

# In Defence of ‘Early Career Universities’<sup>1</sup>

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## **Abstract**

The expansion of access to tertiary education resulted in the creation of many new universities in the 1970s and 1980s. As a parallel to use of the term ‘early career researchers’, these institutions can be labelled ‘early career universities’ (ECU). With the move in many countries to a greater use of metrics in the assessment of research, the implications for ECUs must be recognised. Data from a comprehensive study of Australian publication output, alongside a detailed analysis of one ECU, provide important insights into the issues that might arise. It reveals that ECUs can be characterised by a rapid increase in publication output, and a reliance on non-ISI journal outlets. Both trends diminish the usefulness of common bibliometric measures and evaluators must be sensitive to this. Where multi-year citation windows are used, the deflating effects on citation rates publication output biased towards the most recent years needs to be recognised and catered for. In addition, it is clear that ISI coverage of ECU output is much lower than for established universities.

## **Introduction**

In the evaluation of research performance, there exists a sensitivity to the plight of early career researchers – those academics who are in the early years of their post-doctoral career. When submitting grant proposals, seeking positions or applying for promotion, it is recognised that many performance measures used for established researchers are inappropriate.

The same allowances have not been made for ‘early career universities’ (ECU). With the rapid expansion of access to higher education in many countries in the 1970s and 1980s, the number of institutions granted university status increased significantly. Many evolved from former polytechnics or institutes of advanced education. Overnight, their roles changed to encompass a commitment to research in addition to their traditional teaching roles.

Just as individual researchers take time to establish their career, new universities also take time to establish an institutional track record in research. If it is necessary, as many analysts advocate, to cover at least eight years (Moed and Van Raan 1988) or even ten years (Van Leeuwen et al. 2003) before the lasting contribution of a group can be assessed, then this is also the minimum for institutions. As governments move to a greater use of metrics in the assessment and funding of research, there is a critical need to be sensitive to the implications this can have for ECUs.

A recent extensive literature review of quantitative indicators revealed no references specifically on this issue (REPP 2005). Discussion to date on problems with indicators has tended to focus on differences in research orientation, rather than the age of the university (e.g. Van Raan 2005). However two recent studies shed considerable light on this topic. In the first, an extensive experimental database of all research outputs from Australian universities for an eight year period (1995-2002) was established and provides fertile ground for examining these issues (the ‘*aggregate analysis*’). A second *case study* evaluated the research performance of one ECU and provides stark examples of the issues faced by such institutions when common bibliometric analyses are applied. Data from both these studies are analysed and presented in this paper.

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## Methods

### *Aggregate Analysis*

As part of a larger study aimed at assessing a wide range of quantitative indicators (both bibliometric and non-bibliometric), Australian universities were approached to provide full details of all their research publications. As the institutions have been required by Government since 1994 to report summaries of their publication output, this request was not as onerous as it might appear. Data was obtained from seven of the eight research-intensive universities, eight universities established prior to the reforms of 1989, and ten new universities, or ECUs. The details were used to identify publications that appeared in journals indexed by the Institute for Scientific Information (ISI), and enabled us to calculate the proportion of each institution's total output covered by standard bibliometric analysis. A database of all Australian publications in the ISI indexes was used for this purpose.

### *Case Study*

In 2004, a detailed bibliometric analysis was undertaken of the research output of one ECU, Swinburne University of Technology, at the request of the university. The analysis was designed to compare the performance of the institution with similar universities (all of which were ECUs), and to determine whether the institution's strategy of focussing research support in a limited number of fields was discernable in the data. The analysis employed a number of common bibliometric measures, but also sought to delve more deeply behind the aggregate data as discussions with the institution highlighted particular issues.

As the analysis presented in the following section will show, both studies provided some enlightening insights into the application of standard performance measures to ECUs.

## Results

### *Aggregate Analysis*

For this analysis, Australian universities have been classified into three groups:

- 'Go8' the eight largest research-intensive universities;
- 'OU' the other eleven 'original universities' that existed prior to the reforms of 1989; and
- 'ECU' the eighteen 'early career universities' established after 1989. Seven had formerly been institutes of technology, while eleven evolved from former colleges of advanced education.

Yearly publication counts from the university data summaries provided to the Australian Government are given in Table 1 for the period 1998-2002.

Table 1: University publication output, 1988-2002

	Go8	OU	ECU
Number of universities	8	11	18
Number of publications			
1998	13004	6159	5133
1999	12492	5688	5456
2000	12796	5817	5676
2001	12827	5824	5686
2002	14248	6646	6773
% increase, 1998 to 2002	10	8	32

Both the OU and Go8 universities have a similar increase in aggregate output over the five year period, though the spread of results for individual institutions is wider for the OUs than for the Go8. The ECUs have increased their publication output by three times the rate of the other two groups, with a much greater spread across institutions. Six of the universities increased their output in the five year period by over 50%, with one increasing by a massive 216%. The publication output that is reported

is restricted to four tightly-defined types – authored research books, chapters in edited research books, refereed journal articles, and refereed conference publications – and is subject to external audit.

Citation analysis using the ISI indices is becoming increasingly common for measuring the relative performance of universities – the Kiao Tong, The Times Higher Education Supplement, and Melbourne Institute rankings all use some form of citation analysis (SJTU 2004, THES 2004, The Melbourne Institute 2004). As part of the study of publication details provided by universities, it was possible to determine the proportion of their refereed journal publications that appeared in the ISI databases. The results are presented in Table 2.

Table 2: Proportion of journal output in ISI-indexed journals

	<b>Go8</b>	<b>OU</b>	<b>ECU</b>
Total journal publications	84962	17059	6948
ISI-indexed journal publications	58630	10741	3294
% in ISI-indexed journals	69	63	47

While two-thirds of the journal articles from the Go8 universities appear in ISI source journals, less than half those from ECUs are in the same journal set. Further analysis revealed that this result was not due to a stronger focus on the social sciences and humanities which have lower coverage in the ISI databases, particularly for non-USA research (Hicks 1999).

#### *Case Study*

Some of the ECU characteristics identified in the aggregate analysis were encountered when undertaking an analysis for Swinburne University of Technology. Table 3 details the distribution of publication output for the institution across the five year period covered by the analysis:

Table 3: Distribution of publications by year, 1998-2002

	<b>Swinburne</b>	
	<b>No.</b>	<b>%</b>
1998	49	9
1999	80	15
2000	93	18
2001	138	26
2002	168	32
1998-02	528	100

Most citation measures based on a window spanning several years assume an even distribution across the time period. Where an institution, such as Swinburne, is experiencing a rapid increase in output, publications can be heavily skewed to the most recent years. This has the affect of deflating average citation rates as these more recent publications have little time in which to attract citations.

This condition was even more apparent when analysing the impact of Swinburne's publication record in astronomy, one of the research fields targeted for enhanced funding and support by the university. Figure 1 depicts a comparison of actual and expected citation rates for the university's publications in astronomy journals, compared to the Australian average, and to the average for the field (the 'World' figure).

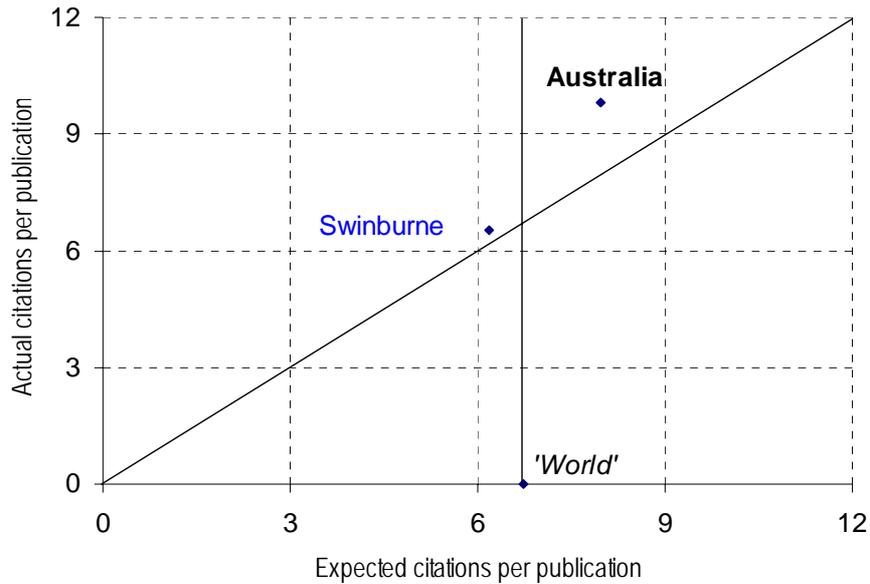


Figure 1: Actual and expected citation rates 1988-2002, Astronomy

While the publications achieved slightly above the expected level for the journals in which they appeared (taking into account the year of publication), it was well below the Australian average and lower than the field benchmark. Output was strongly skewed to the more recent years of the analysis (three-quarters appeared in 2001 and 2002), and this deflated the average citation rate and also gave the appearance of appearing in relatively low impact journals.

In an attempt to gain an insight into potential impact for the university, astronomy journals were divided into four equal groups on the basis of the journal's average citation per publication rate for 1998-2002. The university's publications were allocated to the four quartiles and its distribution compared to that for Australia and the field as a whole (Figure 2).

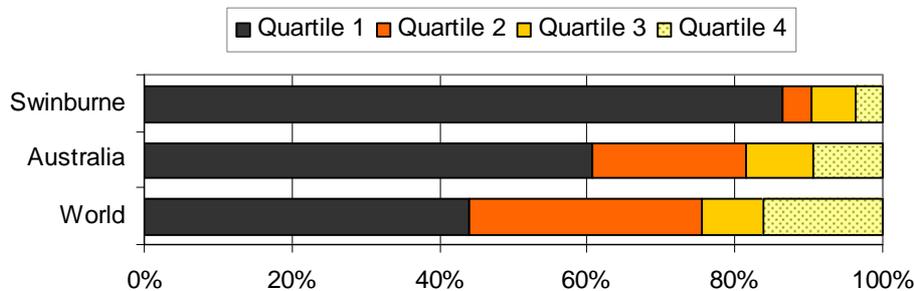


Figure 2: Journal impact quartiles—Astronomy

Though not discernible in figure 1, this second analysis shows that the university's astronomy publications are being placed almost exclusively in high impact journals.

**Discussion**

The information contained in an extensive database of research publications covering the whole Australian university sector has provided data that helps characterise a group of universities, new to the sector, which can be termed 'early career universities'. They share many of the characteristics of early career researchers – a currently small, but rapidly expanding, track record; a higher reliance on non-ISI journals; and a resultant lack of visibility in the ISI database.

These universities are not well served by many bibliometric indicators. Any discipline analysis based on annual data would almost inevitably face problems of statistical reliability due to small publication numbers (Van Raan 1993). Attempting to overcome this by extending the analysis to a multi-year

window encounters a different problem – the deflating effects of a rapid increase in publication output where output is skewed towards the most recent years.

The effects of these conundrums is starkly illustrated by examples from the case study. Yet the situation is not without hope. The analysis undertaken for Swinburne, with the inclusion of analyses such as that shown in Figure 2, together with a detailed peer evaluation of the information provided, showed that some of the problems could be overcome. What is of utmost importance is to recognise their existence and not assume that standard indicators, whether bibliometric or otherwise, are equally applicable to all universities.

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