“Bibliometrics and the REF”
&
“REF equalities analysis”

Mark Gittoes: m.gittoes@hefce.ac.uk
David Mawdsley: d.mawdsley@hefce.ac.uk
Hannah White: h.white@hefce.ac.uk
Research Funding

• The allocation of over £1.5bn of funding is driven by Universities’ research performance
• Policy to focus on the highest quality research
• Previously allocated by periodic peer review exercises (the RAE)
• Push towards a (purely) metrics based allocation in the sciences (the REF).
• After an extensive pilot exercise we anticipate a system of peer review informed by metrics
Two parts

• Discussion on two technical aspects of HEFCE’s preparatory work on the use of metrics in the REF:
  • Exploration of particular metric measures
  • Use of metrics in equality analysis
• Not intended to be a complete overview of the REF or HEFCE’s approach to research assessment.
Bibliometrics and the REF

David Mawdsley
Contents

• Overview of bibliometrics

• How we adjust between subjects to present fairer picture

• How best to present information to groups of peer reviewers
How bibliometrics work...

• Take a journal...
• …and a paper inside it
• The bibliography references other papers
References


• What’s a citation worth?
  — Old documents tend to be cited more
  — Some types of document are cited more
  — Subject dependence

http://xkcd.com/435/
What’s a citation worth?

- Old documents tend to be cited more
- Some types of document are cited more
- Subject dependence

<table>
<thead>
<tr>
<th>Field</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>12.81</td>
</tr>
<tr>
<td>Chemistry</td>
<td>10.10</td>
</tr>
<tr>
<td>Physics (multidisciplinary)</td>
<td>7.13</td>
</tr>
<tr>
<td>Mathematics</td>
<td>1.92</td>
</tr>
</tbody>
</table>

Factors are for articles in English published in 2004. Subject categories are biochemistry & molecular biology, chemistry (multidisciplinary), Physics (multidisciplinary), and mathematics.
Computing a normalised citation score (NCS)

- Number of citations
- Divided by the average number of citations for its peer group:
  - All documents of the same type (article, review, etc)
  - Published in the same year
  - In the same subject category
- A normalised citation count of 1 = world average
Distributions of citations

Scopus, “animal science and zoology”, articles, published 2003
How do we benchmark against this?

• Typically the mean is used
  – Not ideal

• “Department” level indicators:
  – Mean NCS
  – Proportion of work above a threshold

• Percentiles
Percentiles

• For each peer group, we rank all the papers by the number of citations.
• For each paper we report which percentile it is in.
• For each department we then calculate the proportion of items that are in the top 10% of their peer groups.
To inform peer review...

- As we’re not using formulaically the *peer group* is less important
- Compare the output’s score against two *peer groups*
  - Everything else within the UOA
  - Everything else within the journal
- Communicate visually
REF equalities analysis

Hannah White
Motivation

Bibliometrics move away from the peer review method used in previous RAEs. This equalities analysis looked at addressing the question:

- Were the equalities differences observed in the RAE still present when bibliometric measures were used?
History

Equalities analyses were carried out for staff selection to RAE2001 and RAE2008. Findings included:

- Men were more likely to be selected than women and modelling showed this to be significant over the age range 30-50.

- Staff with non-UK nationality were significantly more likely to be selected than staff with UK nationality.
Comparison

RAE

• Data analysed after the assessment
• Compared the selection rates of groups of staff

REF

• Data analysed to inform development of REF
• Compared the citation scores of groups of staff previously selected for the RAE
REF model structure
Cross-classification multi-level model

HEI → UOA → Staff Member → Record → Paper
Model variables

The attributes simultaneously allowed for in the statistical models were:

• age; gender; ethnicity; nationality; disability; ECR status;
• mode of employment (part-time or full-time); subject area; clinical status; contract status (permanent, fixed-term or atypical); employment function (research and/or teaching); senior position holder; grade; member of ECR department;
• paper; institution; unit of assessment; person;
Findings

- Age and sex

- Nationality – There were no significant differences found between UK and non-UK nationals in the proportion achieving the threshold.
Conclusions

Age and sex differences possibly:

- Men are producing better quality papers which are then more highly cited than women.
- There is some systematic bias towards men within the research assessment or production process.

Nationality differences:

- The difference in selection rate is likely to be based on the quality of papers produced by the two groups of staff rather than selection bias.
Summary (1)

- Pitfalls and caveats with all bibliometric measures
- Key challenge is how these interact with REF expert panels
- Aiming for consistency of information
- But not necessarily one size fits all
Summary (2)

- Consultation document:
  - HEFCE publication 38 of 2009;
  - Assessing output quality;
  - Central group of equality specialists and REF panel members

- Spring 2010:
  - Announce consultation outcomes;
  - Invite nominations for panels;
  - Development of REF data collection systems.