

Monitoring research concentration and diversity: changes between 1994 and 2007



This series of Research reports published by Universities UK will present the results of research we have commissioned or undertaken in support of our policy development function. The series aims to disseminate project results in an accessible form and there will normally be a discussion of policy options arising from the work.

This report was prepared for Universities UK by Evidence Ltd.

evidence

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The issue of the concentration of research funding within the UK higher education sector and the implications of such concentration for the health and diversity of the research base have been monitored by Universities UK for several years. In 2003 we commissioned a first report from Evidence Ltd on the potential impact of proposals on research funding in the Government's White Paper *The future of higher education*. These proposals aimed to change the structure of the research base by pursuing a policy of concentrating research funding in the largest and most highly rated university units. The rationale for the increased concentration was a belief that benefits would come from concentrating research in larger units, and that this would enable the UK to meet the challenge of international competition.

The aim of the first report was to test the assumptions underpinning the White Paper proposals and explore what the implications might be for the whole higher education research base. Based on data covering the period 1992/2000, the report concluded that there was 'no evidence that there is a current problem with the performance of the UK research base that needs to be addressed'. It also argued that 'there is no clear evidence that the UK's research performance would benefit from further concentration of research funding'.

The first report informed the development of our research policy, which is based on the assumption that the current level of concentration of research funding in the sector is about right. The key priority has been to ensure that there is an appropriate balance between funding top-rated departments to support excellence, protecting areas of research excellence across the sector and the encouragement of new and developing areas.

Since the publication of the White Paper, the Government has made no further statements on increasing the concentration of research funding in the university sector. However, the impact of policy changes since 2001 was still unclear and a further report was commissioned from Evidence Ltd to explore whether there had been any further changes. The main conclusion of that report, published in 2007, was that there has been a measurable overall increase in research concentration across the units of assessment featured in the study. However, it was recognised that the period under review was too short to draw any robust conclusions at that stage.

This new report extends the earlier analyses by examining the data over a 14 year period up to 2007 and confirms previous trends. In the selected subjects under review, the study concludes that the process of concentration continues although it recognises that there is still considerable diversity across the system as a whole. The impact of the announcement of the funding allocations for 2009/10 on trends in concentration is currently uncertain as is the effect of the system that will eventually succeed the Research Assessment Exercise. This report provides a good basis from which to develop an understanding of this. Universities UK will continue to monitor these trends and plans to undertake a further review of evidence of the impact of concentration on research performance.

Professor Eric Thomas

Chair, Research Policy Committee,
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- This study reviews the extent of research concentration and diversity across six sample subject disciplines¹. Data and analyses for these disciplines suggest that over the 14 years from 1994 to 2007 research activity has become more concentrated in the most highly rated research units² (grades 5 and 5* based on the outcome of the Research Assessment Exercise (RAE) in 2001). Although these data have implications for research concentration by institution, they do not provide direct information on that issue.
- Research activity is measured in terms of research income, the number of people involved in research and the number of publications in leading journals. Research income measures include research council grants and industrial contracts as well as the quality related funding (QR) distributed as block grants by the higher education funding councils.
- The percentage of total research funding going to grade 5 and 5* units within our sample disciplines increased from 82 per cent to 86 per cent between 2001 and 2007. The aggregated results show that on average these highly rated units gained in their share of both the input and output research variables analysed, with the exception of research contracts funded by industry.
- Whilst research activity in higher education in the UK is highly concentrated, at present it nonetheless retains a substantial degree of diversity.
- It is difficult to isolate the role and dynamics of any particular funding stream within the research system. Data presented in this report suggest that QR, often cited as a funding stream which spreads resource, appears to be playing a role in contributing to increased concentration. It is distributed to universities as a block grant, however, and the way management chooses to distribute QR between disciplines is one way in which research diversity can be maintained. Further work may be required to build up a more accurate picture of actual practice in this area.
- The degree of concentration, and the way this has altered over the years, is discipline-dependent. It would be misleading to suggest that the whole research base is in the same situation. There are different levels of 'maturity' in terms of research base development:
 - Of the subjects we examined, the one where research activity is most concentrated is biology. In 1995, biology demonstrated a high level of concentration but even against this high base level there has been a consistent if modest increase in concentration over the last 12 years.
 - Chemistry and mechanical engineering are less concentrated than biology at present. However, both these subjects show trends towards further concentration, particularly in terms of the location of people involved in research.
 - Psychology presents a less consistent picture – there is increasing concentration in most areas of research funding, but a wide spread of research active staff and PhD students across units with diverse RAE scores.
 - Sociology (and social sciences overall) show a clear trend towards concentration in terms of research funding. However, measures of people and publications show no such trend.
 - History (and the humanities overall) present a very mixed picture. Research funding shows no consistent trend: research active staff are becoming more concentrated, while PhD students and research outputs (number of publications) are increasing in the lower graded units.
- In March 2009 the Higher Education Funding Council for England (HEFCE) announced the allocation of QR funding after 2009, using the RAE grades awarded in 2008. It currently remains unclear as to how the RAE outcome and these funding decisions will impact on research concentration. It will therefore be necessary to undertake further work to understand the implications of the 2008 RAE.

1.1 Concentration and diversity

This report explores the ways in which research concentration in the UK higher education sector has changed over the 14 year period from 1994 to 2007.

Academic units have always competed with each other both for research funding and in seeking to attract leading researchers. This competition results in a differential spread of research activity across research units, and frequently leads to a concentration of research within certain universities. Selective funding of the higher rated research units has been shown to support research excellence. Against most metrics, the UK's research effort is more effective than that of comparable countries, and this success can in part be attributed to the way the bulk of UK research funds have been selectively allocated since the mid-1980s.

While concentration of research activity supports excellence, it also has implications for the health and dynamism of the research base as a whole. If the result of concentration in the system is that most research is carried out by a small number of institutions, this could be at the expense of research diversity, in terms of the number and type of institutions able to support significant levels of research activity in different disciplines. If diversity decreases as a result, this might have an impact on the UK's capacity in a number of ways:

- it might reduce the overall spread of research fields that are supported and thereby reduce the UK's ability to shift into new areas when the opportunity or need arises;
- it might also reduce the diversity of schools of thought in any field and so reduce the healthy internal competition of contending lines of enquiry that underpin cutting-edge, innovative excellence;
- it could reduce the regional spread of activity in any field, thereby reducing access to international research excellence for companies and the likelihood of regional growth through innovative spin-outs. This will be a particular concern within the devolved administrations of the UK;
- it could be a factor in the decision to close core departments in certain institutions; and
- it would reduce the number of places where students were being trained in an atmosphere of research excellence and vitality that produces the knowledge-competent people the general economy requires.

The degree of research concentration is well illustrated by the way in which almost a quarter of the UK's research output in 2007 (measured as the percentage of UK research articles indexed by Thomson Reuters on the *Web of Science*) has at least one author based at one of the 'big four' research institutions - Cambridge, Oxford, University College London and Imperial College. Another example is the way in which across most subjects the lion's share of research funding is allocated to units which scored grade 5* or 5 in the RAE in 2001. These highly rated units represent only a proportion of the academic community working in any given field.

Universities UK commissioned this work to provide an up-to-date picture of research concentration and diversity across the UK system and, in particular, to pick up the trends in the system. This report is the third in a series, with previous reports having been produced by Evidence Ltd in 2003³ and 2006⁴.

1.2 The 2003 report

The 2003 study was commissioned to examine the potential impact of proposals on research funding presented in the Government's White Paper *The future of higher education*⁵. These proposals aimed to change the structure of the research base by pursuing a policy of concentrating research funding in the largest and most highly rated university units. The rationale for this was the belief that benefits would come from concentrating research in larger units, and that this would enable the UK to meet the challenge of international competition more effectively.

The report set out to test the assumptions underpinning the White Paper proposals, to explore what the implications might be for the whole higher education research base, and to analyse the projected effects of the proposals on institutional and regional research structures.

Based on data covering the period from 1992 to 2000, the report came to three key conclusions:

- first, there was no evidence that there was any problem with the performance of the UK research base that needed to be addressed, either overall or at the level of the units most likely to lose funding should the system become more concentrated;

- second, if there was an emerging problem, then there was no clear evidence that the UK's research performance would benefit from further concentration of research funding; and
- third, there was evidence that research concentration as proposed would exacerbate existing regional differences in research capacity and performance.

The 2003 report informed the development of Universities UK's policy on research funding, which is based on the assumption that the level of concentration of research funding in the sector has gone 'about as far as it should go', and that any further significant concentration would be detrimental to the health of UK research. The priority for Universities UK is to ensure that there is an appropriate balance between funding top-rated units to support excellence, protecting areas of research excellence across the sector and the encouragement of new and developing areas.

Universities UK used the 2003 report and other analyses to argue successfully against such undue concentration and in favour of maintaining a network of activity that would support the diversity and agility of the higher education research base to the net benefit of the UK economy regionally as well as nationally. The Government has made no further pronouncements on the need significantly to increase the concentration of research funding in the university sector.

1.3 The 2006 report

Despite the decision not to pursue an overt concentration agenda, concerns about the possibility of increasing research concentration and the potential impact have remained. In 2001 HEFCE made changes to research funding policy in England, and the impact of these remained unclear. One change was that the gradient of funding differentials between more and less highly research-rated units was increased, with more units (those graded at 3a or below) falling below the minimum funding threshold with respect to their eligibility for QR funding (see Section 4.1 below). In the light of this, Universities UK decided to commission a new report from Evidence Ltd to explore the extent of any further changes to research concentration which might have occurred since 2000. The main conclusion from this work was that there had indeed been a measurable overall increase in research concentration between 2000 and 2005 across the units of assessment featured in the study.

1.4 Rationale for the current report

It was always recognised that the short period under review for the 2006 study (2000/05) meant that its conclusions about trends in research concentration would necessarily be provisional. This current study not only adds two more years' data by going forward to 2006/07 (the most recent year for which data is available) but also looks back to 1994/95, and so illustrates trends over a 14 year period in total.

This report is particularly timely in the light of, firstly, the recent completion of the latest Research Assessment Exercise in 2008; secondly, the funding decisions for 2009/10 made in the light of the RAE results; and, thirdly, the forthcoming roll-out of the new Research Excellence Framework (REF).

Although in England HEFCE as now announced the funding decision based on RAE 2008 outcomes, it is not yet clear how these funding decisions will impact on levels of concentration in the system. Further work to understand the impact of the RAE 2008 profiling outcomes will therefore need to be undertaken.

The REF is currently at the level of a framework with much development work underway. There is no indication as yet how the funding councils will fund against outcomes. It is not possible to predict how the new system will impact on levels of concentration in the system.

2.1 Measuring research activity in relation to RAE grades

The approach in this study (as was the case in 2006) has been to view various indicators of research activity (see below) against the key dimension of research grade. The data summarised in the bar graphs in section 4 give a clear indication of the extent to which research activity is concentrated in units which achieved different grades at RAE 2001, and how this has changed over time. The choice of this dimension reflects the central question for this study, of whether research activity is becoming further concentrated in a smaller number of highly-graded units.

In this report, the data used to measure research activity have been drawn from the databases of the Higher Education Statistics Agency (HESA), the higher education funding councils, the research councils and Thomson Scientific Inc.

All the data sources have their own categorical structure, and to deal with this the data have been mapped to a common disciplinary structure – broadly seeking to follow a number of units of assessment employed in the RAE.

2.2 Sample disciplines

It is unhelpful to consider too many subject areas for an analysis of this kind, not only because of the mass of data that would be required but also because attempting to present and interpret what is going on across a wide range of subject areas would result in a huge report which would be difficult to understand. Conversely, too coarse an analysis (lumping data from diverse fields together) would obscure disciplinary differences which may be highly significant in their influence on research concentration.

This study has used a cross-faculty selection of units of assessment with a sufficiently large number and diverse range of units (and hence data) to provide a robust and defensible testing ground. A set of six disciplines has been selected, covering biology, chemistry, mechanical engineering, psychology, sociology and history. These same disciplines were used in the analyses for the 2006 report.

2.3 Indicators of research activity

Data have been collected for a number of indicators which collectively provide an overview of research activity across the UK higher education sector. The selected indicators address three areas of research activity: research income (inputs), numbers of people engaged in research (either research active academic staff or research students), and research outputs. In total, eight indicators have been used as follows:

a) Research income

1. Total research funding⁶;
2. Quality related research funding (QR) provided to universities as a block grant by the higher education funding councils. QR is allocated on the basis of performance in the RAE;
3. Total research grant and contract income (RGCI)⁷;
4. Research grant income from the research councils (allocated on the basis of peer-reviewed competition);
5. Research contract income from industry (allocated on the basis of user judgments regarding research quality, utility and potential).

b) Research people

6. Numbers of research active staff⁸;
7. Numbers of researchers in training working towards a PhD (these individuals will in due course contribute to the availability of highly qualified workers across the economy).

c) Research outputs

8. Publication outputs in leading journals.

These categories can be interpreted in different ways. The number of PhD students within a unit is both an indicator of capacity for research and a potential (and important) output from the system. Data need to be interpreted with care for a number of reasons. In every case there are both absolute and relative scales to consider. An example of this is that the absolute level of funding could rise in a unit that acquired more staff while the funding per capita might remain constant or even fall.

2.4 Time period

Comparisons are made over a 12 year period, the data points being:

- 1994/95 - the first year for which comparable HESA data are available;
- 1996/97 and 2001/02 - RAE years;
- 2004/05 - the year data were collected for the 2006 report; and
- 2006/07 - the most recent year for which comprehensive data are available.

- recent data validation work suggests that individual institutions indulge in a certain degree of interpretation, allocating data for variables to different categories in order to maximise their financial position vis-à-vis funding council formulae etc. This can have the effect of disassociating staff from their students and their research funding streams.

2.5 Data issues

With a project of this nature, drawing on data collected over a number of years by different organisations, some incompatibilities inevitably arise:

- the data for psychology and chemistry are largely unproblematic;
- a number of institutions made multiple biology submissions to the RAE in 2001. The approach adopted in these cases was to attribute these units to the highest grade they scored. In most cases these submissions scored either the same score, or scores separated by just one grade. The impact here would be minimal. Three institutions were awarded more divergent grades (in each case, 5 and 3a) and this will have slightly skewed our data (but if anything this will have decreased observed trends rather than indicating spurious changes);
- the data for engineering are slightly less effective because Cambridge and Oxford universities return their mechanical engineering data to a general category. Oxbridge data have therefore been omitted from the mechanical engineering datasets;
- HESA has reduced the granularity of its data in non-science fields, which has created problems for us in terms of the sociology and history data. While we have been able to resolve output data, numbers of PhD students and QR to a fine level, data relating to the other fields reflects the picture across all of the (respectively) social sciences and humanities;

3.1 Findings across the six sample disciplines

Table 1 presents an overview of the distribution of research activity against RAE grade for all the sample disciplines. The main findings are:

- for many of the indicators there is a similarity in the trend for grade 5 and grade 5* units and, to reflect this, an additional row of data - aggregating these two grades - is included in the table;
- the system is highly concentrated. By 2006/07, 86 per cent of total research funding in these disciplines went to units achieving ratings of grade 5 or 5*, even though these represent only 43 per cent of the units that made submissions to the RAE in 2001;
- the concentration of total research funding within grade 5 and 5* units has increased significantly over the last six years (a comparatively short time period) - from 82 per cent to 86 per cent;
- the large increase in overall concentration can be partly attributed to the change in weighting given to different RAE scores when calculating QR following the 2001 RAE. Chart 1 presents these changes in a graphical form for the four different UK funding bodies. In England the main losers over the period 2001/02 to 2008/09 were grade 3 and grade 4 units. Grade 3 units lost all QR funding from 2003, while the position for grade 4 units vis-à-vis grade 5 and 5* units worsened in both 2001 and 2003;
- the other UK funding bodies have been less radical in moving funds towards higher graded units - Scotland continues to fund 'rising 3a' units (those which failed to achieve 3a in RAE 1996 but did so in RAE 2001), and in Wales grade 4 units are funded at only a slightly lower rate now than they were in 2001/02. Northern Ireland made changes which echoed those in England in 2002/03, but has now reverted to weightings which are not dissimilar to the ones used in 2001/02;
- because England accounts for by far the largest proportion of QR, the changes in weightings here have the greatest effect when we look at concentration across the UK as a whole. The headline result of these changes (shown in column 2 of table 1) is that in 2000/01 78 per cent of QR funding went to grade 5 and 5* units; by 2006/07 these units received 88 per cent of QR funding;
- QR funding has been perceived as being less selective than (for example) research council funding. For this reason QR has sometimes been seen as a funding stream which dampens down any trend towards concentration. Over the last six years, however, this has not been the case, and changes in the QR formulae over this timeframe mean that it has been a significant factor leading to increased concentration;

Table 1
Distribution of research activity
by grade (for all six sample
disciplines), 2000/01-2006/07

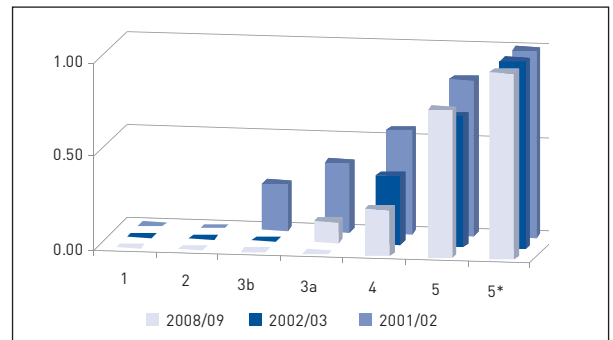
Rating	Total R		QR		RGCI		Research council RGCI		RGCI industry		Research active staff		PhDs		Articles	
	2000/01	2006/07	2000/01	2006/07	2000/01	2006/07	2000/01	2006/07	2000/01	2006/07	2000/01	2006/07	2000/01	2006/07	2000/01	2006/07
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.03	0.02	0.01	0.01	0.00	0.00
3b	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.04	0.03	0.01	0.01	0.01	0.01
3a	0.03	0.02	0.03	0.00	0.03	0.03	0.03	0.01	0.04	0.03	0.13	0.13	0.06	0.04	0.05	0.04
4	0.13	0.11	0.18	0.12	0.12	0.11	0.12	0.12	0.15	0.27	0.22	0.22	0.16	0.18	0.18	0.17
5	0.48	0.49	0.46	0.52	0.49	0.48	0.50	0.50	0.47	0.35	0.40	0.43	0.46	0.47	0.42	0.43
5*	0.34	0.37	0.33	0.36	0.34	0.37	0.35	0.36	0.31	0.34	0.18	0.17	0.31	0.30	0.34	0.35
5+5*	0.82	0.86	0.78	0.88	0.84	0.86	0.85	0.86	0.78	0.69	0.58	0.59	0.76	0.77	0.77	0.78

Sources: HESA (RGCI income, staff, PhDs); HEFCE, HEFCW, SFC, DELNI (QR); Thomson Reuters (articles)

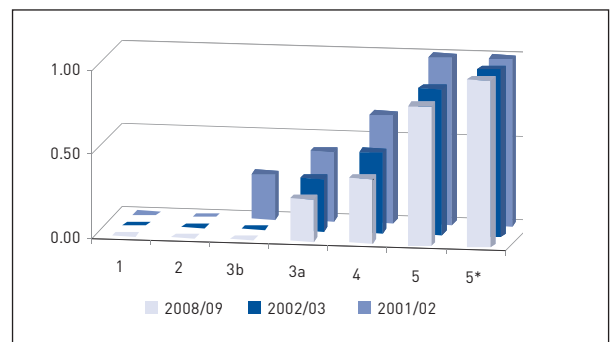
- the overall increase in concentration cannot be attributed solely to changes in QR allocations. The data presented in Table 1 show that it is also due in part to increased concentration of research grants and contract income, which have also been increasingly allocated to the higher scoring units;
- research contracts from industry are the one category of research funding which is becoming less concentrated. Grade 4 units have significantly increased the proportion of this money which goes to them – from 15 per cent to 27 per cent over the six year period. One interpretation is that as grade 4 units receive less money through QR and the research councils, they put more effort into securing industrial contracts.

Chart 1:
Changes in QR weightings
against RAE grade between
2001/02 and 2008/09

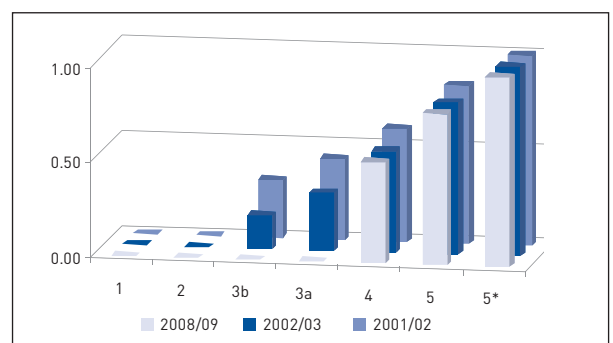
England (HEFCE)



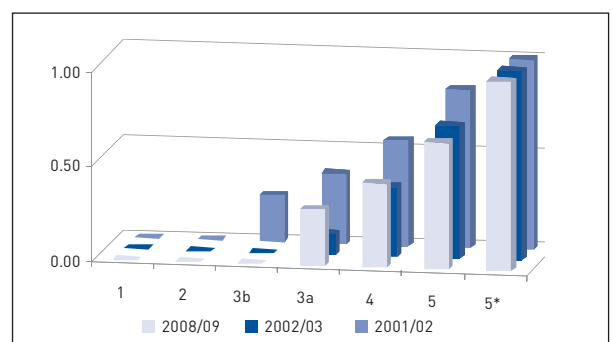
Scotland (SFC)



Wales (HEFCW)



Northern Ireland (DELNI)



3.2 Findings within the sample disciplines

In broad terms the picture across our six sample disciplines is as follows:

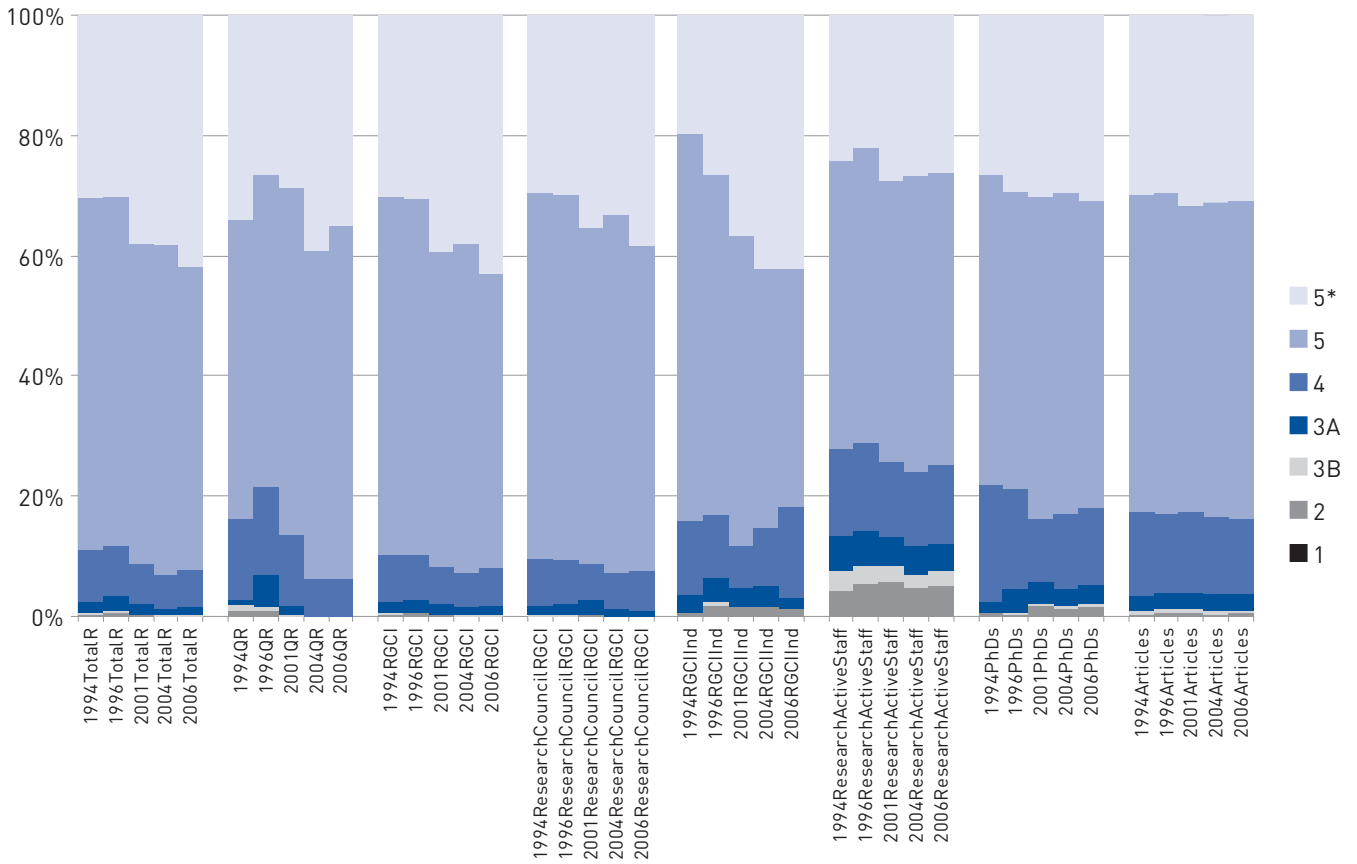
- **Biology** (unit of assessment 14) is one of the most research-concentrated areas, but even so shows a continuing trend to further concentration across all indicators except for industrial research funding;
 - **Chemistry** (unit of assessment 18) is currently less concentrated than biology. Chemistry however also demonstrates a trend to further concentration across most indicators, especially in terms of research active staff;
 - **Mechanical engineering** (unit of assessment 30) has a strong trend to increasing concentration in terms of 'people' - research active staff and numbers of PhD students. Research funding is becoming more concentrated in grade 5 and 5* units;
 - **Psychology** (unit of assessment 13) shows increasing concentration in most areas of research funding, but a less consistent picture in terms of the other indicators. Research active staff are widely spread over units with diverse RAE scores, and numbers working in the lower scoring units are increasing. PhD students are also spread over a wide range of units. The balance of research outputs from differently graded units remains roughly the same;
 - Research funding in **sociology** (unit of assessment 42) (and the social sciences overall) shows a clear trend towards concentration. Measures of people and outputs show no such trend;
 - **History** (unit of assessment 59) (and the humanities overall) is a very mixed picture. Research funding shows no trend between differently graded units over the study period (except for QR, reflecting the overall change in funding council formulae). Research active staff are becoming more concentrated, while PhD students and research outputs are increasing in the lower graded units.
- In interpreting these data it is important to consider the overall funding and staffing position of these different subjects in relation to one another (see Table 2).
- Biology is far and away the largest of these disciplines, in terms of both research funding and number of research active staff (staff numbers for sociology and history are actually staff numbers for all social science and humanities disciplines);
 - over the last six or seven years, biology, chemistry and mechanical engineering have (1) increased their research funding by 24-34 per cent (in practice by less than this as these figures do not take account of inflation), while (2) the number of research active staff has remained constant;
 - Psychology, sociology (social sciences) and history (humanities) have seen a significant increase in research funding – by anything between 45 per cent and 53 per cent. Psychology has seen a significant increase in the number of research active staff (23 per cent) while history (humanities) has seen a massive 59 per cent increase in research active staff.

Table 2
Research income and numbers
of research active staff across
the six sample disciplines

Subject	Total research income			Research active staff		
	2000/01	2006/07	Growth	2000/01	2006/07	Growth
Biology (14)	400,607	511,596	0.28	3,253	3,099	-0.05
Chemistry (18)	155,770	193,473	0.24	1,332	1,147	-0.15
Mechanical engineering (30)	95,303	127,704	0.34	1,408	1,330	-0.06
Psychology (13)	63,849	94,148	0.47	1,705	2,101	0.23
Social sciences [Sociology (42)]	76,362	110,620	0.45	4,155	4,176	0.01
Humanities [History (59)]	56,904	86,990	0.53	3,634	5,767	0.59

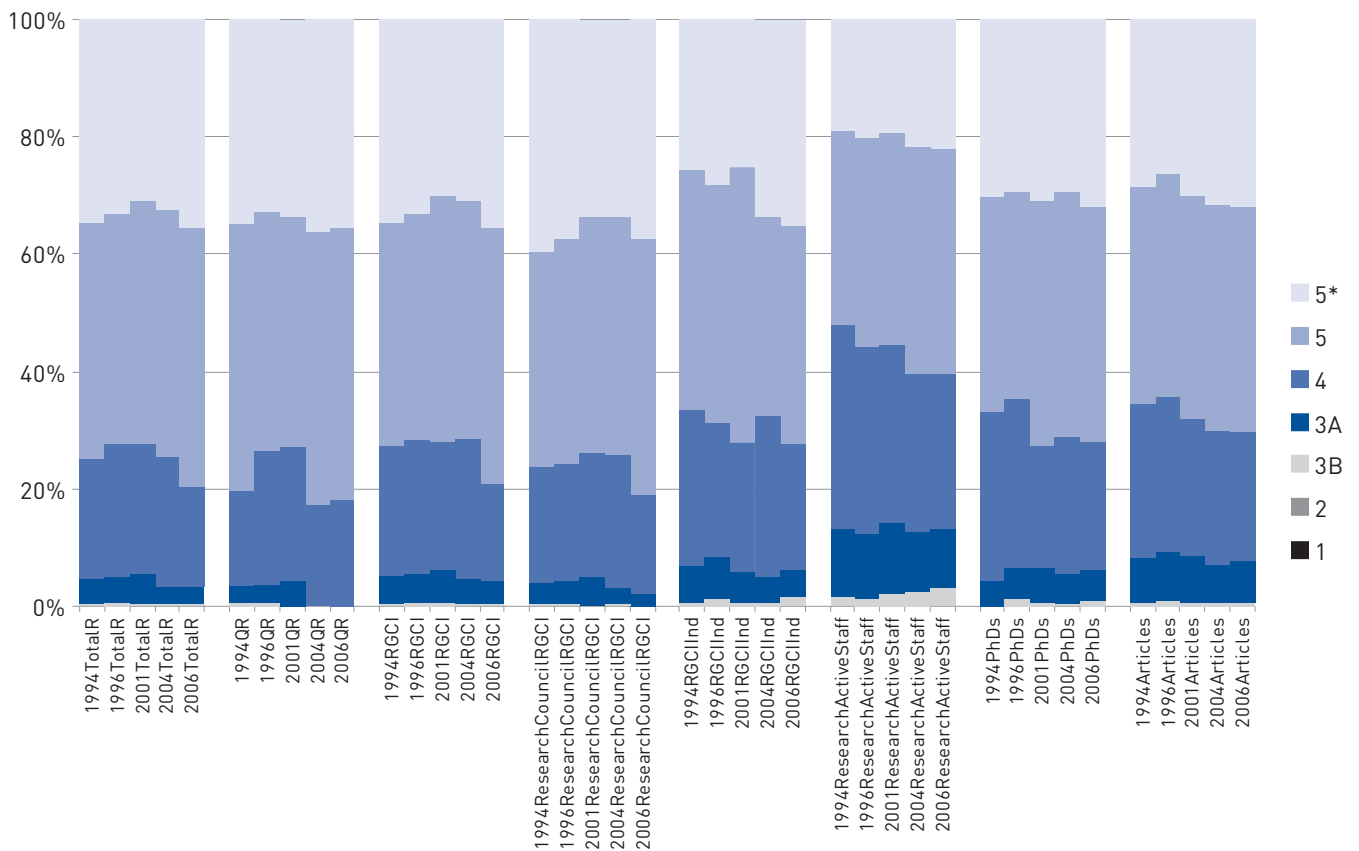
Total research income expressed as thousands of pounds, for example, current income for biology is £511.6 million

3.3 Biology



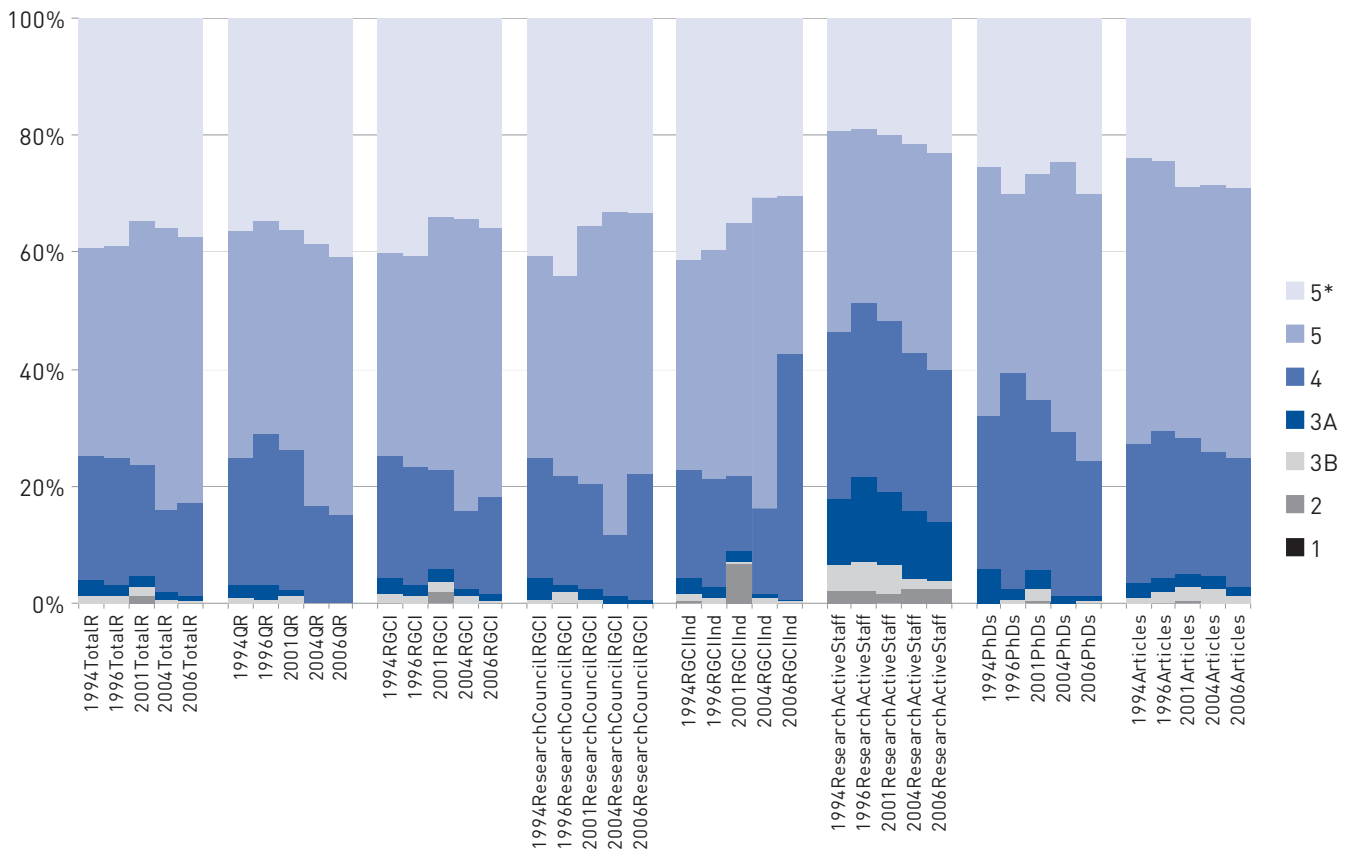
- Biology shows the highest levels of concentration across our selected indicators, compared with the other sample disciplines.
- Even against this high base level, there has been a consistent if modest increase in concentration over the last 12 years against all indicators with the exception of industrial research funding, where grade 4 units have lost out to both 5* and lower rated units.

3.4 Chemistry



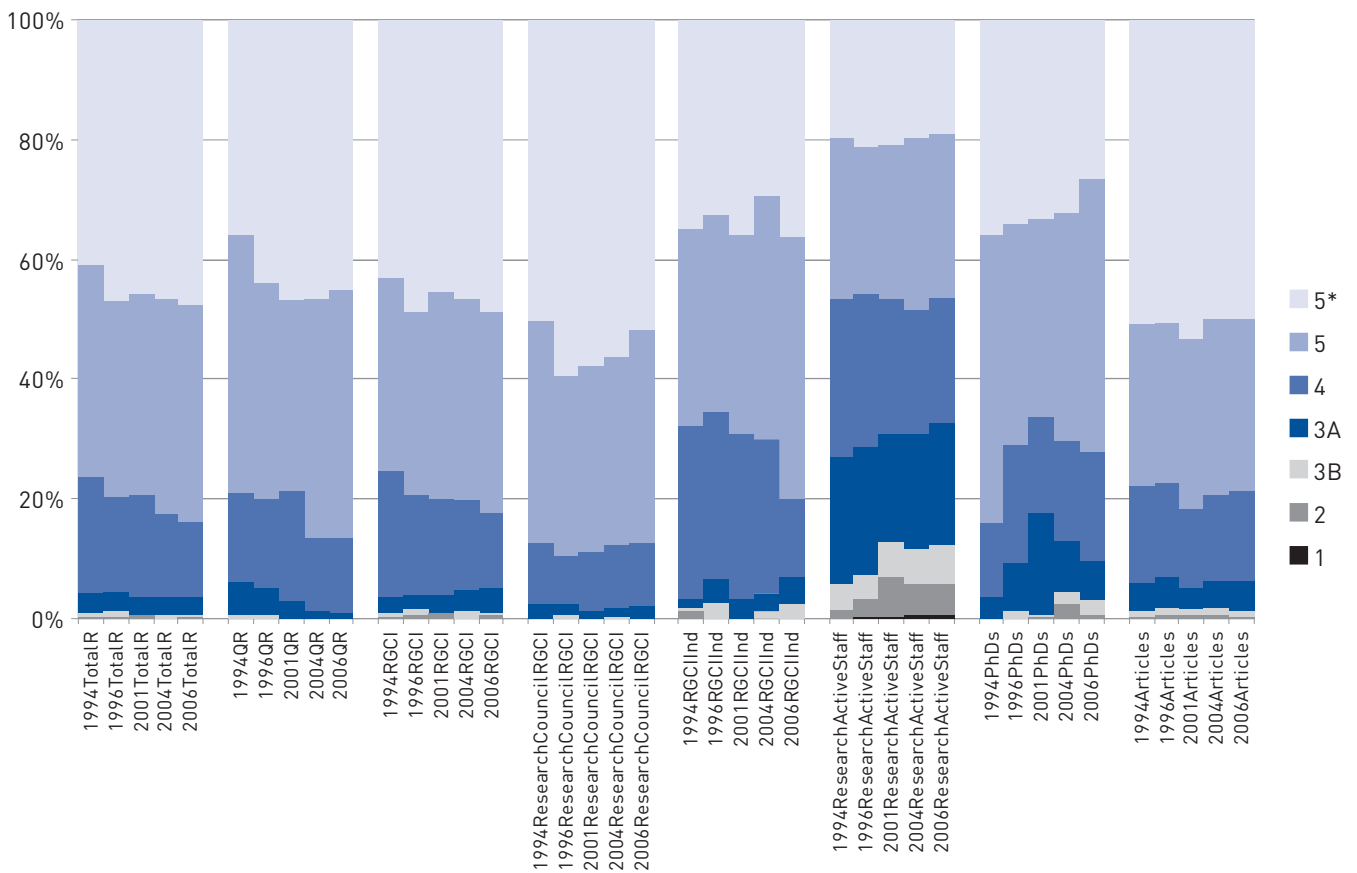
- Chemistry shows a strong trend towards further concentration in terms of research active staff, PhD students and research outputs over the last 12 years.
- Since 2001 there has also been a trend towards increasing concentration in research funding. Research funding is now more concentrated than it was in 1996.

3.5 Mechanical engineering



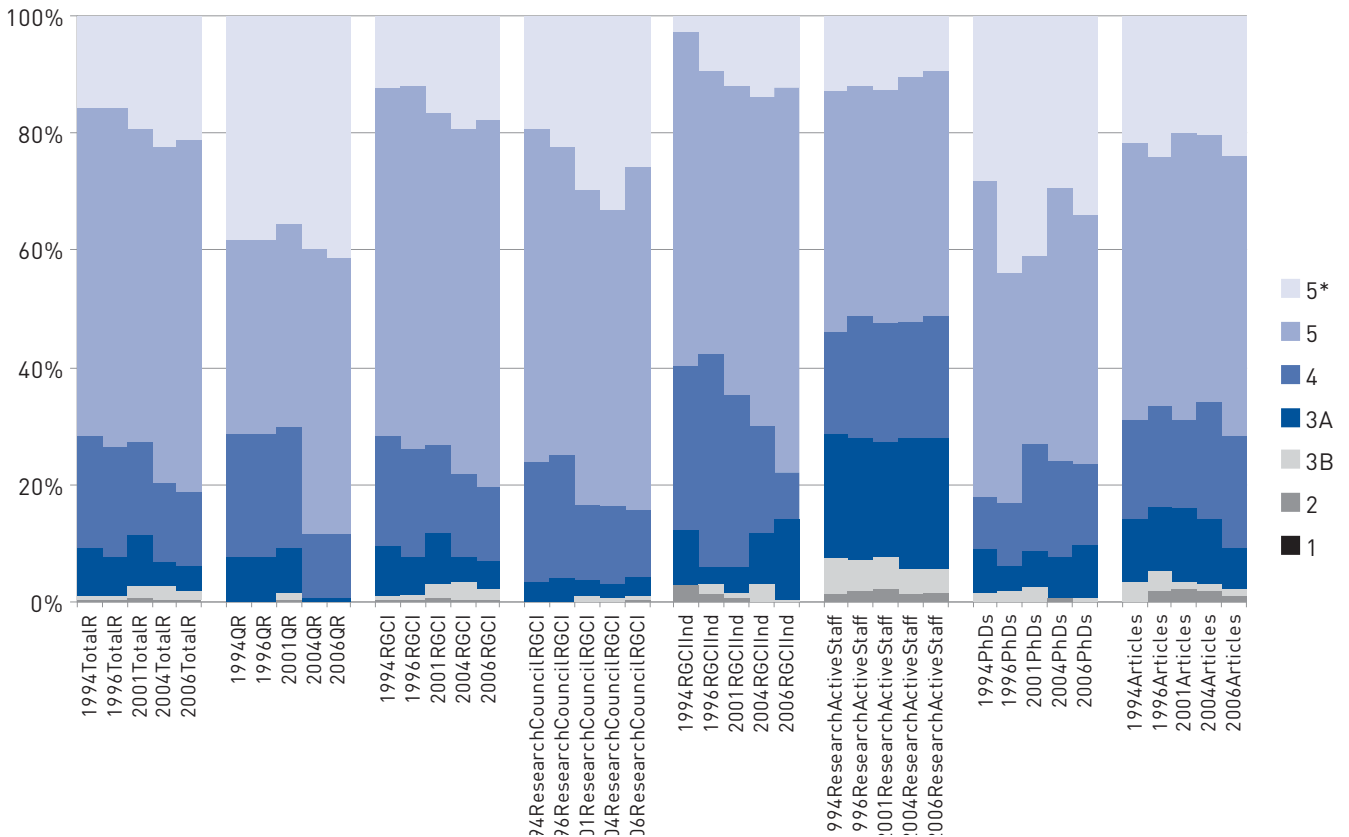
- Mechanical engineering shows a very strong trend towards concentration of research active staff, PhD students and research outputs in higher rated units.
- Research funding overall has become more concentrated in the grade 5 and 5* units, while industrial research has become stronger in grade 4 units in the last three years (at the expense of grade 5 units).
- Figures from Cambridge and Oxford universities have been omitted from these graphs, as these universities submit their mechanical engineering research under 'general engineering'.

3.6 Psychology



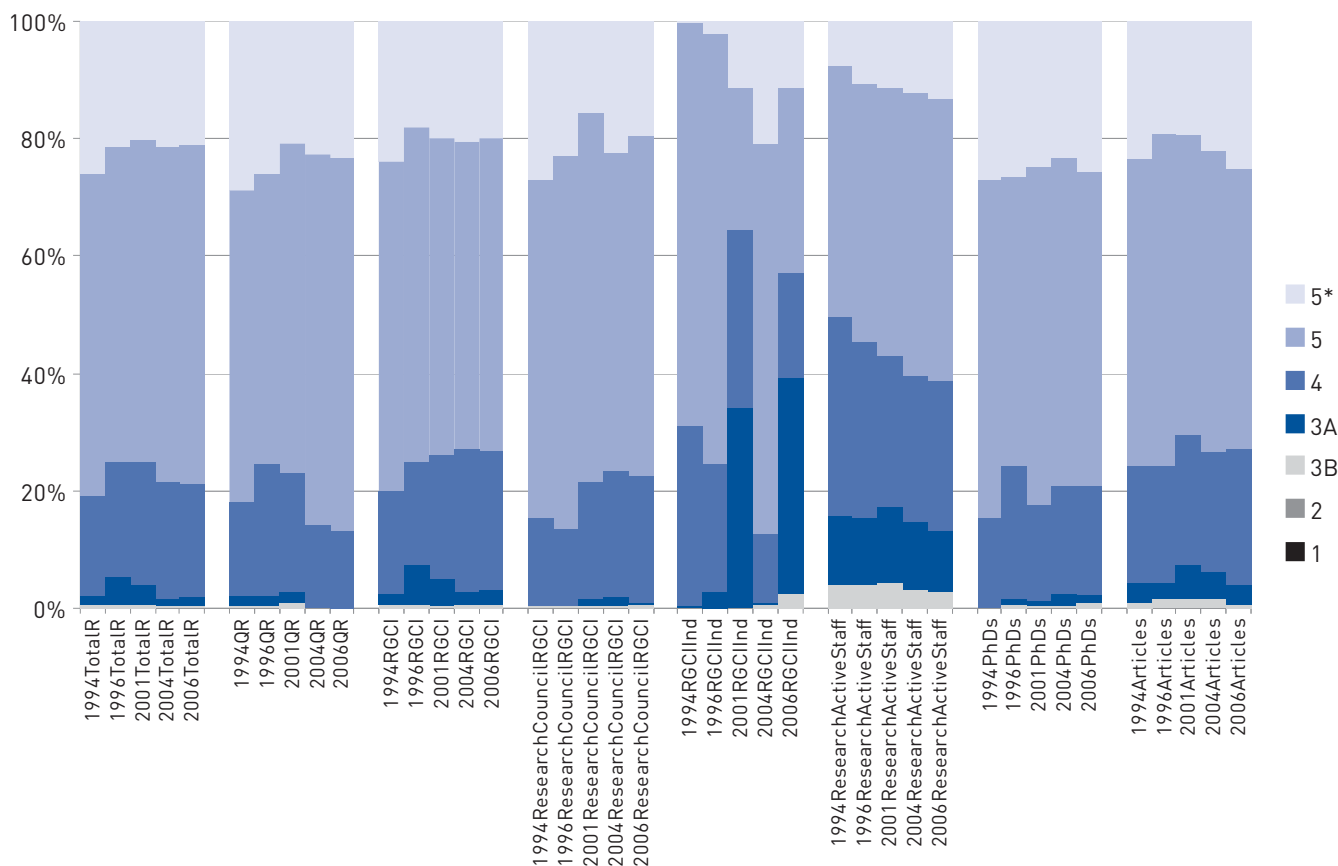
- Psychology shows increased levels of concentration in research funding from all sources with the exception of research council grants. These are static or moving away from 5* units to the benefit of grade 5 units.
- The distribution of research active staff is extremely diverse within psychology across the full range of differently graded units. Grade 2, 3b and 3a units would appear to be appointing more research active staff (as overall staff numbers have increased). Hence the proportion of staff employed in these units (as shown in the bar charts) is increasing.
- The number of research outputs produced by differently graded units has stayed about the same over the study period.

3.7 Sociology (as part of social sciences)⁹



- Across the social sciences, research funding from all sources is becoming increasingly concentrated in grade 5 and 5* units.
- Research active staff are spread across units which achieved the full range of grades at the RAE in 2001. There appear to be no consistent trends in the balance of staff working in units of different grades.
- The number of PhD students working from lower graded units appears to be increasing.
- There is a lot of 'noise' in the data relating to research outputs, and it would be unwise to attempt to draw conclusions.

3.8 History (as part of humanities)¹⁰



- Research activity over time against our set of funding indicators in the humanities shows a lot of 'noise' in the data.
- The data on industrial research are of no consequence. This is not, as yet, a major source of research funding in this field. This is not a surprising result. The gearing between specific quantitative indicators and research excellence is much less clear in the humanities and this has been influential in the policy development around the REF.
- On publications, the shift to peer reviewed journals as a key output mode is present but is not yet a major factor.

- The research system in UK higher education is already highly concentrated. There is also considerable diversity within the system - this is reflected in the spread of activity captured in the bar charts in Section 3 of this report.
- The headline data presented in Section 3.1 suggest that research has become more concentrated in grade 5 and 5* units over the last 12 years. This is true for all the variables we have looked at, with the exception of industrial grant income.
- The degree of research concentration, and the way concentration has altered over the period of this study, is discipline-dependent. It would be misleading to suggest that the whole research base is at the same point.
- The percentage of research funding going to grade 5 and 5* units has increased by 4 per cent in only six years (from 82 per cent to 86 per cent).
- It has been argued that the units which have been most vulnerable to further concentration are those in the middle – the 4s and the 3s as defined by RAE 2001. The impact of further concentration on research excellence – in terms of research carried out by units scoring 5 or 5* – would be minimal in most disciplines. These units already receive the lion's share of the funding, and any increase for them would represent a fairly small percentage of what they already receive. Units scoring grade 1 or 2 in the RAE would not be greatly affected by further concentration. Their levels of research funding are already minimal, and it is likely that they are not generally in direct competition with the highest graded units as their funding streams are often dominated by regional or local industrial sources, or research customers from a specific niche.
- This study suggests that different disciplines have achieved different levels of 'maturity' in terms of the development of the research base. Of the subjects we examined, the one that is the most concentrated is biology, where research concentration continues to increase. Chemistry and mechanical engineering are less concentrated at present, but are rapidly becoming more so. Psychology presents a more confused picture, reflecting perhaps the major quantitative and qualitative changes which have occurred in this discipline since 1994.
- Data produced for this report have highlighted the way QR – often cited as a funding stream which spreads resource around – has contributed to the increase in concentration over the last six years. QR however is distributed to universities as a block grant, and the way vice-chancellors choose to distribute this (between different disciplines achieving different grades at the RAE) is one way in which research diversity could be maintained.

- 1 The six selected disciplines were biology, chemistry, mechanical engineering, psychology, sociology and history.
- 2 In this report we refer to the 'units' which achieved different ratings at the RAE, and within which we are looking for measures of concentration. In some institutions, and in some disciplines, submissions to the RAE and measures of concentration may be made at a departmental level, in others at a research unit level and in others at a school / faculty level.
- 3 *Funding research diversity: the impact of further concentration on university research performance and regional research capacity (2003)*
 Summary report: www.universitiesuk.ac.uk/Publications/Documents/funding_sum.pdf
 Technical report: www.universitiesuk.ac.uk/Publications/Documents/funding_tech.pdf
- 4 *Monitoring research diversity: changes between 2000 and 2005 (2006)*
http://www.universitiesuk.ac.uk/Publications/Documents/researchreport_monitoringdiversity.pdf
- 5 *The future of higher education*
- 6 Total research funding (indicator 1) is the sum of QR (indicator 2) and RGCI (indicator 3)
- 7 Total RGCI (indicator 3) is the sum not only of research council income (indicator 4) and industrial research contracts (indicator 5), but also other sources of grant and contract income such as charities, local government, EU and overseas funding. These other sources have not been subjected to analysis in this study.
- 8 Research active staff are defined as academic staff whose employment function is teaching and research or research only (ie excluding teaching only); their mode of employment can be full- or part-time, and their terms of employment can be permanent or fixed term (excluding therefore casual/ hourly paid staff). Research active staff are those in a position to take on the role of 'Principal Investigator'. 'Research Assistants' – usually employed on 'research grades' rather than academic grades, do not fall into the 'research active' category.
- 9 Disaggregated data are not available for sociology against some of our indicators:
 - Data presented for PhD students, research outputs (articles) are for sociology;
 - Data for research active staff are for all the social sciences;
 - Funding data relating to industrial funding, research council funding and research grants and contract income are for all of social sciences;
 - Funding data for QR are for sociology;
 - Total funding data are the sum of total RGCI and QR, and so are a mix of data relating to sociology and social sciences.
- 10 Disaggregated data are not available for history against some of our indicators:
 - Data presented for PhD students, research outputs (articles) are for history;
 - Data for research active staff are for all humanities;
 - Funding data relating to industrial funding, research council funding and research grants and contract income are for all humanities;
 - Funding data for QR are for history;
 - Total funding data are the sum of total RGCI and QR, and so are a mix of data relating to history and humanities.



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