of US public HE policy
- To get institutions in top-ranked place
  - Strongly increase investments
  - Move huge amounts of money to a single HEI
  - Create institutional structures for lasting concentration
- Softer measures, such as some performance-based funding, will not make this game
  - But is it worth playing?

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# THANK YOU!

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