

The funding of research in the tertiary sector

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ABSTRACT

This paper considers how research in the tertiary sector is currently funded and outlines some of the problems with existing arrangements. It then sets out in greater detail, and critically assesses, the changes proposed in the White Paper. Following this, the paper summarizes the tertiary funding decisions announced in late August 1999 and explores their possible impact on research activity. The final section considers the principles which should guide the funding of research within the tertiary sector and examines alternatives to existing arrangements. For reasons of brevity, no consideration is given to some of the wider issues raised by the debate over the funding of research in the tertiary sector, such as the relationship between research funding and economic performance and the link between research and teaching (see Clark, 1997; Gottlieb and Keith, 1997).

Introduction

In November 1998, the National-led minority government released its long-awaited White Paper on tertiary education (see New Zealand Government, 1998). As expected, this included proposals for significant changes to the funding of research within the tertiary sector. First, a new contestable pool would be established for allocating a substantial proportion of the funds currently distributed for research within the tertiary sector via student tuition subsidies. Second, a new regime of research subsidies (referred to as 'research top-ups') would be introduced, involving sweeping changes to the existing structure of tuition subsidies.

As with many other proposals contained in the Tertiary White Paper, the government's ideas in relation to the funding of research provoked a largely hostile response from tertiary institutions, especially the universities. Partly as a result, the proposal for a new contestable pool was abandoned (at least for the time being), and significant modifications were made to the proposed structure of research top-ups.

This paper considers how research in the tertiary sector is currently funded and outlines some of the problems with existing arrangements. It then sets out in greater detail, and critically assesses, the changes proposed in the White Paper. Following this, the paper summarizes the tertiary funding decisions announced in late August 1999 and explores their possible impact on research activity. The final section considers the principles which should guide the funding of research within the tertiary sector and examines alternatives to existing arrangements. For reasons of brevity, no consideration is given to some of the wider issues raised by the debate over the funding of research in the tertiary sector, such as the relationship between research funding and economic performance and the link between research and teaching (see Clark, 1997; Gottlieb and Keith, 1997).

Research in the tertiary sector: The funding framework

The sources and level of research funding for the university sector in New Zealand during the mid-to-late 1990s are summarized in Table 1. The figures in this Table should be treated with considerable caution, since they are based on various estimates, some of which are open to serious question. For instance, according to the data the level of research funding for the university sector from central government sources increased dramatically between 1996 and 1998, from about \$150 million to over \$246 million. Yet during this same period there were no significant changes in research-funding policy or in the volume of public funds received by the universities for research purposes. Likewise, the figures in Table 1 imply that university research funding rose by over 70 per cent between 1994 and 1998. Yet there is no objective evidence of any commensurate expansion of research activity. What this suggests, therefore, is that the data on research funding are highly sensitive to the particular cost-allocation methodologies employed within institutions. In other words, the country's universities have chosen in recent years to increase the amount that they claim to spend on research (with the direct implication that less is now spent on tuition), and this has been reflected in a rise in the apparent level of external and internal funding provided for research.

Regardless of the accuracy of the aggregate data in Table 1, we can be reasonably confident about at least two matters. First, there can be little doubt that the public sector provides the majority of the resources available for research within New Zealand's universities. Table 1 suggests that of the \$403 million spent on research in 1998, around 61 per cent came from central government sources, 29 per cent from student fees and endowment income, and only 10 per cent from other sources (mainly the private sector). Second, while other tertiary providers also undertake research in specific areas, the overwhelming majority of research within the tertiary sector is undertaken by the country's seven universities. Accordingly, the aggregate figures in Table 1 probably reflect the situation in the tertiary sector as whole rather than merely the university sector.

Source of funds	(\$000)			(%)		
	1994	1996	1998	1994	1996	1998
Own funds (includes tuition fees & interest)	53,600	74,135	117,030	23%	27%	29%
Central government (includes tuition subsidies, PGSF, HRC & Marsden)	144,600	149,453	246,167	62%	55%	61%
Other (includes private sector & local government)	35,300	49,925	40,355	15%	18%	10%
Total	233,500	273,513	403,552	100%	100%	100%

Sources: Ministry of Research, Science and Technology, *New Zealand Research and Experimental Development Statistics, All Sectors 1995/96*, and New Zealand Vice-Chancellors' Committee.

Table 1: Sources of Funds for Research in the University Sector, mid-to-late 1990s

Of the roughly \$150 million which the universities were deemed to have received from the government for research in 1996, about two-thirds came from Vote Education (a separate Vote for tertiary education was introduced in the 1999 Budget). This calculation was based on estimates by the Ministry of Research, Science and Technology that around \$100 million of the approximately \$1.2 billion in annual tuition subsidies paid to tertiary providers - on the basis of the number of equivalent full-time students (EFTS) adjusted by weightings for different course costs - was for research. Aside from Vote Education, most of the remaining research funding from government sources came from three separate contestable pools: the Public Good Science Fund (PGSF), the Marsden Fund and the Health Research Council. In 1996 the universities secured around \$50 million from these three sources.

The policy framework for the funding of research in the tertiary sector has been the subject of wide-ranging criticisms, both by academic researchers and government officials. It is not possible here to consider all the relevant concerns, but the main ones are summarized below.

1. The Overall Level of Research Funding

By international standards, the total quantum of funds (both public and private) available for research within the tertiary sector is modest. For instance, many leading universities elsewhere in the world receive significantly more funding per annum for research purposes than the combined research resources of New Zealand's seven universities. Particularly telling is the fact that New Zealand universities are relatively impoverished when compared with their Australian counterparts. Total expenditure on research (and research training) in the Australian tertiary sector was estimated to be around A\$2.3 billion in 1996 (Kemp, 1999: 7), with some 88 per cent of the available resources coming from the federal government. Comparisons with New Zealand are complicated because of major differences in the respective funding regimes, especially in relation to the funding of research training. Nevertheless, on a per capita basis Australian universities appear to have access to nearly double the volume of research funding (in real terms) compared with their New Zealand counterparts. Australian universities also have access to a much wider range of funding sources.

The poor resourcing of tertiary-based research in New Zealand is, of course, indicative of a much wider problem. In the mid-1990s it was estimated that New Zealand's total expenditure (public and private combined) on research and development (R & D) was equivalent to barely 1 per cent of GDP. Although the reliability of the relevant private sector data has been questioned, there can be little doubt that the overall level of private investment in R & D is comparatively low. For instance, the average spending of comparable OECD countries on R & D was about 1.9 per cent of GDP (Ministry of Research, Science and Technology, 1996), with some OECD countries spending close to 3 per cent. The problems facing New Zealand's universities have been compounded by the continuing - and significant - reductions in the real level of government funding per EFTS since the late 1980s. Although substantial fees are now charged for most degree-based programmes, these have not been sufficient to offset the cuts in public subsidy levels.

It is sometimes suggested that these reductions in public subsidies per EFTS might not have been so severe had the government followed the recommendations of the Hawke Report in 1988 and separated expenditure on tuition subsidies from the funding of research in the tertiary sector. The assumption underpinning this proposition is that governments would probably have been unwilling to cut research funding in real terms, while there would have been no lessening of the political pressure to curb the fall in the real value of tuition subsidies. Whether this line of reasoning has any validity, however, is difficult to assess. On the one hand, the funding of Vote: Research, Science and Technology has increased, especially since the mid-1990s, thereby suggesting that governments have recognized the vital importance of public investment in R & D. On the other hand, it is conceivable that tuition subsidies could have been cut to an even greater extent had the funding of research and tuition been decoupled.

2. The Limited Sources of Research Funding

The sources of funding available to researchers in the tertiary sector are relatively limited. Unlike the situation in many other jurisdictions, there are few large private sector funders. This reflects the small size of New Zealand's manufacturing and industrial sector, and the relative absence of industries - such as computing, defense, petro-chemicals, pharmaceuticals and aerospace - that tend to invest heavily in R & D. Similarly, there are few charitable foundations that provide significant funding for research purposes. This lack of private sources of research funding has not been mitigated to any extent by the government through the provision of a greater volume of public funding. To be sure, the introduction of the PGSF and the Marsden Fund over the past decade has increased the

resources available to academic researchers. However, the demand for funds from these sources (and also the Health Funding Council) greatly exceeds the available supply. Furthermore, in order to provide a degree of funding stability for the country's nine Crown Research Institutes, bidders from the tertiary sector have only had access to a small proportion of the roughly \$320 million distributed annually via the PGSF.

To compound matters, relatively little of the funding currently provided via the PGSF and the Marsden Fund is devoted to the humanities, social sciences, law and commerce, despite the fact that a large proportion of research activity within the tertiary sector occurs in these areas. This is partly because priority has traditionally been given to the physical and biological sciences, and partly because the existing contestable pools are better geared to supporting research undertaken by teams (of the kind that are common in the sciences) rather than research undertaken by individual scholars (which is the more usual pattern in many other areas of academic inquiry). It is significant in this context that there are no separate research funding bodies for the humanities and social sciences of the kind that exist in other jurisdictions.

3. The Thin Spread of Research Funding

Such research funding as is available to the tertiary sector tends to spread rather thinly across all the various disciplinary areas rather than being concentrated in particular centres of excellence. There are a number of reasons for this. To start with, the three existing contestable research pools have very different mandates and there is little overlap with respect to their areas of responsibility. Accordingly, there is only limited scope for coordinating the allocation of funds between the competing research providers. More important, the current resourcing arrangements for the tertiary sector are largely student driven (see Boston, 1999; OECD, 1997). Thus, the research funding which is included in tuition subsidies essentially follows students to whichever provider they choose to attend, and also to the particular disciplinary areas in which they enrol (at least in the case of institutions with devolved systems of financial management). This means, in effect, that the mechanism for allocating a significant proportion of the public funds for research in the tertiary sector is highly decentralized and strongly influenced by the changing level, structure and pattern of student demand. While this helps to ensure that at least a modest level of research funding is available to scholars irrespective of their field of inquiry, such arrangements also have a number of serious drawbacks.

One of these is the lack of medium-to-long term certainty over funding levels, both at the institutional and sub-institutional levels. To be sure, this may not represent a major impediment for funding short-term and small-scale research projects (e.g. of the kind which are common in the humanities and social sciences), but it certainly creates greater difficulties for funding expensive, long-term projects, especially those requiring significant investments in infrastructure and equipment. Another problem is the minimal scope available to the government (or indeed any other central organization, such as the Vice-Chancellors' Committee) to coordinate research funding in the interests of building up centres of excellence. Nor is it possible under the current policy arrangement for particular universities to be favoured over the others in terms of their overall level of research funding. For such reasons, New Zealand universities have tended to be regarded as roughly comparable in relation to the quality of their research - although, of course, they differ greatly in size and in terms of the nature and breadth of their research activity. In short, New Zealand lacks a high-quality research university, such as Cambridge, Oxford, Princeton or the Australian National University. Equally, none of the universities have had the resources to fund large research institutes in specific disciplinary areas or to establish significant numbers of research chairs.

4. The Structure of Tuition Subsidies

Since the late 1980s students in the same cost-category have been eligible for the same tuition subsidy regardless of whether they attend a university, a polytechnic or a college of education. Thus, full-time students pursuing a commerce or arts degree carry with them an equivalent volume of public funds irrespective of the public tertiary institution in which they enrol. From the year 2000, approved tertiary providers in the private sector will also be eligible for similar public subsidies. At first sight, such arrangements might seem fair. On closer inspection, however, it is evident that they are beset with problems.

The polytechnics, for instance, have rightly claimed that they are disadvantaged because, although all institutions receive identical resources for teaching equivalent programmes, the universities are much wealthier (i.e. in terms of their capital assets per student). The universities, in turn, have raised their own objections. One continuing source of concern has been the failure of tuition subsidies to reflect the actual costs of provision, both in absolute and relative terms. A particular bone of contention has been the balance between undergraduate and postgraduate funding subsidies. For instance, although postgraduate students have been funded at a higher rate than undergraduates, the subsidies have fallen far short of the costs of provision. In the interests of avoiding excessively high fees (and thus deterring large numbers of capable students), the universities have been forced to cross-subsidize most postgraduate programmes (especially those in the sciences and engineering) from their undergraduate programmes. This has placed universities at a disadvantage relative to those providers (such as polytechnics) that have few postgraduate students.

Another concern on the part of the universities has been the failure by polytechnics and other providers of degree-based programmes to fulfil their statutory obligations. Under Section 254 of the Education Act, degree-based programmes are required to be 'taught mainly by people engaged in research'. In practice, it appears that a substantial proportion, if not a significant majority, of those teaching degree-based programmes in most polytechnics are not active researchers. Certainly, the research output of many polytechnics is exceedingly modest, especially when judged on the basis of publications in refereed journals. Thus, under current arrangements, various tertiary providers are receiving research funds via their tuition subsidies yet are failing to undertake the desired level of research. This poses two obvious problems: first, it is inconsistent with a prudent or efficient allocation of scarce research funds; and second, it means that many students undertaking degree-level programmes are missing out on the opportunity to be taught by active researchers operating in a research-oriented environment.

5. Accountability and Incentives

Regardless of the extent to which particular institutions are complying with their statutory obligations, it is argued - especially by some within government circles - that the current research funding regime is characterized by an inadequate degree of transparency and accountability. Equally, it is claimed that there are insufficient incentives on providers to improve the quality of their output. Critics admit that public tertiary institutions are required to produce statements of service performance, and these must include an account of their research performance. However, it is pointed out that such accounts are typically brief, with any quantitative data (e.g. in relation to the volume and type of publications) being at a high level of aggregation. There is, of course, nothing to prevent institutions from assessing the quality of their research in a more comprehensive and systematic fashion, but such evaluations tend to be rare. Moreover, the Academic Audit Unit sponsored by the Vice-Chancellors' Committee has tended to focus on the quality of the management processes within universities rather than attempting to assess their actual performance.

At another level, there have been concerns that the internal performance management systems within tertiary institutions, such as those pertaining to appointments, promotions and the allocation of internal research grants, fail to provide adequate incentives for improving the quality and quantity of research output. Similarly, despite the greater emphasis that universities (and indeed the wider tertiary sector) have placed on research performance in recent years, research output per academic staff member has actually declined at some institutions. But the reasons for this probably have more to do with the severe funding constraints affecting the tertiary sector and deteriorating student-staff ratios rather than any serious problems with the structure of incentives.

The proposals for funding research in the white paper

As noted, the Tertiary White Paper proposed two major changes in relation to research funding. First, a new contestable research pool was to be established, with effect from the year 2000. Initially, this pool would have \$20 million per annum, the relevant funds being drawn from the estimated \$100 million in research money attached to EFTS-based subsidies. Funding would be allocated for up to three years and would be designed to 'encourage strategically-focussed research portfolios rather than short-term projects' (New Zealand Government, 1998: 32). The assumption, it seems, was that the new pool would differ from the existing contestable funds in that tertiary institutions would put up bids consisting of existing and planned areas of research activity (especially in areas of basic or pure research) rather than specific, discrete projects. In this way, the new pool would supplement, rather than duplicate, existing funding arrangements. Further, unlike the other contestable funds, only providers of tertiary education would have access to the new pool. Partly for this reason, it was proposed that the Ministry of Education, rather than the Ministry of Research, Science and Technology, would have overall responsibility for the pool. It was assumed, however, that the actual administration of the fund would be the responsibility of an organization with existing expertise in managing contestable research funding, such as the Foundation for Research, Science and Technology or the Royal Society.

According to the White Paper, four criteria would be used to assess applications for research funds:

- Demonstrated quality and capacity of researchers. Researchers bidding for this funding would be required to submit recent track records of research activity in the area for which funding is sought.
- Quality of the proposed research portfolio. This quality would be judged on the basis of the design and purpose of the proposed portfolio, its feasibility, the research methods, the skills and technologies to be developed and used, and the relationship to other programmes and investments.
- Strategic focus. Researchers would be required to demonstrate how their portfolios would develop the innovation and human resource capabilities of New Zealand.
- Cost-effectiveness. All elements of proposed research portfolios would need to be appropriately costed (New Zealand Government, 1998: 32-3).

The second change in the White Paper with major implications for research funding was the proposed introduction of a new regime of tuition subsidies. Under the new policy framework, there would have been three research subsidy levels: undergraduate degree programmes would have received an additional subsidy of \$500 per EFTS; taught or papers-based postgraduate degree programmes and diplomas would have received \$2,400 per EFTS; and high-level research degrees (such as thesis-based masters degrees and doctorates) would have received \$3,800 per EFTS. No research subsidy would have been provided for nondegree programmes. Whereas the \$500 undergraduate top-up would have been applied to existing cost-categories, the postgraduate top-ups would have been added to the relevant undergraduate cost-categories not the existing

postgraduate rates. In effect, therefore, the postgraduate funding categories would have been replaced with research top-ups.

According to an analysis undertaken by the New Zealand Vice-Chancellors' Committee, the new regime, if implemented, would have reduced postgraduate tuition subsidies (on the basis of 1998 enrolments) by approximately \$60 million (or around 34 per cent). The reductions in funding per EFTS would have varied depending on the relevant cost category. For instance, whereas postgraduate students taking taught courses in arts, commerce and law would have faced a cut of \$1,041 in their tuition subsidy, those taking research-oriented courses in science would have lost \$8,247 and research students in engineering would have lost \$10,099 (or about 43 per cent). By contrast, an additional \$35 million would have been applied to undergraduate-degree based programmes.

In net terms, the new policy would have reduced public expenditure on tuition subsidies by about \$25 million (i.e. on the basis of a static analysis using 1998 EFTS). However, much of this would have been compensated for via the proposed \$20 million contestable pool. Equally, if not more important, the new policy would have generated substantial shifts in funding between institutions and also between disciplinary areas. Put simply, universities would have lost relative to other tertiary providers, while engineering, science and technology would have lost relative to the arts, commerce, law and the social sciences.

Two justifications were provided for the introduction of an undergraduate research top-up. First, the new policy, it was argued, would assist tertiary providers (especially the polytechnics) in ensuring that all their degree-based programmes were taught by active researchers. Second, amongst the many other changes proposed in the White Paper was the abolition of the 'study-right' policy introduced by the National government in the early 1990s. If study-right were abandoned, this would have a negative impact on the polytechnic sector. The proposed reallocation of funds from postgraduates to undergraduates would offset these distributional shifts.

A critique of the white paper proposals

Both of the proposals outlined above contained serious drawbacks. As already noted, the impact of the proposed changes in tuition subsidies would have been substantial, with most undergraduate degree programmes gaining (albeit modestly), and most postgraduate programmes losing, in some cases massively. Moreover, within the existing structure of postgraduate programmes, those with the strongest research orientation would have lost the most, and the losses would have been particularly marked in the more expensive disciplinary areas, such as engineering and science. Any change of this kind would have presented tertiary institutions, and especially the universities, with major difficulties (see Victoria University of Wellington, 1999).

In effect, the universities would have had two main options. The first would have been to retain their existing structure of fees but increase substantially the extent of internal cross-subsidization. That is to say, each university could have increased the cross-subsidies from undergraduate to postgraduate programmes, and from programmes in the arts, commerce and law to those in science (and also to engineering in the case of Auckland University and Canterbury University). But such an approach would have been severely constrained by competitive pressures, in particular the likelihood of the polytechnics offering cheaper undergraduate degree programmes. Indeed, given that the bulk of university revenue comes from undergraduate students, the pursuit of pricing policies that might put this income stream at risk would clearly be imprudent.

The other option would have been for the universities to lift postgraduate fees to compensate for the loss of public subsidies. But very large fee increases would have been required under this scenario, especially in the sciences and engineering. In some cases, for instance, fees would have had to quadruple (e.g. from around \$3,000 per annum to around \$12,000) in order to compensate for the proposed subsidy reductions. Yet fee increases of this magnitude would almost certainly

have reduced postgraduate participation rates. To make matters worse, any reduction in student demand, particularly amongst those pursuing research-oriented masters degrees and doctorates, would have had a negative impact on the overall volume of research output. In short, the proposed changes to the structure of undergraduate and postgraduate tuition subsidies, while ostensibly designed to enhance the quality and quantity of research (and research training) within the tertiary sector, would probably have had precisely the opposite effect.

There were also serious problems with the proposed contestable pool (see Victoria University of Wellington, 1999). According to the White Paper, the pool was to be funded, at least in the first instance, through a reduction in the level of the public subsidies provided to postgraduate students. But such an approach would have run the risk of undermining, rather than encouraging, research in the tertiary sector since it could have had a severe impact on postgraduate programmes, especially in expensive disciplines. Furthermore, given that all degree-level students, not merely postgraduates, stand to gain from being taught by research-active staff, it is not clear why the main burden of funding the contestable pool should have fallen on postgraduate. A more equitable approach (if no alternative sources of funding were available) would have been to fund the pool via a reduction in tuition subsidies for all students (or at least for all degree-level students).

Another problem centred upon the proposal to increase the size of the contestable pool to \$80 million over a three-to-five year period, starting in 2002. Beyond 2004-2006, therefore, only \$20 million of research funding would have continued to follow degree-level students to the institutions of their choice. Accordingly, taking the PGSF and Marsden Fund into account, only a small proportion of the public research funds available to tertiary providers would have been related to the number of students enrolled. Under this scenario, therefore, some institutions could potentially have ended up with a significant number of degree-level students but relatively little research funding. Inevitably, this would have raised questions about the quality of the degrees being provided by such institutions.

Equally important, the White Paper was silent on how the proposed expansion of the contestable pool was to be funded. If postgraduate tuition subsidies were again the primary source, then the consequences for many postgraduate programmes would have been severe. Alternatively, if most of the extra funds were drawn from the proposed \$500 research top-up for those taking undergraduate degrees, then ultimately there would have been no differential between non-degree programmes and undergraduate degree programmes. The logic of the new research top-up policy would then have been called into serious doubt.

To compound matters, if a high proportion of research funding were made fully contestable and if most of the available funds were allocated on a relatively short-term basis (e.g. 2-4 years), institutions could be deterred from investing in inexpensive infrastructure and equipment and from supporting longer-term basic research. This would make it more difficult to recruit and retain top-flight academics in certain fields, thereby undermining research quality. Related to this, if a high proportion of the research funding available to the tertiary sector were to be determined by externally-managed contestable pools, institutional autonomy and academic freedom would necessarily be constrained. It is one thing for around \$50 million of the existing tertiary research funding to be distributed via competitive bidding processes; it would be quite another if this figure were to rise to \$130 million (or more).

Another cluster of problems centred upon the White Paper proposal for funds from the contestable pool to be allocated to 'strategically-focussed research portfolios'. Unfortunately, neither the White Paper nor any other of the related official documents attempted to define the nature of a 'research portfolio' or to justify the use of portfolios rather than projects as the relevant unit for bidding purposes. The proposed criteria for allocating funds were also open to question. For instance, the suggestion that portfolios should be assessed according to their 'cost-effectiveness' is little short of bizarre. It is difficult enough, even a long time after the completion of a particular research undertaking, to estimate the benefits generated; but to assess the cost-effectiveness of a

project (or portfolio) in advance of the research being conducted would be an impossible task. Similarly, researchers were likely to encounter serious difficulties demonstrating 'how their portfolios will develop the innovation and human resource capabilities of New Zealand'.

Finally, there was a risk that the proposed pool would duplicate existing contestable pools (even if the allocative criteria were slightly different). Given the relatively high administrative costs associated with managing funding arrangements of this nature, any such duplication would simply reduce the actual funds available for research purposes (see Froggart, 1998; Victoria University of Wellington, 1999). In these circumstances, a good case could be made for boosting one of the existing funds, preferably the Marsden Fund, rather than establishing yet another separate pool.

The tertiary funding arrangements for the year 2000

In late August 1999, it was announced that the proposed contestable pool would not be implemented for the year 2000 as previously envisaged. Major modifications were also made to the proposed tuition-subsidy regime. Under the new policy framework, the study-right policy will be phased out over two years, the proposed research top-up for undergraduate degree programmes has been substantially reduced (for most students), and the proposed structure of postgraduate tuition subsidies has been radically revised.

More specifically, the subsidies provided to students taking taught postgraduate programmes (such as honours and taught masters degrees) have been cut by between 24 and 28 per cent (depending on the disciplinary area). In dollar terms, this involves reductions of between about \$2,000 and \$5,000 per EFTS. By contrast, the subsidies for wholly research-based postgraduate programmes (such as masters by thesis and doctoral study) have been increased by between 12 and 15 per cent (depending on the disciplinary area), 01· between about \$1,300 and \$3,500. In net terms, the Vice-Chancellors' Committee has estimated (on the basis of a static analysis using 1998 enrolment figures) that the new subsidy regime will reduce public support for postgraduate programmes by about \$12.6 million, or just over 7 per cent (in nominal terms). If allowance is made for inflation, the cut is closer to 9 per cent in real terms. Against this, the changes are expected to increase undergraduate income within the university sector by around 3 per cent (in nominal terms). As a result, the overall effect on the level of public support per EFTS within the university sector is relatively neutral. Having said this, the impact on different institutions will vary depending on the nature and structure of their courses and the composition of their student body. Some universities, such as Auckland and Victoria, are expected to lose while others, most notably Massey and Otago, stand to gain.

As with the funding changes announced in the White Paper, the new subsidy regime was not based on any systematic analysis of the actual costs of providing particular kinds of programmes. Instead, the government's decisions reflected a number of essentially political calculations, including the desire to abandon the unpopular study-right policy while at the same time minimizing the impact of this upon institutions with a high proportion of study-right students. Also of importance, it appears, was a view on the part of officials in the Ministry of Education that some taught postgraduate programmes (most notably in commerce disciplines) were too highly subsidized.

Other changes of relevance to the funding of tertiary institutions were also announced in late August - as part of the Government's so-called 'Bright Future' policy package (see Ministry of Commerce, 1999). Amongst these were a decision to provide an additional \$10 million per annum for the funding of doctoral students, and provision for up to 1500 'enterprise scholarships' (by 2002) for those undertaking either advanced study with a research component or advanced learning in technical areas. The latter scholarships will involve the state providing matching funding in cases where enterprises are prepared to support one or more students undertaking an approved course of study (or research). While the 'Bright Future' package made provision for state funding of up to

\$20 million per annum (by 2004), the actual cost of the enterprise scholarships will depend entirely upon the willingness of the private sector to support the scheme. If few firms are prepared to back the programme, the number of scholarships will be low and the cost to the public purse will be correspondingly modest.

The likely impact on research activity

In assessing the impact of these various policy changes on research activity within the tertiary sector, a number of observations can be made. First, the new subsidy regime entails a further cut, albeit small, in the real level of funding per EFTS. Accordingly, tertiary institutions will have little choice but to increase fees if they are to protect their income stream and maintain existing levels of quality. On the other hand, the removal of the cap on the number of students the government is prepared to fund means that if institutions can increase their enrolments they will also be entitled to commensurately larger public subsidies. Hence, if student enrolments were to grow, especially in degree-based programmes, then there should (at least in theory) be more funds available for research and a higher level of research output. Having said this, significant growth in student participation rates in the university sector over the medium term is highly unlikely given current demographic trends, migration patterns and fee levels.

Second, the new structure of subsidies provides universities with a somewhat greater incentive to enrol students in wholly research-based programmes. Also, the extra funding which such students will attract should help to reduce - although not eliminate - the extent to which research-oriented students are cross-subsidized from other programmes. And if more students can be enrolled in wholly research-based programmes, then, other things being equal, this will increase the overall volume of research being conducted within the tertiary sector. But one of the difficulties will be how to attract more students, and especially those of high ability, to undertake advanced courses of study. The impediments should not be underestimated. For one thing, there is only modest support available at present for such students (e.g. in the form of scholarships and living allowances) and this will change only marginally as a result of the new regime of subsidies and the new doctoral and enterprise scholarships. For another, the level of student indebtedness is continuing to rise, thus making it less attractive financially for many students to contemplate lengthy research-oriented post-graduate programmes.

New Zealand universities must also compete with their counterparts in other jurisdictions for high-quality postgraduate students. In this regard, the new funding regime does little to assist local institutions. Indeed, competitive pressures are likely to increase in the near future, especially if the Australian government goes ahead with its plans to expand the range and level of public assistance available to doctoral students (see Kemp, 1999).

To compound matters, tertiary institutions will be faced with some hard choices over how to recoup the losses that they will incur as a result of the large cuts in the subsidies for *taught* postgraduate programmes. One possibility will be to charge higher fees for such programmes. But fee increases of up to 60-70 per cent would be required in many cases to compensate for the loss of government subsidies, and rises of this magnitude seem destined to reduce participation rates and increase student indebtedness. Under this scenario, therefore, there are likely to be fewer students who are eligible to apply for research-oriented programmes, and many of them will have higher levels of indebtedness. Another possibility would be to increase the degree of cross-subsidization to postgraduate programmes. However, as already noted, competitive pressures make this an unattractive option. A final possibility would be to squeeze yet more 'efficiencies' out of the existing institutional arrangements. But in practice this is likely to entail higher student-staff ratios - and in all probability this would have a harmful impact on the research output of academic staff.

In short, there is a profound tension between the government's policy rhetoric and the realities of the tertiary funding regime. On the one hand, ministers are committed to creating a 'knowledge-

based' economy and recognize the vital importance of tertiary education and research in achieving this objective. On the other hand, the level of funding being provided to the tertiary sector is not consistent with the government's declared goals. Although the structure of tuition subsidies which will apply from the year 2000 is less hostile to postgraduate research (and research generally) than the model proposed in the White Paper, it nevertheless involves a continuing reduction in the real level of funding per EFTS and a significant shift of public resources from postgraduate to undergraduate programmes. Even allowing for the new funding which will eventually flow from the 'Bright Future' package, it is difficult to see how the new subsidy regime will enhance the quality, or even the quantity, of research output in the tertiary sector. In fact, the net effect is likely to be negative.

The funding of research in the tertiary sector: Principles and future options

It has been argued above that neither the funding proposals in the White Paper nor the new regime of tuition subsidies which will be implemented from the year 2000 provide a good basis for encouraging high-quality research in the tertiary sector. What, then, might be a preferable approach?

In designing a robust framework for research funding it is important to consider the policy regime as a whole rather than parts of it in isolation. There is a need, in other words, for a coherent and integrated approach - one, for instance, which takes into account the vital relationship between academic research and research training (and research and teaching more generally), and one which recognizes the collaborative nature of the research enterprise (and thus facilitates inter-disciplinary and inter-institutional cooperation). Further, in building a sound policy framework there are a significant number of values and considerations which need to be taken into account, and some of these are likely to be in tension (see Boston 1997). For instance, amongst the important criteria are the following:

- providing strong incentives to encourage and reward high-quality research;
- protecting institutional autonomy and academic freedom;
- facilitating long-term research projects by ensuring a reasonable degree of funding certainty;
- ensuring that most, if not all, degree-based teaching is undertaken by active researchers;
- ensuring that there is adequate funding, within the global amount available, for research training (i.e. for postgraduate students);
- minimizing transaction costs and encouraging productive efficiency;
- providing incentives for institutions (and teams of researchers) to build strong relationships with industry and to seek, wherever relevant, private sources of funding;
- ensuring a proper degree of transparency and accountability for the use of public funds; and
- avoiding monopolistic funding arrangements under which most research funds are controlled by a single funding or purchasing agency.

In all likelihood, such criteria will be best satisfied in a context where there is both an element of contestability for funds (between both institutions and groups of researchers) as well as non-specific institution-based (or student-driven) funding. To rely solely on competitive-bidding arrangements would create a good deal of uncertainty, increase transaction costs, and reduce the incentive and capacity for institutions to undertake expensive, long-term projects. This, in turn, could have an adverse impact on the recruitment and retention of high-quality academic staff in certain areas, with damaging consequences for both postgraduate and undergraduate teaching.

Against this, in the absence of some external contestability for research funds, the incentives for performance would be weakened.

As to the specific policy options for enhancing research in the tertiary sector, two broad kinds of changes can be identified:

- modest changes to existing policy parameters; and
- more radical reforms.

With respect to the first broad option, possible changes could include modifications to the operation of existing competitive pools, such as the PGSF and the Marsden Fund. For instance, the tertiary sector could be given greater access to the funds available via the PGSF. Alternatively, some funds could be shifted from the PGSF to the Marsden Fund, thus increasingly the resources available for high-quality, 'curiosity-driven' research. Another relatively modest change would be the introduction of an incentive-based funding regime under which the government matched (either fully or partially) the research funds raised by tertiary institutions from the private sector. However, unless such a proposal involved additional public resources (rather than merely shifting resources within Vote: Tertiary Education), there would be little to commend it.

If more radical proposals were to be considered, a range of possibilities present themselves. Amongst these are the following:

- the introduction of a policy under which several universities are designated as 'research universities' and funded on a more generous basis than other tertiary institutions;
- the introduction of a Research Assessment Exercise (RAE) modeled along the lines of that employed in Britain (or perhaps Hong Kong);
- the establishment of a separate contestable fund for research infrastructure and equipment; and
- the establishment of special government-funded research centres within tertiary institutions on a medium-to-long-term basis (e.g. 5-10 years), subject to periodic performance reviews.

Such options, of course, all have strengths and weaknesses. Nor are they necessarily mutually exclusive. In assessing their merits, the issue of whether they would be funded from within existing fiscal parameters or via new resources is of critical importance. For instance, under the former scenario, any evaluation would need to include an analysis of how a reallocation of existing resources might affect those areas where funding will be reduced.

While a detailed assessment of each of the suggested options is beyond the scope of this paper, a number of brief observations are worth recording. First, the idea of concentrating research resources within several universities has received support from various quarters, including the Minister of Tertiary Education, Max Bradford. The problem with this proposal, however, is that there are significant centres of research excellence in each of the seven existing universities. For instance, Auckland and Otago have strength in the sciences and medicine, Massey and Lincoln in agriculture and biotechnology, Canterbury in the sciences and engineering, Waikato in biotechnology, fuel cells technology, forestry and bicultural studies, and Victoria in the humanities and social sciences. If a funding regime were introduced under which two universities - say, Auckland and Otago - were favoured over the rest, then there is plainly a risk (particularly if no new resources were provided) that the research capability of the other five universities would be significantly impaired, with consequent implications for the quality of their teaching programmes and their international reputation. This is likely to be damaging for the whole tertiary sector.

There is a further consideration of relevance to the debate over 'research' universities. Currently, most students attend a university in their home city, and, apart from those taking specialist courses (such as dentistry and medicine), relatively few students travel long distances to secure their tertiary

education. If several 'research' universities were established, this would have significant implications for the amount of domestic travel which many students would be required to undertake. Yet neither the existing system of student allowances, nor the current structure of student accommodation, are conducive to such requirements.

Second, the idea of introducing an RAE (modeled largely along British lines) has been championed in recent years by a number of leading academics, including Professor Peter Gluckman (the Dean of the Auckland Medical School), as well as the Treasury. There can be little doubt that an RAE has many attractions, especially when compared with the establishment of a new contestable pool of the kind envisaged by the White Paper (see Bourke, 1997; Gluckman, 1998; Higher Education Funding Council, 1998; University Grants Committee, 1999, Victoria University of Wellington, 1999). For example, unlike the White Paper proposal, an RAE would not significantly weaken institutional autonomy, it would preserve a high degree of flexibility over the kind of research undertaken, and it would provide reasonable funding certainty over the medium term. Moreover, it would generate strong incentives for performance across all institutions and departments, not merely those selected by providers as part of their respective 'portfolio' bids.

Against this, the experience of Britain and Hong Kong (both of which have had RAEs for a reasonable period of time) indicates that such schemes are not without their drawbacks. These include: additional administrative and compliance costs; goal displacing behaviour, with academic staff focusing upon research (and especially short-term research projects) at the expense of teaching and supervision; the inherent problems of assessing the quality of highly diverse research outputs; the difficulty of categorizing subject areas for assessment purposes; the problem of assessing research of a strongly inter-disciplinary nature; the difficulties of determining an appropriate rating system and ensuring fairness (in the application of rewards and incentives) across widely disparate disciplines; and the potentially long-term problems - in terms of morale and the loss of active researchers - encountered by institutions which receive relatively low average ratings (Dearing, 1997; Humphrey, Moizer and Owen, 1995; McNay, 1999; Ministry of Education, 1998a, 1998b; Parker, Guthrie and Gray, 1998; Pollitt, 1996; Whittington, 1997).

Quite apart from the generic problems associated with RAEs, the application of such a scheme in New Zealand would present additional difficulties because of the relatively small size of the tertiary sector and the limited number of active researchers in many disciplinary areas. To guarantee impartiality in these circumstances, it would be essential to include at least one senior academic from other jurisdictions (especially Australia) in each of the assessment panels. But this would inevitably increase the administrative costs associated with such an exercise.

Conclusion

In policy terms, the government's protracted tertiary review between early 1997 and mid- 1999 borne little fruit. It did, however, assist in clarifying some of the critical issues affecting the funding of research in the tertiary sector. Above all, it highlighted that the research funding available to New Zealand universities is relatively modest, certainly when compared with that available to their counterparts in many other jurisdictions, including Australia. Compounding this problem is the fact that there are comparatively few sources of funding and the structure of tuition subsidies poorly reflects the actual costs of provision.

As argued above, the proposals announced in the White Paper would almost certainly have undermined the volume and/or quality of research within tertiary institutions. This is because of the massive reduction to postgraduate subsidies and the problematic nature of the contestable pool. In the event, the government heeded the warnings of the university sector, and substantially amended its original proposals. Nevertheless, the new subsidy structure that takes effect in the year 2000 will cut postgraduate funding by around 9 per cent in real terms per EFTS. Such a reduction sits uncomfortably with the government's ostensible commitment to a knowledge-based economy.

If New Zealand is to flourish economically, it will be imperative to increase the country's investment in R & D; a critical part of this must be greater investment in research within the tertiary sector. Given the relative dearth of private funding sources, there is little alternative but for the public sector to take the lead. While there appears to be a growing acceptance of this amongst policy makers, the development of a coherent, stable, long-term funding strategy has not been forthcoming. With yet another review of the tertiary sector planned for the year 2000, any decisions on the broader questions surrounding the level and structure of research funding appear a long way off. For tertiary institutions this means continuing uncertainty over the future shape of the funding framework and continuing difficulties in maintaining their existing research capability.

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