

Job security for early career researchers is a significant factor in helping research make an impact.

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Doctorate holders' careers are increasingly diverse and research funders have a strong interest in exploring how their investment has contributed to the career paths of the researchers supported and how their work benefits society. Funders are also looking to understand the challenges, bottlenecks and opportunities at different career stages in order to tailor policies and activities to researchers' needs. [Siobhan Phillips](#) and [Rhona Heywood-Roos](#) share some of the headline findings of the European Science Foundation's career tracking study. Unsurprisingly, employment insecurity was noted as the greatest source of career dissatisfaction amongst researchers and the highest cited reason for withdrawal from research careers. The survey findings also found that ECRs with permanent jobs are nearly three times as likely to have had a significant impact on policy or practice than those on temporary contracts.

The [European Science Foundation](#) (ESF) has studied research careers through various members' initiatives, culminating in the work of the Member Organisation Fora '[Research Careers](#)' and '[European Alliance on Research Careers](#)'. As a follow-up, ESF initiated a career tracking pilot study in 2014 together with five participating research funding/performing organisations:

1. AXA Research Fund (AXA RF), France – private (funding) foundation
2. Fonds National de la Recherche (FNR), Luxembourg – research funding organisation
3. Goethe Graduate Academy (GRADE), Goethe University Frankfurt, Germany – university
4. Paul Scherrer Institute (PSI), Switzerland – research performing organisation
5. The Special Programme for Research and Training in Tropical Diseases (TDR), a co-sponsored programme of UNICEF, UNDP, the World Bank and WHO – international training programme

The aim of this [stand-alone pilot](#), which kicked off with a survey and produced a report and process manual (ongoing), was to establish the feasibility of this kind of study and to test the validity and reliability of the instrument (the questionnaire). Some 500 doctorate holders responded to the survey (a response rate of 57%), most of whom were at early stages of their career.

While addressing methodological issues was the main purpose of the career tracking study, some of the findings proved unexpectedly interesting, providing material for debate and further study on the consequences of oversupply/lack of absorptive capacity of doctorate level qualifications.

The study is set against a context of increasing numbers of numbers of doctorate holders internationally, encouraged by national governments' knowledge economy policies together with the European Research Area objectives which envisage the development of a common European Research and Development policy to **boost employment and growth in Europe**.

Between 1998 and 2006, the number of PhDs awarded in the OECD countries increased by some 40% prompting discussion of PhD bubbles, academic inflation, diminution in quality and concerns that an expensively educated group would not find suitable careers and displace others in posts that traditionally did not require a PhD. As an editorial put it in [Nature](#):

The problem is widely discussed, yet many PhD programmes remain firmly in the traditional mould — offering an apprenticeship for academic research, even as numbers of academic positions stagnate

or decline. Yes, there are many worthwhile careers outside academia for science PhD holders... Widening concerns about dismal job prospects are dissuading some of the brightest candidates from taking the PhD route.

Something needs to change — but what? Ideally, the system would produce high-quality PhD holders well matched to the attractive careers on offer. Yet many academics are reluctant to rock the boat as long as they are rewarded with grants (which pay for cheap PhD students) and publications (produced by their cheap PhD students). So are universities, which often receive government subsidies to fill their PhD spots.

The editorial noted that the proportion of people with science PhDs who get tenured academic positions in the sciences had been dropping steadily and that industry had not fully absorbed the additional supply. It pointed out that in 1973, 55% of US doctorates in the biological sciences secured tenure-track positions within six years of completing their PhDs, and only 2% were in a post-doctorate or other untenured academic position. By 2006, only 15% were in tenured positions six years after graduating.



The University of Massachusetts Amherst at night by Rhobite (CC BY-SA 3.0, Wikimedia)

Those who completed their doctorates relatively recently risk long-term stints in poorly paying and increasingly, multiple post-doctorate positions (see [OECD -KNOWINNO](#) project findings) with little opportunity for progression or security. This is usually after an extended period in education and relatively late entry to the workforce. Knock-on consequences pointed out in the [Deloitte Researcher's Report 2014](#) can include poor working conditions, inadequate social security cover and underfunded pension provision.

Not surprisingly, this issue came out strongly in our survey with employment insecurity being the greatest source of career dissatisfaction amongst researchers and the highest cited reason for withdrawal from research careers. It was also the subject of critical comments in the focus groups:

“Ongoing moves and staff changes caused discontinuities in some units and contributed to lower research outputs.”

“Sometimes, available infrastructure could not be operated appropriately due to lack of knowledge or experience as

the persons in charge had left.”

“I want to stay in research, but at what cost – there is a point where ongoing insecurity and instability will cause me to leave what should be a fulfilling career.”

One of the most striking findings from the survey is that the evidence suggests this type of system is inefficient and damaging. Comparisons between the researchers on permanent contracts and those on temporary contracts belie the notion that the flexibility of temporary contracts is beneficial for employers. In the previous twelve months, those on permanent contracts were:

- Twice as likely to produce patents
- Nearly three times as likely to have had a significant impact on policy or practice
- More likely to have been awarded an academic prize
- Nearly twice as likely to have undertaken public engagement activities.

Table: Comparison of outputs/impacts for permanent and temporary post-holders in previous twelve months

Output/impact	Permanent posts		Temporary posts	
	N ^o	%	N ^o	%
Presented work at national conference	112	71%	166	65%
Presented work at international conference	112	71%	204	80%
Lead author for peer-reviewed article	111	71%	180	71%
Other author for peer-reviewed article	120	76%	187	73%
Awarded an academic prize	23	15%	27	11%
Produced new research resources or software	44	28%	62	24%
Filed a patent	13	8%	11	4%
Registered a new product licence	0	0%	1	0.4%
Had significant impact on policy	31	20%	18	7%
Received media coverage	41	26%	55	22%
Undertook public engagement activities	35	22%	34	13%
Contributed book chapter	43	27%	58	23%
Published book	13	8%	14	5%

Note: Percentages do not add up to 100% because respondents may have selected several replies.

Satisfaction levels in a number of key areas are also higher in statistically significant ways. Specifically, those with permanent/tenured contracts were significantly **more satisfied** with the following aspects of their current working environment:

- The scientific environment of their workplace ($p < .05$)
- The organisational culture of their workplace ($p = .001$)
- Career development support ($p = .01$).

It could be argued that the difference in productivity between those on temporary and permanent contracts is attributable to their seniority/expertise/reputation i.e. factors other than their employment security. One of the ways to test this is to examine whether the differences hold up when a sub group of those who have similar levels of experience.

We performed a supplementary analysis isolating researchers at the first/early 'R1' and 'R2' stages' (early stage researchers who are not yet fully independent). While the numbers of those in established positions is small (53 in permanent posts compared to 152 in temporary positions), the trends are similar in the sense that those on permanent contracts were:

- More than three times as likely to have had a significant impact on policy
- Nearly twice as likely to have undertaken public engagement activities (17% compared to 12%)
- More Likely to have received media coverage
- Twice as likely to have published a book.

For both the entire sample and more 'junior' sub-group, the levels of publications (apart for books in the sub-group) and conference activity is similar for those on permanent and temporary contracts. If it were the case that those on permanent contracts were more competent say, than those on temporary contracts, one might expect the level of publications to be higher for the former group. Taken together, these findings suggest that those on temporary contracts are behaving rationally in response to the incentives of the academic job market. As such, they are more focused on individual achievements and the kinds of outcomes that are recognised and rewarded by the system (publications) in the form of employment security. Those that are not on constant alert for their next employment position are 'freer' and thus likelier to produce more societal type outcomes – policy influence, public engagement, patents etc.

While further study with larger samples of how tenure intersects with productivity and career satisfaction is clearly warranted, these findings provide food for thought. They appear to dovetail with those of [Peterson et al. \(2012\)](#) who found that short-term contracts (amongst physicists) can amplify the effects of competition and uncertainty, making careers more vulnerable to early termination. Their conclusion is that short-term contracts may increase the strength of the 'rich-get-richer' mechanism in science and hinder the upward mobility of young scientists.

If, as seems to be the case, those on permanent contracts are more satisfied with important aspects of their work environment and are more productive in terms of societal and economic impacts, the traditional and increasing trend towards less secure contracts needs to be examined as it is of benefit neither to science nor to society. Lack of tenure-track structures and crushing levels of competition for very few posts is also costly in the sense that investment in fourth level education is not being fully realised. Negative policy impacts include early withdrawal from science careers and others that are more difficult to quantify but take in motivation, research team/work discontinuities and good will.

The dilemma is that the creation of more tenure track positions in academia will have the effect of reducing the number of research positions available. This could be counterbalanced by the development of more post-doctorate positions outside academia or even reducing/slowing down the growth in numbers of those going into doctorate level study. At a minimum, there needs to be much more guidance and communication with those considering doctorate level study to ensure that they make informed choices and that their expectations are aligned with the reality that only a tiny minority will achieve tenure in academia.

While more study of these trends is needed, what nobody wants to see is wide scale displacement effects and/or under-utilisation of expertise that is costly for the state and requires huge individual effort and sacrifice in terms of late entry to work-force, long periods on low salary and high levels of uncertainty.

More information on www.esf.org/career-tracking-pilot, where the full report can be downloaded

Note: This article gives the views of the author, and not the position of the Impact of Social Science blog, nor of the London School of Economics. Please review our [Comments Policy](#) if you have any concerns on posting a comment below.

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