

University research funding: the wheel still is spinnin'

Introduction

Ten years ago, there was a clear and straightforward FAUSA policy on research. Universities were the bastions of intellectual excellence, each academic had an outstanding research record, the integration and inter-dependence of research and teaching were universally accepted, and the only question on the political agenda was the perennial one of the appropriate level of funding for the research function of universities. Colleges of advanced education [CAEs] knew their place, and accepted being funded at a lower level which took account of there not being an expectation that staff would pursue research. The research activity of universities was correctly focused on basic research, the pure advancement of knowledge in directions dictated only by the inner logic of the subject concerned. The Australian Science and Technology Council (ASTEC) had quoted with approval in their report *The Funding of Basic Research*, the British politician who averred that the pursuit of knowledge for its own sake was as much a part of our culture as the arts, and ought to be similarly supported by any civilized society¹. From time to time research, particularly in the sciences, would yield a useful discovery which could be turned to some productive use; these adventitious leaps forward were seen as evidence that pure basic research was the goose that laid golden eggs, and that applied research and new products or processes flowed inexorably from advancements in basic knowledge.

From time to time, FAUSA ran campaigns about the level of research funding or the steady disintegration of equipment and infrastructure. These were located within the intellectual framework described above, with the shared assumption by academics and politicians alike that curiosity-motivated research was inherently valuable, and the only question was the level of funding which could be allocated in competition with other priorities. As Ronayne has pointed out, even total acceptance of the view that basic research is a sound investment for future economic prosperity provides no guidance at all on the appropriate level of such investment². Unfortunately for the research community, the last ten years

have seen a series of events which have totally reshaped the political landscape on which the battle for research funding is conducted. The most important events in this reshaping have been:

- the establishment in 1981 of what were temporarily called centres of excellence;
- the steady rise in the real value of funds allocated by the mission-oriented granting schemes such as NH&MRC, NERDDC, and AMSTAC, accompanied by an increasing inability of the ARGs to fund all the high-quality projects in basic research;
- the commencement of the ASTEC research funding inquiry;
- the dramatic ascendancy of utilitarian emphases in political rhetoric concerning research, combined with an explicit rejection of the old view of basic research as an intrinsically valuable activity;
- the ASTEC report and consideration of its recommendations;
- the perfunctory review by CTEC of what are now centres of research concentration, leading to continued funding of all but one and a recommendation for more to be established;
- the perceptible crumbling of the wall which previously separated universities from CAEs in the 'binary system'.

Any one of these events would have had a significant impact on university research and caused concern to at least some academic staff. Together, they constitute, as suggested above, a fundamental reshaping of the landscape in which we struggle for the resources to maintain a research impetus. Even though it might be wise to heed Dylan's advice not to speak too soon, for the wheel still is spinnin', it is already clear who it won't be namin'. While university research must continue to be defended on the grounds of its excellence, and that excellence must be continually contrasted with the dismal record of some other research sectors in this country, excellence alone is no longer the password which opens government coffers.

The pressure of utilitarianism appears to be combined with a desire to protect the public purse from all expenditures other than the clearly essential, such as

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public service salaries and pensions, not to mention the pressing national need for a new Parliament House worthy of its inhabitants.

This article summarises the current funding of research in higher education, and briefly reviews the discourse of the last decade before tentatively exploring the rather bleak prospect for university research in the late 1980s.

Current funding of research

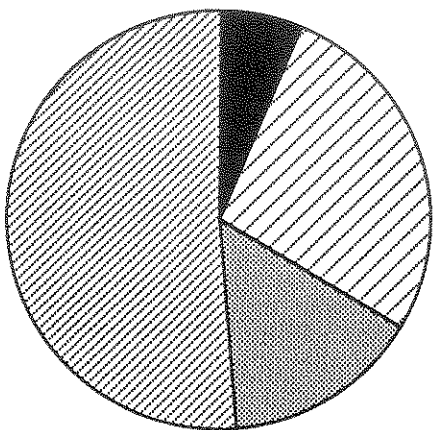
The last decade has seen a significant growth in expenditure on higher education research and development [HERD], both in real dollars and as a share of the overall R&D effort. Expenditure remains heavily concentrated in the universities, with the fraction in CAEs having grown to 2% by 1981-82. Table 1 shows the changes in the HERD in recent years, in constant dollars and as a percentage of the total research activity of the nation, the Gross Expenditure on Research and Development [GERD]³.

Table 1: HERD in Australia

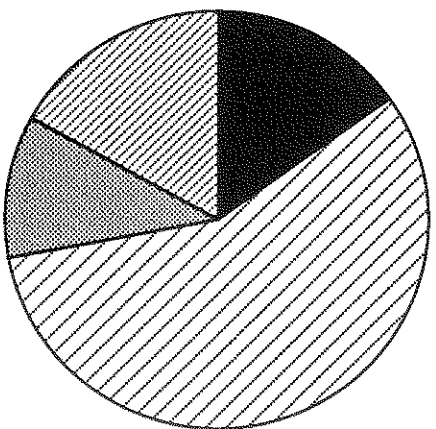
Year	\$m (1979-80)	% GERD
1976-77	324	27.9
1978-79	362	30.9
1981-82	387	30.5

Throughout the last decade, the funds for research and development in higher education have consistently come almost entirely from the Commonwealth Government (about 95%) and have consistently gone almost entirely to the universities (about 98%). There is a strong emphasis on basic research, the traditional area of strength in the universities, while the R&D effort of the CAEs is much more directed to applied research⁴, as is shown by Figure 1.

In terms of disciplines, there is a strong leaning towards the natural sciences and engineering in the distribution of financial resources, with the social sciences and humanities accounting for only about 30% of the funds⁵. Table 2 shows the allocation of financial resources for R&D in the higher education sector by field of study⁶.



(i) All HERD



(ii) CAEs only

Figure 1: R&D emphasis in the higher education sector

Table 3 shows the level of support per researcher (excluding overheads of the institution concerned) by field of study⁷.

It is perhaps worth noting that the figure for the social sciences and humanities would have been still lower but for the presence in that grouping of economics, the expenditure/researcher of which reached 128% of the average in 1981. It is also important to note that the level of support is at a much lower level than that in the government sector or the

business enterprise sector. The average staff support for 100 researchers is 25 technicians and eight other support staff, whereas the figures for the business sector are 90 technicians and 60 other support staff respectively. Expenditure per researcher is also lower in higher education than in other sectors; figures for 1981-82, which represent a 10% drop in real terms from the 1978-79 values, were about \$17,000 per researcher in the social sciences/humanities and about \$25,000 in the

Table 2: HERD resources by field (%)

	1976	1978	1981
Natural sciences			
Physical sciences	12	11	11
Chemical sciences	8	7	6
Biological sciences	16	17	16
Earth sciences	5	4	4
Engineering & applied sciences	11	11	12
Agricultural sciences	6	7	7
Medical sciences	14	15	14
Social sciences & humanities	29	27	30

Table 3: Expenditure/researcher (% average)

	1976	1978	1981
Natural sciences			
Physical sciences	124	117	130
Chemical sciences	112	101	106
Biological sciences	106	105	100
Earth sciences	105	94	130
Engineering & applied sciences	96	91	102
Agricultural sciences	102	99	105
Medical sciences	166	189	133
Social sciences & humanities	75	77	79

natural sciences/engineering disciplines, compared with about \$80,000 per researcher in the other two principal sectors⁸.

It is important also to note that Australia still produces comparatively few PhD graduates per head of population. In 1982, the figure for Australia was about 40 per million population, compared with 70 in Japan, 130 in the U.K., 150 in France, 150 in the U.S.A. and 200 in the Federal Republic of Germany⁹.

"Centres of excellence"

The establishment in 1981 of the 'centres of excellence' raised, albeit in a crude and overtly political form, the broad argument which has been at the centre of most discussion of research funding since: the advantages and disadvantages of concentration of resources. In this earliest example, the assertion was made that the most able researchers would become more productive if they were given more resources. This is palpably true, although it is not clear why it should be confined to the most able researchers; indeed, it is difficult to imagine how a credible case could be made to oppose a more general assertion that any competent researcher would be more productive if given more resources with which to prosecute research. It is also likely to be accepted as a generally true assertion that any competent researcher would be less productive if given less resources. Thus any division of resources represents some sort of judgement as to the relative effect on the vitality of research of giving \$x to Dr Y or to Professor Z. Giving more resources to an identified researcher makes that person more productive, but taking those same resources from another reduces that second person's productivity. Any honest assessment of the benefits of giving one researcher increased resources should also consider the other side of the equation: the negative effects of removing those resources from one or more other researchers.

The announcement by the Fraser Government that research was to be boosted by the establishment of 'centres of excellence' made no such consideration of the effect of removing the necessary resources from the general budget for higher education. An indecently short

period for the preparation of submissions nevertheless obtained a large field of hopefuls, from which a selection was made by a small committee¹⁰. FAUSA criticised the whole operation on the general principle that there was no obvious nett benefit, and on the operational grounds that the committee had neither the time nor the expertise to choose the 'best' applications¹¹. There was also criticism of the 'applied' emphasis of the decisions, with five of the ten centres chosen being in the bio-medical area, while there was only one in the whole of the social sciences and none at all in the humanities. While it evinced little criticism at the time, there was another remarkably simplistic facet of the policy. Each centre was given essentially the same level of funding, \$500,000 per year for an initial period of six years, regardless of whether the research area was one in which the main use for funds would be equipment purchases or one in which funds would be used to employ people. Even those who accepted the dubious principle that research could best be fostered by the establishment of centres of concentration might have been expected to question the startling belief that the same amounts of money would provide equal stimuli to policy research, research in pure mathematics, transplantation research or research in applied micro-electronics. The FAUSA argument at the time was that any funds available to encourage 'the best researchers' should have been used for ARGs grants of a size larger than usually considered. Such an approach would have meant that there would have been peer review of specific projects and allocation of different sums according to well-argued proposals, rather than the simplistic doling out of equal large sums of money to the lucky beneficiaries of an explicitly political process.

While a more rational debate and more serious consideration of the advantages and disadvantages might have been desired, it did not happen. The Fraser Government accepted the recommendations of its hastily-convened committee for the establishment of ten 'centres of excellence'. The whole process was seen by some as window-dressing; the impression was that the general run-down of research funding could be cloaked by the existence of a small number of centres of undoubted research excellence. The system acquired the characteristics of an inverse Achilles, able to deflect tiny arrows of criticism with its small armoured heel of research centres while the rest of the body was weak and unprotected. The performance of the centres, and the recent perfunctory review of the whole programme is discussed further below.

The ASTEC 1985 Report

In May 1985 the Federal Government asked ASTEC to undertake a review of public investment in R&D. The specific terms of reference were to report on four points:

1. the rationale and appropriate economic, social and cultural objectives — both short and long term — of government funding and performance of research and development in Australia;
2. the implications for other publicly funded policies and for CSIRO;
3. the implications of this for other publicly funded research institutions;
4. the reasons for the declining share of expenditure and activity on R&D by the private sector and to suggest mechanisms for stimulating additional expenditure by the private sector.

In November 1985 the first report arising from this reference was presented¹². It was directed at the first of the four terms of reference, the general rationale and objectives of government funding and performance of R&D. The broad recommendations of this report were unexceptional: maintenance of the level of support for R&D as a percentage of GDP, portability of superannuation and other steps to improve collaboration between the different sectors, wider use of research fellowships and encouragement for the practice of contracting research tasks to the higher education sector. Within the university research community, attention naturally focused on those sections which hinted at the thinking of ASTEC about the problems of research in universities.

The recognition by ASTEC of the increasing difficulty of providing the funds to purchase equipment was generally welcomed. This had been seen as a problem within the research community for some time, and there had been suggestions of devising a 'cost-of research index' to measure the changes in the cost of various aspects of research: personnel, equipment and consumables. Many researchers felt that these costs had been increasing faster than the consumer price index, so that the real value of research funds was shrinking. Although ASTEC offered no solution, the fact that they had recognised the problem was seen as a step forward.

Not so universally applauded was the evident wish of ASTEC to increase the emphasis on funding of large groups of researchers. The report stressed this view¹³:

Increasingly, research of the highest quality requires research groups of sufficient size to have critical mass, which in turn may represent a group as large as a normal department or an inde-

pendent research group in CSIRO. Few units other than the Research Schools of the Australian National University have continuing research support on this scale . . . Additional arrangements to provide funds for substantial research groups are urgently needed if Australian universities are to remain in the forefront of international research. The Special Research Centres Scheme provides support for research teams and, if continued, would constitute a good basis on which such supplementary support could be based.

One obvious problem which this quotation illustrates is that the membership of ASTEC and its terms of reference give it a strong orientation toward one area of research, namely the applied sciences and technologies. ASTEC has neither expertise nor interest in the other areas of university research, such as the humanities, the social sciences, law and the welfare professions. Although ASTEC is only competent to recommend on measures to assist research in the technologies and the natural sciences, particularly the applied sciences, their recommendations inevitably impinge on other fields. Whatever the merits of team research might be in a particular field of technology, such as cancer therapy or solar cell development, there are relatively few areas outside science and technology for which the development of large teams makes sense.

"In what was described as an innovative leap into the new discipline of socio-physics, ASTEC advanced the notion that high-quality research came only from teams large enough to have 'critical mass'."

Of more concern than the general thrust of this argument, that our research can only be kept up to international standard if we have large research teams, was the simplistic imagery used in its support. In what was described as an innovative leap into the new discipline of socio-physics, ASTEC advanced the notion that high-quality research came only from teams large enough to have 'critical mass'. The concept of critical mass comes from nuclear physics, and refers to an assembly of fissile material sufficiently large to produce a self-sustaining nuclear reaction. If the mass is slightly lower, the reaction does not continue. The critical mass for any given fissile element can be calculated accurately, which is an impor-

tant safeguard against accidental collection of enough material for an uncontrolled reaction. How can this image apply to research? Does anyone seriously believe that the size of a research team is the crucial indicator of its productivity?

Whether it is believed or not, the fact is that there is remarkably little tangible evidence to support the ASTEC contention. The Griffith University submission to the ASTEC inquiry¹⁴ cited evidence on publication rates in international physics journals for university departments of physics and groups of physicists in government laboratories¹⁵. Other work has been done on publication rates in chemistry¹⁶. This evidence showed no significant correlation between the size of a department and its research productivity. I discussed this evidence personally with the ASTEC working party when it visited Griffith University. When an 'Issues Paper' was subsequently produced¹⁷, it referred to this evidence in the following terms:

Dr Ian Lowe of Griffith University has presented data to the review which he claims (sic) counter the proposition that a concentration of research effort leads to greater research productivity. His data, showing publications by university Physics Departments, indicate some small physics departments have high publication records per staff member, whereas some large departments with concentrated research efforts have relatively low publication records. Major studies of output indicators, however, suggest that the importance and impact of publications also need to be taken into consideration when comparing productivity between various sections of the research community.

Misplaced relative pronoun aside, the ASTEC paper suggested that the impact and importance of publications needs to be considered when comparing productivity of research groupings. A wider study¹⁸ subsequently ranked departments of physics and departments of chemistry by indicators of impact, such as citations per paper and citations per staff member, as well as by broader indicators of research reputation, such as number and value of research grants. Departments were also ranked by a composite index of research performance devised by Campbell and Campbell. Rankings of departments were then compared with their sizes, taking as the index of size the number of full-time-equivalent teaching-and-research staff, using Spearman's Rank-Order Correlation Coefficient. The results are summarised in Table 4.

For this case, the minimum value of ρ for asserting an association at the 5% level of 0.51. Thus two of the chemistry indicators derived — number of ARGs

Table 4: Correlations between departmental size and research output

Size vs publications per staff member:	
physics, 1975-79	- 0.05
physics, 1980-82	- 0.06
physics, 1975-82	- 0.05
chemistry, 1970-75	+ 0.12
chemistry, 1976-79	+ 0.40
Size vs citations per staff member:	
physics	- 0.05
chemistry	+ 0.09
Size vs citations per publication:	
physics	- 0.31
chemistry	+ 0.09
Size vs other indicators	
Physics:	
number of ARGs grants per staff member	+ 0.10
total ARGs grant funds per staff member	+ 0.18
total number of research grants per staff member	- 0.14
total value of research grants per staff member	+ 0.20
Campbell/Campbell index of research performance	- 0.37
Chemistry:	
number of ARGs grants per staff member, 1969-74	+ 0.49
1975-79	+ 0.63
Total ARGs funds per staff member, 1969-74	+ 0.51
1975-79	+ 0.43
Campbell/Campbell index of research performance	+ 0.29

grants per staff member in the 1975-79 period and the value of ARGs grants in the 1969-74 period — can be said to associate positively with the size of department. No indicator of research output correlates significantly with size. In the case of physics, no indicator at all correlates with the size of the department; the two indicators which most closely approach significance are both negative, suggesting some tendency for small departments to perform better. In discussing this issue on radio¹⁹, I also referred to the general absence of a relationship between departmental size and productivity, with a specific comment about the productivity of the Research School of Physical Sciences at the Australian National University. This School has the largest assembly of physicists in the Australian university system by a considerable margin, suggesting that the socio-physical phenomenon of critical mass ought to be visible if the notion had any substance. Referring to the previously mentioned study which counted papers in refereed international journals²⁰, I stated that the productivity of the ANU School was relatively low by comparison with some much smaller departments. This statement was also printed by *The Australian*, in an article on the productivity of researchers and the ASTEC 'critical mass' theory.

The article provoked a hurt response from the ANU. Professor Barry Ninham, of the Research School of Physical Sciences, pointed out that the School contains researchers with a broad range of in-

terests, and so the counting of their publications in physics journals alone gave an inadequate representation of productivity²¹. For the year 1985, he said, the School published a total of about 400 papers, with only 150 of them in physics journals. This is a perfectly valid point, although it should be noted that other physics departments would generally also contain individuals who publish outside the mainstream of that discipline. I took Ninham's case to be that the breadth of that particular School is atypical, and so the use of physics journal articles as a criterion of productivity was especially unfair to that School. Accepting that point, it still needs to be said that neither the ANU nor any other Australian university lends support to the theory of critical mass. Even if the total of all papers published in all journals by the ANU Research School of Physical Sciences is compared with the physics publications alone of the small departments having the strongest publication records, the School is not unusually productive, especially if the teaching obligations of staff in the State universities are taken into account in assessing their productivity.

Ninham advanced a second argument, which was an attack on the simplistic measure of counting of publications as an index of research output. It has to be recognised that different disciplines have different styles and traditions of publication, and so comparisons based on bibliometric indicators can only really be useful within such limited frameworks. It should also be said, at the risk of being super-

ogatory, that nobody is so naive as to believe that all publications are of equal value. All researchers can point to some of their own publications in which they take special pride or pleasure, and can make comparisons (with varying degrees of validity) between the published works of various of their peers. Ninham went further in his criticism, however:

The real impact of a department's work at a given time is not measured by distorted statistics. It is measured by the number of (paid) invitations to give plenary lectures at major international conferences. It is measured too by the number of top young postdoctoral people who win the chance in fierce open competition over all fields to come back from overseas on low-pay short-term contracts to join the research teams at ANU. In the long term, impact is measured by key papers which are cited most frequently in the best journals over a 10-20-30 year period. Those statistics are somewhat more revealing than simplistic distorted accounting, based on ignorance of what science is about. They would lead to precisely the opposite conclusion to that of the article in The Australian.

Leaving the gratuitous insult aside, this statement is a mixture of reasonable observations and bizarre special pleading. Invitations to give plenary lectures at major international conferences are a valid measure of esteem among the international community, and should be considered in any detailed evaluation of the standing of a researcher or group. The number of people who 'win the chance' to join a particular institution, on the other hand, is no measure at all of esteem; it is simply a measure of the number of posts which are available, in turn a measure of the level of financial support. The number who apply for each post might be considered a rough indicator of the prestige of an establishment. The point about citations is true, but worrying in its emphasis. The longer the time period used for assessment, the more valid will be the measure of the true significance of a piece of research. In the short term, it is often difficult to separate the true insight from the trendy irrelevance. The argument, however, that no changes to funding can be considered until a generous historical span has been allowed to elapse is simply a disguised plea for the maintenance of the status quo. A proper assessment of the overall impact of the Institute of Advanced Studies would presumably have access to all the sorts of measures of impact suggested by Ninham, rather than being limited to those data accessible to a researcher in a State university in the gaps between teaching commitments. If such an inquiry were likely to show that the level of support of the Institute of Ad-

vanced Studies returns good value, the prospect of the inquiry would presumably be welcomed by the staff. Given that the Institute has an annual budget of \$94 million, about 14% of the total higher education research budget, and employs about 22% of all the research staff in the system, its position cannot be defended simply by arguing that the importance of research achievements can more validly be assessed after 30 years.

ASTEC and concentration: the FAUSA response

The FAUSA submission²² to the ASTEC inquiry marked a significant change in the approach taken by that body, made clear in the very first paragraph of the document:

The primary role of higher education institutions in the national scientific and technological research effort should be that of educating creative and skilled people. It follows that the principal role and objective of research in higher education should be to maximise the educational opportunities of participants, above and beyond maximising the research output itself.

The very next paragraph quoted with approval the Chairman of NERDDC, Mr Kolm, who said²³:

The fundamental role of knowledge-oriented research in universities as part of the educational process is unquestioned . . . The training of creative and skilled people — industry's most valuable resource — is of major economic importance. It is the universities' most valuable economic and cultural contribution.

Thus the FAUSA rhetoric changed from its earlier emphasis on the intrinsic value of research to this stress on the importance of research in educating skilled and creative people. Johnston had earlier pointed out that there was no longer a widespread belief in the old model of innovation, usually referred to as the linear model²⁴. This suggested that the gains in basic research led to new developments in applied research, leading in turn to the development of new products or processes. It has been an article of faith for decades that the development of new products or processes is the key to economic growth and general prosperity, so basic research was supported as the first link in the chain which led to economic prosperity. With this model falling into disrepute, a different approach was certainly required.

The remainder of the FAUSA submission emphasised the declining ability of universities to maintain their research emphasis, given the reduced real funding and the real increases in the costs of some items, notably journal subscriptions and

equipment. Most of the individual universities made similar comments, as did the Australian Vice-Chancellors' Committee. FAUSA called for increased funding for basic research through the ARGS, noting that the applied schemes such as the National Health and Medical Research Council had been treated much more generously than the budget for basic research, and urged ASTEC not to neglect the needs of areas other than science and technology.

FAUSA opposed the creation of further centres of research concentration as a diversion of recurrent funds to a few institutions 'at the expense of the education and research capability of the rest'. This was probably an important countervailing submission to those from the Department of Science and the Academy of Science. Both these bodies called for the establishment of still more centres, with the Academy making the amazing suggestion that no fewer than fifty centres should be established with annual budgets of \$750,000 each! FAUSA also supported the maintenance of the Special Research Grants funding at at least the present level, as the only source of funds directed specifically at inexperienced researchers. The use of these funds has been of concern to FAUSA for some time, as it has been suggested that some of the universities do not appear to be using the funds in a manner consistent with the CTEC guidelines. As ASTEC had suggested that more academics might be channelled into becoming solely researchers, FAUSA also stressed the importance of the integration of research and the educational role of the universities:

Research activity not only ensures that academics remain at the forefront of their own fields and pass this knowledge on to their students, but also ensures that they continue to exercise the very skills in which their research students are being trained . . . the application of fundamental principles or theories to the unknown or the uncertain . . . If the best academic researchers are channelled into research-only activities in order to increase their research output, the teaching system is deprived of the resource which makes it able to produce the best graduates . . .

The ASTEC Report (and some responses)

Almost two years after ASTEC received the commission to undertake a review of the Australian research and development scene, including R&D in higher education, it finally reported²⁵ early in 1987. Inevitably, the Report did not please everyone. Those in the public service who had been urging ASTEC to concentrate the limited resources available on a small number of academic

mega-stars were disappointed that it did not recommend such a dramatic change in the structure and emphasis of the higher education system. The publication *Scitech*, which has consistently espoused the public service line of concentrating limited resources, referred to the ASTEC recommendations as²⁶ 'ineffectual measures to stop the current undirected distribution of funds to all academics regardless of the quality of the research'.

At the other extreme, some academics were essentially suggesting that there was no problem which couldn't be solved by the injection of large amounts of money. They were disappointed that the suggested increases in funding were contingent on other changes which are likely to be unpalatable. FAUSA has criticised the suggestion that the research activity of individuals, departments and faculties should vary 'much more widely than at present' as a fundamental attack on the nature of universities. One interpretation of this suggestion is that there could be individuals, or whole departments, or entire faculties, funded only for their teaching with no research money at all. Such a change would certainly be a fundamental one.

"The Report treads a delicate line between the Scylla of concentration and the Charybdis of fiscal largesse."

The Report treads a delicate line between the Scylla of concentration and the Charybdis of fiscal largesse. As a result, it has been predictably assaulted from both sides. In analysing the ASTEC position, it is important to recognise the strength of the push for concentration of the resources available. I have commented earlier on the simplistic rhetoric which accompanied this move, with its implication that only research teams which had attained the Holy Grail of 'critical mass' were able to do work which would be internationally recognised for its excellence. This was the sort of thinking which led to the establishment of the research centres, praised by ASTEC in their earlier report as a good model for further concentration of resources. Most of those centres, now termed 'special research centres', have recently been given a perfunctory review and guaranteed funding for a further three years, as discussed further below. While the centres have relished what the Duke of Plaza-Toro referred to as the luxury of unaccustomed pocket-money, the decline in research infrastructure generally has reached quite alarming propor-

tions. The Department of Science, after conducting a study of equipment in a selection of university departments, concluded on the basis of this work that one-third of equipment was either in poor working condition, inoperable or technically inadequate²⁷. The general tenor of the submissions to ASTEC from the universities and from FAUSA was that the decline in infrastructure has become a serious problem, as has the growing incapacity of the Australian Research Grants Scheme (ARGS) to fund research projects of high quality.

ASTEC clearly faced a difficult political dilemma. While the statement of needs from the higher education system was clear and unambiguous, they faced on the other hand a public service which has been widely infected by the rhetoric of the so-called New Right. This title is not only unduly romantic for a group who are peddling ideas which are about as new as the code of Hammurabi — and about equally relevant to modern society; it is also, for that reason, a spectacularly inaccurate description of the group and their rhetoric. This rhetoric is based on a series of assertions which are demonstrably untrue, but have gained currency by their regular repetition. The principal assertions in this litany are that Australians are heavily taxed, over-governed and over-regulated, with the level of taxation removing incentive and the level of regulation stifling initiative. Of course, by comparison with other OECD countries, both the level of taxation and the public share of the economy in Australia are comparatively modest. Even if it is assumed that a high level of economic growth is of itself a desirable end, there is remarkably little association between the size of the public sector in different countries and their respective rates of economic growth²⁸. The facts have never stood in the way of good rhetoric, however, and the slogans of the month in Canberra are clearly 'small government' and 'deregulation', usually uttered with a conviction of revivalist fervour that these magic potions will cure all our economic ills. In the circumstances, it would probably not have been possible for ASTEC to recommend a simple expansion of research funding, even if it had been their considered conclusion that funding levels were the only problem.

The importance of this rhetoric is that it leads inexorably to the push for concentration. If it is taken as axiomatic that increased funding of research is simply unthinkable, then one rational response to a recognition of the present unsatisfactory level of funding is to increase to a satisfactory level the funding of a small minority of researchers by redistribution of the available funds. While it might have been expected that

Departments of Science and Education would see research as a higher priority than some of the current activities of the Federal Government, it appeared at the time of writing that their complete acceptance of the prevailing rhetoric was likely to lead to complete capitulation on the question of research funding. The Canberra gossip was predicting that the Departments would make no attempt to argue the case for increased funding, dissipating such energies as they have in an empire-building battle for control of the research empire²⁹.

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With friends like that, the higher education system scarcely needs enemies. Enemies it has, however, as witnessed by the opportunistic attacks on basic research by the Liberal Party's self-styled 'Waste-Watch Committee'. Sounding like either a dieting scheme for politicians lurching unsteadily from one expense-account lunch to the next or, perhaps, a new plumbing system using clear plastic pipes, the Waste WC has used the American technique made famous by Senator William Proxmire of deriding research by parading publicly the titles of esoteric research projects. The attack is based on the absurd implication that every research project must be an obvious short-term remedy for the economic woes caused by generations of their fellow politicians.

This weapon is used to assault anonymous individual researchers, almost inevitably in the humanities or the social sciences. While it is not necessarily an intrinsic virtue for research projects to be beyond the understanding of typical politicians, researchers need to be making the point publicly that being beyond such understanding is not of itself a criticism of any substance. If it were, almost all the research currently being conducted on this planet would be deemed worthless.

The criticism is part of the general utilitarian emphasis, which sees universities as of value only insofar as they produce useful graduates or research results capable of immediate application. Other central functions of universities — to train the next generation of research workers, and to be the conscience and critic of society — are either not recognised or not seen as important. It is in this area that universities need to be putting their public-relations emphasis, rather

than stressing the utilitarian benefits of competent graduates and usable research results. Not even the most neanderthal member of the Queensland National Party disputes the value of universities working in those areas; if universities are to retain their essential critical and educative roles, politicians and public servants need to be educated to value such activities. Professor Don Aitkin, Chair of the ARGC, delivered a brisk riposte along such lines to the attacks on basic research³⁰.

ASTEC had flagged, at a very early stage of their inquiry, their intention to recommend the establishment of an Australian Research Council, combining the functions of the ARGS with various other granting schemes. Various options had been canvassed for making the funds large enough to achieve significant change. The most fundamental suggestions were to usurp some fraction of the Special Research Grants, currently allocated to universities by a mystical process shrouded in the mists of CTEC bureaucracy, and some fraction of the funds currently allocated to the Institute of Advanced Studies at the Australian National University.

Each of these suggestions stirred up its own little hornets' nest. The Vice-Chancellors have long jealously guarded the Special Research Grants even from the detailed scrutiny of CTEC, and so naturally defended the continuation of this separate scheme. ASTEC drew back from attempting to include these funds in the common pool, and suggested instead that each university should devise a research management strategy, showing how all the funds at its disposal are being used 'to improve the effectiveness and productivity of the overall research activity'. The case of the ANU was resolved by the traditional method of recommending another inquiry! ASTEC recommended that an independent review be commissioned by CTEC. There can be little doubt that this question was a difficult and potentially embarrassing one for ASTEC, as it has as many members from the Institute as from all the State universities combined. It undoubtedly needs to be addressed, however, given the number of blinkered bureaucrats who sit in Canberra and appear to think that the ANU is a typical representative of the whole university system, despite the fact that the level of funding of the ANU per staff member is about double that for the rest of the system. Even the modest suggestion of another inquiry appears to have been too radical a suggestion for CTEC. In their response to the ASTEC Report³¹, they pointed out that the ANU conducts internal reviews of the various Schools from time to time. They stated that an overall review of the Institute 'would not be a

high priority', listing one current activity and two planned future studies which they regard as being more urgent. Given that level of enthusiasm and commitment, it seems certain that the Institute will continue to operate as it does now for the foreseeable future.

The central recommendations of the report are essentially a package. They suggest that the new Australian Research Council (ARC) should be given increasing levels of funding, and that universities in return should be pressured to use their research resources more selectively. The increased levels of funding suggested are quite substantial, \$20 million in 1987-88 and \$10-15 million in the following three years. In return, universities would be asked to draw up research management strategies, with the explicit threat that these strategies — and their implementation — should be considered by CTEC in allocating funds. Further, the universities would be asked to establish staffing policies and reward structures which support a greater variation in the balance of responsibilities of different staff members. This is a slightly curious recommendation, since it has been a common complaint for decades (if not centuries) that universities only reward excellence in research. Changed reward structures could well be interpreted as giving more weight to other aspects of university duties, such as assisting student learning. While this might be seen as a progressive and desirable move, it is not immediately obvious that it would improve research productivity. Presumably the intention is to persuade some staff that they would not be jeopardising their promotion prospects by abandoning their research and releasing funds for use by their more conventionally-ambitious colleagues.

'The history of amalgamations of educational institutions — and, whisper it softly, government departments — does not give grounds for being sanguine about increased efficiency.'

That being said, the balance struck by ASTEC in this report seems to be a very wise one. It is impossible to argue with the central premise that more funds should be available for direct grants to support research of high quality, or with the associated argument that each university should develop and implement a research management strategy to ensure that the funds available are used most effectively. Amalgamating various small schemes into

the ARC appears to have administrative advantages, although it remains to be seen whether these will be realised in practice. The history of amalgamations of educational institutions — and, whisper it softly, government departments — does not give grounds for being sanguine about increased efficiency. Often an amalgamated enterprise has fewer productive workers, but more bureaucrats to administer the more complicated system.

If the proposed changes to staffing policies and reward structures are permissive, allowing staff who lose their research impetus to change the emphasis of their work with dignity, they should be generally applauded. There would be widespread concern if the report were seen as an excuse to starve unpopular or unconventional researchers of resources, or to appoint a new class of academic peons who would not be expected to contribute to the advancement of knowledge. The main political concern is that the Federal Government, who appear completely in the grip of the public service rhetoric, might throw out the baby and keep the bath-water. They might see merit in accepting the organisational recommendations, but deny the ARC the funding needed to do the job. There would be little point in reorganising the research system to meet perceived needs, but ensuring that the system is slowly strangled by lack of resources.

Despressingly, the CTEC response and the subsequent debate seems to be focused on what could be neutrally called structural questions, or less neutrally be described as empire-building. CTEC has stated that it is 'implacably opposed' to the idea of the special research centres coming under the umbrella of an Australian Research Council administered by another section of the public service. As well as resisting the transfer of one of its current areas of responsibility, CTEC has also made a blatant bid to corner the market in research:

The second measure which the Commission would suggest is the establishment of a Council for Research within the CTEC, which would encompass the functions of the ARGC as well as CTEC's general research responsibilities associated with providing appropriate infrastructure support for research in universities. The inclusion of the National Research Fellowship Scheme could also be justified on the grounds that the CTEC is a more rational location for such general schemes . . .

Thus the argument being advanced by CTEC is that they could support the proposal for an Australian Research Council, but only if the new body did not take over the special research centres. If the government were to accept the case for the centres being under the new ARC, then

CTEC believes that 'the only alternative . . . would be for the establishment of such a Council within the Commission' (my emphasis). CTEC clearly feel that their provision of research infrastructure support in the past should reveal them to be an appropriate body to manage research, a claim which is a little surprising in the light of the almost universal recognition of the problems in this area. The management by CTEC of the special research centres programme is discussed further below; suffice to say at this point that it scarcely strengthens the argument for CTEC to have almost total control over all sources of research funding. Canberra gossip suggests that the Departments of Education and Science, in preparing a joint Cabinet submission on the ASTEC Report, are locked in battle over the structural questions of which department will increase its empire at the expense of the other³², while 'it is thought that the submission will not be pushing for any major increase in funding as recommended in the report due to the present tight economic situation'. As suggested above, the likely outcome is one of throwing out the baby and keeping the bath-water.

It remains to be seen whether the Government will recognise that ASTEC have produced a well-argued and thoughtful report and, on this occasion, transcend the rhetoric of 'small government' to put in place structures and policies which will allow the research potential of the higher education system to be harnessed creatively and productively. The prospects are not bright for those who are concerned about the future of research and believe it to deserve better treatment than some grubby deal based principally on organisational clout within the bureaucracy. Those interested in basic research, especially in the humanities and social sciences, should also be concerned about the proposed membership of the ARC. ASTEC proposed a Governing Board of 10, made up of four bureaucrats, three industrialists and three from higher education. As the bureaucrats suggested are respectively from CSIRO, CTEC, the Department of Science and the Department of Industry, Technology and Commerce, it is clear that the Boards will always have an overwhelming majority of members whose backgrounds and interests are in applied research in science and technology. One does not have to believe in conspiracy theory to recognise that basic research, especially in the humanities and the social sciences, is not likely to receive sympathetic treatment from such a group.

Concentration and productivity: the Special Research Centres

As discussed above, there is remarkably little evidence for the claimed benefits of concentrating research resources. Comparing departments of different sizes, even spanning a factor of ten between the largest and smallest aggregations of researchers, provides no convincing demonstration of the efficacy of large concentrations. If benefits there be, however, surely they ought to be apparent in the Special Research Centres. Chosen on the basis of the perceived excellence of their leaders and funded at about twenty times the level of an average university researcher to allow them to develop large research programmes, and having operated for six years, they should by now be showing the fruits of the resource concentration they have enjoyed.

A quick and superficial study was carried out, using as a random sample of the centres those whose universities' annual reports on research in 1984 and/or 1985 were available in the Griffith University library. That criterion gave a sample of four centres, from the nine which were in operation at the time. The results were as follows:

(i) Adelaide University (1984) stated that the Centre for Gene Technology had received \$600,000 as the third instalment of \$1.6 million granted for the triennium. A newspaper report referred to a team of seven: the output listed in the report was one book chapter and two articles in journals.

(ii) Monash University (1984) referred to its 'Research Centre of Excellence' as receiving \$500,000, while the 1985 report listed Commonwealth funding of \$460,000. The two reports list respectively 18 and 20 researchers. The publication output for 1984 was one edited book, one report and 19 journal articles, while that for 1985 was one edited book, six reports, one book chapter and six journal articles.

(iii) University of New South Wales (1984-85) gave no specific data for the Joint Microelectronics Research Centre, although one member of the group is identifiable as the author of nine journal articles and three papers to conferences in the 1984 report. The 1985 report lists no publications for authors identifiable as being associated with the Centre.

(iv) University of Western Australia (1984) lists publications which can be identified with the Centre for Environmental Fluid Dynamics as an edited book and four journal articles; neither the level of funding nor the number of researchers is given.

This simplistic operation needs to be heavily qualified; the university research reports may not have been complete, and the years and centres for which data were obtained may not have been representative. There have also been tangible outputs other than publications from the centres. Examples of such outputs are the very efficient solar cells developed by the Joint Microelectronics Research Centre, or the new clinical techniques and potential therapies developed by the Research Centre for Cancer and Transplantation. That being said, it is not possible to make any sort of a case that the centres are disproportionately productive on the basis of this evidence. The conclusion that the centres are not especially productive appears to be supported by an article in *The Australian* on their productivity³³. The article, bravely entitled 'The triumphs of research', listed among the triumphs of one centre that 'it has carried out major research', while for another it gave the value of the installed equipment and the number of international conferences attended!

Information was subsequently passed to me concerning the Plant Cell Biology Centre at the University of Melbourne³⁴. The performance of this centre is rather more impressive. The 1984 staff list shows 15 full-time researchers, plus some honorary associates and 13 higher-degree students. The third annual report³⁵ gave publications for the triennium 1982-84 as 15 book chapters, 50 papers in refereed journals, 43 papers in other journals, 40 papers in conference proceedings, seven miscellaneous publications and two patents. This is equivalent to an approximate rate of publication per researcher per year of one-third of a book chapter, one paper in a refereed journal, one paper in an unrefereed journal and one paper in proceedings of a conference. This is a respectable record indeed. Taken together with the data on the other four centres listed, however, the overall conclusion must still be that the centres do not appear to be disproportionately productive by comparison with the normal teaching and research staff in the State universities.

FAUSA argued for a review of the centres, suggesting that the funds could be better used to restore the research infrastructure and/or support the ARGS proposals acknowledged to be excellent but unfunded because of resource limitations. Among the submissions from the universities to ASTEC, only two (ANU and Melbourne) supported the centres unequivocally. Two others gave support, while emphasising that infrastructure funding is a higher priority. Five universities either opposed the centres explicitly or expressed strong doubts, while six others which did not make explicit reference to the centres stressed the need for infrastructure spending.

ding, increased resources for the ARGs and greater funding of the Special Research Grants. Thus the collective view of the universities was very similar to the FAUSA position.

Without attempting to review the effectiveness of the centres, ASTEC made some general comments about the value of team research, in more moderate tones than before³⁶:

While research of the highest quality can be, and indeed is, carried out by individual researchers, in many areas research teams above some critical size threshold are needed, particularly when multiple skills are required. Although there is no guarantee that a research group will be relatively more successful than a similar number of individual researchers, the presence of a group of outstanding researchers in the one place helps to develop an environment which, itself, encourages high-quality research as well as promoting interaction . . .

On that basis, ASTEC recommended the establishment of another 10-12 research centres at a cost of \$600,000 per annum for each centre. AUSTEC's attention to the centres could, however, be considered as a detailed scrutiny by comparison with the review conducted by CTEC. The Government agreed in 1984 to continue funding of the existing nine centres for the 1985-87 triennium, asking CTEC to review the centres and report on the future of the whole scheme. A Steering Committee for this review was established in July, 1986³⁷. It consisted of two full-time members of CTEC, the Chair of ARG, the Chair of the Medical Research Committee of the NH&MRC, and a senior ANU academic. This Committee in turn established assessment panels for each centre during September of that year, and gave each until the end of October to review the work of their respective centres. Each assessment panel visited the centre it was reviewing, as well as considering such written material as annual reports and 'statements by each Centre on their past achievements, future plans, and perceived funding needs beyond 1987'.

It is perhaps not surprising, given the limited time which busy people were given to carry out the reviews, that they consist largely of subjective impressions³⁸. This emphasis is, nevertheless, disappointing, given that the productivity of the centres had been publicly questioned and general statements had been made by members of CTEC (and the ASTEC working party) to the effect that the centres were undoubtedly successful³⁹. The report contains a detailed analysis of the publication record of one centre, preceding the conclusion that 'with respect to published research, the Centre's record has not been outstanding'. For another centre, the state-

ment that it 'has been very productive' is followed by the numbers of publications and research staff, revealing an average annual publication rate of about one paper per researcher. Other reports are couched in terms of generalities, such as 'a number of quite outstanding papers' or 'a major increase in the papers published in prestigious journals'. One exception to this contains an element of special pleading; for one centre, there is no quantitative information on the rate of publication, but the number of citations for a particular paper is quoted as evidence of its significance. Citation rates are, of course, an important measure of the value placed by the research community on a piece of work, but they are only one piece of evidence.

In general, it could be argued that the reviews were so constrained by the time-scale laid down by CTEC that they were almost certain to be relatively superficial. One of the reviews was only just over three pages in length, but professed to be 'enormously impressed with the quality of the science'. No supporting documentation was provided. The case for the 'critical mass' effect has not been given any quantitative support by this exercise. It is by no means clear that research councils which receive many more applications than they can fund would be impressed by reports couched in terms of such generality.

One qualification to this broad conclusion is necessary. The review of one centre appended detailed subjective reviews of its performance, emphasising that the influence of the centre could not be measured solely in terms of such measures as the number of publications. One referee, for example, said in part 'I doubt whether the rate of publication of learned papers (or a similar crude measure of productivity) would fully justify the Centre. Its real importance . . . is in the opportunities it provides for those who have worked or visited there . . .' In the case of that particular centre, the review presented an impressive array of such subjective impressions which said, in essence, that the centre was having a catalytic effect on research in its field out of proportion to its funding, staffing or publication rate. Such a case could be just as persuasive in showing the value of a centre as so-called crude measures of productivity; the real cause for concern is that in some cases continued levels of funding of the level of \$0.5 million per year have been recommended on much more flimsy evidence. The inevitable conclusion is that the centres are seen as a cosmetic exercise, distracting attention from the general decline of funding and opportunities for research.

The collapse of the binary divide: implications for research funding

A final problem for the future of university research is the crumbling of the binary divide between the universities and the CAEs. This is no sudden phenomenon, although it has gained momentum in recent years. It is worth recalling that the University of New South Wales and Deakin University both began life in what is now called the advanced education sector, while universities such as James Cook and Wollongong contain elements which were quite recently colleges. The decision by the WA government to designate WAIT as a university by legislative fiat has led to moves by some other institutes of technology for similar transmigration, while the growing threats that so-called 'private universities' will be established also demonstrates that the old simple ordering of the higher education system is breaking down irretrievably. It is no longer possible to pretend either that all the universities have the same dedication to research across all fields of endeavour or that the institutions in the CAE sector do no research. ASTEC made their views clear in their Report:

CTEC has a major role to play in inducing change in higher education research. The Commission is in an excellent position to examine the mix of institutional research efforts that is most appropriate to Australia's needs and to promote greater variation between the various institutions. This could involve, for example, institutions focusing their research effort on a relatively small number of themes rather than across all disciplines . . . At present, CTEC does not provide funds to support the development of an internal research capability. Nevertheless, a number of these institutions have gained industry support for research in particular areas and have built up their research performance in these areas. While we consider that the overall investment in advanced education institutions is presently under-utilised, we do not recommend that these bodies should, at this stage, receive recurrent funding on a similar basis to universities. Rather, we urge CTEC, in the course of a more selective approach to research funding, to recognise the research potential of the advanced education sector and develop ways to nurture and utilize areas of expertise.

The message there is abundantly clear: CAEs should not be automatically funded for research, but there should be selective removal of resources from particular

areas of particular universities to allow discretionary funding within the advanced education sector. It is clear which areas ASTEC would single out for deprivation of research funds. In one section of the report, judicious selection of international comparisons is used to suggest that the proportion of resources going to the humanities and social sciences in the Australian higher education system is unusually high. The proportion is, in fact, higher than in many countries, particularly those in which funds from the private sector flow into research in the sciences, although it is lower than in other countries, notably including Japan⁴⁰. The two countries in the medium-spending group which spend the highest fraction of their research effort in the sciences are referred to as 'the group leaders'. The ASTEC view appears to be quite clear: research in the humanities and the social sciences in universities should be slowly starved of resources to allow greater concentration in the sciences and the transfer of some resources to applied areas in advanced education.

"The ASTEC view appears to be quite clear: research in the humanities and the social sciences should be slowly starved of resources to allow greater concentration in the sciences and the transfer of some resources to applied areas in advanced education."

It is perhaps worth speculating briefly on the options for CTEC as the binary divide falls down around its corporate ears. They could continue to pretend that the binary divide is in perfect working order, making arbitrary decisions each year about which institutions fall on each side of the academic Maginot line. They could perhaps move to a more complicated structure. One possible example would be for the central institutes of technology to occupy a funding position intermediate between the universities and the other CAEs. Another is the one sometimes advocated over the port by senior academics in the old universities: a three-tier structure with the old universities in the first division, the smaller or newer universities in the second tier with the central institutes of technology, and all other institutions in the third division. A third and even more radical possibility would be for all institutions to be funded at a base level according to their teaching

obligations, with all equally able to compete for research funds on some sort of peer-review basis. All of these possible future models have one thing in common: they encompass a transfer of funds from the present universities to other institutions of higher education. Some also encompass a transfer of funds between universities, or between areas of knowledge within universities, or both. While there is nothing sacrosanct about the current distribution, especially given that the larger universities are funded at a 15% higher level per effective full-time student than the smaller universities, any proposal for change represents a further erosion of funding for some individuals or groups.

While these ideas all have obvious problems, such proposals are being actively discussed among the bureaucracy. University researchers need to be aware of the extent to which the political landscape has changed, and to be prepared to defend the central values of universities. The pressures for restrictions in government spending are no less real for being based on a fundamental flaw in understanding, and the pressures for a more utilitarian emphasis in research are no less real for being based on a fundamental ignorance of the role of research in universities. While the members of ASTEC can say collectively 'We see no conflict between the pursuit of excellence in research and the relevance of that research to important economic or social issues', many in universities will see such a conflict. If each university is to be required to develop a research management strategy, those of us who cherish the freedom to pursue basic research need to exercise some vigilance during that exercise. A university, to be worthy of the name, must span a wide range of disciplines and must advance knowledge in association with providing an educational role. It is not idle to suggest that this fundamental role of universities — to seek the truth and make it known — is under threat. If truth can only be sought in areas deemed to be relevant to important economic or social issues by some central body, numerically and ideologically dominated by technocrats, our universities will have changed fundamentally — and not for the better.

Ironically, in the midst of all these developments, the OECD held a high-level international conference in Canberra on policies and directions for science and research. Among the conclusions of the international gathering, it was noted that⁴¹ 'several countries (Japan, Sweden, USA) see a need to increase the level of support for basic research; and the role of universities in basic research is being strengthened and reasserted'. Perhaps that conclusion should be drawn to the attention of ASTEC and CTEC.

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Free market education

The new free market orthodoxy

Recent years have seen the emergence of a new free market orthodoxy in the economics of education.

This free market orthodoxy stands for selling education in the market place, for private universities, for tuition fees in tertiary education, for private training rather than Technical and Further Education, for the continued privatisation of schooling and for a radical reduction in direct public funding of education — although it

is generally not opposed to taxpayer subsidisation of private ventures.

While strictly speaking education is a service rather than a material commodity, the point is that the new free market orthodoxy wants education to be produced according to the laws of the market-place that govern unregulated commodity production.

The new orthodoxy has gained many adherents.

It is supported by most academic economists and business organisations, and well publicised in the media. It has a growing influence in Canberra.

Free market assumptions about the desirability of competition, the individual (rather than social) nature of the benefits of education, and the alleged inefficiencies and inequalities arising from public provision are entering the language of education debate as a sort of new common sense that all parties to the debate are meant to take for granted.

But orthodoxies are not always right. A close examination of the policies of some leading free market thinkers shows just how disastrous they would be if fully applied to the education system.

Adam Smith and the origins of the freemarket line

The free market theory of education has its origins in the work of Adam Smith, whose book *The Wealth of Nations* (1776) is relied on as a sort of bible by the new right.

It was Adam Smith who first conceived of education as a process of individual investment in *human capital*, and argued that the social benefits of education were equivalent to the sum of the private monetary benefits accruing to individuals — the increased earnings resulting from education and training.¹

In Smith's view, social prosperity was maximized when individuals were free to compete against each other without state interference. The 'invisible hand' of the market guaranteed the optimal outcome.

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Hence Smith favoured private education, which in any case was the dominant form of education provision in this day — one hundred years before the first systems of universal public primary education were established.

The ideas that education is a process of individual investment in human capital and that its social value could be reduced to its economic value, measured by adding up the increased earnings to educated individuals,² lay largely dormant until the 1950s.

They were then revived by economists of education such as G.S. Becker who sought to explain the unprecedented period of post-war economic growth through exaggerated claims about the effects of education. Many educationists seized on these claims as a useful argument for increased resources (an argument that fell flat after the world-wide recession of 1974 and 1975).³

Although many of the economists advocating a human capital line were Keynesian advocates of the role of government rather than neo-classical free marketeers, at heart the human capital theory always was uncompromisingly individualist and was most consistent with a free market 'neo-classical' approach to economics.

Milton Friedman on education

The modern guru of the new right, Chicago-school economist Milton Friedman, was the first to systematise the free market human capital view of education. Friedman argued that:

Vocational and professional schooling . . . is a form of investment in human capital precisely analogous to investment in machinery, buildings, or other forms of non-human capital. Its function is to raise the economic productivity of the human being. If it does so, the individual is rewarded in a free enterprise society by receiving a higher return for his (sic) services than he would otherwise be able to command. This difference in return is the economic incentive to invest capital

whether in the form of a machine or a human being.

In both cases, an individual presumably regards the investment as desirable if the extra returns, as he views them, exceed the extra costs, as he views them. In both cases, if the individual undertakes the investment and if the state neither subsidizes the investment nor taxes the return, the individual (or his parents, sponsor or benefactor) in general bears all the extra costs and receives all the extra returns: there are no obvious unborne costs or unappropriable returns that tend to make private incentives diverge systematically from those that are socially appropriate.⁴

The points to note here are that Friedman saw vocational education solely in economic terms, and assumed like Smith that the social benefits of education were equivalent to the sum of the private benefits to individual investors operating on a free education market, i.e. that there was no case for government funding of vocational education because there were no social benefits independent of the benefits to private 'users' of education.

He suggested that the only form of government intervention should be the provision of loans to individuals, to be repaid from future earnings — possibly through the income tax system. "In this way, the individuals who received the training would in effect bear the whole cost . . . provided the calculated earnings reflected all relevant returns and costs. The free choice of individuals would tend to produce the optimum amount of investment."⁵

Friedman saw equality in education merely as a matter of providing everyone with free opportunities to invest⁶ (that is providing they could raise the necessary money to do so).

Primary education was treated somewhat differently to vocational education in Friedman's schema. He acknowledged that there were some social benefits in the provision of schooling, albeit limited to the elementary school years.

Noting that education could provide "a minimum degree of literacy and knowledge" and "widespread acceptance of some common set of values", Friedman said that there were significant "neighbourhood effects" in the first few years of schooling — effects that yielded gains to all citizens.⁷

These neighbourhood effects were seen to diminish and disappear at later levels of education, especially at the higher education stage, on the curious ground that there was less agreement on the desired content of education once the three Rs had been left behind.

Friedman did not see the general education of all citizens to the end of secondary

school as necessary; society's general interest extended only to ensuring that "the exceptional few" received an education because "it is they who are the hope of the future."⁸ He was an unequivocal elitist.

In a later work, Friedman suggested that compulsory school attendance laws were not necessary to guarantee the desired minimum degree of literacy and knowledge, and should be abandoned.⁹

The voucher system

While Friedman expressed a preference for making parents pay all of the costs of schooling (even in the elementary school years) with subsidies to the needy only in "extreme cases",¹⁰ he proposed the voucher system as a compromise:

Governments could require a minimum level of schooling financed by giving parents vouchers redeemable for a specified maximum sum per child per year if spent on 'approved' educational services. Parents would then be free to spend this sum and any additional sum they themselves provided on purchasing educational services from an 'approved' institution of their own choice. The educational services could be rendered by private enterprises operated for profit, or by non-profit institutions. The role of government would be limited to insuring that the schools met certain minimum standards.¹¹

Accordingly Friedman argued for the "denationalisation" of schools. Public schools in name would still exist, but via the voucher system parents would receive an equivalent sum whether their student children attended private or public schools.

This would permit direct competition to develop which in turn, he claimed, would improve the standard of all schools. Further, individuals' choices would be widened: the market would "permit each to satisfy his own taste". And "new sorts of private schools could arise to tap the vast new market."

Friedman said that under his proposals the public costs of schooling would be reduced but overall expenditure on education could well rise because of increased private expenditure¹² — a doctrine attractive to governments looking for ways of reducing the total education budget.

In higher education Friedman argued for fees corresponding to the full cost of services, to be partly paid through another voucher scheme.

Friedman's Australian followers

The 'free market revolution' in economic thought after the 1974/1975 recession brought Friedman's ideas to the forefront of professional and political debate.

The Liberal Party first took up the

voucher plan in its 1975 pre-election policy, while still in opposition. The Fraser Government did not move to implement vouchers because of the likely resistance from State Departments and education interest groups, preferring instead to step up the per capita funding of private schools and foster the development of new private schools.¹³

Meanwhile, the new right was popularising the free market approach. The first clear official recognition of Friedman's educational ideas in Australia occurred in the year the Thatcher Government was elected in the UK — in the decision to publish, in the Fraser-appointed Williams Committee's report on education and training, an Appendix by Professor Richard Blandy of Flinders University.

Blandy concentrated on post-school education. He proposed that "the burden of financing post-secondary education be shifted progressively from taxpayers at large to taxpayers who have been students of the institutions (and who have, therefore, reaped direct benefits in greater earnings or consumer satisfaction or both)" and also that institutions charge fees intended to cover the whole of tuition in order to transfer costs to the "direct beneficiaries of the services".¹⁴

"The first clear official recognition of Friedman's educational ideas in Australia occurred in the year the Thatcher government was elected in the UK . . ."

The Blandy paper urged a graduate tax as proposed by Friedman and a mix of public and private institutions in place of the public higher education system. He suggested that all post-school students receive a "standard grant" — an education voucher — and be eligible for access to a government-administered loans scheme.

George Fane's proposals

With the debate shifting further to the right, in 1984 George Fane of the Australian National University prepared a paper for the Federal Government's Economic Planning Advisory Council (EPAC) that was a fuller exposition of the free market human capital approach and one more faithful to Friedman.

Fane's view of education was entirely individualist. "In terms of its intrinsic economic characteristics education is a private good not a public good", he said. For society as a whole the net external economic benefits of education were

We have recommended that students at universities, CAEs and TAFEs should be charged fees equal to the estimated marginal social costs of their places. We have argued that the external benefits (i.e. the benefits not captured by the students themselves) from tertiary education are probably negligible so that the appropriate fees are roughly equal to the estimated direct budgetary marginal cost of places; we have recommended that student assistance schemes be terminated and that subsidised loan schemes not be introduced. Critics may reply that if these policies were implemented most tertiary students would abandon their studies. We certainly expect that many would respond in just this way; however, we see this not as a defect of our recommendations but as their chief merit.

— George Fane,
'Education policy in Australia', Office of the Economic Planning Advisory Council,
EPAC Discussion Paper 85/08, Canberra,
Pages 99-100.