

Institutional Differentiation and Social Stratification in European Universities: The Academic Profession Between „Research Top Performers” and „Silent Scientists”

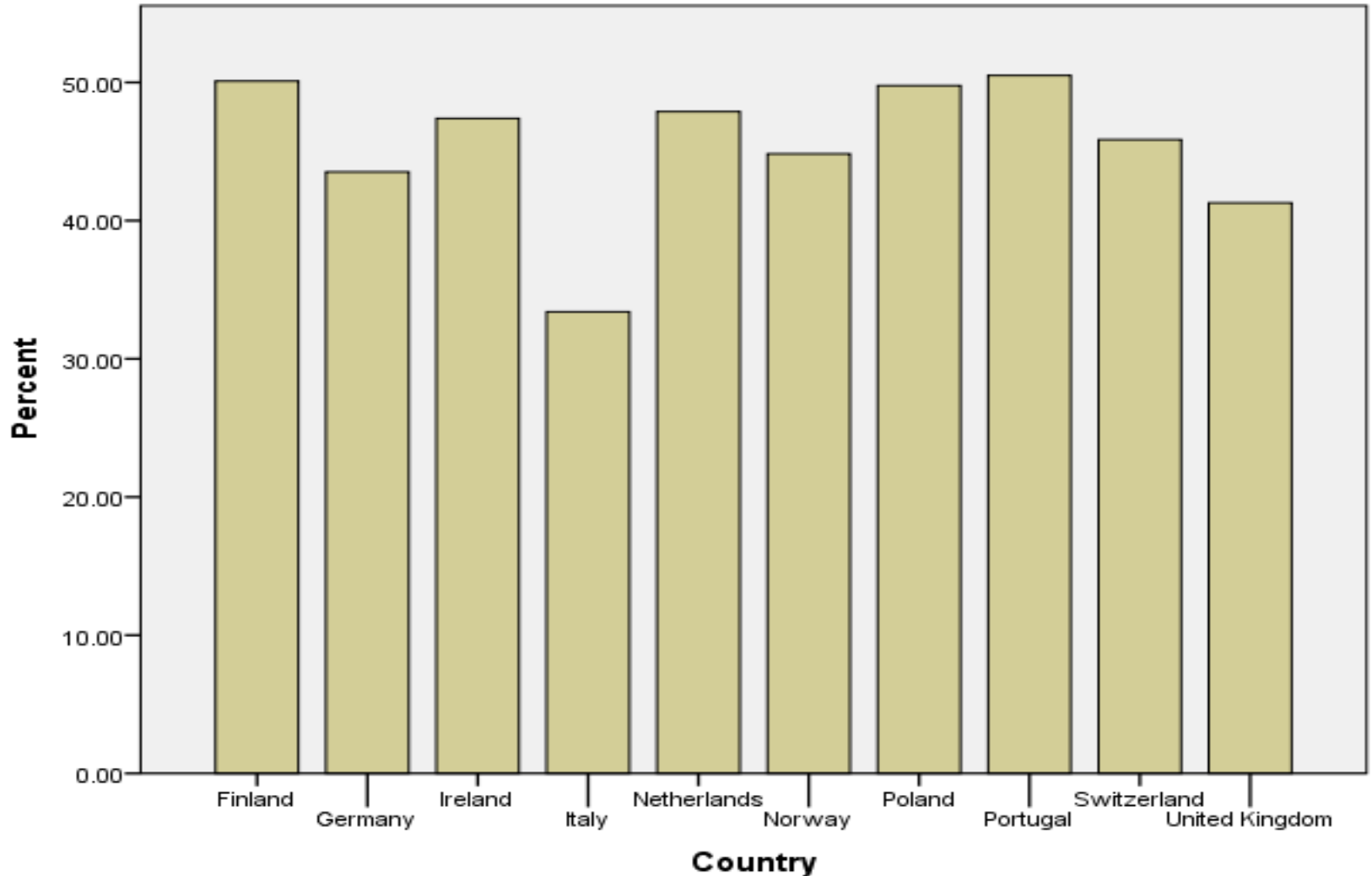
Opening Speech,
5th Annual International Conference of the Russian Association of
Higher Education Researchers,
Moscow, October 18, 2014

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Introduction: inequality in research production

- Who: A subpopulation of highly productive academics in 11 European systems (the upper 10 percent, or $N(tp)=1,583$), contrasted with a subpopulation of 90 percent of the remaining academics ($N(r)=12,325$), both indicating their research involvement.
- Question: Our study was motivated by the puzzle of the impact of highly productive academics on the European academic knowledge production.
- Results: Our research calls into question the assumption regarding the relative homogeneity of the European (university-based) academic profession.
 - The dividing line today is not only between academics employed in university and non-university sectors: it is between highly productive academics and the remaining academics in the university sector itself.
 - Based on different research productivity rates, there are strikingly different academic communities across Europe and within individual countries. We are as divided as ever!
 - Basic patterns hold today as they did 50 years ago!

Research output (=total number of journal articles) of research top performers as a share of total research output from all academics involved in research, all countries (in percent).



Introduction

- Our research of the academic profession shows: the productivity distribution patterns across European systems are strikingly similar, despite different national academic and institutional traditions.
- The upper echelons of highly productive academics provide on average almost half of all academic knowledge production (as measured by journal articles and book chapters).
- The primary data analyzed comes from the large-scale global CAP and European EUROAC research projects on the academic profession (“Changing Academic Profession” and “Academic Profession in Europe”), with 17,211 usable cases, and 13,908 usable cases of research-involved academics.

Data used (1)

- 11 European countries: Austria, Finland, Germany, Ireland, Italy, the Netherlands, Norway, Poland, Portugal, Switzerland, and the UK.
- Cleaned, weighted and integrated into a single European data set by the University of Kassel team.
- The total number of returned surveys 17,211 and included 1,000 and 1,700 surveys in all European countries studied except for Poland where it was higher.
- Individual data files produced in all participating countries but all specifically national categories (faculty ranks, institutional type structures etc.) reduced to internationally comparable categories.
- The data cleaning process included the use of “survey audits” prepared by national teams. International data coordination, sample values weighted so that the national samples broadly representative of national academic populations for most independent variables (national-level sampling techniques: RIHE 2008: 89-178 and Teichler/Höhle 2013: 6-9).

Data used – institutional types (2)

Table 1. Sample characteristics, by country.

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	N	Universities %	Other HEIs %	Full-time	Part-time
Austria	1,492	100.0	0.0	65.8	34.2
Finland	1,374	76.5	23.5	82.4	17.6
Germany	1,215	86.1	13.9	70.7	29.3
Ireland	1,126	73.3	26.7	91.2	8.8
Italy	1,711	100.0	0.0	96.9	3.1
Netherlands	1,209	34.4	65.6	56.0	44.0
Norway	986	93.3	6.7	89.7	10.3
Poland	3,704	48.3	51.7	98.0	2.0
Portugal	1,513	40.0	60.0	90.3	9.7
Switzerland	1,414	45.6	54.4	58.5	41.5
UK	1,467	40.8	59.2	86.5	13.5

Data used – academic fields (3)

Table 2. Proportion of faculty by clusters of academic fields and sample size (N).

	Life sciences and medical sciences	Physical sciences , mathe matics	Engineering	Humanities and social sciences	Professions	Other Field s	Total
Austria	20.2	9.8	11.9	41.3	8.7	8.2	1,492
Finland	15.7	9.7	21.5	18.6	12.1	22.4	1,374
Germany	29.3	15.2	14.8	15.6	11.1	13.9	1,215
Ireland	23.0	11.5	8.8	23.8	20.5	12.4	1,126
Italy	28.6	23.3	11.1	17.5	13.6	5.9	1,711
Netherlands	12.6	10.9	10.7	22.3	34.7	8.8	1,209
Norway	29.0	14.1	7.4	27.5	8.9	13.1	986
Poland	24.6	8.4	21.5	23.0	12.5	10.0	3,704
Portugal	16.9	7.9	20.4	10.5	20.6	23.7	1,513
Switzerland	30.8	10.2	12.7	16.9	23.9	5.5	1,414
UK	21.9	11.6	6.3	18.6	11.0	30.7	1,467

Overall approach: micro-level vs. macro-level

- A micro-level (individual) approach: relies on primary academic attitudinal and behavioral data, voluntarily provided by academics in a consistent, internationally comparable format.
- The individual academic as the unit of analysis, rather than national higher education systems or individual institutions.
- A new “data-rich” research environment in the international comparative academic profession studies!
- Similar studies possible never before!

Research ultra-elite unexplored!

- Top research performing academics across Europe: 10 percent of academics ranked highest, across 5 major clusters of academic fields.
- What makes some academics substantially more research productive than others across 11 national systems)?
- The proxy of academic productivity: the number of journal articles (and book chapters) published in a period of 3 years preceding the survey conducted in the 2007-2010 period).
- Faculty research productivity have been thoroughly explored in the academic literature - but mostly in national contexts of Anglo-Saxon countries, and much less often in cross-national (and European) contexts.
- The distribution of faculty research productivity across the European academic profession (and the correlates of research productivity of a distinctive subgroup of research top performers) - have not been explored so far (“star scientists” in Giovanni Abramo et al. (2009), Italian academics).
- Academic profession studies have not researched top research performing academics across different systems so far.
- Highly productive scientists were mentioned in passing but never studied in more detail, either quantitatively or qualitatively, and either in single-nation studies or in (more recent) cross-national studies.

The quality-quantity dilemma

- No link is made here between the publications, their value, and the prestige of publication journals. Following Mary Frank Fox (1983: 285) and many others, we assume that
 - “it is through publication that scientists receive professional recognition and esteem, as well as promotion, advancement, and funding for future research”.
- The quality-quantity dilemma in academic productivity studies based on publication numbers is not easily solved. We follow a simple assumption:
 - more productive academics produce more articles and less productive academics produce fewer articles. Because, as Jonathan R. Cole and Stephen Cole (1973: 111) argued,
 - “since quality and quantity of research output are fairly highly correlated, the high producers *tend* to publish the more consequential research. ... engaging in a lot of research is in one sense ‘necessary’ condition for the production of high-quality work”.
 - The nature of the survey instrument used does not allow the recognition of research top performing academics to be studied through either formal awards they receive or through their academic visibility (e.g. through citation indexes), though.

Academic Behaviors, Attitudes and Productivity

The data allow to study:

- academic behaviors (working hours and their weekly distribution),
- academic attitudes (teaching/research role orientation), and
- research productivity (papers and book chapters only, over 3 years).

European academics divided: two complementary subsamples:

- academics reporting being involved in research.
- academics reporting *not* being involved in research, and

Then the first subsample divided into two subgroups:

- “research top performers” (identified as academics ranked among the top 10 percent of academics with the highest research performance in each of the 5 clusters of fields), and
- „the rest” (the remaining 90 percent of academics reporting being involved in research).

General reservations: productivity vs. creativity;

frontier/breakthrough research vs. publishing;

quality vs. quantity;

publishing rates vs. citation rates, etc.

Research top performers

Table 3. The distribution of the sample population, by country.

	All	Research-involved (N)	% Research-involved	Research top performers	% Research top performers
Austria	1,492	1,297	86.9	146	11.3
Finland	1,374	1,063	77.4	126	11.9
Germany	1,215	1,007	82.9	110	10.9
Ireland	1,126	865	76.8	101	11.7
Italy	1,711	1,674	97.8	191	11.4
Netherlands	1,209	536	44.3	61	11.4
Norway	986	876	88.8	106	12.1
Poland	3,704	3,659	98.8	411	11.2
Portugal	1,513	944	62.4	104	11.0
Switzerland	1,414	1,210	85.6	138	11.4
United Kingdom	1,467	777	53.0	89	11.5
Total	17,211	13,908	80.8	1,583	11.4

Inequality in Research Production

- Evidence found for a thesis that across Europe (and in Poland):
 - “only a small proportion of scientists produce the bulk of science which emerges from the scientific community” (Cole and Cole 1973: 59).
- Consistently with previous research, academic knowledge production across Europe is highly stratified:
 - “no matter how it is measured, there is enormous inequality in scientists’ research productivity” (Allison 1980: 163, see Stephan and Levin 1991) because
 - We provide large-scale empirical cross-European support from across Europe to conclusions from previous, usually single-nation and smaller-scale, research studies.
- Amazingly, finding: also in Poland an exact half (50 percent) of all academic research production comes from about 10 percent of the most highly productive academics (“research ultra-elite”).

Findings in a nutshell

- There are different “academic professions” in European universities, with a small share of highly research productive (as well as research *non-productive*) academics - and a large share of relatively low productive academics.
- The cross-national similarities among highly productive academics are as strong as the intra-national differences between them and the remaining research-involved academics in their national systems.
- The patterns hold consistently!

Research output (=total number of journal articles in three years) of research top performers as a share of total research output from all academics involved in research, all countries (in numbers and percent).

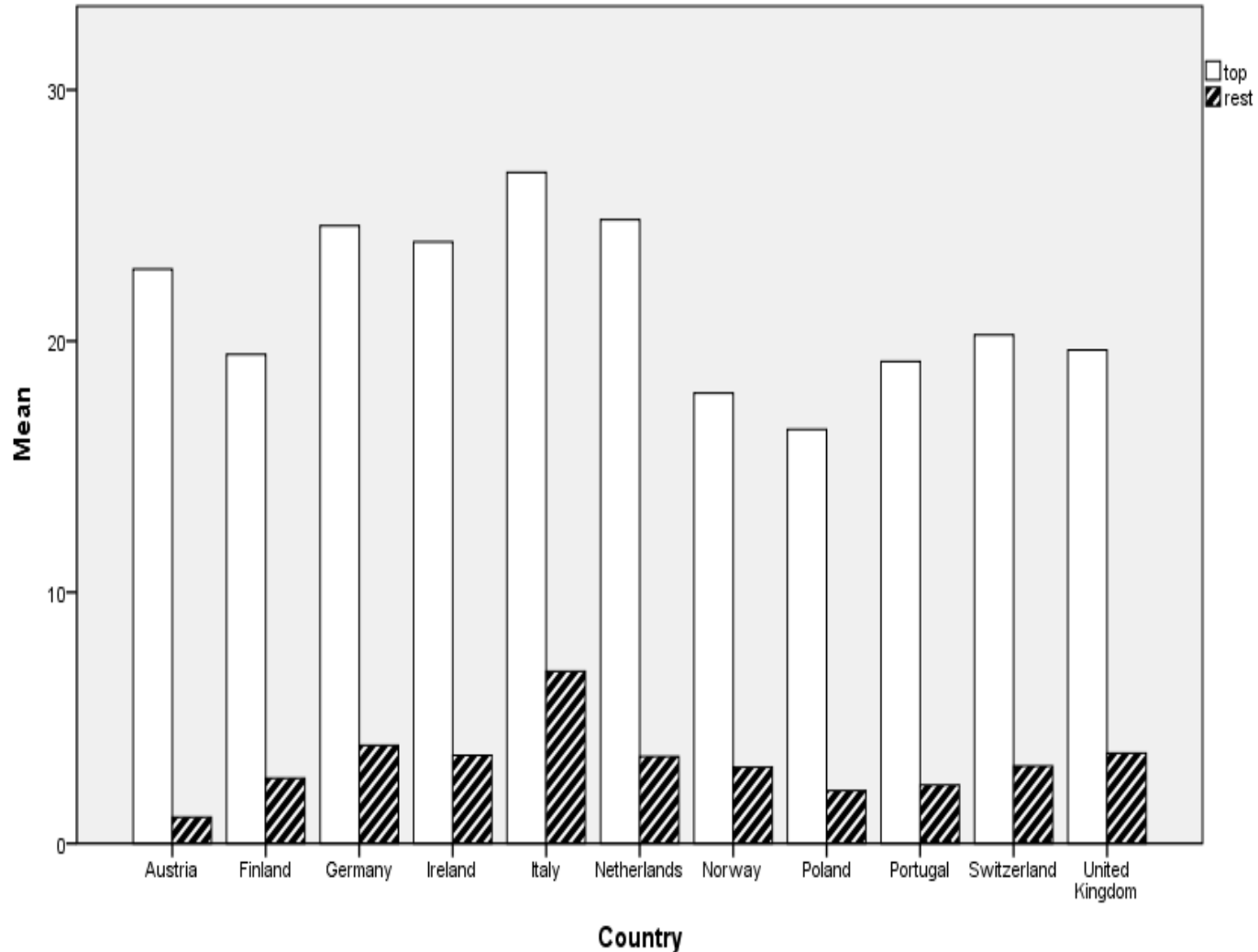
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	Papers by Top Performers	Papers by the Rest	Total	% papers by Top Performers
Finland	2,445	2,435	4,880	50.1
Germany	2,702	3,506	6,208	43.5
Ireland	2,419	2,684	5,103	47.4
Italy	5,096	10,162	15,259	33.4
Netherlands	1,513	1,647	3,160	47.9
Norway	1,902	2,340	4,243	44.8
Poland	6,767	6,831	13,599	49.8
Portugal	1,992	1,952	3,945	50.5
Switzerland	2,798	3,304	6,102	45.9
United Kingdom	1,740	2,475	4,215	41.3
Total	32,706	38,543	71,248	45.9

Research ultra-elite (7)

- Our findings surprisingly consistent with the productivity patterns by Derek Price in the 1960s (in *Little Science, Big Science*, 1963), who referred directly to Alfred Lotka's paper on "The Frequency Distribution of Scientific Productivity" (1926).
- Or, as Cole and Cole argued in their study of American physicists (1973: 218), "using Price model, we can estimate that roughly 50 percent of all scientific papers are produced by approximately 10 percent of the scientists".
 - This is exactly the Polish case today: 50 percent. And the European case!
- 50 years after Derek Price's estimations, this productivity distribution pattern strongly holds for Poland and for most European HE systems.
- We expected it – but there was no large-scale, cross-national evidence so far.
- The productivity distribution pattern consistent across all clusters of academic fields (40% - 60 % by TPs).
- The mean rate of productivity of TPs across all systems: 7 times higher (i.e. they produce on average seven times more articles), see below.

Research productivity (= mean number of journal articles): research top performers vs. the remaining 90% of academics involved in research, all countries.



Working Patterns: More and More Hours...

- Working patterns (academic behaviors) of top performers similar across 11 systems.
- Also the level of research orientation similar: more research-oriented.
- Both findings confirmed through regression analysis: predictors found.
- The annualization of the estimates of the academic time distribution: a 60 percent teaching period and 40 percent non-teaching period formula.
- The mean of the annualized total working time differential between top performers and the rest of academics is about 6 hours per week, ranging from 2 hours in Italy to 10 hours in Norway.
- Top performers in almost all countries also work consistently longer research hours per week, from 2 more hours in Italy and Norway, to as many more as about 5 hours in Germany, Poland and Portugal, 6 hours in Ireland, and 8 hours in the UK.
- In other words:
 - Polish TPs (vs. the rest of Polish academics), spend yearly in academia on average additional 33 full working days (5 hours times 52 weeks divided by 8 hours per day) on research, and
 - British TPs yearly on average additional 52 full work. days on research.
 - But, surprisingly: TPs spend more time on all 5 major activities, across most systems and across most clusters of academic fields studied.
 - Considering all academic activities, they just work on average (much) longer hours: week by week, month by month, and year by year...

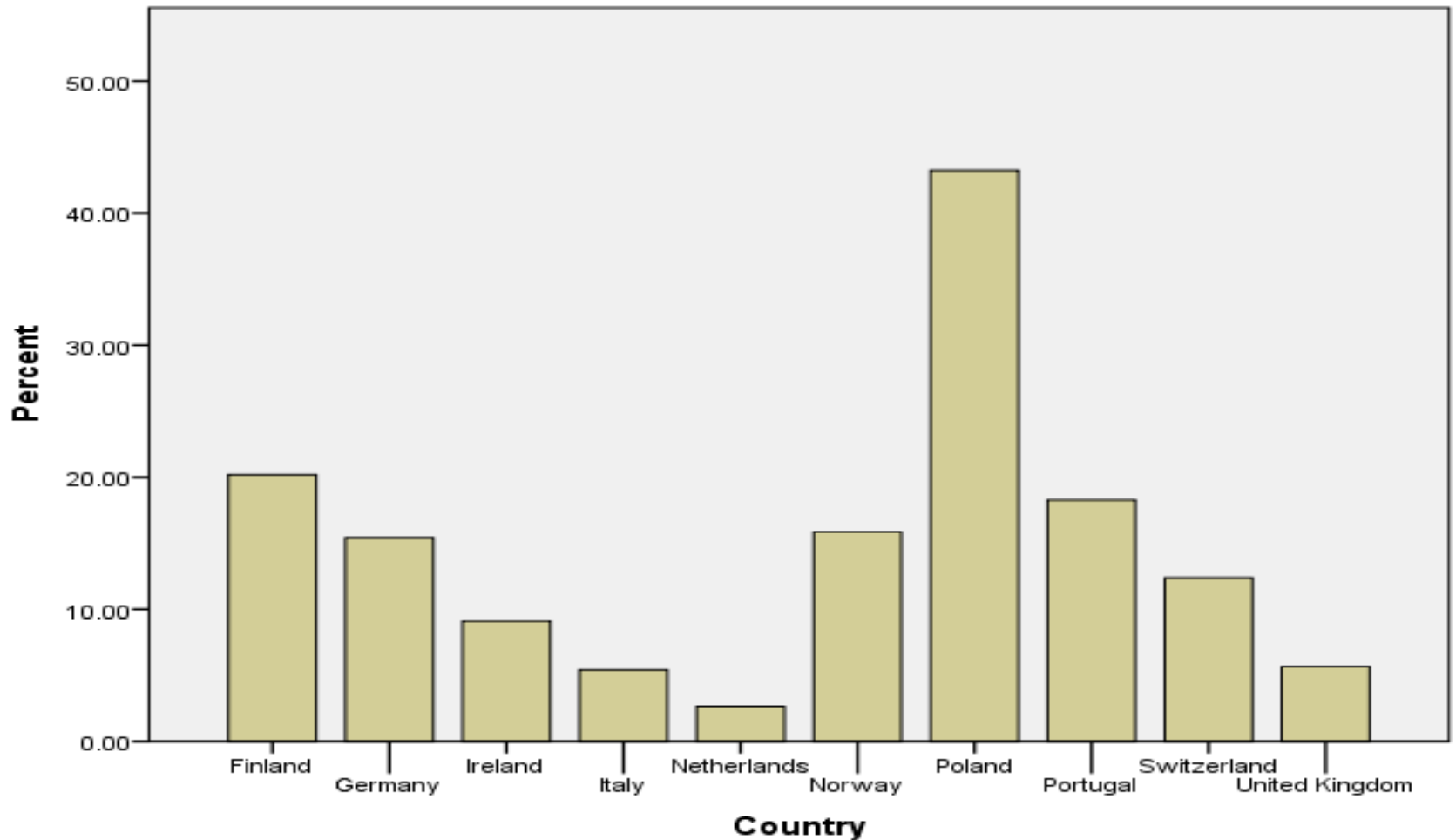
Top performers and non-performers

- Two ends of research productivity rates:
 - research top performers
 - research non-performers (non-publishers; Cole and Cole's "silent" scientists).
- Consistent non-publishers (among research-involved faculty) employed full-time in the university sectors across Europe). Their contribution to measurable national research output is zero. They do teach.
- Their massive institutional existence: surprising from a traditional perspective prevalent prior to the emergence of the massified university.
- In Polish universities, their share is unprecedented: 43% (UK: 5.7%).
- Huge policy implications for Polish reforms: our disagreement with Mary Frank Fox (1983: 299) – the burden of unproductive faculty members is too heavy, and policy measures (now being taken!) need to be harsh.
- Competitive systems vs. non-competitive systems (universities, faculties, research groups, academics...): a lot can be done about „silent” scientists:
 - „Little can be done to affect the least productive, and nothing need be done that could affect the most productive”.

Publishing and academic community

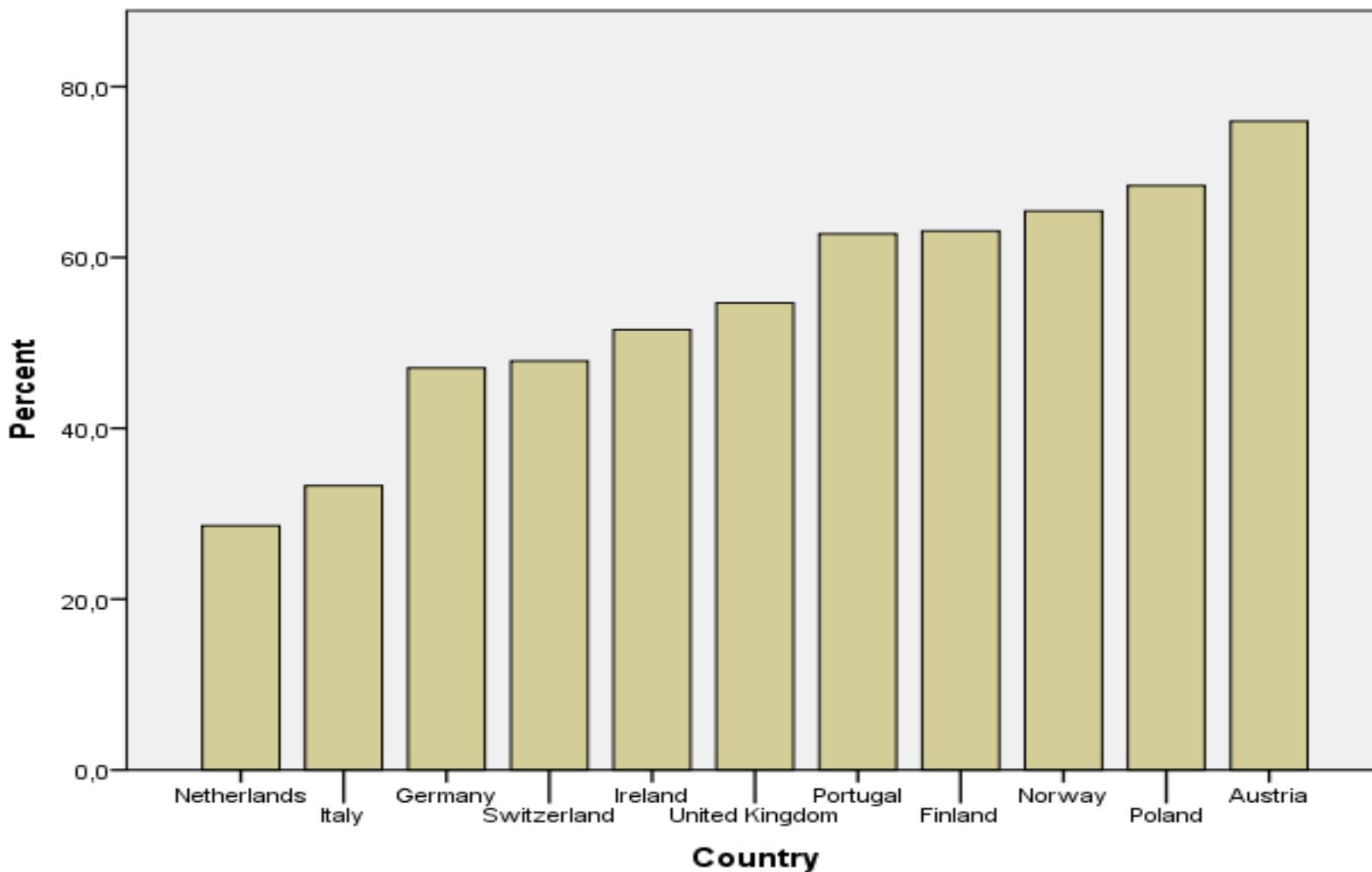
- A traditional account of the scientific community: full-time academic faculty employed in (Humboldtian, Continental) European universities who do not produce do not belong to it:
 - Warren O. Hagstrom's (1965: 43, *The Scientific Community*): published articles and books are “the most important channel of communication from the standpoint of the larger community. Those who do not contribute at all through this channel cannot be considered scientists”.
 - Consistent non-publishers would not belong the larger academic community also according to:
 - Logan Wilson's *The Academic Man. A Study in the Sociology of a Profession* (1942),
 - Paul Lazarsfeld and Wagner Thielens' *The Academic Mind. Social Scientists in a Time of Crisis* (1958)
 - Theodore Caplow and Reece McGee's *The Academic Marketplace* (1958).
 - John D. Millett's *The Academic Community. An Essay on Organization* (1962) and
 - Paul Goodman's *The Community of Scholars* (1962)
- Wilson's (1942: 197) argument: „intellectual inquiry, unlike the growing of mushrooms, is not carried on in hidden recesses away from the public gaze. There is the necessity for bringing results to light in the form of publication, for in the academic scheme of things results unpublished are little better than those never achieved”.
- Millett's (1962: 82) argument: scholars are permanently subject to the critical scrutiny of their peers:
 - “each published article, each book review, each research project recorded, each participation in professional discussion, each book – all are carefully observed and remembered. No faculty member can escape the judgment of his colleagues or university and in the scholarly world at large”.
 - Thus: where do the consistent non-publishers („involved in research”) in Poland belong (see below)? New reforms – research-funding starvation; no further promotions/retention.

Non-performers (=non-publishers in three years), full-time academics, universities only, by country (in percent).



The share of academic publishing 0-4 articles (0 and 1-4 combined) in three years (Question D4 “How many of the following scholarly contributions have you completed in the past three years?”), researchactive academics,

universities only, full-time, all countries, in percent.



The Divided Academic Profession

- Thus: all the research-active European academics divided into two halves,
 - the upper most productive half - more than 90 percent of all articles, and
 - the lower most productive half produces less than 10 percent.
- Research-active employed full-time in universities only: picture only slightly different.
- Specifically, 50% of European academics self-describing themselves as research-active actually show marginal or no research production (0-4 papers in 3 years).
- Leading to the redefinition of the meaning of what “average” and “low” research performance currently means.
- The distribution of academic knowledge production in Europe not only skewed towards some institutional types (e.g. national flagship universities; or scattered); it is skewed most towards individual high performing academics, wherever they are institutionally located.
- Different institutional cultures lead to different research productivity. Institutions of low academic standing may belittle the significance of academic research while institutions of high academic standing may exert normative pressures on academics to get involved in research (Blau 1994: 24).
- In Poland, TPs are scattered across the country – but concentrated in 5 cities: Warsaw, Krakow, Poznan, Wroclaw and Lodz (NCN data).

New context

- If on average across Europe, about five in every ten academics employed full-time in the university sector produce no more than four articles in a three-years period, than the whole idea of high and increasing academic knowledge production in Europe needs to be put in a new context.
- Knowledge-based economy? Competitive research? World-class universities, isolated islands of flagship universities needed!
 - The policy implications are severe

Conclusions and policy implications (1)

- Dilemma: supporting high-performing individuals – or supporting highly-ranked institutions (towards concentration of talents in several institutions only, with forced mobility)?
- Danger: TPs in isolated islands; in unfavorable institutional cultures – how to do research in the „minor league” universities; mobility, cloning and inbreeding (Crane 1965)?
- Different dilemmas in different countries:
 - with high investments in academic research (most of the 11) vs. low investment countries (PL).
 - Competitive (most of 10) vs. non-competitive systems (PL, IT): „Once in – forever in” vs. „up or out” countries
 - How to fund research in low-investment, non-competitive systems? Balance: individuals vs. institutions? More for individuals, wherever?
- Poland since 2012: towards a highly competitive, individuals-based system (the NCN), with low academic research investments.
- Growing productivity inequalities and academic stratification, haves and have-nots, institutions and research groups. No more evenly spread funding. Disadvantages?

Conclusions and policy implications (2)

- Our research shows the complexities inherent in the “academic profession” concept: the disaggregated picture of faculty research performance in Europe shows a powerful divide between research top performers and the rest of academics (not explored so far from a comparative perspective).
- The distribution of academic knowledge production in Europe is highly skewed towards highly productive academics.
- The question “who does what” in European universities in publishing terms becomes urgent in the context of ongoing Europe-wide structural reforms.
- European universities are so heavily reliant on the European research ultra-elite that every national reform agenda should explicitly take their role into consideration.
- In other words, perhaps, “above all, do not harm!” top performers across Europe (*primum non nocere*) might be a guiding theme for current university reforms!

– Thank you very much for your attention!

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