WHO CARES ABOUT THE REAL COSTS OF UNIVERSITY RESEARCH?

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Early in 1980 the Research Committee of the University of Queensland asked the authors to investigate the costs of research in the University. This paper briefly summarises the findings of our report,[1] and then considers the university's eventual reaction. The University's Research Committee had been anxious to uncover an administratively convenient formula for the allocation of direct research funds to departments. This formula was to reflect what the Committee believed were the differing costs of research among departments. However, our study rapidly discovered direct research costs to be such a small part of total research costs that regulating them by formulae was a pointless exercise. Much more meaningful was an investigation of total research expenditure in the University, and from this investigation a number of insights into the real costs of university research have emerged.

Measuring the Full Costs of University Research

The concept of cost has little economic meaning unless it is related to some measure of benefit, in this case the social benefit of university research. However, it is almost impossible to measure accurately research output, let alone the value of that output. Many academics seem to feel that simply stating their research has value is quite sufficient.[2]

A number of indicators of research output have been investigated; all have been found wanting.[3] For example, number of publications per staff member per year is a common research output indicator. This is one measure of physical quantity associated with research output, but it gives no insight into the value — to other academics, to industry, to government, to the community at large — of that research. If this measure were to be applied in a mechanistic manner for the allocation of research funds, such a 'publish or perish' approach would probably bias research toward narrowly defined research problems of a short-term nature, of the 'follow the leader' variety, or research based on trivial quantitative variations.[4] In cross-disciplinary comparisons, the highly subjective issues of 'what is a publication?', and the weighting of publications need to be considered. A recent thorough attempt to do this concluded that

> *quantitative measures for evaluating the research of universities, faculties, departments and/or individual academics are very questionable.*[5]

Thus the authors, along with other investigators of science policy, and the service, information, and higher education sectors, were forced to consider costs without the advantage of a precise measure of benefits.[6] In this vacuum, the value of research output becomes *de facto* the value of the sum of inputs, or the costs of research. It is necessary to discover what these costs, both direct and indirect, are.

Both the Australian Universities Commission and the Universities Council have noted that specific research grants in no way encompass all university research costs. Research activities also impose a cost on university recurrent grants not intended for the specific support of research.

> *First, some departments may allocate additional funds to research from departmental budgets. Secondly, and more importantly, ordinary expenditure on academic salaries, the library and general administrative arrangements inevitably contains a large but unidentifiable research component.*[7]

While these research costs are certainly more difficult to identify than specific research grants, it is unduly pessimistic to refer to them as unidentifiable. Considerable effort has been applied to their identification. Project SCORE has estimated that salary and wage costs attributable to research in universities amounted to $33.5 million in 1968 compared with direct research costs of about the same amount.[8] The Project SCORE survey for 1974 calculated that direct research costs amounted to $60.9 million,[9] and that for 1976 put those costs at $75.2 million with indirect research costs estimated at $109.1 million.[10]

Project SCORE derived these figures in a way which is most relevant to the present study. Direct research costs were readily obtained from universities' annual statistics. Project SCORE refers to these costs as 'research only' expenditure and describes the data as "comparable with those usually presented in university publications, i.e. the effort specifically incurring research costs".[11] Total research costs were calculated from returns of a questionnaire, sent to all university departments, which asked for an account of man-hours spent on research by academic, technical and administrative staff of universities. From this account was derived the fraction of working time spent on research. By assuming that this fraction represented the proportion of university costs attributable to research, it was possible to calculate what part of salaries and wages, other current expenditure, land and building costs and other capital costs should be regarded as research costs.[12]

Table 1 shows university research costs by type of expenditure and subject area for 1976. Very clearly, according to Project SCORE calculations, by far the greatest research cost in universities is staff salaries. Equipment costs, which tend to loom large in debate on the costs of research, are really relatively insignificant.

Table 1

Type of Research Expenditure by Subject Area, Australian Higher Education, 1976 (per cent)

	Labour	Other current (maintenance, etc.)	Land and buildings	Other capital (equipment, etc.)	Total
Biological sciences	75.4	14.4	5.0	5.2	100
Humanities	84.7	8.6	4.9	1.8	100
Medical	74.2	12.3	9.1	4.4	100
Physical sciences	77.5	12.8	3.6	6.1	100
Social sciences	84.3	11.5	2.3	1.8	100

Source: Department of Science and the Environment, personal communication.

Table 1 seems to cast a new light on the perennial debate between science departments and non-science departments concerning the greater need of the former for expensive research equipment. Certainly the science subject areas expend a greater proportion of research resources on equipment than the humanities or the social sciences, but as a proportion of what Project SCORE calculates to be total costs of research in higher education, the difference is small. This would appear to be an important finding. When total research costs are considered across the Australian Higher Education sector, there are no major differences in the proportional costs of research among different academic disciplines. On average, about 70 per cent of national Higher Education research expenditure is on labour, 12 per cent on maintenance, 3 per cent on land and buildings and 5 per cent on equipment.[13]

Table 2

Type of Research Expenditure by Subject Area, University of Queensland, 1976 (per cent)

	Labour	Other current (maintenance, etc.)	Land and buildings	Other capital (equipment, etc.)	Total
Biological sciences	78.1	13.7	4.1	4.1	100
Humanities	88.2	10.4	0.6	0.8	100
Medical	79.5	14.1	2.1	4.2	100
Physical sciences	81.9	12.1	1.5	4.6	100
Social sciences	89.0	10.2	0.1	0.8	100

Source: Department of Science and the Environment, personal communication.

A comparison of Tables 1 and 2 indicates that research expenditure at the University of Queensland, as calculated by the Department of Science and the Environment, differs somewhat from the national average. The University of Queensland spends a greater proportion of research resources on salaries and wages, and a smaller proportion on land, buildings and equipment. How reliable the research figures are is open to question; for example, it is hardly conceivable that all expenditure on land and buildings used for research in all the social science departments of the University of Queensland amounted to no more than the $2,000 reported in 1976. Such data are illustrative of an attitude which does not regard any costs, other than the most direct, as attributable to research.

The former Department of Science and the Environment extended the imputation of Project SCORE and, from data provided by academics themselves on how much time they spend on research, calculated that expenditure attributable to research represents 21 per cent of all university expenditure, excluding all grants from government and other sources specifically intended for research.[14] If the University Research Grant (URG), the Universities Council Special Research Grant (UC) and the research component of the equipment grant are added to imputed research costs, the 21 per cent becomes about 28 per cent — and that still excludes all research funding from such external sources as ARGC (now ARGS). Add research grants from these external sources and the research expenditure of universities comes to about 31 per cent of total university expenditure.[15] That sort of proportion may seem excessive and the means by which it was calculated dubious, but it is not so very dissimilar from the conclusions reached by other studies of the costs of research in universities. Selby Smith, having conducted a rather more detailed and rigorous assessment of the components of university

costs than Project SCORE, was able to make some assumptions about the proportion of each faculty's total costs attributable to research[16].

Table 3

Research Costs as Per Cent of Total Costs by Faculty, Australian Universities

	Per cent
Architecture	25
Engineering	40
Medicine and dentistry	50
Physical and biological sciences	50
Arts	40
Economics	42
Education	42
Law	56

Source: C. Selby Smith, The Costs of Post Secondary Education, Macmillan, Melbourne, 1975, p. 21.

Several other surveys have been carried out in the United States and Britain which suggest that about one third of academic time is supposedly devoted to research.[17] Other research on how Australian academics use their time attributes slightly less of that time to research — between 23 per cent and 30 per cent according to academic rank.[18] A theoretical consideration of academic time available for research could assume that no research at all is carried out in those weeks in which classes are taught (26), in which exams are marked (say, 2) and in which leave is taken (4). If 32 weeks of the year are occupied by teaching and holidays, 20 weeks may be imagined to remain for the pursuit of research. Thus 20/52 or 38 per cent of academic time, and arguably, of university resources, may be thought of as research time and research resources. But this is only hypothesis and hardly sufficient basis for attributing a proportion of university costs to research. The figure it produces, though, is not too dissimilar to that yielded by more elaborate studies.

The University of Queensland conducts annually a survey of all academic staff which purports to show how many hours each academic has spent during the year in formal class contact and associated work, on thesis supervision and on 'other work'.[19] A sub-category of 'other work' is research. The form is completed by every academic who does any teaching during the year, though 'research only' staff are required to supply only their teaching hours. It seems that the main emphasis of the survey is on teaching, and that research is not a primary concern. How accurate the returns are is not known; certainly the fact that those who complete them refer to the forms as 'cheat sheets' does not boost confidence in their reliability. It is probably more realistic to see this survey as giving an indication of academic time available for research rather than time actually spent on research. For the purposes of this study that does not matter: the output may differ, but the costs are the same.

An examination of returns from 1978 revealed massive differences among academics at the University of Queensland in time made available for research. Even at departmental level, huge differences remained. The academic staff of one department devoted only 8.6 per cent of 1978 man-hours to research and twenty-one departments devoted less than 20 per cent of time available to research. At the other extreme, five departments attributed more than half of time available to research.

It is interesting to compare results from this survey with those from another covering exactly the same period. The Australian Bureau of Statistics collects data for the Department of Science and the Environment's Project SCORE programme, and university staff are required to state what proportion of each man-year is spent on research. Perhaps the greatest difference between the two surveys, and certainly the one most relevant to this study, is that the survey on teaching staff work load was interested primarily in teaching time and the Project SCORE survey was concerned mainly with research time. A comparison suggests the consequence of this.

Table 4

Working Time Spent on Research, University of Queensland, 1978 (per cent)

	Survey of Teaching Staff Work Load	Project SCORE survey	Difference
Biological sciences	35.7	38.6	2.9
Humanities	28.1	30.1	2.0
Medical	24.6	40.8	16.2
Physical sciences	37.1	50.3	13.2
Social sciences	30.8	31.9	1.1

Source: University of Queensland, Survey of Teaching Staff Work Load, 1978, departmental returns. Survey of Research and Experimental Development — 1978, University of Queensland departmental returns to ABS.

As Table 4 indicates, all subject groups showed their academic staff to be spending a higher proportion of their working time on research in the Project SCORE survey. It is probably only natural that a survey of research should tempt academics to stress their research activities, and that a survey of teaching should elicit a greater involvement in teaching. In three subject areas, the differences are so small that one survey result tends to confirm the other. However, in both the medical and physical sciences there is a large discrepancy between the survey results and this requires some explanation.

It is possible that many of the academic staff in the medical and physical sciences spend much of their time on activities that are neither clearly research nor clearly teaching, and that these activities are described as either teaching or research as the occasion warrants. Certainly, several departments in both these subject areas reported a huge proportion of academic staff time spent on research: 6 departments spent more than 80 per cent of total time on research, and 2 departments more than 100 per cent. It seems that staff in departments of these subject areas, because they do not always distinguish between teaching and research, actually attribute the same time to both functions. A system of research funding geared to a consideration of research effort in isolation from other academic effort would not be particularly appropriate in these circumstances.

According to the University's own survey, with its emphasis on teaching time, 30.3 per cent of the working time of academic staff at the University of Queensland is spent on research. The comparable figure from the Project SCORE survey, with its chief interest in research, is 38.7 per cent. Neither figure is utterly incompatible with the results of other surveys reviewed, and the latter figure corresponds with that produced by the rough calculation of nominal time available for research. Consequently, our study had some justification for its assumption that about a third of all academic time at the University of Queensland is research time. If a third of an academic's working time is attributable to research, then so too is a third of the cost of that academic. While one could probably hire an academic for the price of his or her salary, he or she would be ineffective in both teaching and research without the facilities provided by the university.

For teaching, lecture rooms and blackboards and filing cabinets and so on are needed and, of course, students, who themselves need facilities such as libraries and refectories and playing fields. To research, the academic requires an office, a telephone, secretarial help, libraries, stationery, equipment, laboratories — all of which are found in the university. To perform as teacher or researcher, the academic needs administrative support, toilets, cleaners, maintenance staff, car parks, furniture and many other things. Some of these are obviously more vital to this total work than others; uncut grass might have little impact on productivity, but no chair in an office would probably affect it considerably. Some factors facilitate work only very indirectly, but are absolutely vital nonetheless. For example, a university without any land would simply not exist and would carry out no teaching or research at all. Similarly, a university with no water or electricity would be virtually unfunctional.

All these facilities cost money and a great deal of it, yet if universities are to perform their joint function of teaching and research, the whole expenditure is necessary. What part of that expenditure is attributable to research rather than to teaching is a more difficult problem. In an important sense, even seeking a solution is invidious and undesirable if teaching and research are seen as inter-linking or complementary activities. This they undoubtedly are, but circumstances arise when it becomes necessary to distinguish the research function from the teaching. As has been seen, other studies have managed to separate academic time spent on research from academic time spent on teaching. This ratio may not be an entirely satisfactory analogue of the relative cost of university facilities devoted to research rather than to teaching, but there is probably no better.

Total expenditure of the University of Queensland in 1978 was $68.8 million.[20] While it is usual to regard this as encompassing all university costs, the full costs of a university *"should include capital costs for buildings, contents and land, expressed as an annual charge"*.[21] When this component is estimated and added to the total expenditure of $68.8 million, it suggests that total real costs of the University of Queensland in 1978 were about $80 million. From the earlier observation that a third of total university costs is attributable to research, it follows that the cost of research at the University of Queensland in 1978 was $26.5 million. A cost of that magnitude greatly exceeds what is normally taken to be the cost of research.

We have previously justified the use of academics' time as an index of total resource allocation in universities. Thus it is possible to attribute a proportion of total annual university costs to each academic or, more precisely, to each full-time equivalent filled position. As there were 1194 such positions in 1978,[22] it can be calculated that each academic represents $67,420 of total university costs. Assuming that each academic involves himself or herself in academic work for five days every week (less holidays), each of these 'working' days is supported by university costs of $297. Not all of this cost, of course, is attributable to research; two-thirds is associated with the university's teaching function. It should be reasserted that the university is presumed to have a joint teaching and research function and that both aspects of this function are directly dependent on the efforts of the university's academics. Other staff play a vital role, but essentially a supportive one and it is not unreasonable to represent total university costs in terms of those people responsible for the performance of university functions.

Table 5 shows the main sources of direct research funds at the University of Queensland. Less than a quarter of this funding (the URG and UC contributions) is subject to the University's tortuous distribution formulae based on weighted publications and weighted people, formulae traditionally regarded as being the key to the efficient and equitable distribu-

tion of research resources. The bulk of direct research funding comes from a wide variety of sources, is distributed to researchers rather than their departments, and is allocated by merit. There has been increasing emphasis of late on the benefits to be gained in allocating research resources by merit, yet such merit schemes are not without their costs.[23]

Table 5

Direct Research Expenditure by Source of Funds, University of Queensland, 1978-79

	1978		1979	
	$'000	Per cent	$'000	Per cent
URG	883.9	28.3	920.4	23.2
UC	646.7		666.2	
ARGC	770.8	26.0	775.1	20.5
NHMRC	634.0		623.8	
Other govt.	1,063.1	19.7	2,089.6*	30.6*
Other sources	1,409.6	26.0	1,749.3	25.7
TOTAL	5,408.1	100.0	6,824.4	100.0

*includes NERDDC

Source: Calculated from University of Queensland, Financial Statistics, Form 406, 1979 and 1980.

The Cost of Finding Merit

The authors conducted a survey of those responsible for the 189 ARGC applications made from the University of Queensland in 1980. The chief investigator of each proposed project was asked simply how long the application had taken to make, including all time spent on preparation specific to the project, time spent on consultation and drafting, becoming acquainted with application procedures, and time spent on completion, checking and despatch. As several investigators often collaborate on projects, information requested was on time spent per application and not per applicant. A good response (85.7 per cent) was achieved, consisting of 162 usable replies.

The results of the survey are shown in Table 6. The average time spent in 1980 on each application from the University of Queensland for an ARGC grant was 5.3 days. As Table 6 shows, there was a marked difference among subject areas in the time spent on applications. Staff in the social sciences spent very much longer on applications than staff from other subject areas, while staff in the biological sciences and humanities spent least time of all. There would appear to be no obvious explanation for this, but the consequence is certainly that an application from the social sciences costs nearly three times as much as an application from biological sciences. The survey gives a reasonable indication of how much time is taken applying for a research grant. From this indication, a calculation can be made of the cost of such an application.

Table 6

Applications for ARGC Grants, University of Queensland, 1980

	Number of returns	Average number of days spent on application
Biological sciences	20	3.4
Humanities	12	3.5
Medical	37	5.3
Physical sciences	73	5.1
Social sciences	20	9.0
	162	5.3

Source: Study team survey.

Academic time spent applying for research grants is time that cannot be occupied by either teaching or research. Yet the resources of the University of Queensland are available for teaching and research during this time and the cost of those resources must be paid. In terms of academic time, those resources have been calculated to be worth $297 for each working day of each staff member. Thus an activity occupying 5.3 days has used $1,574 of University resources. On this basis, the 189 applications made to ARGC from the University of Queensland in 1980 cost $297,500. As the University gained well over $1 million in ARGC grants from the exercise, application was clearly worthwhile.

Merit Schemes at the University of Queensland

Unfortunately the same cannot be said for the University of Queensland's own merit schemes. The allocation of merit grants by the Research Committee in 1979 was a total disaster: selection criteria was never determined, the whole exercise was rushed, and the research projects which received grants were not those which won the merit competition. If preparation of an application for funds in the University of Queensland 1979 merit scheme took just half the time taken to apply for an ARGC grant, then about 2.7 days of academic time were involved in each of the 104 applications. In the University of Queensland, that time is worth about $297 per day in terms of the cost of total University resources. Thus 2.7 x 297 x 104 dollars worth of resources was spent in order to allocate $70,000 in a merit competition. In these terms the total cost to the University of the merit scheme of 1979 was about $153,000, of which only $70,000 was spent on research and $83,000 on allocation.[24]

While the Research Committee was making arrangements for the allocation of $70,000 for deserving research projects in 1979, both the humanities and the social sciences research sub-committees were making their own arrangements, completely separate from those of the Research Committee, for the allocation of their own grants to meritorious

research projects. The humanities research sub-committee attracted 9 project applications for the $14,500 it was offering, and made 8 grants. The social sciences research sub-committee attracted 15 project applications for the $20,150 it was offering, and made 11. With so few applications, application costs were accordingly low, but so too were average grants. The ARGC scheme offers both large grants and a reasonable chance of getting them. However, when the University of Queensland has attempted to emulate what may be an admirable system on a larger scale, the result is very different. The success rate of the humanities and social sciences grant schemes combined was similar to that of the ARGC scheme, but the grants made were trifling. The grants made under the Research Committee scheme were much larger, but the success rate was appalling with 87% of applicants getting nothing. Those enthusiastic in their support of funding research on merit seem to have forgotten that researchers do not apply for research grants for fun, but in the expectation, or at least the hope, of receiving funds to carry out research.

University of Queensland Response to Cost of Research Study

The University of Queensland Research Committee was strangely quiet for a long time after the submission of our report in November 1980. The vigorous debate we had anticipated simply did not eventuate. When one goes to some trouble to point out that there is no concern for the bulk of university research costs, and that schemes to improve the efficiency of research funds allocation probably reduce the amount of research performed, one expects to arouse at least a little interest among those responsible for the administration of university research. We had naively failed to consider the enormous inertia inherent in all large organisations, particularly large sheltered institutions.[25] This and many of the observations made in this paper are not unique to the University of Queensland.

A full year after submission of our report, the University Research Committee delivered its verdict. The Committee accepted that there were some indirect research costs, but

> *Its own province, however, is essentially direct research costs, and it remains convinced that these must be kept under continuous examination if the university's research output is to be improved.*[26]

The Committee remained adamant that the difference in direct research costs among disciplines was the vital factor.

> *The Committee considers that while the Report has identified many factors that directly and indirectly contribute to the cost of research, it has tended to emphasize those which apply to all disciplines with equal effect and to minimize those which apply to different disciplines with different effects. Grants from outside funding bodies, such as the A.R.G.C., tend to be larger in some subject areas than in others, and this fact would appear to reflect differences in cost.*[27]

The Committee conceded that there were certain defects in the system by which research funds were allocated, but none that could not be repaired with revised formulae of weighted publications and weighted people. Problems associated with distributing funds by merit were admitted, but these were to be solved with more experience, and, of course, more money. The Committee was sceptical about huge costs being incurred in the application process, and argued that academics would hardly apply for merit grants if application were not worthwhile. Failure to grasp the difference between private and public costs and benefits produced some fascinating conclusions; for example, the Committee decided that it would be a mistake to encourage research which increased social benefit because this would "overvalue 'applied' at the expense of 'pure' research".[28] The Committee was keen on the report's recommendation of a large central pool from which research funds would be distributed on merit, but not if this meant a reduction in the research funds otherwise allocated to departments. Thus there was virtually no scope for the redistribution of research resources; if some areas were to get more, then new resources would have to be created.

It would be wrong to leave the impression that nothing has happened to research funding in the University of Queensland since the submission of our report. Not surprisingly, the Research Committee considered the report unsuitable for wider publication, and University policy is still formulated with little apparent regard for real costs. There is now to be a University research company, though costs and benefits of that venture, and even the company name, are still uncertain. There is also the new University of Queensland Foundation, contributions to which will provide interest to fund university research.[29] Just how that research will be selected may pose ethical problems in a few years when the Foundation eventually manages to amass more interest from contributions than is required to cover its administrative costs. While it is far from clear precisely where the benefits from the Foundation's activities will flow, the Foundation's private enterprise backers seem to be aware that they will be derived from total university costs.

> *Funds from the Foundation will provide the flexibility necessary to obtain maximum benefit from the substantial public investment in capital, equipment, and skilled people at the University.*[30]

There is also the new University of Queensland Business School, which presently co-exists with the

Department of Management and hopes to achieve a staff level of about twenty over three years.[31] Unlike university departments, the Business School is supposed to pay for itself.

> *The QBS is now expanding rapidly on a self-financing policy based on executive management development programs and project research.*[32]

Working capital of $350,000 has already been contributed by the Queensland government and local industrialists, and it is intended that the Business School be 75 per cent self-funding within five years.[33] Plans are very ambitious indeed and include the construction of a residential and teaching complex on the campus and the establishment of an International Trade Development Centre with offices in Brisbane, S.E. Asia and Britain.[34] "*The objective*", as one of the Business School's new professors has said, "[*is*] *to run the school as a dynamic profit-making business*".[35]

While there may be all sorts of academic objections to dynamic profit-making businesses operating from within the confines of a university, they are not our current concern. Nor do we choose to question here the useful contribution the Business School might make to Queensland industry and commerce. We wish merely to give some indication of the magnitude of the costs to the University of such an acquisition. Each university staff member, it will be recalled, represented annual costs to the University of $67,420 in 1978. That figure is supported by the recent Ralph Report on management education, which calculated that the cost of an additional academic staff member in a management school was between $60,000 and $80,000 (1982 dollars).[36] The Ralph Report included salary and salary on-costs, but only the marginal — not the average — cost of support services. It will take a good many business courses and a deal of consultancy work to earn that sort of money. Of course, the Business School could reduce its debt by not using some university facilities, perhaps the library, or the secretarial staff, or the car park. Alternatively, the Business School could work off the debt by engaging its staff in university teaching and academic research, though that would reduce resources available to earn money in the outside world, and seems to be at odds with the reported views of one of the School's professors.

> *As far as I can see, Australian university business schools remain too academic. They're concerned with developing theories rather than trying, in precise ways, to help Australian management. They still cling to somewhat quaint ideas about being the guardians of knowledge.*[37]

The point is, of course, that the Business School is extremely unlikely to pay to the University of Queensland all, or even 75 per cent, of what it costs the University. The Ralph Report suggests that it is practical for 15 staff in a regional management centre to generate income to pay just the salaries of three staff.[38] Notions that the Business School will be a profit-centre for the University producing extra income during times of financial stringency are pure fantasy — unless, of course, it is believed that the bulk of university costs are so fixed and sunk that they are incapable of yielding any better return. That belief would be tantamount to regarding the university as a disused factory which might as well be used for something as long as the owner incurs no extra costs. In fact, the university is a very active factory, though its product is largely intangible and its productivity uncertain. If the Business School were to approach such a factory in the industrial or commercial world with the offer of taking over its offices in return for paying, say, the extra salaries, the offer would produce only hysterical laughter. The University of Queensland's reaction has been quite different.

> *The income-gathering and entrepreneurial activities of the Business School would provide resources, financial and human, not otherwise available in the University . . .*[39]
>
> *In accordance with standard University policy, a percentage of monies received would be directed to central university funds and a proportion to the development of other activities in the management field. The remaining funds (over and above those required to run the projects) would then be reinvested. It was stressed that the University's annual budget of $88 million and projected deficit of $6 million meant that there was no way in which the University could grow unless it looked to such activities.*[40]

Objection might be raised that the costs of the Business School are merely marginal costs to the University and should not be expressed as average costs. The same could be said of research costs and, indeed, of even teaching costs if it is assumed that the main cost of universities is an intellectual infrastructure from which no output of any sort is expected. We do not find that a particularly constructive view: the university does not exist, and then provide teaching and research as marginal products. A university could certainly engage in marginal activities: it could open its car parks to Sunday flea markets, for example, but it could not argue both that the flea market imposed only marginal costs and also that it was a suitable academic activity for a university. So with the University of Queensland Business School; if it is a suitable academic activity for the University, it must share the University's common costs.

It is not the conclusion of this paper that there is something peculiarly remiss about the University of Queensland. Indeed, the University is responding urgently to the funding problems now facing all Australian universities. However, no amount of desperate endeavour is likely to be terribly successful within a tradition that refuses to consider the real costs of universities. The University's response to our study of the real costs of research made us painfully aware that most of these costs were considered to be irrelevant to any attempt to achieve a better distribution of research resources. Similarly, the major costs of the Business School go unrecognised so that the Business School can actually be seen as a self-financing profit centre. It is normal for organisations during bleak times to examine their cost structures closely and to make necessary adjustments in order to achieve greater efficiency, but if they refuse even to acknowledge their real costs, they can hardly expect much improvement in efficiency from the changes they make. What they can expect is that those who pay the real costs of universities will begin to take a much closer interest in how their resources are being used.

References

1. S. Macdonald, T. Mandeville, and D. Lamberton, *Real Costs of University Research: The Case of the University of Queensland*, Report to the University of Queensland Research Committee, November 1980. See also S. Macdonald, T. Mandeville, and D. Lamberton, 'The cost of merit in university research', *Australian Journal of Education*, 36, 3, pp. 41-53.
2. See 'Funding cuts upset academics', *Australian*, 20 August, 1980, p. 17; C. Macquire, and R. Kench, 'The productivity of university research', *Vestes*, 21, 1, 1978, p. 13.
3. For example, (a) number of publications, (b) value of outside funds attracted, (c) number of research postgraduate students, (d) amount of time spent on research. For a critique of the first three of these indicators see L. West, T. Hore, and P. Boon. *Publication Rates and Research Productivity*, Higher Education Advisory and Research Unit, Monash University, undated. In the context of national science policy, a comprehensive listing and discussion of academic research input and output indicators is contained in R. Johnston, *The Development of Indicators of Academic Research in Australia*, paper presented to OECD Science and Technology Conference (STIC/80/17), Paris, 1980.
4. W. Miklius, and J. Gerald, 'Research co-ordinator or 'invisible hand'?', *Journal of Farm Economics*, 49, 1967, pp. 756-8; Macquire and Kench, *op. cit.*; M. Rothkopf, 'Publication policy in a primitive scientific society', *Interfaces*, 8, 2, 1978, pp. 43-5; B. Johnston, *Publish or Perish — The Financial Rewards of Publication for CSIRO Scientists*, Discussion Paper 28, Centre for Economic Policy Research, ANU, 1981.
5. West, Hore and Boon, *op. cit.*, p. 12.
6. See C. Tisdell, 'Science policy and the flow of Australian inventions', *Search*, 6, 5, 1975, pp. 174-8; E. James, 'Product mix and cost disaggregation: a reinterpretation of the economics of higher education', *Journal of Human Resources*, 13, 2, 1978, 157-86.
7. Universities Commission, *Sixth Report*, Canberra, AGPS, 1975, p. 234.
8. Department of Education and Science, *Project SCORE*, AGPS, Canberra, Report 3 — Higher Education Sector, 1974, p. 21.
9. Department of Science, *Project SCORE*, AGPS, Canberra, 1977, Vol. 2, pp. 135-8.
10. Department of Science and the Environment, *Project SCORE*, AGPS, Canberra, 1980, pp. 423-33.
11. Department of Science, *op. cit.*, 1977, p. 122.
12. *Ibid.*, pp. 122-7.
13. Department of Science and the Environment, *op. cit.*, p. 214.
14. Department of Science and the Environment, *Science Statement, 1979-80*, AGPS, Canberra, 1980, pp. 17-18.
15. Department of Science and the Environment, *op. cit.*, 1980, pp. 432-3.
16. C. Selby Smith, *The Costs of Post Secondary Education*, Macmillan, Melbourne, 1975.
17. See H. Bowen, and G. Douglas, *Efficiency in Liberal Education*, McGraw-Hill, New York, 1971, pp. 25-6; James, *op. cit.*; Committee of Vice-Chancellors and Principals, *Report of an Inquiry into the Use of Academic Staff Time*, London, 1972; Committee on Higher Education, *Higher Education (Robbins Report)*, HMSO, London, Appendix 3, 1963, pp. 53-67.
18. L. West, 'The non-training roles of post-secondary education in the eighties', in T. Hore, P. Chippendale, and L. West, *A New Era for Tertiary Education*, Darling Downs IAE, Toowoomba, 1981, pp. 173-90.
19. University of Queensland, *Survey of Teaching Staff Work Load*, annual.
20. University of Queensland, *Statistics 1979*, Brisbane, 1980.
21. Selby Smith, *op. cit.*, p. 18.
22. University of Queensland, *Statistics 1978*, Brisbane, 1979, p. 81.
23. Macdonald, Mandeville and Lamberton, "The cost of merit in university research" *op. cit.*
24. These problems are not unique to the University of Queensland, or even to academic research. Commenting on the Australian Industrial Research and Development Incentives Scheme, the Jessop Report notes that, "the average grant per company per year was $4,176. Funding at this average level can hardly be regarded as providing much incentive, particularly when it is remembered that grants are taxed and that the cost of preparing the detailed financial information required for an application may be in the region of $1,500 to $2,000"; Senate Standing Committee on Science and the Environment, *Industrial Research and Development in Australia*, AGPS, Canberra, 1979, p. 283.
25. See H. Liebenstein, 'X-efficiency from concept to theory', *Challenge*, Sept.-Oct., 1979, pp. 13-22. For a discussion of organisational inertia: in CSIRO, see S. Macdonald, 'The mystery of CSIRO', forthcoming; in large telecommunications common carriers, see S. Macdonald, T. Mandeville, and D. Lamberton, 'Telecommunications in the Pacific region — impact of a new regime', *Telecommunications Policy*, 5, 4, Dec., 1981, pp. 243-50; in the U.S. auto industry, see 'Detroit promises car buyers a second honeymoon', *Economist*, 22 May, 1982, pp. 83-90.
26. Research Committee, 'Comments by the Research Committee on Real Costs of University Research: The Case of the University of Queensland', 16 Nov., 1981, p. 1.

27. *Ibid.*, p. 1.
28. Research Committee, *op. cit.*, p. 3.
29. See T. Grant-Taylor, 'Qld. University Foundation to make $5 m. appeal', *Financial Review*, 23 March 1982, p. 16.
30. Sir James Foots, Chairman of Board of University of Queensland Foundation Limited, *Press Release*, 22 March 1982.
31. This total would apparently include the academic staff of the Department of Management, currently numbering six. Minutes of the Commerce and Economics Faculty Board, University of Queensland, 23 Feb. 1982. p. 4.
32. Information sent to job applicants by Registrar, University of Queensland, 25 Feb. 1982.
33. University of Queensland, *News Release*, 16 Feb. 1982.
34. *Ibid.*
35. *Ibid.*
36. *Inquiry into Management Education Report (Ralph Report)*, AGPS, Canberra, 1982, p. 112.
37. Gordon Wills as quoted in A. Stone, 'Newcomer plans a managerial revolution for business schools', *Sydney Morning Herald*, 17 Feb. 1982, p. 26.
38. *Ibid.*, p. 71.
39. Vice Chancellor, University of Queensland, quoted in 'Management to offer new courses, services', *University News*, 10 March 1982, p. 1.
40. Minutes of the Commerce and Economics Faculty Board, 23 Feb. 1982.

REVIEWS

The Economics of University Behaviour

David A. Garvin

Academic Press, New York, 1980, pp. xv + 176.

In these difficult times for Australian universities, when the real value of government grants is declining, we should welcome insights on how resources might be best allocated. This small book, which is a by-product of a PhD thesis, aims *"to describe how universities actually behave in decision-making, with respect to resource allocation."* The author says he has two audiences in mind, viz, academic economists and university administrators.

Garvin admits to seeing universities solely from an economic viewpoint but reminds us of the need to use other perspectives. His approach involves the development of a model of universities as 'prestige-maximising' organisations. This assumption of the importance of maximising prestige is basic to his thesis and is one which is not clearly justified in the book. The emphasis throughout is clearly on research and publication. Little attention is given to the teaching and public service functions of universities. This emphasis on research, publication and prestige reflects the sample of institutions studied. The sample was based on the more prestigious universities of the United States of America.

Garvin proposes that 'the behaviour of universities can best be understood by employing the framework of utility maximisation'. His model suggests that the utility of the university is based on such elements as: the overall prestige of the university, the quality of the university's students and the number of students enrolled. However, he clearly places primary emphasis on prestige, which he sees as being produced by research and publication.

The resource allocation process is said to hinge on the struggle between departments to improve their prestige by gaining more funds through the budgetary process or from outside grants. While the academic departments fight amongst themselves on this basis, it is suggested that the administration acts as a restraining hand trying to achieve equity. Garvin describes these competing approaches but fails to describe what commonly happens in practice, viz, an incremental approach is taken with no significant attempts at reallocation.

There are important differences between the American and the Australian university scenes. One difference which features largely in the model is the flexibility which American institutions have in the salaries they offer to academics. Garvin provides a model of 'prestige improvement', as a set of ten equations. The first of these equations relates changes in prestige to changes in academic salaries, to changes in the number of academic staff at the institution and to some measure of the institution's prestige in an earlier period. A major conclusion is that an institution wishing to increase its prestige in a short period of time is likely to be far more successful if it raises its academic salaries than if it simply increases the size of its academic staff. In Australia, the option of increasing academic salaries is not so readily available.

This book set out with the aim of describing how universities actually behave in decision-making with respect to resource allocation. In fact, the book makes a basic assumption that universities are all about prestige maximisation and suggests that resource allocation is related to this maximisation. The book fails to canvass the various possible bases for resource allocation and certainly does not survey resource allocation practices amongst universities. It does provide an interesting attempt at model building but the model tells us how American universities maximise their prestige rather than how they allocate their resources. It should also be noted that there are important differences between American and Australian universities and an explanation of how American universities behave in decision-making on resource allocation would be unlikely to describe Australian practice. Perhaps a reading of this book might encourage some Australian to take a broader view of resource allocation and to survey and analyse how Australian universities behave in decision-making on resource allocation.

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Higher Education and the Labour Market

Robert Lindley, (ed.)

The Leverhulme Programme of Study into the Future of Higher Education 1, Society for Research into Higher Education, Guildford, 1981, pp 171.

This is the first of a series of publications based on seminars on British Higher Education organised by Professor Gareth Williams. Later seminars deal with Demand and Access, Institutional Adaptation and Change, The Research Function, The Teaching Function, and Mechanisms of Finance. This first publication contains three papers on British Higher Education and one on the USA together with an introduction and summing up by the editor.

The first paper by Laurence Hunter gives an overview of enrolments, of the number of graduates and of their destinations by type of qualification. It also reviews Employers Attitudes to Graduate Recruits with sections on general management, engineering management, accountancy, law and medicine. It discusses a range of aspects of the operation of labour markets and the response of higher education institutions. As do the other papers in this volume it notes that *"the almost unanimous verdict*