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AN OVERVIEW
The research performance of the tertiary sector improved in several areas in 2005. In the area of research training, enrolments in doctoral degrees continued their rising trend in 2005. The number of people completing a doctor of philosophy also rose in 2005, but at a slower rate than in previous years. The research contract income earned by the universities per academic staff member rose in real terms between 2004 and 2005. In addition, the share of the funding won by the universities from contestable funds in Vote Research, Science and Technology increased between 2002 and 2004.

A study by the Ministry of Research, Science and Technology of indexed research publications by university authors, between 1997 and 2003, showed that total research publications increased over the period, resulting in a greater share of New Zealand-authored papers originating from universities. Despite the rise in total research publications, a faster rise in the number of academic staff resulted in a decline in research productivity – measured by publications per full-time equivalent academic staff member – between 1999 and 2003.

LOOKING TO 2006
A partial Performance-Based Research Fund quality evaluation was carried out during 2006. The evaluation measured the research quality of staff in the participating tertiary education organisations over the period from 2000 to 2005. The number of participating organisations in the quality evaluation increased significantly, with 32 organisations submitting evidence portfolios in 2006, compared with 23 in 2003. In particular, the number of participating institutes of technology and polytechnics increased from two in 2003 to 10 in 2006.

In the 2006 quality evaluation, staff that were assessed in 2003 could choose to submit a new evidence portfolio. Eligible staff at newly participating tertiary education organisations, along with newly eligible staff at the organisations that participated in 2003, also submitted evidence portfolios. In total, 4,542 evidence portfolios were submitted to the Tertiary Education Commission for assessment in 2006. The results of the 2006 quality evaluation are expected in the first half of 2007.

Two additional quality categories were introduced in the 2006 quality evaluation. These categories are for new and emerging researchers, who were disadvantaged by not having a research record in the 2003 quality evaluation.

FOREWORD
This chapter focuses on the contribution of the tertiary education sector to the national innovation system and, in particular, it considers the research performance of the universities, which are the most significant producers of research in the sector. It explores the sector’s role in knowledge creation and innovation, looking firstly at the training of potential researchers. Then, performance indicators of research output are examined, in terms of both quality and quantity. In addition, the impact of research in the tertiary sector on the wider economy is analysed through measures such as citations and patents. A profile of the research performance of each university, across a variety of performance measures, is presented at the end of the chapter.

Research in universities
Section 162 of the Education Act 1989 characterises universities as institutions whose ‘… research and teaching are closely interdependent and most of their teaching is done by people who are active in advancing knowledge [and meeting] … international standards of research and teaching … ’. The Act also states that universities are ‘… characterised by a wide variety of teaching and research …’.

The tertiary sector has the responsibility for training most of the researchers for the innovation system – producing graduates from research degrees with skills, knowledge and attributes that enable them to contribute to a knowledge-based society. As a result, the sustainability of the country’s research and innovation sector depends on a strong and improving research culture in the universities.

The tertiary sector also undertakes significant research focused on adapting, transferring and exploiting domestic and international knowledge and technology. It does this alongside, and sometimes in partnership with, other research organisations, industry and business, community organisations and government.

The Education Act 1989, which sets out the statutory framework for all tertiary education in New Zealand, describes degrees as ‘primarily taught by those active in research’ [refer to
In section 162(4), the Act also states, in its characterisation of universities, that ‘…their research and teaching are closely interdependent and most of their teaching is done by people who are active in advancing knowledge … and meeting international standards of research …’. Thus, the legislation states that teaching at degree level and above is to be shaped and informed by research and that the universities are to have a major role as providers of research across a wide range of disciplines.

The government has developed two major new means of promoting and funding research excellence in the tertiary sector – centres of research excellence and the Performance-Based Research Fund.

The centres of research excellence were established during 2002 and 2003 and have been designed to support world-class research that will contribute to New Zealand’s development as a knowledge society. They are inter-institutional research networks focused on areas of acknowledged research strength and in areas important for New Zealand’s growth. The centres of research excellence provide funding to encourage researchers from several institutions to work together on a commonly agreed research plan.

The Performance-Based Research Fund is being phased in over the period 2004 to 2007 and over that period the basis of research funding is shifting from a system based on student enrolments to one where funding will be allocated on the basis of research performance. Detailed information on the operation of the fund can be found in Ministry of Education (2003), pages 108-110, and in Tertiary Education Commission (2004), pages 15-23.
Enrolments by international students in doctoral programmes grew by 19 percent in 2005 (following growth of 26 percent from 2003 to 2004). From 2000 to 2005, these enrolments increased by 144 percent, which is over four times the rate for the population as a whole. International students now constitute 15 percent of all doctoral students in universities, compared to 13 percent in 2004 and 7.8 percent in 2000.

In 2005, 617 doctorates were awarded by New Zealand tertiary education institutions. This was an increase of 2.3 percent on those awarded in 2004. The number of awards has risen by 36 percent since 2000.

The number of women awarded doctoral degrees as a proportion of all those earning doctoral qualifications was 49 percent in 2005, compared with 48 percent in 2004 and 43 percent in 2000. The gradually increasing representation of women among those awarded doctoral qualifications is a reflection of the rising enrolments by women in this qualification. The proportion of women awarded doctorates in New Zealand is not out of line with other countries. Organisation for Economic Co-operation and Development (OECD) data\(^1\) shows that the proportion of women among advanced research degree graduates in 2004 in New Zealand was 49 percent. This was more than in Australia (46 percent) and in the United Kingdom (43 percent), and roughly the same as in the United States (48 percent). The mean for all OECD countries was 41 percent.

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1. Education at a glance: OECD indicators 2006, Table A3.4.
The number of Māori students awarded a doctorate decreased in 2005, following five years of successive increases. In 2005, 23 Māori students were awarded a doctorate, a decrease from 31 in 2004, but an increase from 17 in 2000. The share of domestic students earning doctoral qualifications who were Māori was 4.2 percent in 2005, 5.9 percent in 2004 and 4.1 percent in 2000. The proportion of Māori students being awarded doctorates remains low in comparison to the proportion of Māori being awarded tertiary qualifications overall. Of the 119,500 domestic students awarded a tertiary qualification in 2005, 19 percent were Māori. The number of domestic Pasifika students awarded doctoral degrees is also low – four in 2005, six in 2004 and three in 2000.

The most common broad areas of study for doctoral degrees completed over the period 2000 to 2005 were the social sciences (19 percent), the biological sciences (18 percent), the physical sciences (14 percent) and the humanities (12 percent). These four areas collectively represented almost two-thirds of all doctoral completions from New Zealand tertiary education institutions over those six years. Medicine and health-related sciences constituted 10 percent of the doctoral completions, while engineering and architecture represented 8 percent of the total. Other fields with significant shares of the total were business and commerce (8 percent), mathematics and information/computer science (6 percent) and law and agriculture, horticulture, forestry and environment (4 percent).

Figure 11.7 gives an idea of the work of the universities in producing doctoral graduates by comparing the number of doctoral graduates with the number of academic staff in each university. The University of Canterbury achieved the highest number of doctoral completions per academic staff member in 2005, with 0.13. This result is not surprising, given the high number of doctoral enrolments at this university shown in Figure 11.3.

Overall, the ratio of doctoral completions to academic staff increased by 14 percent in the universities from 0.07 to 0.08. The increase in this ratio was not uniform across the universities, with the University of Auckland and Massey University experiencing significant rises, while the University of Waikato recorded a significant drop.
An examination of the rate of completion of doctoral students shows that, of domestic students who started a doctorate in 1998, 43 percent had completed successfully by 2005. The long-term completion rate for doctoral students was estimated at between 54 and 57 percent in a report by Scott (2004). That rate is similar to estimates made in a report by Yew, Maclachlan and Karmel (2001) of long-term completion rates for doctoral degrees in Australia.

In 2004, New Zealand ranked 16th out of 28 OECD countries for the graduation rates of advanced research degrees. The OECD reports that in New Zealand the proportion of the population at the expected age of graduation that hold advanced research degrees is 1.1 percent, compared with 1.7 percent in Australia, 1.3 percent in the United States, 1.9 percent in the United Kingdom and 3.1 percent in Sweden. The mean of OECD countries on this indicator was 1.3 percent. The corresponding ranking for New Zealand in 1999 was 14th out of 23 countries.

THE QUALITY OF RESEARCH

The quality of research in the tertiary sector was measured explicitly for the first time in the 2003 Performance-Based Research Fund quality evaluation. In the evaluation, quality categories were assigned to each eligible staff member by a panel of experts that assessed a portfolio submitted by the staff member. In the 2003 quality evaluation an A quality category represented the highest quality standard. Where a researcher did not meet a threshold for the A, B or C quality categories, an R category was assigned. In the 2003 quality evaluation 5.7 percent of Performance-Based Research Fund-eligible staff were assigned an A, 23 percent a B, 31 percent a C and 41 percent an R.

These categories were translated into numerical quality scores for the purpose of comparing research quality across fields of study and providers. The maximum possible quality score for a provider or a subject area is 10. This score would occur if every single Performance-Based Research Fund-eligible staff member in that provider or subject area were awarded an A quality category. The universities generally received the highest average quality scores in the 2003 quality evaluation. The University of Auckland had the highest average quality score of 3.96, followed by the University of Canterbury (3.83) and Victoria University of Wellington (3.39). In other results, Unitec New Zealand received an average quality score of 0.77, Auckland College of Education 0.39 and Carey Baptist College 1.16. A full list of the average quality scores of all participating organisations can be found in Tertiary Education Commission (2004), page 97.

A partial quality evaluation is taking place in 2006 followed by a full quality evaluation in 2012. This six-year gap between evaluations means that the Performance-Based Research Fund quality score cannot be used to show annual changes in the quality of research in tertiary education organisations. The measurement of annual changes in research quality requires the use of a proxy measure. Research contract income is a good proxy measure of quality as it is usually won through competitive bidding and is often subjected to rigorous peer review. It needs to be noted that some research funding is, however, commissioned by industry or by public sector agencies and hence is not won in competitive tender. However, the capacity of providers to maintain income from these sources over time depends on their reputation for delivery of research of high quality. It should also be noted that the main public research funds are oriented towards certain types of disciplines or outcomes. This limits the extent to which external research earnings can be used as a measure of research quality.

In addition, increased research funding may also simply reflect an improvement in the quality of the applications themselves, rather than an improvement in the quality of the underlying research.

The largest part of research contract income is provided by firms and not-for-profit organisations that contract universities to conduct specific pieces of research on their behalf, in order to meet their business needs – that is, they ‘purchase’ the research.

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1 Education at a glance: OECD indicators 2006, Table A1.1 page 58.
outputs. Trends in this form of external research income provide a good proxy measure for the extent to which the research performed by the universities meets a test of relevance.

Figure 11.9 shows the research contract income per full-time equivalent academic staff member at each university in 2000 and 2005, adjusted for inflation. All universities, with the exception of the University of Waikato, showed an increase in inflation-adjusted research contract income per full-time equivalent academic between 2000 and 2005.

![Figure 11.9: Inflation-adjusted research contract income per university academic](image)

**Source:** Annual reports of the universities.

The strong relative performance of the University of Auckland and the University of Otago needs to be placed in context. These two universities dominate the funding distributed by the Health Research Council through their medical schools, which partly explains their strong performance.

However, using real research contract income per full-time equivalent academic staff as a proxy for changes in research quality is problematic as the total funding pool distributed by the research funding agencies may rise over time. Therefore, the increase in research contract income displayed in Figure 11.9 may not represent an increase in the ability to attract funding. One approach to avoid this complication is to examine the relative performance of the universities in attracting research contract income over time. If the quality of research at a university improves they should capture a larger share of total available university research contract income.

![Figure 11.10: Total research contract income shares by university](image)

**Source:** Annual reports of the universities.

The universities that increased their share of total university research contract income between 2000 and 2005 were the Auckland University of Technology, Lincoln University, the University of Auckland, the University of Canterbury and Victoria University of Wellington. The University of Otago, University of Waikato and Massey University all experienced significant falls in their share of total research contract income.

To gauge the level of university performance against the rest of the research sector in New Zealand we can examine the share of Vote Research, Science and Technology funding won by the universities through a contestable bidding process. The research funding from Vote Research, Science and Technology is distributed through three funding agents – the Health Research Council, the Royal Society and the Foundation for Research, Science and Technology – on a contestable basis. An increase in the share of Vote Research, Science and Technology won by the universities may indicate that the quality of university research has improved, relative to that of other research organisations in New Zealand.

The share of Vote Research, Science and Technology funding won by the universities increased from 23 percent in 2002 to 26 percent in 2004, indicating a possible improvement in the quality of university research relative to other research organisations in New Zealand (or in the quality of the applications).
THE QUANTITY OF RESEARCH

Measuring the research output of the universities over time is difficult, given the different reporting conventions used by some universities. One way of measuring the research output of universities in a consistent manner, though with some important reservations, is the use of bibliometrics. Bibliometrics involves the indexing of research outputs, normally journal articles, into searchable databases. The drawback of using these databases is that they favour disciplines such as the natural sciences and medical sciences, where there is much better coverage of journals. Also, bibliometric databases do not record research produced in outputs such as books and chapters of books, and therefore they cannot fully capture the research output of areas such as the social sciences and humanities. In addition, the journals that the databases use are generally North American or European, meaning that research that appears in local journals may not be captured by the databases. In some countries there is a list of approved journals that include high-quality local publications, so the measure can be made less dependent on international trends and priorities. These important caveats notwithstanding, research output counts drawn from bibliometric databases are still useful in identifying trends in research output.

A recent bibliometric study published by the Ministry of Research, Science and Technology in 2006 examined the number of publications produced by the universities between 1997 and 2003 and indexed by the Institute of Scientific Information. The study showed that indexed research publications (journal articles and reviews) by New Zealand university authors increased by 21 percent from 2,685 in 1997 to 3,252 in 2003. This compared to an increase of 13 percent in New Zealand-authored publications as a whole. As a result, the share of New Zealand publications by university authors has increased from 64 percent in 1997 to 69 percent in 2003.

The Ministry of Research, Science and Technology report also showed that the research productivity of university staff declined between 1999 and 2003. Although total research publications increased between 1999 and 2003, the number of academic staff increased at a faster rate. As a result, the number of university research publications per full-time equivalent academic declined by 8.8 percent from a peak of 0.61 in 1999 to 0.55 in 2003. However, there are signs that this decrease in productivity stabilised in 2003, with publications per academic staff of a similar level to that in 2002.

Comparing the research productivity of universities using bibliometrics is difficult. As discussed earlier, the coverage of the Institute of Scientific Information databases means that there is a bias towards publications in the natural sciences and medical sciences in these types of measurements. Universities with a proportionately large science faculty and/or a medical school will have higher research outputs than a university of a similar size that concentrates on the social sciences. As an example, the University of Otago has the highest number of indexed publications per academic staff member. In 2003, 1.1 publications per full-time equivalent academic were produced by the University of Otago, a figure significantly higher than

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3 See Ministry of Research, Science and Technology (2006b).

4 The Auckland University of Technology is treated as a university for all of the period.
the next best performer, the University of Canterbury, with 0.8 publications per full-time equivalent academic. However, part of the reason for the high relative productivity of the University of Otago is the presence of its four medical schools, which boosts the number of indexed research outputs.

Of more relevance is to examine the changes in the research productivity of universities over time. The Ministry of Research, Science and Technology analysis showed that only the Auckland University of Technology increased its research productivity between 1997 and 2003. However, the growth in productivity of 387 percent was coming off a very low base. Six of the remaining universities recorded a fall in research productivity between 1999 and 2003. The largest decline took place at Lincoln University, where research productivity fell by 29 percent.

The Ministry of Research, Science and Technology study also analysed university research publications by subject area. The largest number of indexed publications are in the natural sciences, followed by the medical sciences. However, this is partly due to the nature of the coverage of the journals in the Institute of Scientific Information indices, which favour these subject areas. Between 1997 and 2003, the fastest growth in publications, at 34 percent, was in the area of the social sciences and humanities. This was followed by the medical sciences with an increase of 31 percent. The smallest increase in publications, at 15 percent, was in the area of the natural sciences.

One common means of analysing the impact of research is through measuring citation rates—that is, the number of times a research paper has been cited or referred to in subsequent research publications. The Ministry of Research, Science and Technology conducts periodic studies of citation rates using information from Thomson Scientific’s publications National Citation Report and National Science Indicators. However, the calculation of citation rates is never absolutely precise. Further, the number of citations is, at best, only a proxy measure for the impact of research. Trends in citation rates, however, are a well-accepted indicator of the extent to which a research community is building its research impact and thus its research quality. The probability of a paper being cited is dependent on a number of factors, particularly on the journal or other publication in which the paper appears and on the field of research.

The Ministry of Research, Science and Technology data shows that the average number of citations over a two-year period for research publications that were published in 1999 and 2002 increased in all of the broad research areas analysed in the study. In 1999, there were 2.9 citations on average per university publication. In 2002, this figure had increased to 3.5.

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5 Refer also to Ministry of Research, Science and Technology (2001), which contains data on the 1996 bibliometric analysis, and Ministry of Research, Science and Technology (2004), for earlier analyses.
The impact of university papers improved in relation to all New Zealand-authored publications. In 1999, the average citations for all New Zealand-authored papers was 3.8 percent higher than for publications by university authors. In 2002, this outcome was reversed, with the average citations of university-authored papers being 0.9 percent higher than for all New Zealand-authored publications.

The Ministry of Research, Science and Technology study also examined the impact of papers at the individual university level and the broad research areas. The analysis showed that, in 2002, publications by authors from Lincoln University had the greatest impact in the agricultural sciences. In the area of engineering and technology, publications by the University of Canterbury had the greatest impact and publications by University of Otago authors had the greatest impact in the remaining research areas of medical sciences, natural sciences and the social sciences.

A Statistics New Zealand survey of business practices in 2003 found that 14 percent of New Zealand businesses that were classified as innovators considered universities an important, or very important, source of information for innovation. This compared with 72 percent who found their suppliers an important, or very important, source of innovation information, 53 percent for other New Zealand businesses in the same industry, 60 percent for books, journals, conferences and shows, and 28 percent for research institutes.

The Statistics New Zealand survey also asked innovative businesses about the types of organisation they had collaborative or co-operative arrangements with. Around 20 percent reported that they had collaborative arrangements with a university or polytechnic. This was about the same as reported collaborations with a Crown research institute or other public research provider. Nearly 70 percent of respondents claimed to have collaborations with suppliers of equipment, components or software.

Ministry of Research, Science and Technology data shows that the amount of patenting by New Zealand universities is increasing, although their share of domestic patenting has been stable since 1992 at around 2 percent to 3 percent per annum. Between 1993 and 1997, Auckland Uniservices Ltd (a subsidiary of the University of Auckland that manages the university’s research contracts) ranked second in the list of New Zealand’s top patenting organisations. Most university patents are in biotechnology and scientific instruments.6

**RESEARCH PROFILES OF THE UNIVERSITIES**

This section draws together the performance of each of the universities across several of the dimensions discussed in this chapter in order to create an overall research profile for each institution. A clearer overall picture of the research strengths of each university can be ascertained by viewing these profiles. The profiles display the performance of a university across five measures, relative to the average for all universities.

The five performance measures used in each university profile are:

- Research quality = average quality score in the 2003 quality evaluation
- Research contract income = research contract income per full-time equivalent academic in 2005
- Research output = indexed research publications per full-time equivalent academic in 2003
- PhD enrolments = PhD enrolments per full-time equivalent academic in 2005, and
- PhD completions = PhD completions per full-time equivalent academic in 2005.

For each performance measure the score for each university is expressed as a multiple of the score for the universities as a whole – so that the university sector average on each indicator is 1.0. The data for each profile was sourced from the Tertiary Education Commission, the Ministry of Research, Science and Technology, the Ministry of Education and the annual reports of the universities.

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The University of Auckland performed above the all universities average in all areas. In particular, research contract income is well above the university average, due in part to the access to Health Research Council funding.

The University of Otago performed above the all universities average in all areas. The particularly strong performance in research output is due partly to the large number of indexed research publications attached to the four medical schools at the university.

The University of Canterbury performed above the all universities average in four of the five measures. In particular there was a high number of doctoral completions per full-time equivalent academic.

The Auckland University of Technology performed below the all universities average in all areas. This result is a reflection of the relatively short time since the Auckland University of Technology was granted university status in 2000.
The University of Waikato performed at the all universities average in research quality and doctoral enrolments. The quantity of research output was below the university average, along with research contract income and doctoral completions.

Massey University performed at a level similar to the all universities average in the areas of research contract income, doctoral completions and enrolments. Massey’s performance was below the university average in the areas of research output and research quality.

Lincoln University had strong performance in the areas of doctoral completions and research contract income. Research output was at the university average and research quality was slightly below the university average.

Research quality at Victoria University of Wellington was slightly above the all universities average. Research contract income was well below the average and doctoral enrolments and completions were also below the all universities average.
COMPARING THE QUALITY, QUANTITY AND IMPACT OF UNIVERSITY RESEARCH

In the first part of this section, information on the quality of research from the 2003 quality evaluation is combined with bibliometric measures of quantity and impact from Ministry of Research, Science and Technology (2006) to compare the performance of the universities across these three dimensions. As the subject discipline mix is different across universities, this analysis is limited to three broad subject areas – the agricultural sciences, engineering and technology, and medical sciences – where a reasonable match in the data can be achieved. However, as there is not a perfect match in these subject areas, caution should be used in assessing the results of this analysis. In addition, it should be noted that only those universities with a significant number of academic staff in the particular subject area have been included in the analysis.

The three measures examined in this analysis are:
- **Quality** – Performance-Based Research Fund score. This is the average quality score assigned to the subject area in the 2003 quality evaluation.
- **Quantity** – Publications per full-time equivalent academic. These are the indexed publications, per full-time equivalent Performance-Based Research Fund-eligible staff, that were published between 1997 and 2002. This is the time period that was used to assess research quality in the Performance-Based Research Fund 2003 quality evaluation.
- **Impact** – Citations/publication. This is the average number of citations over a two-year period for papers published in 1999 and 2002.

To allow comparisons to be made, the individual university score for each performance measure is expressed as a proportion of the score for the top performing university. Therefore a value of 1 for a university indicates it was the top performing university for that particular measure.

In the second part of this section, the results of an analysis by Macri and Sinha (2006) that ranked the quantity and quality of journal articles produced by staff in New Zealand university economics departments is compared with the average quality score these departments achieved in the 2003 quality evaluation.

AGRICULTURAL SCIENCES

The two main university producers of research in the area of agricultural sciences are Massey University and Lincoln University. As can be seen in Figure 11.24, Massey University received a higher quality score than Lincoln University in the 2003 quality evaluation. The data on research quantity shows that Massey University produced a significantly higher number of publications per full-time equivalent staff than Lincoln University, but that the publications produced by Lincoln in 1999 and 2002 achieved greater impact with a higher number of average citations.

ENGINEERING AND TECHNOLOGY

This analysis focuses on the universities with the four largest research workforces in the area of engineering and technology. In the 2003 quality evaluation, the University of Canterbury had the highest research quality. They were followed by the University of Auckland, Massey University and the Auckland University of Technology. As can be seen in Figure 11.25, the performance of the universities in terms of the quantity of publications per full-time equivalent staff follows the same order.
as the Performance-Based Research Fund quality score. However, the citations/publication measure shows that research by Massey University had the greatest impact, followed by research at the University of Auckland.

![Figure 11.25: Quality, quantity and impact of research in engineering and technology](image)

**Notes:**
1. The Ministry of Science, Research and Technology data uses the OECD field of science definition of ‘engineering and technology’.
2. For a detailed breakdown of the subject areas within this field see Ministry of Research, Science and Technology (2006a).
3. The Performance-Based Research Fund score uses data from the subject category of ‘engineering and technology’ in the 2003 quality evaluation.

MEDICAL SCIENCES

This analysis of university research in the medical sciences is limited to those four universities with the largest staff in the 2003 quality evaluation. In the 2003 quality evaluation, the University of Auckland achieved the highest Performance-Based Research Fund quality score. Research at the University of Otago was assessed as having the next highest quality, followed by Massey University, and the Auckland University of Technology. As shown in Figure 11.26, this aligns with the rankings of the universities when measuring citations per publication, although the relative performance of the University of Otago was closer to the University of Auckland than in the Performance-Based Research Fund score. In terms of research quantity, the University of Otago produced a slightly higher number of publications per full-time equivalent staff than the University of Auckland.

![Figure 11.26: Quality, quantity and impact of research in the medical sciences](image)

**Notes:**
1. The Ministry of Research, Science and Technology data uses the OECD field of science definition of ‘medical sciences’.
2. For a detailed breakdown of the subject areas within this field see Ministry of Research, Science and Technology (2006a).

ECONOMICS

A recent study by Macri and Sinha (2006) analysed the research performance of economics departments at Australian and New Zealand universities, over the period 1988 to 2002. The analysis examined the performance of the departments by calculating the number of published journal articles per staff member. The study also calculated the number of pages that were published in journals, weighted by measures of the quality of each publication per staff member. The study calculated rankings for each department based on these measures for the period 1996 to 2002 – a time-frame similar to that used in the 2003 Performance-Based Research Fund quality evaluation. Table 11.1 below compares the relative ranking of New Zealand university economics departments in the 2003 quality evaluation with their rankings in the Macri and Sinha study.

The Macri and Sinha study ranked the economics department at the University of Otago as the largest producer of journal articles per staff member, followed by the University of Waikato. The University of Auckland, which achieved the highest ranking in the 2003 quality evaluation, was ranked sixth in terms of the journal articles produced per staff member in the Macri and Sinha study. Over the three measures that weighted the
number of pages in journal articles by the quality of the journal, the University of Canterbury achieved the highest ranking on average. They were followed by the University of Auckland and the University of Waikato.

The differences in the rankings of the economics departments in the Performance-Based Research Fund quality evaluation and those in the Macri and Sinha study are not surprising. The Macri and Sinha study is formulaic in approach and although it uses weightings for quality in some measures, it is still based essentially on a quantitative measure. In contrast, the Performance-Based Research Fund quality evaluation used peer-review to assess the level of quality of research. Also, the quality evaluation assessed the quality of a restricted number of research outputs, while the Macri and Sinha study assessed all the journal articles published by faculty staff in the ECONLIT database. Another reason for the difference in rankings is that the peer review panels in the 2003 Performance-Based Research Fund quality evaluation could examine a much wider range of research outputs including journal articles, books and book chapters.

| Table 11.1: Quality and quantity of research in university economics departments |
|-------------------------------------------------|------------------|------------------|-----------|
| 2003 Performance-Based Research Fund quality evaluation | Macri and Sinha |  |
| Journal articles per staff member | Pages in journals weighted for journal quality per staff member | Ranking |
| University of Auckland | 1 | 6 | 2 |
| University of Otago | 2 | 1 | 4 |
| University of Waikato | 3 | 2 | 3 |
| University of Canterbury | 4 | 3 | 1 |
| Lincoln University | 5 | 5 | 7 |
| Victoria University of Wellington | 6 | 7 | 5 |
| Massey University | 7 | 4 | 6 |


Notes:
1. The Macri and Sinha study assessed publications over the period 1996 to 2002. The PBRF quality evaluation assessed the quality of research over the period 1997 to 2002.
2. Auckland University of Technology was not included in the Macri and Sinha study.
3. The ‘pages in journals’ ranking uses the average ranking of the three measures that applied weightings for the quality of the journals to rank the economics departments. Two measures used citations to weight the journals for quality, while the third measure used the perceived quality of the journals to weight the quality of the journals, based on a survey of academics.
References


Research and knowledge creation