



**Department of Economics
Discussion Papers
ISSN 1441-5429**

Reforming the Funding of University Research

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No. 18/02

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This paper was written while the author was a visitor at the Productivity Commission. The views expressed in it are entirely the author's and should not be attributed to the Commission

Introduction

Most of the recent discussion of university funding has focused on student related matters: the funding of teaching, cost recovery from students, the ability of universities to charge fees, the merits or limitations of vouchers and the ability of students to choose between universities. The issues have been fairly well identified, though no consensus has emerged. The attention which has been given to funding teaching has been warranted, granted the size of the teaching task, and the possible scope for improving arrangements.

By contrast, very little attention has been given to the research funding of universities. There have been debates about the level of research in general, and that provided to specific research programs. However, when “research funding” is raised as a topic, the focus invariably narrows on to specific research initiatives. These, such as those administered by the ARC and NHMRC, fund grants for specific research projects, and are separate from the basic research funding provided to universities. There has been a little discussion of the Research Quantum and its successor funding arrangements, and funding for research infrastructure- these represent only a small proportion of the funds which are provided to universities for research.

The source of research funding which is by far the largest is that which is embodied in the operating grants to the universities. These are sometimes described as funding for “teaching”, but in reality they fund both teaching and research. They fund academic salaries, and help fund libraries and laboratories, which are used for both teaching and research. This funding is intended to fund research, through providing academics with the time to do research. In reality, it achieves this aim; it would be possible to reduce funding to universities by about one third if they were required to only provide teaching services. Very substantial resources (a little less than \$2bn) are granted to universities to fund their general research efforts.

This aspect of research funding has attracted very little analysis. There has been some discussion of it within individual universities. The public debate has focused almost entirely on other aspects of research funding. For example, the West Report discussed funding to the grant giving bodies such as the ARC, and it looked at some small programs such as Research Quantum and Infrastructure Grants. It also gave considerable attention to research training (West, 1998). However, it did not consider the main source of university research funding.

This lack of interest has serious consequences. This is the element of research funding which is the least transparent, and probably the least efficient. It is also the largest. Over the past decade there has been a substantial reallocation of this funding, with serious implications for the research effort and output. While the system has not collapsed given the current arrangements for university funding, it will have significant implications for the operation of a more student based, competitive funding model.

The problems arise because the allocation of research funding is based essentially on an irrelevant variable- student numbers. Since there have been big swings in student numbers in the last decade, there have been big swings in the allocation of this funding. Many of the discipline areas which have lost out in terms of student numbers, such as science and arts, have been good performers in research; however many of the areas which have gained students have been, at best, only moderate research performers. By shifting resources out of high research productivity disciplines into low research productivity disciplines, the overall research effort and output has been reduced. The practice of allocating research funding on the basis of an irrelevant indicator has not been the sole cause

of the problems of Science and Arts faculties, since falling student numbers would have warranted some contraction in staff. However it has made a difficult situation significantly- and unnecessarily- worse.

The implications of this research allocation system do not stop here. There will be adverse implications for the student funding arrangements if a move is made towards more student centred funding and competition between universities. For a start, most of the discussions of the cost of a student place exaggerate the cost by about 50%, because typically, cost is calculated by dividing total costs of university operation (excluding some small amounts such as Research Quantum) by student numbers. About a third of these costs are attributable to research, not teaching. Discussions of cost recovery of courses significantly understate the extent to which students are paying the full cost of their courses (some, such as business students, are perhaps paying more than full cost at present).

However, more seriously, if there is a move towards greater reliance on student based funding, major problems could develop. Students will not be prepared to pay for university research as well as their teaching; they will not have to, because some universities will set fees on a teaching

only basis, and will not try to fund research from student fees. If the government continues fund research by linking payments to student numbers, this will constitute a per student subsidy in the market place, and less research oriented universities will compete the fee downwards, making it difficult for research oriented universities to fund research. A necessary condition for enabling changes in student funding to be effective is the breaking of the nexus between research funding and student numbers.

This component of research funding should be a priority for reform. By far the major responsibility lies with the Commonwealth government. The Commonwealth is currently the major provider of funds for the research done in universities. The universities themselves do have discretion over the ways they allocate the funds they receive, but they follow (perhaps too slavishly) the signals given by the government. The government will have to remain the main source of this funding. There is no good reason to expect students to fund research. In a tightly regulated and planned environment, it will be feasible to charge students more than the cost of teaching to fund research, but in a more competitive environment, attempts to do this will break down. There will be some scope for research support from the private sector, however most of this

will be for specific projects of direct value to industry. The private sector is unlikely to be willing to provide much of the general funding to allow academics time to do basic research; most research is not of the form which industry is prepared to pay for.

This paper begins with an analysis of the research funding arrangements as they operate at present. It concentrates on the research funding which is provided directly to universities and which is primarily allocated on the basis of student numbers; it does not discuss specific research programs such as those administered by the ARC. The implications for the research effort and performance are then discussed. After this, the implications for changes to student funding and competition between universities are considered. Finally the priorities for reform of research funding are discussed. The key requirement is that the link to student numbers be broken, and this can be achieved under a wide range of funding alternatives.

The Current Model: Student Based Research Funding

It is worthwhile noting from the outset that there is no explicitly set out model for the funding of research and teaching. Nevertheless there is

considerable uniformity across and within universities on how the bulk of research and teaching task is funded.

Within the overall framework, there are several levels at which discretion can be exercised. The Commonwealth government can choose how it allocates funds to universities, universities can choose how to allocate funds between faculties or schools, and these in turn can choose how to allocate funds to departments or centres. Staff members can choose, to some extent, what effort and time they put into research. Universities also allocate funds for research infrastructure such as libraries, which buy material and provide services for both teaching and research.

The way in which the Commonwealth allocates funds to universities for teaching and research is essentially based on student numbers. A small proportion of funds is allocated on the basis on research performance, and there is now a direct funding mechanism for research students. However, the bulk of funds for teaching of undergraduate and postgraduate students and for research are allocated on the basis of student numbers. There has long been a recognition that different types of students impose different costs on the university to achieve an acceptable standard of teaching and training. Medical students cost more

than law students, for example. In the early 1990s the government used an explicit model, the Relative Funding Model (RFM), to allocate funding. This model incorporated different costs for different types (by discipline area, by level) of student. More recently, it has ceased using the RFM explicitly, and has adjusted funding for each university according to the student load (Industry Commission, 1997). The costs associated with different universities differ because of different mixes of students, and thus there is variation in the per student funding- the RFM continues to influence funding indirectly. Funding is based on student targets and outcomes, though in the short run, universities face a nearly fixed grant. In the long run, if a university were permitted to change its profile significantly (eg by shifting from science to law students) there would no doubt be funding implications.

Universities are free to allocate the funds they receive as they see fit. Typically, after funding administration and university wide facilities such as libraries, they allocate most of the funds to faculties or schools. They will often take a small proportion off the top to fund strategic research initiatives; these funds are usually allocated by competitive bidding. In allocating funds to faculties, they base their allocations on student numbers, and on relative funding models of their own. These

could be identical to the original Commonwealth RFM, but they may be adjusted somewhat to make allowance for local conditions (eg a strong Arts dean may succeed in getting a higher weight for Arts students). Recently, some of the more research oriented universities, such as Monash, have been allocating some of the Commonwealth funds on the basis of research performance, not just weighted student numbers. Universities also receive funds from full fee paying students, and they pass some of these on to faculties.

A similar process takes place at the faculty level. Student numbers drive allocations. Some funds are held for faculty research initiatives, and there are some moves to allocate Commonwealth funds partly on the basis of research performance. Departments and Centres receive funds and in turn, they employ staff. Thus, at each level, most of the funding received is dependent on student numbers, though there is a small but growing proportion of funds driven by research performance.

The funds which come to departments and centres support teaching and research. There is no formal division of funding between teaching and research. Apart from some research only staff, and very few teaching only staff, academics are understood to divide their time between

teaching and research. Departments have student loads, and norms about class sizes, hours taught and preparation levels determine how much time academics spend on teaching. The time left over can be spent on research, though the effort on research differs from person to person. In this way departments and staff determine the level of research effort and ultimately, the research output. If funds per student are reduced, fewer staff are employed, and both teaching and research inputs will be reduced; class sizes will increase, and staff will have less time for research.

This allocation is implicitly, though not explicitly, recognised in the ways universities are funded. Sufficient funds are provided to enable levels of staffing such that staff are not engaged in teaching full time. If universities were only funded for teaching, they could make do with perhaps \$1.5-2bn less; fewer staff would be hired, but these staff would work full time on teaching. Related facilities, such as libraries would only needed to purchase books for teaching, not research. There is something of a rule of thumb that university funding and staff time, on average, are allocated on the basis of one third to research and two thirds to teaching. While this rule is not something which has been derived

scientifically, it does seem to have some empirical validity. This can be seen in several examples.

Before the unified system, Colleges of Advanced Education were funded about one third less per student than universities. There were not explicitly funded for research, and staff/student ratios were lower, and teaching loads were higher than in the better-funded universities. In spite of this they produced some research, though not as much as the universities. It suggests that it would be possible to operate on a teaching only basis for no more than two thirds of the current average total cost per student.

More recently, there is the experience of teaching only campuses to draw upon. The University of Central Queensland has pioneered teaching only campuses in capital cities of Australia. These are provided for full fee paying international students, and they operate on the basis of only employing staff to teach, not do research. Likewise, the equipment and library infrastructure provided is only sufficient to support teaching. The costs of operating these campuses per student is very much lower than the average costs per student doing comparable courses on teaching and research campuses. The nature of the students' experience is different,

though not necessarily inferior (for some discussion, see Chipman, 2002).

Thus it should be clear that a high proportion of the funds which are allocated to and within universities is funding for research, not teaching. This is both intentional and actual. The best way to make an estimate of this proportion is not to undertake a dubious cost accounting exercise, but rather to measure the cost of providing comparable teaching on a teaching only basis, and then subtracting this from the total per student cost as at present. This approach does skate over some issues, such as whether there are economies of scope in linking teaching to research. Nevertheless it should yield a ball park estimate of the extent to which research is funded under current arrangements. In the absence of more scientific estimates, for present purposes the rule of thumb, that one third of funding goes to research, will be used.

It should be clear from this that the actual size of this research funding is very large. If one third of the total funding to universities is research funding, then it is of the order of \$1.5-2bn annually. This amount dwarfs the amount allocated by the ARC and the other research funding pools. For most university departments, it would be by far the largest source of

research support. Thus the largest share of the resources provided for research in universities is from this source, which is allocated primarily on the basis of student numbers.

This allocation rule has far reaching implications in at least two areas. Firstly, it has a major impact on the directions which university research takes, and also on the level of research effort and output. As the pattern of student numbers changes, so too does research funding. Does this conform to research priorities, and does it create the right incentives to do research? Secondly, by linking research funding to student numbers, there is an implicit subsidy given to taking on students. In the short term, this distorts the measures of the costs of teaching, and in the long term, if there is a move towards student based funding and competition, it will distort the workings on this market.

The Implications for Research Performance

Linking research funding to student numbers is fundamentally an odd practice (see also the comments of Chipman, 2002). If research were demonstrably closely linked to students, there would be a justification for it, but this does not appear to be the case. Granted the difficulties of

measuring research, there may be something of a case for doing things in this way- this case is considered later. However, there is a strong possibility that by linking funding to an inappropriate indicator both unexpected and seriously inefficient results can come about.

Funding systems serve at least two important roles. Firstly, they provide resources which enable activities, such as research, to take place. Secondly, they create incentives; when funds are linked to indicators, such as student numbers, they provide incentives to increase those indicators. Student linked research funding encounters problems with both these roles.

Consider the first of these. Linking funding to student numbers will be a major determinant of the pattern of research effort and output. Student numbers determine staff numbers, and thus will partly determine the research effort and output which eventuates. Other variables, such as the research intensity and productivity of the staff will also have an impact. When patterns of student numbers change, there will be a change in the patterns of staff numbers and the research they do. Some areas of research will enjoy increased resources, while others will be starved of funds.

Over the past decade, there have been serious impacts on the pattern and performance of research as a result of shifts in student numbers. There have been some marked shifts in student preferences, and students have moved from traditional arts and science courses to more vocationally oriented courses, such as accounting, law, and tourism. Given the heavy reliance on student based funding, resources have been shifted out of arts and science to the newly expanding areas. Effectively, the funds available to employ staff to do research have been reduced in arts and science and increased in the expanding areas. This has not been a response to declining research output; in many cases, the research output of the faculties being cut back has been spectacular. Student course preferences have had a profound impact on the pattern of the nation's university research effort.

Is this a positive or a negative outcome? A shift in the pattern of research is neither obviously desirable nor undesirable. The positive aspect is that the funding for research in accounting, management, IT, tourism and nursing has increased substantially. Different disciplines will have differing perspectives on the shifts which have taken place. Does it matter if an internationally respected econometrics department is gutted

to provide resources for a dysfunctional law school notable only for its mediocrity? Some considerations are relevant.

(a) As things have turned out, there has been a shift in resources from research productive areas, such as science and arts, to areas which are not nearly as research productive. Most vocationally oriented disciplines are not as research oriented as the more traditional disciplines. To the extent that this has happened, there has been an overall reduction in research effort and output. If no area's research is regarded as being more important than any other area's, then this a negative consequence. It could be argued that it takes time for the research performance in some disciplines to gather momentum, and that some of the poor performers will be good performers later. However, law and accounting have long been university subjects, yet research performance in both of them remains modest.

(b) There has been a significant loss of human capital, as researchers in arts and science departments are forced out, and research teams become nonviable. These skills and teams take a long time to develop, and there has possibly been a significant loss in research capacity,

which even a reversal of funding shifts would not be able to overcome.

(c) There have been substantial adjustment costs. Apart from the human costs, universities have faced large bills for redundancy payments. Often these go to the more productive, mobile, staff members who are able to get jobs elsewhere, not the poor performers.

(d) Significant shifts in research funding have come about by misadventure rather than design. There was no evaluation of research performance of physics and history department's research performance, concluding that resources should be transferred from them to promote research in nursing and accounting.

The patterns of allocation of research funds and efforts prior to the shifts in the 1990's should not be assumed to have been ideal. They too were based on student numbers, and there were good and bad performers amongst the discipline areas. However the shifts in recent years do appear to have been costly. The shifts have been large, and disruptive, and it has been the research strong performers which have tended to lose.

The big shifts in funding have created an impression in some universities that the Arts and Science faculties are poor performers; that they have been overspending on their budget and that they have not been financially responsible. However, the problem has not been of their own making. Most have performed well according to the rules of the game as they were. Most of their costs are fixed, and when revenues fall, deficits are very difficult to avoid. If research funding were not linked to student numbers, there still would have been a problem; however it would have been considerably less critical.

The second way in which the student linked research funding system performs poorly is in the incentives it creates. It fails both in terms of what it does not do, and what it does do. In particular, the research funding model does not provide any incentives to undertake research. There are some elements of university funding which do provide incentives for research, but they are quantitatively quite modest. Research funding enables research to take place, but it does not reward it by linking effort or output to funding. Fortunately there are other motivations to do research. Staff are interested in it for its own sake, and promotion depends on research performance. University prestige is linked to research outcomes. Many universities have a self sustaining

research culture. This is not true of all, and at some universities it is taking a long time for them to become active in research.

The lack of incentives for research must have become painfully obvious to science faculties in recent years. At the same time they were reporting on how well they had done, in publications, in obtaining research grants and in achieving high profile research results, their funding was being sharply cut back because the number of students doing science was falling.

By linking research funding to student numbers, the wrong incentives are created. This artificially increases the incentive given to faculties to take students. When student numbers are falling, a faculty will be under pressure to take weaker and weaker students. This pressure will be strong when there is a strong group of staff members whose salaries need to be found.

The poor incentive structure starts at the top, in the way the Commonwealth funds universities. The system of funding is essentially student number driven, though universities are constrained in the short term by the quasi lump sum nature of the grants they receive. They are

not given an incentive to promote research or to allocate funding for research in an effective manner. In recent times, some universities and faculties have been allocating some of their general funding according to research performance criteria, though the proportion of funds which they allocate in this way rarely reaches one third. These changes has been made only recently, too late to assist the arts and science departments which were performing well in research but losing students. The government does have a responsibility here, because universities do respond to the incentives they are faced with. This became very evident when funding rules for research students were altered; many universities were quick to respond to the new patterns of incentives.

There are understandable reasons why research funding has traditionally been linked to indicators other than research; in particular, research performance is difficult to measure. If all discipline areas are active in research, if not equally productive, a model under which research funding is allocated according to student numbers might not perform too badly. However, when there are big variations in research performance, and shifts in student numbers, this ceases to be so. There are still problems in measuring research performance; for example, if winning competitive grants is a key indicator, too much of an incentive may be

given to achieving good performance in obtaining inputs rather than producing outputs. However, research indicators have improved and been collected on a more systematic basis. In other countries, such as the United Kingdom, there has been a substantial shift towards funding research based on research indicators rather than student numbers. There are viable alternatives to the current Australian model.

The Implications for Student Funding, Fees and Competition

The current system of student based research funding has distinct implications for the student funding/contribution issue. At one level, it leads to distorted discussion of the cost of providing courses to students- estimates of the full cost of courses are usually grossly exaggerated. At another level, if there is a move towards more student choice and competition between universities, the current system of research funding, if retained, will distort the workings of the market which eventuates. Reform of research funding is a necessary precondition for successful changes to student funding arrangements.

Several models for reform of student funding have been proposed (eg, Pincus and Miller, 1997, West 1998). These can involve charging of fees, changes to HECS, and explicit or implicit vouchers. If there is a move to

any of these, one issue which needs to be resolved is that of how much courses cost, and how much students will be required to pay if there is contributions are related to the full cost of providing courses. Furthermore, most of the proposals involve increasing the scope for universities to compete for students and for revenue. If permitted, competition would be on the basis of several dimensions, including quality, facilities and prestige. It will also be based on price, or the contribution which will be required from the student, whether by way of direct fees or HECS payments.

Most discussions of the cost of university courses proceed by way of dividing the total cost of university operations (less some items specifically related to research, such as infrastructure grants) by the total number of students. This gives an average across disciplines; the cost of individual courses can be worked out by reference to the parameters of models such as the RFM. Alternatively, it is possible to divide the costs of different faculties by the students studying in those faculties. However, these cost measures include funding for research as well as teaching. If one works with the one third rule of thumb, the costs per student are about one third less than usually calculated. Evidence from

teaching only operations suggests that it is feasible to provide courses for no more than this.

Thus the current level of cost recovery in higher education is much greater than is commonly supposed. For students in law and business, HECS payments are probably already covering full cost. This is so without taking into account the stream of tax payments which are generated by students investment in their education (see Pincus and Miller, 1997). When this is taken into account, these students would be paying well above full cost, and indeed would be subsidising the university and government, not the other way around. If research funding is de-linked from student numbers, and competition develops between universities, these lower amounts are the best guides to the level of fees or contributions from students which are likely to come about. It is also worth noting that international student fees have been set, and originally regulated, on a basis which includes a payment for research as well as teaching. With such a high margin of price over teaching costs, it is not surprising that universities are prepared to incur high marketing costs to attract international students.

Perhaps more important than this measurement problem are the implications for competition based reforms. If the link between research funding and student numbers is not broken, there will be serious implications for the working of competition, and ultimately there will be serious consequences for the funding of research. This is best appreciated with the use of an example.

Suppose that current per student funding for a course is \$9,000. Of this, \$3,000 is effectively research funding, and \$6,000 represents the full teaching cost of the course. However, following current practice, \$9,000 is taken as the “full cost” of the course. Suppose that the government decides that the student contribution should be \$4,000, and that it will provide a subsidy of \$5,000. It could do this in several ways. It might allow the universities to charge \$9,000, and give each student a voucher worth \$5,000. Alternatively, it might give universities a grant of \$5,000 per student and allow them to impose a charge on students (which could be collected through a HECS mechanism) of \$4,000. Whichever option is chosen, the student would be expected to pay \$4,000, and the universities would be free to compete for students.

It would not take long for some universities to realise that the real full cost per student is \$6,000, not \$9,000. As long as they do not expect to gain a contribution for research from the student, they can cover costs with fees as low as \$1,000. As competition for students develops, the fee/HECS will fall below the initial \$4,000, towards \$1,000. For universities which do not rate research highly, or which do not expect to recoup research funding from student related funding, this will not be a problem. However, the universities which do wish to promote research will find that they are unable to hold on to the \$3,000 per student research component of funding. By linking the research funding to student numbers, however indirectly or non transparently, the research grant effectively becomes a per student subsidy. Under competition, this subsidy will be competed away. A competitive market will ensure a lower student contribution than anticipated, but it will do this by creating a crisis in research funding.

This point does not seem to have been realised in most discussions of the various options for reform of student funding arrangements. Invariably, the costs to students and government as forecast under these options are calculated on a basis which incorporates research as well as teaching costs. Further, proponents of reforms which involve competition between

universities do not examine the implications of student based research funding for competition, and do not address the problem which has been identified here.

It is a straightforward matter to address the problem. The link between research funding and students numbers has to be broken. Research funding arrangements need to be devised which do not base the funds which a university or faculty receives either explicitly or implicitly on the number of students it attracts. There will be a problem of devising other drivers for research funding, but as other countries, such as the United Kingdom have shown, this is possible. The current system of research funding will simply not survive a shift to a competitive environment for universities.

Research Reform Priorities

The largest single component of university research funding is that which is embodied in university operating grants; these are intended to provide funding for research, not just teaching. This element of funding has been given very little attention, perhaps because it is so non transparent. It is ignored in discussions of funding teaching and student contributions, and when research funding is discussed, attention is invariably concentrated

on explicit funding mechanism, such as the ARC. Most research funding is allocated, albeit obliquely, on the basis of student numbers. This rule can be questioned on principle, but in practice it has had a significant, though accidental, impact on the pattern and level of research effort and output over the past decade. Many would regard this impact as undesirable or worse. The implications of this funding rule do not stop here; if a move is made towards more student choice and competition between universities, it is likely to severely distort the workings of the market which develops.

The key priority is to break the nexus between research funding and student numbers. This has happened to a limited extent in some universities already, though the change has come too late to prevent some of the damage which has been done. Some universities allocate a proportion of their general funding on the basis of research indicators. The universities will respond to incentives if the Commonwealth government gives them; unfortunately, most funding from the government is essentially student number driven.

Most of the research funding that is provided directly to universities still needs to go to pay the salaries of staff for the time they spend on

research, and to fund related research infrastructure, such as libraries and laboratories. To this extent, it should not be provided as grants with strings attached: to work on specific projects, to buy equipment or employ research assistants, or to advance specific research priorities. It needs to filter down to faculties, schools and departments to fund the staff who do the research. There are several ways in which research funds can be allocated, but it is desirable to link funding as closely as possible to research performance. Faculties and departments can be funded partly on the basis of research performance, and they can spend the funds according to their own priorities. Staff and departments can allocate their time and choose their own research topics, (though they will respond to any incentives which are given).

While individual universities can allocate their general funds partly on the basis of research performance (some already do), most will respond to the incentives set by the main provider of those funds, the Commonwealth government. If the government continues to provide most funds using allocation formulae explicitly or implicitly linking funds to student numbers, most universities will respond by using similar formulae. Universities will respond if the government shifts away

from student based research funding. They have responded swiftly to the changes in the drivers for research student funding.

Reform of university research funding rules is desirable for its own sake, to provide a less accidental pattern of research funding, and to provide clearer incentives based on research performance. It will become a necessity if a move to more competition between universities for students is to be achieved effectively. Any shift in funding arrangements will entail some adjustment costs, which may need to be spread over a longer period. These costs are real; it should be recognised that large adjustment costs have already been imposed on sections of universities as a result of retaining the student based funding of research during a time of big swings in student preferences for courses.

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