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Promoting quality research

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1 Summary

Key findings:

This report used data from the Performance-Based Research Fund (PBRF) Quality Evaluations to analyse the factors associated with the likelihood of university academics being promoted between 2003 and 2006. The study found that:

- Staff with higher levels of research quality had a greater likelihood of being promoted.
- Staff with higher levels of submitted research outputs had a greater likelihood of being promoted.
- While research *quantity* decreased in importance as a factor at higher academic ranks, research *quality* had an increasingly important relationship to the likelihood of promotion at more senior academic ranks.

This report uses data from the Performance-Based Research Fund (PBRF) Quality Evaluations to analyse whether there is a relationship between higher research quality and the likelihood of being promoted to a higher academic rank in a university. The analysis applies logistic regression to the PBRF unit record data to isolate the effects on promotion of research quality from the effects of other factors, such as age.

This analysis is important as a recent study by Gibson et al. (2008) found that the association between the research quality and the academic rank of academic economists was lower in 2007 compared with 1999. In addition, they found that the quantity of research had a greater degree of association in 2007. Gibson et al. suggest that, if this is also the case in other academic disciplines, it would imply that there are low private benefits from improving research quality. Over time, that could undermine the main objective of the PBRF – which was to raise the average quality of research.

This analysis set out to test Gibson et al.'s findings using PBRF data. It shows that there is a statistically significant association between higher research quality and a higher likelihood of academic staff in universities being promoted. Also, higher research productivity appears to be associated with a higher likelihood of being promoted, particularly at lower academic ranks (ie at lecturer level, more than at senior lecturer and associate professor levels).

Although the results of this study cannot determine whether the association between the quality of research and academic rank has lessened over the last decade, as was suggested by Gibson et al., the findings in this study at least suggest that research quality remains an important contributing factor to whether or not academic staff were promoted following the introduction of the PBRF.

2 Introduction

In a recent report, Gibson, Tressler and Anderson (2008) look at the factors linked to career advancement among New Zealand university economists. They claim that there appears to be a lower degree of association between the academic rank of university economists and the *quality* of their research following the introduction of the Performance-Based Research Fund (PBRF). Instead, their research shows a stronger association between *quantity* of research and academic rank following the introduction of the PBRF. Gibson et al. suggest that if this is also the case in the other academic disciplines, then this would imply that there are low private benefits from improving research quality. Over time, that could undermine the main objective of the PBRF – which was to raise the average quality of research.

The British researcher Jonathan Adams, who conducted an independent review of the PBRF for the Tertiary Education Commission and the Ministry of Education in 2008, also stressed the importance of the individual benefits from improving research quality. He stated that:

> "To support and comply with the underlying policy, people need to believe that their personal investment will lead to beneficial changes to their research environment, at whatever level of granularity." Adams (2008: 37).

This report uses data from the PBRF Quality Evaluations to analyse if there is a relationship between higher research quality and the likelihood of being promoted to a higher academic rank in a university. The analysis applies logistic regression to the PBRF unit record data to isolate the effects on promotion of research quality from the effects of other factors, such as age.

The structure of the report is as follows. In section 3, background on the introduction of the PBRF is presented. Then, in section 4 the dataset used in the analysis is discussed and the logistic regression model presented. The results of the logistic regression are then presented in section 5. Finally, some conclusions are presented in section 6.

3 Background

The Performance-Based Research Fund (PBRF) was introduced in 2004 to replace the previous system of allocating research funding to tertiary education organisations (TEOs) via the number of domestic enrolments at degree level and higher. The majority of PBRF funding (60 percent) is distributed through the results of the Quality Evaluations, where the quality of research by staff in participating TEOs is assessed and measured by panels of experts. Staff who are assessed as producing research of higher quality attract more funding via the PBRF, providing a financial incentive for TEOs to maximise the quality of research produced by their staff.[1] In addition, the results of the Quality Evaluation are published by the Tertiary Education Commission, providing a further incentive for TEOs to improve the quality of their research.

The PBRF funding to TEOs is distributed in the form of a bulk fund, with TEOs having discretion over how they allocate this funding within the institution. Therefore, the TEOs determine whether and how individual academics get rewarded for better research quality.

Adams (2008) provides an overview of how TEOs allocate PBRF funding and reward staff for higher research quality. Through a series of interviews with staff at various TEOs, Adams found that although some TEOs had a well-developed strategy for monitoring funding allocations and strategic research support, this did not happen everywhere. Adams stated that:

> "This matters, because the influence of a policy of rewarding excellence and incentivising research strategy is reduced if it is not felt throughout the system, if it is filtered out at an institutional level." Adams (2008: 37).

The review also found that some institutions use the results of the PBRF Quality Evaluations directly in their performance appraisal systems. Therefore, there is the potential for a direct link between research quality as measured in the PBRF and promotion. However, this practice was strongly criticised by Adams as being inappropriate and was an abdication of the responsibility of managers to assess their staff in place of proper staff development programmes.[2] Adams (2008: 71) states that "…the acknowledged inaccuracies in scoring at individual level, which individuals cannot appeal, raise serious doubts about the value of information in this format" (Adams 2008: 71). He recommended that the results of individual staff members not be provided to TEOs in future Quality Evaluations to avoid this problem.

While Adams' view of the use of actual PBRF scores in promotion has reasonably wide acceptance among academics, there is also widespread agreement that TEO promotions processes should assess academics' performance. This means that the quality of an academic's research performance is something that should count towards his/her career advancement. For this reason, the Gibson et al paper raises issues that deserve further analysis.

Academic promotion procedures differ in detail between universities. However, they tend to have a number of common features. To win promotion, an academic staff member usually needs to make a formal written application which is considered by a promotions committee normally comprising managers and senior academic staff, with union representatives having observer status. Academics applying for promotions are usually advised to include in their applications information about their most important research outputs – including citation information if appropriate – and about distinctions they have achieved, as well as about their teaching performance. Promotion is often competitive – with a fixed sum allocated for the promotions round.

[1] In 2007, around $124 million was distributed to TEOs based on the results of the Quality Evaluation.

[2] Ashcroft (2005) also argued that using PBRF Quality Evaluation results to determine academic appointments and promotion could have dire repercussions. He argues that using the PBRF results to aid in promotions could create an environment which reduced collegiality, increased anxiety for academics and more narrow focused research.

4 Data and method

This study uses unit record data of around 3,200 university staff who participated in both the 2003 and 2006 PBRF Quality Evaluations. This data was supplied by the Tertiary Education Commission.[3] The staff examined include those who were employed at universities in the July 2006 Quality Evaluation and who held the academic rank of lecturer, senior lecturer or associate professor in the 2003 Quality Evaluation.[4]

The analysis is restricted to those who participated in both the 2003 and 2006 Quality Evaluations, given that the academic rank of these staff in both 2003 and 2006 is required to work out if they were promoted. Also note that the staff members included in the analysis are limited to those who had evidence portfolios examined in the 2003 Quality Evaluation. Only those staff who submitted evidence portfolios provided details of their research output.

As there are two possible outcomes for staff, ie, they were or were not promoted between the 2003 and 2006 Quality Evaluations, logistic regression is used to analyse whether various staff characteristics are associated with the likelihood of staff being promoted. The advantage of using regression analysis for a study of this kind is that it holds other factors constant, while examining the association between the likelihood of being promoted and the factor of interest.

The logistic regression model takes the following form where $P_{Promoted}$ is the probability that a staff member was promoted:

$$\ln\left[\frac{P_{promoted}}{P\left(1-P_{promoted}\right)}\right] = \alpha \quad + X_i\beta + \mu$$

where the dependent variable is the natural logarithm of the odds of a staff member being promoted, X is a vector of explanatory variables, β is the coefficient of the explanatory variables in logit form, μ is an error term and i = 1 to n staff members.

The variables included in the regression model (X_i) are discussed below.

2003 PBRF QUALITY CATEGORY

The quality category assigned to staff in the 2003 Quality Evaluation is included in the model. This is the result that would have potentially impacted on their chance of promotion in the following three years. The quality categories awarded in the 2003 Quality Evaluation ranged from an 'A' to an 'R', with a 'A' representing the highest level of peer-assessed research quality. In general terms, an 'A' quality category indicated that a researcher was producing research that was esteemed internationally. A 'B' quality category indicated that research was recognised at a national level for its quality and a 'C' quality category indicated the quality of research was recognised at a local level within their tertiary education organisation. An 'R' quality category indicates the staff have been assessed by the panel as not having met the requirements of a 'C' quality category. The reference category in the regression analysis is a 'C' quality category.

If the quality of research does have a positive association with the likelihood of promotion, then we would expect to see staff who received 'A' and 'B' quality categories in the 2003 Quality Evaluation having a greater chance of being promoted than staff who received a 'C' or 'R' quality category.

[3] See http://www.tec.govt.nz/upload/downloads/pbrf_dataaccess_final.pdf for more information on the process for accessing information from the PBRF Quality Evaluations.

[4] The categories used in this analysis are based on simplified job titles as defined by the Tertiary Education Commission. For more detail on how these aggregated positions were determined see Çinlar and Dowse (2008).

RESEARCH OUTPUT

The number of research outputs submitted in evidence portfolios in the 2003 Quality Evaluation is included as a proxy for the quantity of the research output of staff. If the quantity of research output influences promotion, we would expect to see a positive association between the quantity of research output and the likelihood of promotion.

Some caution should be used as this variable does not capture all research output. Rather, it represents all the research outputs (to a maximum of 50) that staff produced in the assessment window between 1998 and 2002 that they considered to be 'quality' outputs and so would enhance their evidence portfolios. Also, this count of research outputs does not weight for type of publication – for example, a book receives the same weighting as a journal article. So is a somewhat crude measure of quantity.

AGE

The age of staff as at June 2006 is included as an explanatory variable in the model. Also included in the regression model is the square of age, given that a non-linear relationship between age and likelihood of promotion is expected. In other words, the likelihood of promotion may well increase initially with age, but then decline.

GENDER

Also included in the regression model is the gender of staff. The reference category is males.

EXPERIENCE

This variable is included in the model to control for the experience that an academic has. If a staff member was employed for the first time in an academic role after 1 Jan 2000 (either in NZ or overseas) or required to do degree teaching for the first time from this point, they could be nominated by their tertiary education organisation as a 'new and emerging' researcher. Obviously, staff who are relatively inexperienced may be less likely to be promoted in the short term.

This variable takes a value of 1 if the staff member was identified as new and emerging and a value of 0 if they were not.

INSTITUTION

The institution staff were employed at in 2006 is included as an explanatory variable with multiple categories in the regression analysis. Different universities may have different promotional processes and so the likelihood of promotion may be affected. The University of Auckland is the reference category.

PBRF SUBJECT PANEL

The broad PBRF subject panels are also included as a variable with multiple categories. The reference category is Biological Sciences.

2003 JOB TITLE

This is the academic rank of a staff member at the time of the 2003 Quality Evaluation. This variable includes all lecturers, senior lecturers and associate professors. The analysis excludes professors (as they are already at the highest rank) and those whose 2003 job titles mean that they can't be assigned to a rank on the academic career path. Given that there are substantially fewer associate professors and professors than senior lecturers and lecturers, one might expect that the likelihood of promotion diminishes with higher academic status/rank.

The results of the logistic regression analysis are presented in the form of odds ratios. An odds ratio is the odds of an event happening divided by the odds of the opposite event happening. For example,

suppose that 400 senior lecturers were promoted and 200 were not. The odds of a senior lecturer being promoted are 400/200 = 2, or 2 to 1. In other words, the chances of a senior lecturer being promoted are reasonably good. To give another example, suppose that 500 lecturers were promoted and 1,000 were not. The odds of a lecturer being promoted would be 500/1,000 = 0.5, or 1 to 2. The chances of their being promoted are therefore significantly lower than for senior lecturers.

For continuous explanatory variables (AGE and RESEARCH OUTPUT), an odds ratio of greater than 1 indicates a higher likelihood of achieving a higher quality category as the value of the explanatory variable increases and an odds ratio less than 1 indicates a lower likelihood.

For categorical explanatory variables, the odds ratio compares the likelihood of achieving a higher quality category compared with the reference category. An odds ratio greater than 1 indicates a higher likelihood of achieving a higher quality category compared with the reference group, while an odds ratio of less than 1 indicates a lower likelihood.

5 Logistic regression results

Summary statistics of the dataset used in this analysis are presented in Table 1. Overall, 23 percent of the 3,248 staff in this sample were promoted between the 2003 and 2006 PBRF staff census. The data in Table 1 shows that the likelihood of being promoted was higher for staff who received higher grades in the 2003 Quality Evaluation. Fifty-five percent of staff with an 'A' were promoted, compared with 33 percent of staff with a 'B', 22 percent with a 'C' and 16 percent with an 'R'.

Table 1: Descriptive statistics - proportion of staff being promoted by staff characteristic

Characteristic	Category	N	% promoted
AGE	<30	13	15.4%
	30-39	508	36.0%
	40-49	1,209	29.0%
	50-59	1,065	24.4%
	60+	453	13.5%
GENDER	Male	2,050	26.7%
	Female	1,198	25.8%
EXPERIENCE	Experienced	3,037	26.7%
	New and emerging	211	22.3%
2003 JOB TITLE	Lecturer	1,013	43.2%
	Senior lecturer	1,669	17.4%
	Associate professor	566	22.6%
2003 PBRF	A	124	54.8%
QUALITY	B	1,220	32.7%
CATEGORY	C	1,505	21.8%
	R	399	15.5%
NUMBER OF 2003	<10	584	17.1%
SUBMITTED	10-19	1,133	23.9%
RESEARCH	20-29	682	28.4%
OUTPUTS	30-39	383	27.9%
	40+	466	39.7%
INSTITUTION	Auckland	829	27.1%
	Waikato	310	30.0%
	Massey	594	23.2%
	Victoria	358	19.0%
	Canterbury	322	32.3%
	Lincoln	105	23.8%
	Otago	613	27.2%
	AUT	117	31.6%
PBRF SUBJECT PANEL	Biological Sciences	356	24.7%
	Business and Economics	379	31.7%
	Creative and Performing Arts	171	19.9%
	Education	241	27.0%
	Engineering Technology	254	26.4%
	Health	176	27.3%
	Humanities and Law	439	28.0%
	Māori Knowledge and Development	44	25.0%
	Mathematical and Information Sciences	273	22.7%
	Medicine and Public Health	311	20.6%
	Physical Sciences	196	24.0%
	Social Sciences	408	31.4%
All		3,248	26.4%

The data in Table 1 also shows that staff who submitted a higher number of research outputs in the 2003 Quality Evaluation had a higher likelihood of being promoted. Around 40 percent of staff who submitted 40 or more research outputs were promoted, compared with 17 percent for staff that submitted less than 10 outputs.

However, to get a clearer picture of the association between the quality and quantity of research and the likelihood of being promoted, each of these factors needs to be examined while holding all other factors constant. The application of logistic regression to the dataset achieves this.

The results of four logistic regressions are presented in Table 2. Firstly, the factors associated with the likelihood of being promoted for all staff in the sample are analysed. Then, the factors associated with the likelihood of being promoted for each of the three academic ranks in 2003 are analysed. This allows for a more detailed look at the impact of the quality and quantity of research on the chances of promotion. Note that the results discussed in this section assume that all other factors are held constant while the association between a specific explanatory variable and the likelihood of being promoted is discussed.

The results show that there is a statistically significant association between the 2003 quality category received by staff and their chances of promotion. Staff who received higher quality categories had a greater chance of promotion. In the analysis of all staff, the odds of a staff member who received an 'A' quality category being promoted were over 17 times those of a staff member who received a 'C' quality category. Also, the odds of a staff member who received a 'B' quality category being promoted were 4.6 times those of a staff member with a 'C' quality category. Finally, the odds of a staff member with an 'R' quality category being promoted were 58 percent less than those of a staff member with a 'C' quality category.

The separate analysis of each position showed that the likelihood of being promoted from receiving a higher quality category tends to increase with academic rank. For example, the odds of a lecturer with a 'B' quality category being promoted were 3.1 times that of a lecturer with a 'C' quality category. However, the odds of a senior lecturer being promoted who had received a 'B' quality category were 5.6 times those of a senior lecturer with a 'C' quality category. Finally, the odds of an associate professor with a 'B' quality category being promoted were 7.4 times those of an associate professor with a 'C' quality category.[5]

The results also indicated that there is an association between higher research output and the chances of being promoted. In the analysis of all staff, one additional submitted research output increased the odds of promotion by 3.6 percent. For lecturers, this figure was 4.8 percent and senior lecturers 4.3 percent. However, an increase in submitted research outputs did not have a statistically significant effect on the chances of an associate professor being promoted. Therefore, it would appear that the association between higher research productivity and the likelihood of promotion diminishes for those in higher academic ranks.

[5] The fact that lecturers who received an 'A' quality category had a similar likelihood of being promoted as a lecturer who received a 'C' is likely to be due to the small number of staff who received an 'A' quality category resulting in a lack of statistical significance.

Table 2: Logistic regression results – likelihood of being promoted between 2003 and 2006 – odds ratios

(Dependent variable = 1 if promoted, else 0)

Characteristic	Category (where applicable)	Academic rank in 2003			
		All	Lecturer	Senior lecturer	Associate professor
AGE		1.277**	1.221*	1.504**	1.863*
AGE^2		0.998**	0.998*	0.996**	0.994*
GENDER	Male	Reference category			
	Female	0.799*	0.875	0.744	0.792
EXPERIENCE	Experienced	Reference category			
	New and emerging	0.523*	0.483*	0.176	n/a
2003 JOB TITLE	Lecturer	Reference category			
	Senior lecturer	0.061**	n/a	n/a	n/a
	Associate professor	0.030**	n/a	n/a	n/a
2003 PBRF	A	17.544**	5.785	27.023**	45.465**
QUALITY	B	4.593**	3.067**	5.603**	7.382**
CATEGORY	C	Reference category			
	R	0.423**	0.473**	0.082*	n/a
RESEARCH OUTPUT		1.036**	1.048**	1.043**	1.009
INSTITUTION	Auckland	Reference category			
	Waikato	1.535*	0.843	2.009*	5.445**
	Massey	1.077	0.656*	1.200	5.246**
	Victoria	0.779	0.585	1.071	0.626
	Canterbury	1.929**	2.355**	2.192**	2.228
	Lincoln	1.418	0.675	2.886*	3.159
	Otago	1.125	0.674	1.254	3.846**
	AUT	3.740**	2.615*	6.516**	4.431
PBRF SUBJECT PANEL	Biological Sciences	Reference category			
	Business and Economics	3.143**	3.089**	3.077**	3.700**
	Creative and Performing Arts	0.472**	0.327**	0.641	1.275
	Education	2.558**	5.047**	1.123	1.253
	Engineering Technology	1.221	1.500	0.743	2.127
	Health	2.180**	2.099*	2.000	3.336*
	Humanities and Law	2.171**	2.341**	1.571	3.602**
	Māori Knowledge and Development	0.929	0.842	0.804	2.300
	Mathematical and Information Sciences	1.263	1.916	0.792	1.597
	Medicine and Public Health	1.262	0.894	1.346	2.490
	Physical Sciences	1.126	1.165	1.049	0.902
	Social Sciences	1.643**	2.214**	1.027	2.003
Pseudo R^2		0.22	0.17	0.23	0.21
N		3,248	1,013	1,669	561

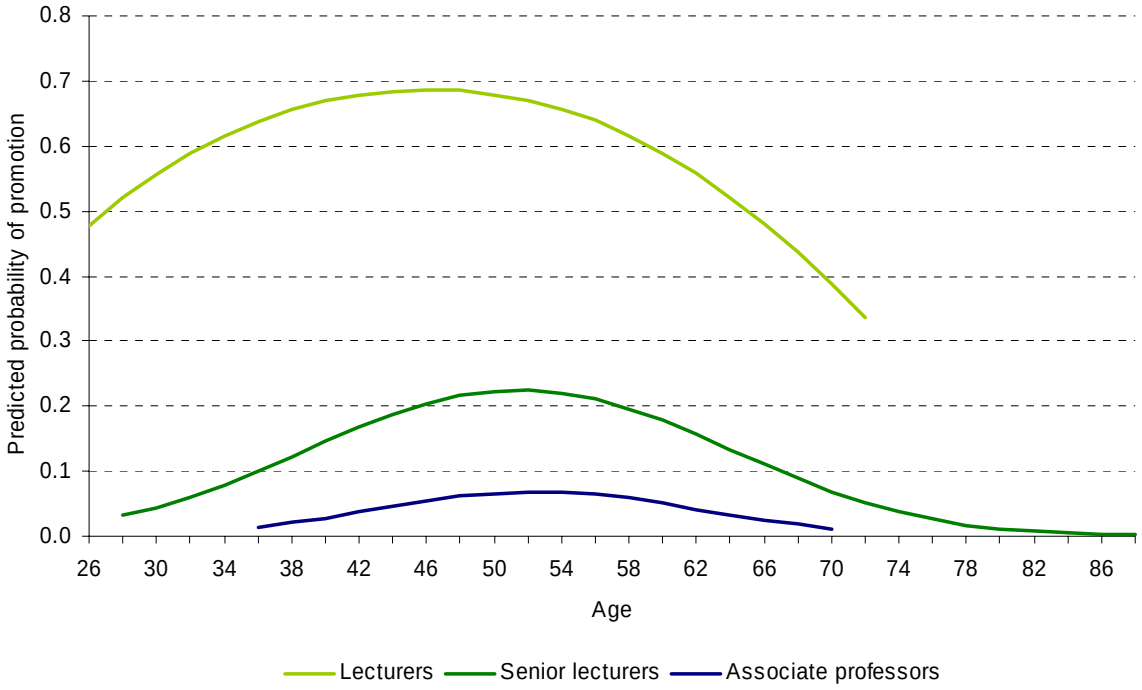
Notes:

1. *, ** significant at the 5 percent and 1 percent level, respectively.
2. The sum of the three academic ranks does not equal the total as the logistic regression drops 5 staff receiving an R quality category in the associate professor regression.

In other results, the quadratic functional form for age suggests that the chances of promotion initially increase with age, but then decrease once a particular threshold age is reached. Figure 1 produces the predicted probabilities for a selected reference group (see note under Figure 1) to illustrate the relationship between age and the chance of promotion, while holding all other factors constant.

As can be seen, the chances of a lecturer being promoted were highest for staff aged 46, while for senior lecturers and associate professors the chance of promotion was highest at age 52.

Figure 1: Predicted probability of promotion by academic rank and age



Note: The reference group used to generate the predicted probabilities was: male, experienced, received a 'B' quality category in 2003, employed at the University of Auckland, produced the average number of research outputs in that academic rank and in the 'Biological sciences' panel.

In Table 1, the actual percentage of men and women promoted was very similar, 27 percent and 26 percent, respectively. However, in the logistic regression analysis of all staff, the odds of women being promoted were around 20 percent less than for men, controlling for other factors. But the logistic regression analysis of each individual academic rank showed no statistically significant difference in the odds of men and women being promoted. Therefore, the evidence is mixed that there is any difference in the likelihood of men and women being promoted.

The results in Table 1 also show that less experienced staff had a lower chance of being promoted. The odds of staff who were identified as being new and emerging in the 2006 Quality Evaluation being promoted were 47 percent lower than staff not identified as new and emerging.

Overall, there was a greater likelihood of staff being promoted at the University of Waikato, University of Canterbury and Auckland University of Technology, compared with the University of Auckland.

The results also show that academic staff in subject areas such as 'Business and economics', 'Education', 'Health', 'Humanities and law' and 'Social sciences' had a greater likelihood of being promoted, compared with the reference category of 'Biological sciences'.

Finally, the results of the analysis of all staff shows that lecturers were the academic rank most likely to be promoted, followed by senior lecturers and then associate professors. The odds of a senior

lecturer being promoted were around 40 percent less than a lecturer. Also, the odds of an associate professor being promoted were around 97 percent less than that of a lecturer.

Given that the Gibson et al. (2008) study examined university economists, it is useful to do a similar analysis for this particular group. Logistic regression was applied to a dataset comprised solely of academics in the 'Economics' narrow subject area. The analysis showed that there were two key factors associated with a higher chance of promotion – a higher level of research quality and the rank of staff prior to promotion. The odds of staff who received a 'B' in the 2003 Quality Evaluation being promoted were 23 times those of staff who received a 'C' quality category. Also, the odds of senior lecturers and associate professors being promoted were much lower than for lecturers. However, there was no statistically significant association between the number of submitted research outputs in the 2003 Quality Evaluation and the likelihood of being promoted.

6 Conclusion

Obviously, for a policy such as the PBRF to work, there needs to be some evidence for individual staff that higher research quality is rewarded. The analysis by Gibson et al. (2008) found that the impact of quality in determining academic rank appeared to diminish following the introduction of the PBRF. Obviously, if this were the case across other disciplines, it would be a cause of concern to policy makers.

However, the Gibson et al. study examined only one discipline – economics – and used bibliometric databases to determine the quality of research. In addition, the start of the time-frame chosen for comparison in the analysis, 1999 and 2007, predates the introduction of the PBRF by five years. Much could have happened in this five-year period prior to the introduction of the PBRF to influence the academic rank of staff in the Gibson et al. study.

The analysis in this study shows that there is a statistically significant association between higher research quality and a higher likelihood of being promoted. Also, higher research productivity appears to be associated with a higher likelihood of being promoted, particularly at lower academic ranks (ie at lecturer level, more than at senior lecturer and associate professor levels). While research *quantity* decreases in importance as a factor at higher academic ranks, *quality* has an increasingly important relationship to the likelihood of promotion at more senior academic ranks.

The analysis of staff in the economics subject area found that the rank of staff prior to promotion, and the quality of their research in the 2003 Quality Evaluation were associated with the likelihood of promotion. The number of research outputs they submitted in the 2003 Quality Evaluation was not a statistically significant factor.

Although the data used in this study cannot be used to show if the association between the quality of research and academic rank has decreased over the last decade, the findings in this study suggest that research quality remains an important contributing factor to whether or not academic staff have been promoted following the introduction of the PBRF.

References

- Adams, J. (2008) *Strategic review of the Performance-Based Research Fund. The assessment process*, Wellington: Tertiary Education Commission.
- Ashcroft, C. (2005) Performance-based research funding: a mechanism to allocate funds or a tool for academic promotion?, *New Zealand Journal of Educational Studies*, 40(1) pp 113-128.
- Çinlar, N. & Dowse, J. (2008) *Human resource trends in the tertiary academic workforce*, Wellington: Tertiary Education Commission.
- Gibson, J., Tressler, J. & Anderson, D. (2008) *Do research assessment exercises raise the returns to publication quality? Evidence from the New Zealand market for academic economists*, Working paper in economics 11/08, Department of Economics, Hamilton: University of Waikato.
- University of Otago (2008) *Academic staff promotions – HR policy* University of Otago https://docushare.otago.ac.nz/docushare/dsweb/Get/Document-11235/ accessed on 29 January 2009

newzealand.govt.nz