



MINISTRY OF EDUCATION

*Te Tāhuhu o te Mātauranga*

# **An analysis of funding allocations for staff and research degree completions in the Performance-Based Research Fund**

**Report**

An analysis of funding allocations for staff and research degree completions in the Performance-Based Research Fund.

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## **1 Introduction**

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In each year, the Performance-Based Research Fund (PBRF) contains a fixed sum<sup>1</sup> that is allocated according to how Tertiary Education Organisations (TEOs) rate on three measures of research performance. So the level of funding for each PBRF eligible staff member and for each research degree completion is unknown at the start of each year. The funding allocations under the PBRF depend on the results of the quality evaluation, the number of research degree completions and the value of the external research income earned by TEOs. This paper analyses the amount of funding generated under the PBRF by each category of research degree completion and by each quality category for staff. It explores incentives provided to TEOs by those funding levels. The funding per researcher and per research degree completion is calculated under the assumption that the PBRF had been fully implemented in 2004<sup>2</sup>. This allows for the full effect of the policy settings and the incentives they create to be evaluated.

## **2 Calculating PBRF funding per staff member**

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In 2004, the PBRF funding for the quality evaluation was allocated on the basis of the performance of eligible staff weighted by the subject category they were engaged in. The quality categories assigned to staff ranged from an A for the highest level of performance, to an R, the lowest level. For funding purposes, a staff member who achieved an A quality category received a weighting of 5, a B staff member received a weighting of 3, a C staff member a weighting of 1 and an R staff member a weighting of 0. Only those staff who received an A, B or C quality category earned funding for their TEO.

The weightings assigned to the subject area were designed to reflect the higher costs associated with research in certain areas. Staff in high cost areas such as engineering and clinical medicine were assigned a weighting of 2.5. Areas such as chemistry and physics received a weighting of 2. The lowest weighting of 1 was for areas such as law and the arts.

To calculate the funding per staff member in the 2004 PBRF allocation, two values are required. These are the estimated government research funding allocation and the total points earned by staff in the quality evaluation.

The estimated government research funding is calculated by adding the 2004 total PBRF funding to the value of the EFTS-based research top ups in 2004. This amounted to \$150.2 million<sup>3</sup>. The quality evaluation allocation (\$90.1 million) accounts for 60 percent of this amount, the research degree completions allocation (\$37.6 million) is 25 percent of this amount and the external research income allocation (\$22.5 million) 15 percent.

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<sup>1</sup> The fixed sum is calculated from estimated research top up funding and additional budget allocations. Total indicative PBRF funding was \$18.2 million and \$46.3 million in 2004 and 2005, respectively.

<sup>2</sup> The PBRF is being phased in gradually over the period between 2004 and 2007. In 2004, 10 percent of the estimated research top up funding was diverted to the PBRF along with an additional budget allocation.

<sup>3</sup> In 2008/09, the PBRF is estimated to total \$193.7 million.

The score for each staff member is calculated by multiplying the PBRF quality score (5, 3, 1 and 0) of each staff member by their FTE status and their subject area weighting. This is summed to provide the total points earned in the PBRF. So a full-time A grade staff member in a subject area weighted at 2.5, such as engineering, generated 12.5 points (5 x 2.5). A total of 16,191 points were earned by staff in the quality evaluation.

The estimated funding earned for each point in 2004 can be calculated by dividing the estimated research funding allocation for the quality evaluation by the sum of the total score earned by staff. This results in funding of \$5,568 per point. This figure can then be used to calculate the funding for staff in different cost categories and across different levels of research performance. For example, an A level staff member in a high cost category earned 12.5 points and therefore attracted funding of \$69,596. Removing GST from this figure leaves funding of \$61,863 available to the TEO.

### **3 Calculating PBRF funding per research degree completion<sup>4</sup>**

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Research degree completions in 2002 were used to assign completion funding in the 2004 allocation<sup>5</sup>. Weightings were applied to the ethnicity of the research graduate, with a weighting of 2 for Māori and Pasifika researchers. Other ethnicities received a weighting of 1.

The funding was also weighted by the volume of research involved in the qualification. For example, a doctoral completion was assigned a weighting of 3 while a masters completion received a weighting of 1.

In addition, the subject area the student was engaged in impacted on funding. A student in funding category C, G or H received a weighting of 2.5. Students in funding category B received a weighting of 2 and students in funding category A or I received a weighting of 1.

The funding earned by a research degree completion can be calculated by dividing the estimated completions allocation by the sum of the score earned by completing graduates in 2002. The points score for each research degree completion is calculated by multiplying the volume of research weighting by the subject area weighting and the ethnicity weighting. A total of 5,048 points were scored by research degree completions at TEOs. Dividing the estimated research completions allocation of \$37.6 million by 5,048, results in a figure of \$7,441 per point.

This can then be used to estimate the level of funding earned by a research degree completion across a variety of levels, ethnicities and subject areas. For example, a Māori doctoral graduate in a high cost category would have earned 15 points (3 x 2 x 2.5) on completion of the PhD. Therefore, such a graduate would have attracted

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<sup>4</sup> It should be noted that the research degree completion is actually a course based measure. When a masters student completes their thesis the TEO will be allocated the funding, even if the degree is still to be completed.

<sup>5</sup> A total of 1,724 graduate completions were recorded by TEOs in 2002.

funding of \$111,616. Removing GST from this figure leaves \$99,214 available for TEOs.

## **4 Results**

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### **Incentives for staff**

Previously, government funding provided little direct incentive for TEOs to have higher performing staff in the area of research, apart from indirect benefits such as the potential to earn contract research income and attract students to study at the TEO through reputation. With the introduction of the PBRF, the financial incentive to have high performing research staff is considerable under the current policy settings. The allocations to the various categories of staff in 2004 are presented in Table 1.

**Table 1: PBRF funding allocations for staff by quality category and cost category 2004**

Quality category of researcher	High cost	Medium cost	Low cost
A	\$61,863	\$49,490	\$24,745
B	\$37,117	\$29,694	\$14,847
C	\$12,372	\$9,898	\$4,949

Notes:

1. Funding is exclusive of GST.
  2. The weighting for 'A' quality category staff is 5, 'B' quality category staff 3 and 'C' quality category staff 1.
  3. The weighting for 'high cost' is 2.5, 'medium cost' 2 and 'low cost' 1.
  4. The funding allocations assume the staff member has an FTE status of 1.
  5. These funding allocations are based on the assumption that the PBRF was fully implemented in 2004.
- Sources: Ministry of Education, Tertiary Education Commission.

The margin in funding attracted by A level staff over C level staff is significant for all three cost categories. For example, in the lowest cost category, exchanging a C staff member for an A staff member (or increasing the level of research of that individual) would have earned a TEO an extra \$19,796, an increase of 400 percent. This additional funding could be available either to increase the incentives to staff to improve performance, or to attract higher performing researchers through higher wages.

The incentives are even greater for staff in the high cost categories. The margin between an A level staff member and a C level staff member in an area weighted at 2.5 is \$49,491, an increase of 400 percent. The potential amount of funding available to spend up-skilling a C staff member or recruiting an A level staff member is therefore very significant. Considering the small amount of funding attracted by C level staff and the absence of funding attracted by R level staff, there is also an incentive for the TEO to redirect these staff more towards the teaching side of the operation. This would free up the time of the higher performing staff to engage in more research.

The weightings attached to the level of research performance by staff are higher in other countries. For example, the 2001 Research Assessment Exercise (RAE) in the United Kingdom funded departments in the highest quality category, 5\*, at a rate 8.7 times higher than departments in the 3a category, the lowest level of category to receive funding. This compares with the PBRF weightings of 5 for A quality category staff and 1 for C quality category staff.

The impact of the subject cost weightings becomes apparent with the margin between A level staff and C level staff ranging from \$37,100 in high cost subject areas to \$7,400 in low cost areas. A comparison of funding across levels of performance and cost categories shows that an A level staff member in a low cost category generates less funding (\$24,745) for a TEO than a B level staff member in a medium cost category (\$29,694), but more than a C level staff member in a high cost category (\$12,372).

The PBRF weightings of 2.5 for high cost areas, 2 for medium cost areas and 1 for low cost areas are higher than applied under similar schemes overseas. For example, the RAE uses weights of 1.6 for high cost, 1.3 for intermediate cost and 1 for low cost research areas. Interestingly, these weightings are based on the estimated cost of research in the various cost categories. In the PBRF however, the subject weightings were originally derived from the differentials between the tuition subsidy rates and hence, are ultimately based on the relative cost of teaching in the various subject areas.

In addition to the direct financial incentives from the quality evaluation allocations for a TEO, there is the positive effect on their reputation of achieving a higher score in the PBRF. This could be expected potentially to attract more students as they perceive the research capacity of the TEO to be of a higher level. This would in turn attract extra Student Component funding for the TEO.

The combined financial and marketing incentives could well stimulate significant movements in research staffing within the tertiary education sector in the next few years.

### **Incentives for research degree completions**

The estimated 2004 PBRF funding allocations for the doctoral and masters research degree completions are presented in Table 2 and Table 3, respectively. Māori and Pasifika research degree completions attract a significantly larger amount of PBRF funding than do 'other ethnicities'<sup>6</sup>. For doctoral completions, the margin ranges from \$49,600 in high cost categories to \$19,800 in low cost. The margins are lower for masters students, ranging from \$16,500 in high cost categories to \$6,600 in low cost.

**Table 2: PBRF funding allocations for doctoral degree completions by ethnicity and subject cost category 2004**

Ethnicity	High cost	Medium cost	Low cost
Māori and Pasifika	\$99,214	\$79,372	\$39,686
Other ethnicities	\$49,607	\$39,686	\$19,843

Notes:

1. Funding is exclusive of GST.
  2. The weighting for 'high cost' is 2.5, 'medium cost' 2 and 'low cost' 1. The weighting for 'Māori and Pasifika' research degree completions is 2 and 'other ethnicities' 1.
  3. These funding allocations are based on the assumption that the PBRF was fully implemented in 2004.
- Sources: Ministry of Education, Tertiary Education Commission.

<sup>6</sup> An increase in research degree completions would result in the funding per point declining, and hence these amounts would fall if the research degree completion allocation remained constant over time. As a result, the absolute margin in funding between Māori or Pasifika research degree completions and other ethnicities research degree completions would fall.

**Table 3: PBRF funding allocations for masters degree completions by ethnicity and subject cost category 2004**

Ethnicity	High cost	Medium cost	Low cost
Māori and Pasifika	\$33,071	\$26,457	\$13,228
Other ethnicities	\$16,536	\$13,228	\$6,614

Notes:

1. Funding is exclusive of GST.
  2. This is for a masters degree including a 1.0 EFTS thesis.
  3. The weighting for 'high cost' is 2.5, 'medium cost' 2 and 'low cost' 1. The weighting for 'Māori and Pasifika' research degree completions is 2 and 'other ethnicities' 1.
  4. These funding allocations are based on the assumption that the PBRF was fully implemented in 2004.
- Sources: Ministry of Education, Tertiary Education Commission.

To analyse how the PBRF has changed incentives for research students, the funding that would have been allocated under the research top ups system is compared with the new PBRF allocations. Although the PBRF research degree completions funding compensates TEOs for that part of the student's enrolment that involves research, TEOs also receive Student Component funding. A doctoral student attracts Student Component funding for up to four years of study (5 years in exceptional circumstances), although it is assumed the doctoral graduate takes three years in this analysis. There is no time limit for a masters student attracting Student Component funding, but this analysis assumes that the graduate is enrolled for two years of study<sup>7</sup>. In this analysis, Student Component and PBRF funding is combined for the PBRF and research top ups comparison. This is done to gain a fuller picture of the incentives that exist for TEOs.

In order to compare the funding allocations under the research top ups system and the PBRF effectively, further simplifying assumptions are required. Firstly, the tuition funding rates are assumed to be frozen at their 2004 levels. Secondly, no allowance has been made for the impact of inflation on the funding streams over time. Thirdly, in calculating the funding for a masters student under the research top ups system, it is assumed that they have one year of taught content (at the level 3 funding rate) and the remaining year is fully research-based (at the level 4 funding rate). Under the PBRF system it is assumed that the doctoral and masters students receive Student Component funding at the level 1 rate for the years they were enrolled. Also, the number and type of research degree completions remains constant. Finally, it is assumed that the students are full-time and successfully complete within the prescribed period.

The PBRF allocates a greater level of funding for Māori and Pasifika doctoral students compared with that allocated under a top ups system (see Table 4). In absolute terms, the extra funding ranges from \$44,600 for high cost categories to \$17,600 for low cost. However, there is a decrease in funding under the PBRF system for doctoral students of 'other ethnicities'. The decrease ranges from \$5,260 for medium cost students to \$2,180 for low cost students. The decrease is magnified if the student takes longer to complete the qualification than the notional durations used in this analysis.

<sup>7</sup> In practice, many research students take longer to complete their research than these figures would suggest.



**Table 4: Doctoral student combined tuition and research funding by ethnicity, subject cost category and funding system (1 EFTS)**

Funding system	Māori and Pasifika			Other ethnicities		
	High cost	Medium cost	Low cost	High cost	Medium cost	Low cost
Top ups	\$82,601	\$68,241	\$37,242	\$82,601	\$68,241	\$37,242
PBRF	\$127,214	\$102,664	\$54,904	\$77,607	\$62,978	\$35,061

1. Funding is exclusive of GST.
2. 'Top ups' is the full Student Component subsidy for these students assuming that the full research top ups funding system had remained in place.
3. In calculating the research top ups contribution, funding category C is used for 'high cost', category B for 'medium cost' and category A for 'low cost'.
4. 'PBRF' includes the Student Component funding and research degree completion allocation for each student. For the Student Component contribution, funding category C is used for 'high cost', category B for 'medium cost' and category A for 'low cost'. For the completions contribution the weighting for 'high cost' is 2.5, 'medium cost' 2 and 'low cost' 1. The weighting for 'Māori and Pasifika' research degree completions is 2 and 'other ethnicities' 1.
5. These funding allocations are based on the assumption that the PBRF was fully implemented in 2004. Sources: Ministry of Education, Tertiary Education Commission.

There is now a significant financial incentive for TEOs to ensure there is a successful completion of the doctoral qualification under the PBRF system. A large proportion of the funding for a research degree completion is now tied to successful completion. The successful completion component makes up between 72 percent to 78 percent of the total payment to Māori and Pasifika doctoral students and 57 percent to 64 percent for doctoral students of 'other ethnicities', in the various cost categories. Therefore, a large proportion of funding is now 'at risk', whereas under the research top ups system the funding was guaranteed<sup>8</sup>.

The scale of the risk is evident when considering the latest data on completion rates for research degree students. The five year completion rates for all doctoral students that started in 1998 show that just 23 percent had successfully completed by 2003<sup>9</sup>. For Māori doctoral students the completion rate is lower at 17 percent.

Analysis of doctoral student enrolment patterns shows that a significant proportion of students study for five EFTS years or longer<sup>10</sup>. As Student Component funding usually lasts for a maximum of 4.0 EFTS for doctoral students, if students do not complete after studying for longer than the prescribed time, TEOs will receive significantly reduced funding for these students under the PBRF funding system. For example, if a student in the medium cost category studied for 6 years and did not complete their doctorate, a TEO would receive total funding of \$90,987 under the research top ups system and just \$31,056 under the PBRF funding system.

The PBRF allocation to masters research degree completions shows a similar pattern to that of doctoral completions, in that, Māori and Pasifika completions receive higher funding under the PBRF than would have been the case in a research top ups regime (see Table 5). However, masters students of 'other ethnicity' receive less funding in the PBRF than would have been the case with research top ups.

<sup>8</sup> There is anecdotal evidence that some universities are working on reducing the risk in this area through tightening up entry levels and adding rigorous milestone reporting mechanisms at the early stages of the student's enrolment.

<sup>9</sup> An additional 22 percent of students were still studying towards their doctorate.

<sup>10</sup> 21 percent of all doctoral students who began studying in 1998 were enrolled for 5 or more EFTS years.

The percentage of the funding allocation that is tied to completion is larger for Māori and Pasifika masters students. For these ethnic groups, the percentage of funding tied to completion ranges between 57 percent and 64 percent. For students of ‘other ethnicities’ the range is between 39 and 47 percent.

The five year completion rates for masters students who started in 1998 was 52 percent, significantly higher than the associated figure for doctorates. The completion rate for Māori masters students is 35 percent, significantly lower than the average for all students. As was the case for doctoral students, there is a significant risk of lost income for TEOs if these completion rates were to continue. However, as Student Component funding for masters students is not time limited, there is not the same degree of incentive for the TEOs to ensure successful completion within the prescribed time period as exists for doctorates, as the funding stream is open ended.

The risk for a TEO also depends upon the dynamics of the funding system over time. If the completions in all TEOs either rise or fall by the same amount, then no one individual TEO would gain. The funding per point would simply rise or fall and no individual TEO would be better or worse off. However, if an individual TEO has a reduction in completions while the remaining TEOs perform at the same level (or better), then they will lose considerable funding and the others will experience a slight gain.

**Table 5: Masters student combined tuition and research funding by ethnicity, subject cost category and funding system (1 EFTS)**

Funding System	Māori and Pasifika			Other ethnicities		
	High cost	Medium cost	Low cost	High cost	Medium cost	Low cost
Top ups	\$41,292	\$34,231	\$19,196	\$41,292	\$34,231	\$19,196
PBRF	\$51,737	\$41,985	\$23,374	\$35,202	\$28,757	\$16,760

Notes:

1. Funding is exclusive of GST.
  2. ‘Top ups’ is the full Student Component subsidy for these students assuming that the full research top-ups funding system had remained in place.
  3. In calculating the research top ups contribution, funding category C is used for ‘high cost’, category B for ‘medium cost’ and category A for ‘low cost’.
  4. ‘PBRF’ includes the Student Component funding and research degree completion allocation for each student. For the Student Component contribution, funding category C is used for ‘high cost’, category B for ‘medium cost’ and category A for ‘low cost’. For the completions contribution the weighting for ‘high cost’ is 2.5, ‘medium cost’ 2 and ‘low cost’ 1. The weighting for ‘Māori and Pasifika’ research degree completions is 2 and ‘other ethnicities’ 1.
  5. These funding allocations are based on the assumption that the PBRF was fully implemented in 2004.
- Sources: Ministry of Education, Tertiary Education Commission.

### **Comparison of staff and research degree completion funding**

The funding received by TEOs for a research degree completion (both Student Component and PBRF) was compared with the funding received for staff in the quality evaluation allocation. To make a more accurate comparison, funding for a staff member was multiplied by three when comparing it with doctoral research degree funding, as the completions funding for a doctorate is paid only after completion - three years or more. Similarly, staff member funding was multiplied by two when comparing it with masters research degree funding.

As shown in Table 6 and 7, an A level staff member attracts more funding for a TEO than a Māori or Pasifika research degree completion across all of the various funding

categories at both doctoral and masters level. For example, the margin between an A level staff member and a Māori doctoral student in a high cost category is over \$58,000.

The margin is even greater for research degree completions for ‘other ethnicities’. The margin between an A level staff member and a doctoral degree completion in a high cost category is close to \$118,000.

**Table 6: PBRF staff and doctoral research degree completion funding by cost category**

Quality category of staff	High cost	Medium cost	Low cost
A	\$185,589	\$148,469	\$74,235
B	\$111,352	\$89,083	\$44,541
C	\$37,117	\$29,693	\$14,848
Ethnicity of research degree completion			
Māori and Pasifika	\$127,214	\$102,664	\$54,904
Other ethnicity	\$77,607	\$62,978	\$35,061

Notes:

1. Funding is exclusive of GST.
  2. Annual staff funding has been multiplied by three to make the comparison with the assumed three years of study of a doctoral student.
  3. Doctoral student funding includes Student Component funding and PBRF completions allocation.
  4. These funding allocations are based on the assumption that the PBRF was fully implemented in 2004.
- Sources: Ministry of Education, Tertiary Education Commission.

**Table 7: PBRF staff and masters research degree completion funding by cost category**

Quality category of staff	High cost	Medium cost	Low cost
A	\$123,726	\$98,980	\$49,490
B	\$74,235	\$59,388	\$29,694
C	\$24,745	\$19,796	\$9,899
Ethnicity of research degree completion			
Māori and Pasifika	\$51,737	\$41,985	\$23,374
Other ethnicity	\$35,202	\$28,757	\$16,760

Notes:

1. Funding is exclusive of GST.
  2. Annual staff funding has been multiplied by two to make the comparison with the assumed two years of study of a masters student.
  3. Masters student funding includes Student Component funding and PBRF completions allocation.
  4. These funding allocations are based on the assumption that the PBRF was fully implemented in 2004.
- Sources: Ministry of Education, Tertiary Education Commission.

B level staff attract more funding for TEOs than research degree completions of ‘other ethnicities’. However, the funding for Māori or Pasifika research degree completions exceeds the funding generated by B level staff.

C level staff earn less funding for TEOs than all types of research degree completion. In some cases the margin in funding is quite significant. For example, a Māori doctoral research degree completion in a high cost area would earn a TEO \$90,000 more than a C level staff member in the same cost category.

## **5 Conclusion**

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The PBRF funding system was designed to reward research excellence. In doing so, the funding system creates incentives for lower performing TEOs to strive for research excellence. This analysis of the PBRF allocations in 2004 suggests that strong financial incentives have indeed been created that should encourage TEOs to aim for higher research performance. The incentives exist in both the staffing and research degree completion areas.

Before the introduction of the PBRF, there was no direct financial incentive from government for TEOs to employ high performing staff. Now there are significant financial gains for a TEO from having high performing researchers on their staff. Lower performing staff attract relatively small amounts of PBRF funding, if any. This may well result in a reallocation of academics' time between teaching and research.

A strong incentive for TEOs to enrol able Māori and Pasifika students in postgraduate research study has been created by the PBRF funding system. There is however little incentive to enrol students who are unlikely to complete, as in most cases over half of the total funding attracted by the student is dependent on their successful completion. As the five year completion rates for doctoral and masters students that started in 1998 are 24 percent and 52 percent, respectively, the potential loss of income for individual TEOs is considerable, depending on the performance of the other TEOs.

A comparison of the PBRF allocations for staff and research degree completions showed that higher performing researchers attract more income for a TEO than individual research degree completions. However, the funding attracted by C level staff was significantly less than that earned by individual research degree completions across all cost categories.

These new incentives created by the PBRF have changed the dynamics of the research area in tertiary education. How the TEOs respond to these incentives and the impact of this on the tertiary education workforce and graduate student population will be an area of future analysis.

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