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## HIGHER EDUCATION AT THE CROSSROADS

### Submission in response to Ministerial Discussion Paper

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### Summary

There are several significant problems with the publications component of the IGS and RTS funding formulas:

- ▶ It rewards quantity, not quality. A university is allocated the same amount of funding whether it's publication is a ground-breaking article in *Nature* or a very pedestrian piece in the *Canberra Journal of Frostbite Studies*. The publication must appear in a refereed journal, but that definition is very inclusive. As a result, we have seen an explosion of publications from Australian universities appearing in the lowest impact journals.
- ▶ The collection of the information required for this component of the collection is expensive, both in relation to auditing the universities' returns, and their compilation by the institutions.
- ▶ Many universities have adopted the **totally inappropriate** practice of using an identical formula to internally distribute the money obtained through the IGS to the faculties, departments, and even researchers, that 'earned' it.

It is essential that the funding formulas be amended to overcome these problems by:

- incorporating quality into the equation
- using externally available and verifiable data

The publications component of the formula should be dropped immediately, and replaced after extensive research and consultation on the efficiency and efficacy of possible alternatives. Recognising that a number of institutions rely on this element of the formulae for significantly more than the notional 10%, distribution of funds under these schemes should be set at an average of the most recent three years data.

## The Publications Collection - Cause for Concern

Initial concerns surfaced about the direction in which the publications component of funding formulas currently in place in the higher education sector was driving universities when data produced by the Institute for Scientific Information (ISI) confirmed the marked increase in Australian output in the journal literature (Figure 1), but pointed to a significant decline in citation impact relative to many OECD countries (Figure 2).

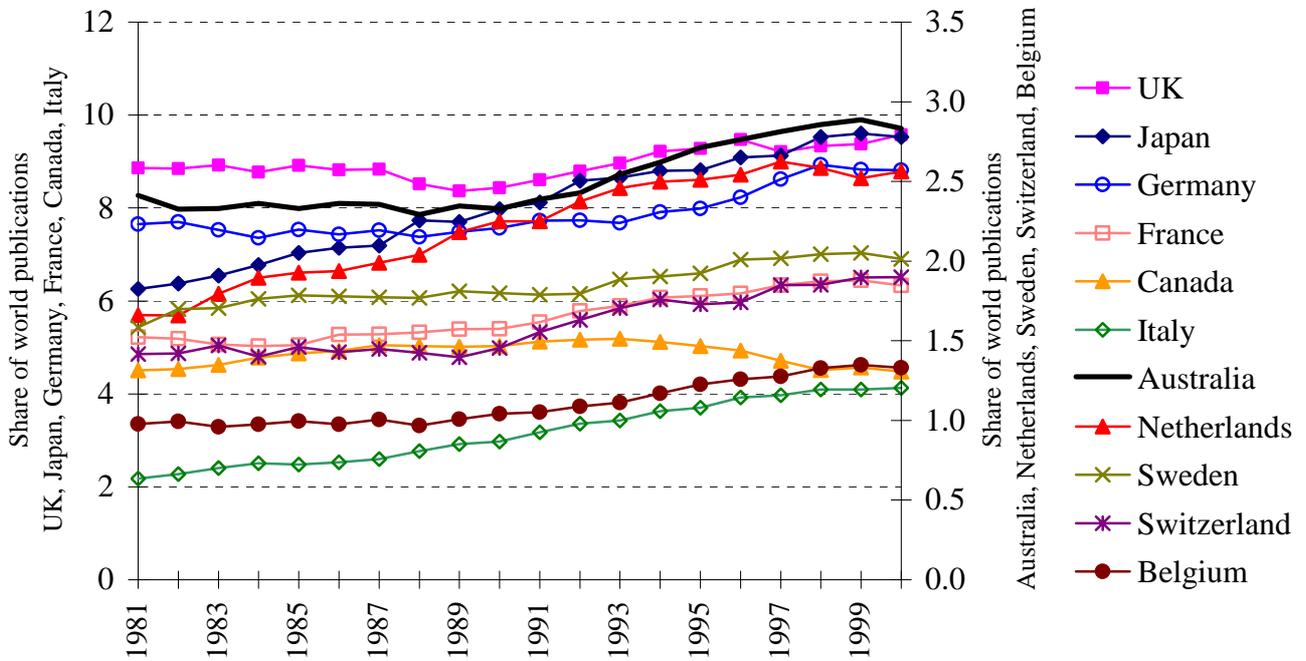


Figure 1: National shares of ISI publications, selected OECD countries, 1981-2000 (source: NSI database)

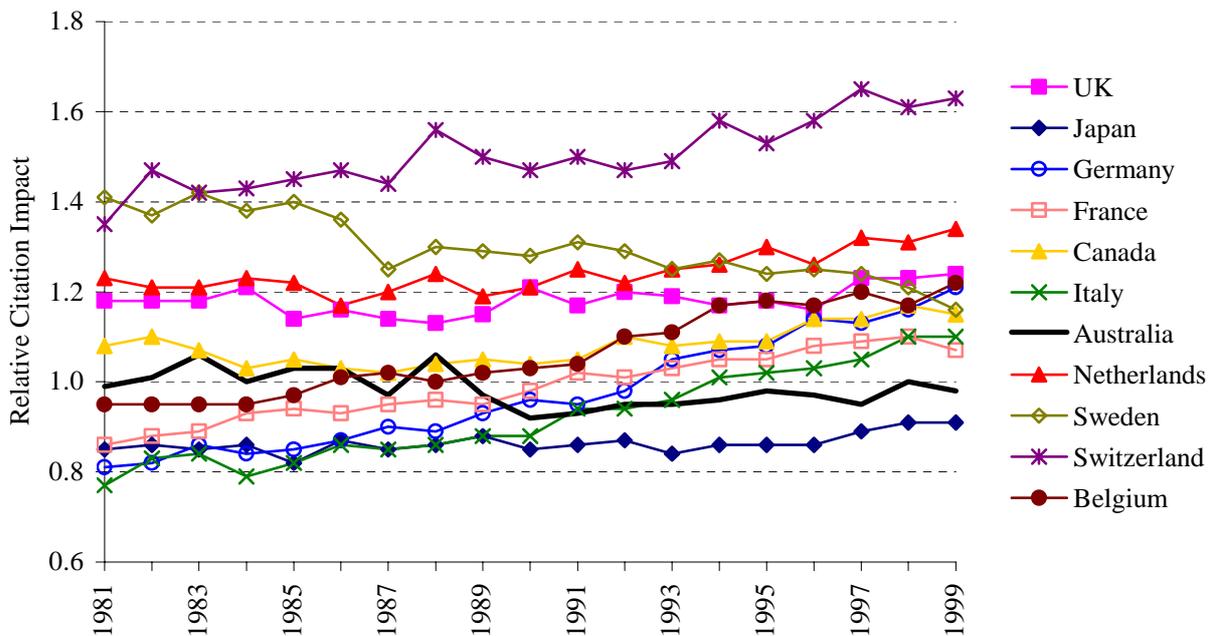


Figure 2: National trends in relative citation impact, selected OECD countries, 1981-1999 (source: NSI database)

Data held by the Research Evaluation and Policy Project (REPP) at the Australian National University, clearly indicates that the decline in relative citation impact may be due to the increased output appearing primarily in low impact journals. Figure 3 provides some initial evidence supporting this hypothesis. Australia's presence in the bottom quartile of journals<sup>1</sup>, suddenly jumped two-thirds in the 1990s from a stable 0.8% to 1.3%. Our presence in the 3rd quartile also jumped nearly 50%, while it exhibited a more modest increase in the top two quartiles. The timing of this sudden jump points to the introduction of the Research Quantum<sup>2</sup> publications collection as one of the major underlying causes.

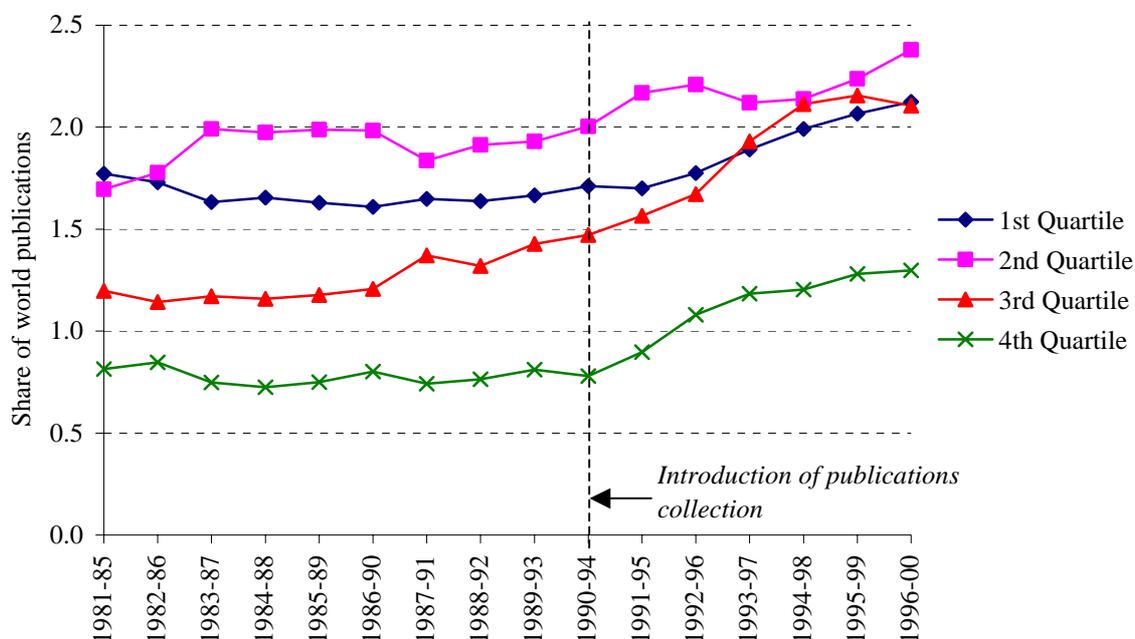


Figure 3: Australian Universities' Share of Publications by Journal Impact Quartiles – 5 year windows

The first year for which Australian universities reported publications data was 1992. Initially details were collected on an extensive range of publication types, but after a sample audit of 1994 publications this was reduced to four categories, by far the largest of which is articles in refereed journals. Articles in any refereed journal were acceptable, but unless the journal was indexed by ISI<sup>3</sup>, universities had to prove the journal was refereed before they could include any publication that appeared in it. Not surprisingly, ISI-indexed journals gained favour with Australian academics.

The disturbing aspects about the trend in Figure 3 is the disproportionate increase in university output in journals allocated to the bottom two quartiles. The percentage increase in their presence in each quartile rose between 1990-94 and 1996-2000 by:

- 1st quartile 24%
- 2nd quartile 19%
- 3rd quartile 43%
- 4th quartile 67%

If one assumes it is easier to place an article in a relatively low impact journal, it is hardly surprising that we see the trends evident in the above figure – universities are, after all, being rewarded for the simple

<sup>1</sup> The average citation rate for the publications appearing in a journal over a five year period was calculated, and journals were classified to one of four quartiles on the basis of this average. The averages were recalculated for each five year window so a journal could (and some did) move between quartiles from one period to the next.

<sup>2</sup> Subsequently this data continued to be collected for input to formulas used for distributing funds from the Institutional Grants Scheme and the Research Training Scheme.

<sup>3</sup> This was subsequently broadened to include any journal specified as refereed in Ulrich's index of journals.

fact that they have published an article, not where that article has been placed or any assessment of the quality or impact of the research it reports.

Disaggregating the university output into fields of research does little to change the picture presented. All fields, with the notable exception of the physical sciences, exhibit similar trends. In contrast, this sudden increase in output in the bottom two journal quartiles in the latter half of the 1990s is not seen in other major research sectors –CSIRO, hospitals, medical research institutes, or government agencies. It is a trend only found in the university sector, hence its root cause must also lie within that sector.

In the same context, it is informative to contrast the placement of publications in journals from two universities, for this purpose identified as 'X' and 'Y'. The two universities have broadly similar research interests with large medical schools and activities across a diverse range of fields. Neither was affected significantly by the institutional amalgamations that occurred after the Dawkins reforms. In the late 1980s, both universities introduced major, but quite different, changes to their research management policy, though both sought the same outcome: to strengthen and enhance their research profile.

University X introduced a formula for distributing a significant proportion of research funds, one major component of which was a publication count. The formula was (and remains) more sophisticated than the current IGS and RTS model, with many more publication categories, and different weightings for each category in the different fields of research. Nevertheless, the formula was based on quantity, not quality. In direct contrast, University Y's strategy was more strategic – targeting specific disciplines in which the resource base was significantly increased, and attracting many of the country's brightest young researchers in those areas. University Y also distributes some of its teaching and research funds using publication counts, but University X allocates 4 times the proportion that University Y does on this simple productivity measure.

The different strategies are reflected in a number of key statistics. In University X, teaching and research and research only staff numbers rose in unison between 1988 and 2000 – 44% and 46% respectively. In University Y, teaching and research staff rose just 13% while research only staff more than doubled, increasing by 113%. The effect of the different management strategies is also reflected in bibliometric data. Figure 4 looks at the relative citation impact of the journals in which the two universities published (“relative” to the world average impact).

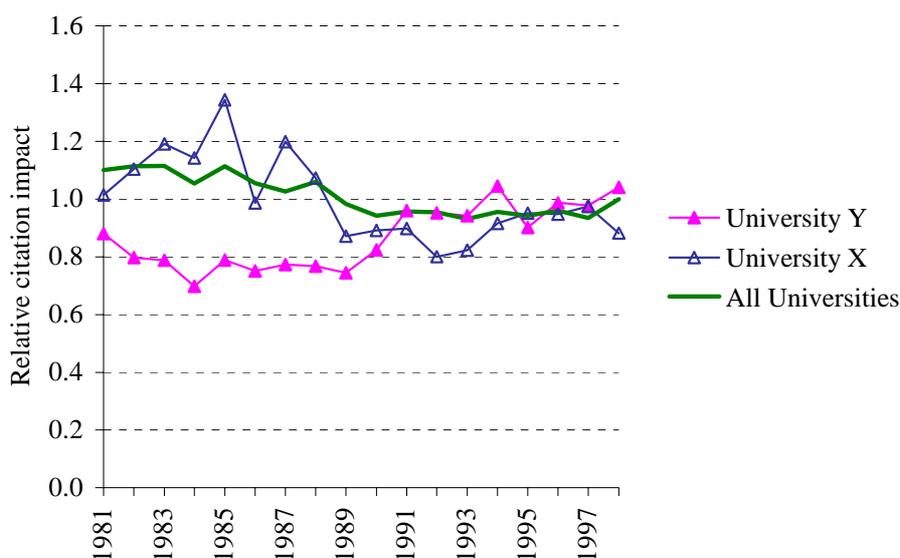


Figure 6: Comparison of relative citation impact trends for two universities with the overall

The RCI for University X followed a similar, though more exaggerated trend to that for the university sector as a whole. Its RCI dropped from a peak in 1985 and declined at a faster and longer rate than for

universities in general, though it has regained a measure of the lost ground in recent years. In stark contrast, University Y's RCI remained steady but very low at less than 0.8 through until the end of the 1980s, followed by a significant improvement in the 1990s. It exhibits none of the decline shown for the sector as a whole or for University X.

This evidence gives rise to concerns about the distorting effects of distributing research funds using publications counts. It comes as no surprise – a measure that provides monetary incentive to publish more, without regard to where the output is placed, could be expected to produce this result. More analysis is required – an attempt needs to be made to understand why the physical sciences does not follow the general trend; and other universities that are counter-trend need to be identified and an explanation sought. But the basic concern remains – should researchers be rewarded for quantity with little regard given to quality?

The answer to that should be a resounding 'no'. The publications component of the formula should be dropped immediately, and replaced by a more strategically targeted alternative measure, after extensive research and consultation on the efficiency and efficacy of possible alternatives. Recognising that a number of institutions rely on this element of the formulas for significantly more than the notional 10%, distribution of funds under these schemes in the interim should be set at an average of the most recent three years data.

Ideally, any alternative measure used should be collected externally to the universities, provided it can be independently verified and the sector is confident in its use. This would have some major benefits. The money currently expended on the external audit of publications could be used to collect the data – no additional funds would be required, and universities would be spared the extensive resources currently committed internally to the collecting the required data. More importantly, data would be collected on an institutional basis, and it would not be necessary to identify either the department or the individual who 'earned' the money. Universities would need to introduce procedures for internally distributing research funds that are far more acceptable than merely mimicking a system designed for the sector as a whole.