Australia and Lithuania Impact of Incentives Programs

Ulf Sandström
KTH Stockholm

Lithuanian Journals Meeting the Needs of Digital Scholarly Communication

Vilnius October 25, 2016

A list of published papers is no measure of value

The present system rewards quantity, not quality — but hasty changes could be as bad.

Linda Butler Nature 2002

A list of published papers is no measure of value

The present system rewards quantity, not quality — but hasty changes could be as bad.

Sir — The choice of performance indicators sends a powerful message to those being evaluated, and when those measures are linked to the distribution of research funds, academics are quick to respond. Our analysis of Australian university publications shows clearly how the sector has reacted to funding formulae that reward quantity rather than quality.

A large part of the government funds that support the research activities of Australian universities is allocated on the basis of formulae that comprise three elements: research income, postgraduate students and publications[1]. Data on the third element have been collected annually since 1993. When this element was incorporated into the funding formulae in 1995, universities and researchers were quick to calculate the 'value' of a

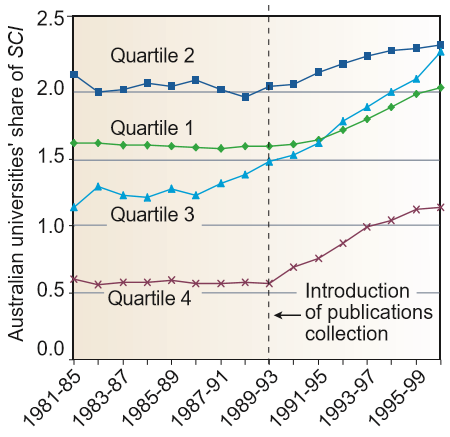


Figure 1 **Australian universities' share of publications in the *SCI*, by journal impact quartile: five-year windows, 1981–1985 to 1996–2000.**

pressure to focus on this will not diminish.

Concerns that this component of the funding formula was not measuring the characteristic that it was designed for — quality — were raised soon after its introduction. However, not all universities were keen to see it removed or replaced. For smaller institutions, this particular element was more rewarding, and easier to improve, than the others.

These concerns are now re-surfacing in the context of the latest review of the Australian higher education system[3]. A number of submissions to recent ministerial discussion papers have suggested the removal or modification of the publications component. The difficulty is that suggested alternatives are as problematic as the one they seek to replace. It is to be hoped that time

Australian Journal Impact Horror

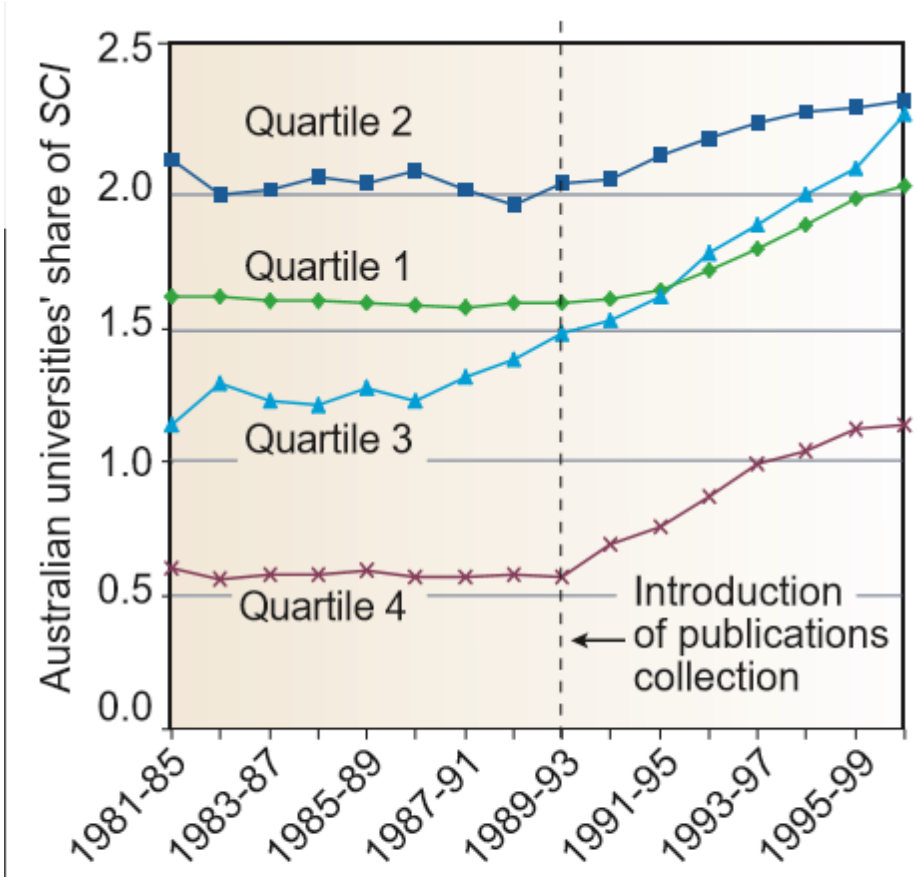


Figure 1 **Australian universities' share of publications in the *SCI*, by journal impact quartile: five-year windows, 1981–1985 to 1996–2000**

Questions

- Did the Australian output based funding system – counting international peer reviewed papers – resulted in a decline of quality?
  - Did the Australian incentive to publish more resulted into lower quality?
  - Is the case an example of ‘perverse effects’?

Replication

- Not a secondary analysis
- Not a as close as possible replication

- Analyzing the same case again, in the same framework
  - Output (in Web of Science database)
  - Quality as impact (citation based indicators)

- As the original study: other quality dimensions are not taken into account

Why 1

Knowledge is tentative – until falsified

- Failed efforts to falsify make knowledge claims stronger
- However, this seems forgotten:
  - By researchers, they hardly do replications
  - By journalists, public politicians, who often believe single results
  - One positive outcome becomes the ‘truth’

Why 2

- The Butler paper has had a huge impact
  - Discussion about research evaluation and ‘responsible use of indicators’
  - Core empirical base for claims about perverse effects (‘salami slicing’)
  - Political: SEP (NL) abandoned ‘productivity’ as criterion

- But:
  - The underlying mechanisms of Butlers’ findings are unclear
  - If other empirical evidence is lacking, replication is important

Why 3

- One needs understanding
  - Contextualizing in terms of (theories of) behavior

- Motivation and commitment of researchers correlates positively with productivity

  (Pelz and Andrews 1966, Van der Weijden et al 2015)

Why 4

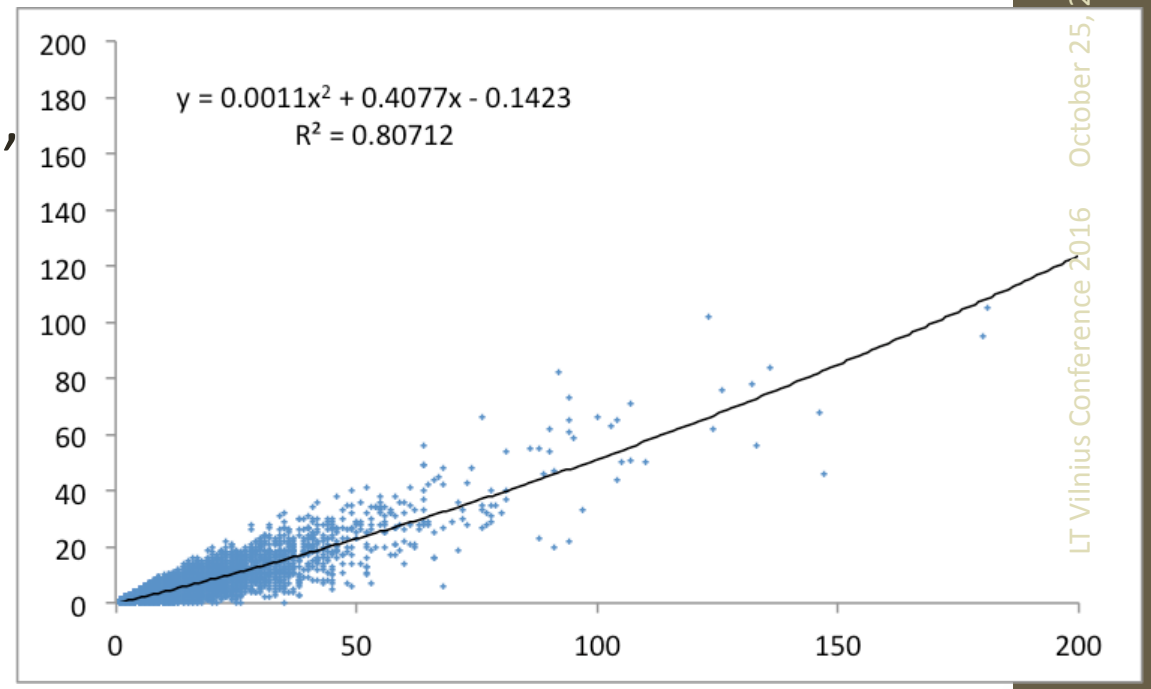
- Contextualizing: Theories of scientific creativity
- More ideas, more tries, more ‘hits’.

  (Simonton 2004, 2008)

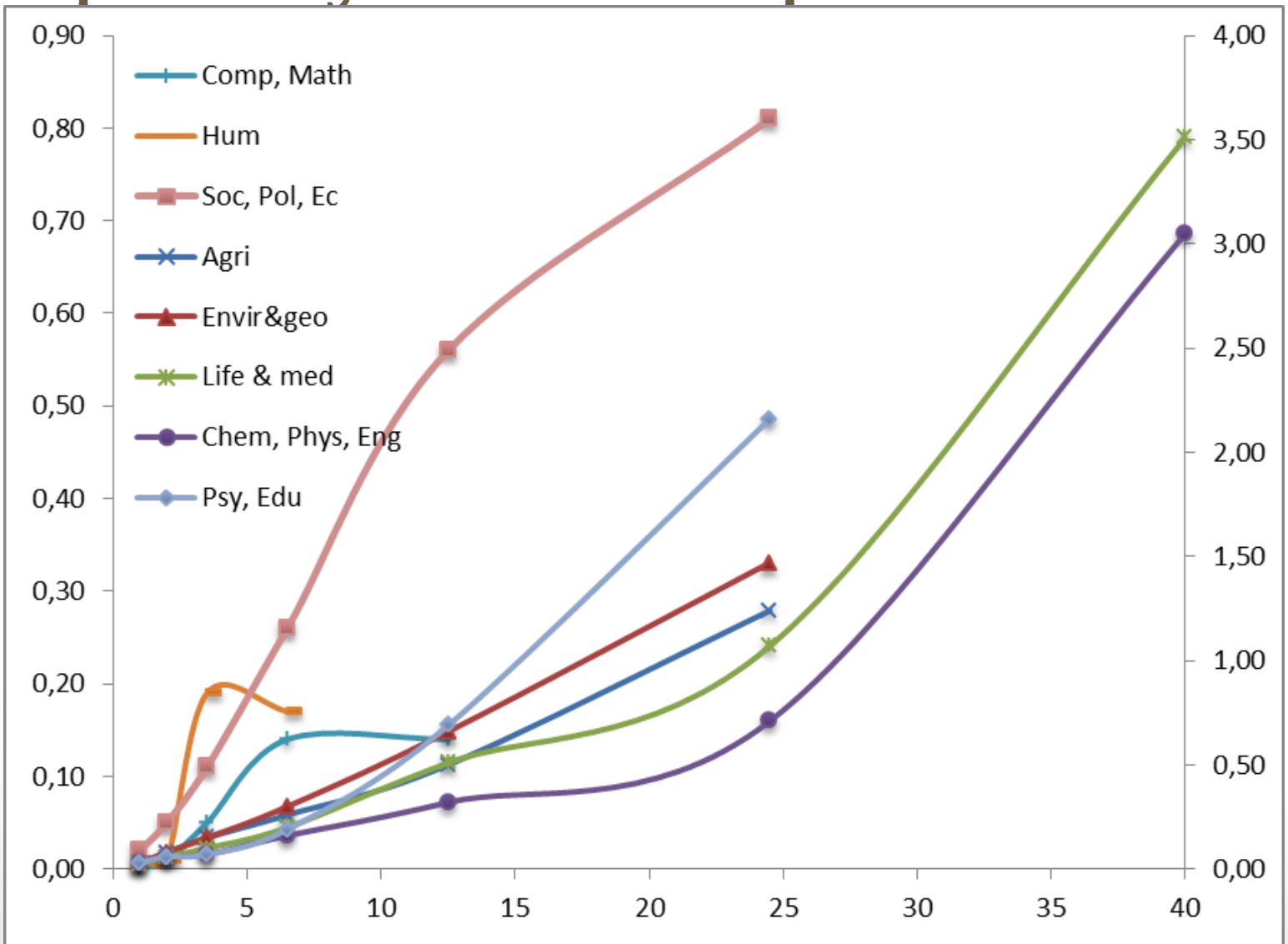
- Empirical evidence supports this

  (Van den Besselaar & Sandström 2015; Larivière & Costas 2015)

Top 10% highly cited papers by all papers
(all Swedish researchers)



Average number of top cited papers by field and prod class



What happened? Australia 1990s

- Decline in the 1980s
- New output based funding system announced in 1992, implemented 1995/6
- Butlers' claim:
  - Quantity up, quality (impact) down
  - Lower average impact

- However: her observations do not cover the period where one should expect an effect

Data & Method

- Database: InCites and we use new indicators
- Longer period: Butlers' analysis stops in 1998!
- Quality as citation based (actual citations)
- As in the original project, we neglect other quality dimensions
- Paper submitted to Journal of Informetrics

Title: Perverse effects of output-based research funding?
Butlers' Australian case revisited

Time-line

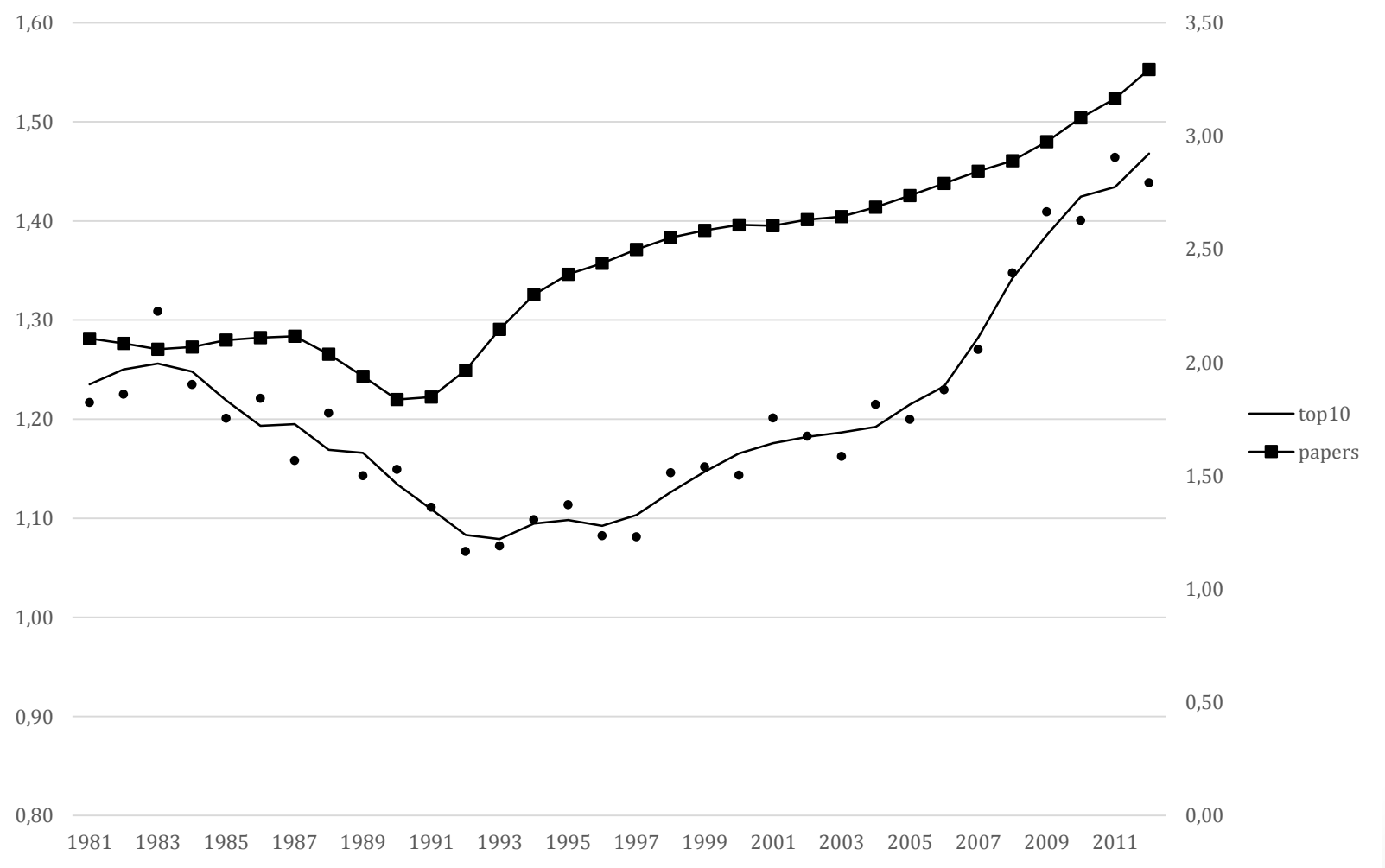
WRITING THE PAPER	PUBLISHING THE PAPER
1991	1993
1992	1994
1993	1995
1994	1996
1995	1997
1996	1998
1997	1999
1998	2000
1999	2001

New analysis

- Output goes up (same as Butler)

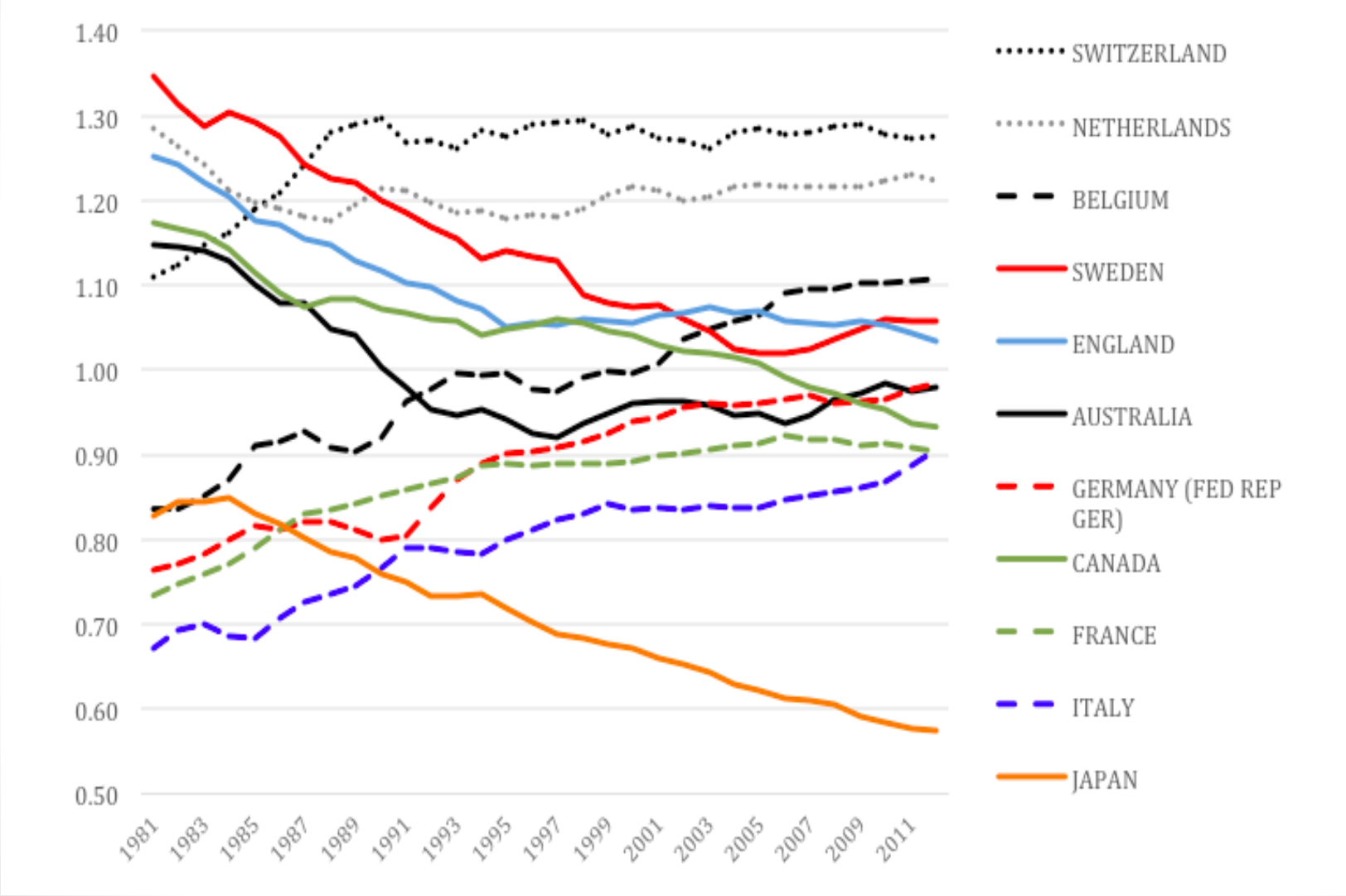
- But: the same holds for the top 10% cited papers, indicating an increase in quality
  - This holds when comparing to the world average as to the average of a set ‘western’ countries
  - Also at country by county comparison, Australia recovered since the new output funding

Australia vs. world average



Australia: compared to set of countries 1

Comparison with set countries 2



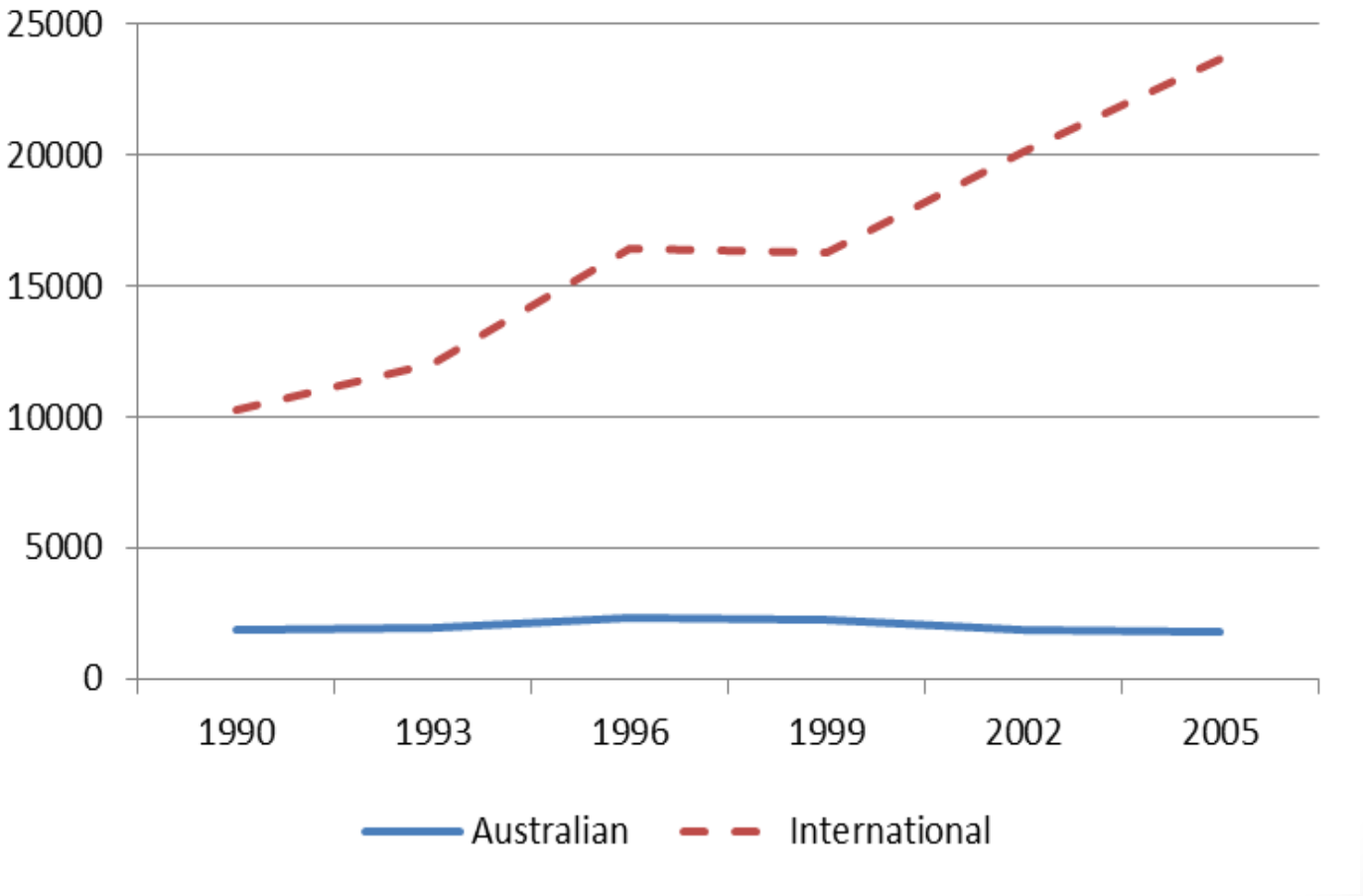
Conclusion

- Empirically:
  - Australian performance went up – output & quality (impact)
    - Same effect found recently for Norway (Schneider et al 2016) and for Denmark (Ingwersen & Larsen 2014)

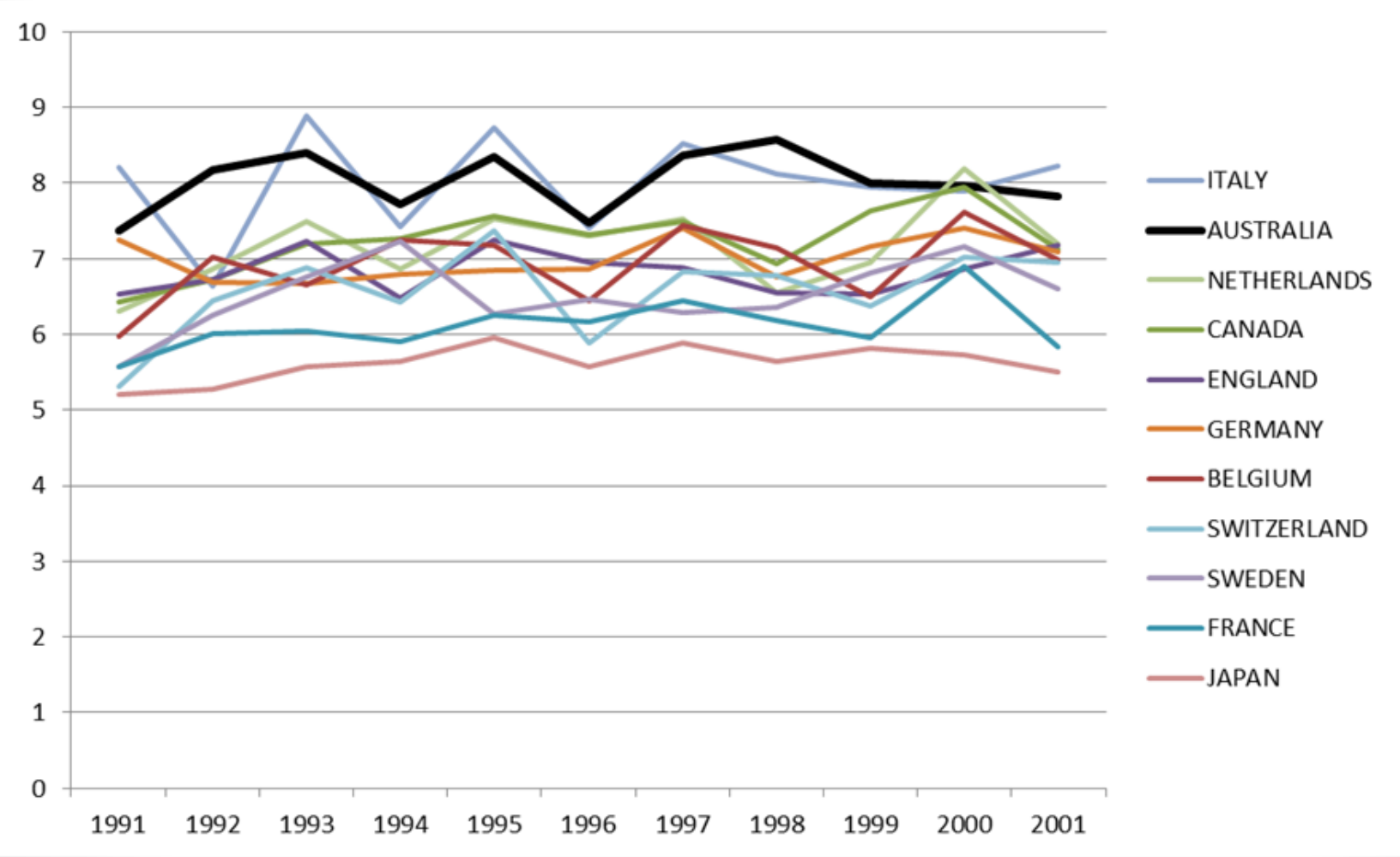
- Theoretically one would expect this
  - Theory of motivation and commitment
  - Creativity theory

- No evidence of perverse effects of output funding

Australia output international (red) and national (blue)



Average page length (number of pages) per year by country.



Implications

- Bibliometrics can only be used in the context of social (and psychological) understanding of the underlying mechanisms
  - Here theories about scientists' behavior and creativity

- Discussion on what indicators mean, how they can be used, and what the effects are may need a radical redirection

Lithuania

FAP per organisation

ORG core publications field adjusted	2011	2012	2013	2014	2015	Core	Non-Core
VILNIUS UNIV	205,9	220,7	227,4	291,4	304,5	47,9	-23
KAUNAS UNIV TECHNOL	77,8	71,8	92,7	110,8	125,2	61,0	-42
LITHUANIAN UNIV HLTH SCI	55,5	71,0	78,8	87,5	76,1	37,0	-51
CTR PHYS SCI & TECHNOL	49,4	73,3	79,7	77,5	76,7	55,3	-45
VILNIUS GEDIMINAS TECH UNIV	35,3	20,5	36,4	42,3	41,5	17,7	-40
NAT RES CTR	25,4	33,9	38,6	31,8	35,3	39,0	-69
LITHUANIAN ENERGY INST	13,9	20,7	18,6	31,9	31,4	126,7	-59
ALEKSANDRAS STULGINSKIS UNIV	21,0	24,5	22,7	13,9	29,4	40,3	-34
LITHUANIAN RES CTR AGR & FORE	19,1	23,1	15,2	13,5	13,4	-30,1	34
VYTAUTAS MAGNUS UNIV	9,1	15,0	10,9	19,9	22,2	142,7	-15
KLAIPEDA UNIV	12,0	12,4	8,8	10,3	14,9	23,5	-43
LITHUANIAN SPORTS UNIV	7,1	4,5	8,1	12,5	13,5	91,4	207
LITHUANIAN UNIV EDUC SCI	6,3	4,0	11,4	8,7	5,2	-18,3	-32
CTR INNOVAT MED	4,2	5,6	4,6	5,5	7,1	66,7	23
MYKOLAS ROMERIS UNIV	1,9	4,7	3,4	4,2	2,7	43,7	-60
SIAULIAI UNIV	2,3	1,5	1,7	1,5	1,2	-47,2	-82
LITHUANIAN INST AGRARIAN ECON	0,7	1,4	2,5	2,5	0,4	-44,4	50
LITHUANIAN SOCIAL RES CTR	1,4	1,0	0,9	1,4	2,1	43,7	-50

Core and non-core journals (Leiden)

- Published in English and has an international scope, as reflected by an international authorship.
- Journals should have sufficiently large number of references to other core journals in the WoS.
- Citation traffic; the journal should be well-connected to other journals.
- LT journals do not meet these conditions
- But, a process is under way
- Formerly about 65% was national authorship
- Is now going down to less than 50%