PRICING OF RESEARCH: WHAT WILL THE MARKET BEAR?[1]

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It has long been the practice of many competitive funding agencies to fund research at a level below full cost, and frequently to exclude salary costs. The implicit subsidy to beneficiaries has been a matter of concern to research performers as well as to government. More recently the greater emphasis given to competitive funding, reductions in direct appropriation funding, the setting of priorities by funding agencies which may differ from a research performer's assessment of priorities and the imposition of external funding targets on research performers by government with the aim of strengthening ties with industry have changed the nature of the game. The commercialisation thrust associated with these changes has given the issue of research pricing greater priority. This paper considers a number of theoretical pricing issues against this background, including the relevance of marginal cost pricing and the impact of the marginal funding policy of granting agencies. A Commonwealth view of research pricing is then offered, based on recent work undertaken by a working party of the Coordination Committee on Science and Technology. The paper concludes with a discussion of CSIRO's recent experience with research pricing and likely future directions for research pricing policy.

Keywords: research pricing, marginal cost pricing, marginal funding, Commonwealth, CSIRO.

INTRODUCTION

The economic analysis of research has proved to be a rich field for Australian analysts. The focus of the work has largely been on the magnitude of the benefits and their measurement[2] and more recently on the distribution of the benefits[3]. Agricultural economists have played a leading role in this work.

Whilst the issue of the pricing of research has not been a mainstream topic, it has received attention in the context of research funding, cost allocation and who should pay[4]. The topic of public enterprise pricing has a much more extensive literature[5] and is relevant to the issue of research pricing, given the prevalence of publicly funded research agencies in Australia. Recent efforts to increase the influence of the market on the direction and funding of public research[6] have had the effect of focusing greater attention on the issue of research pricing by government agencies.

The purpose of this paper is to review a number of theoretical pricing issues against this background, consider how these and other practical concerns can be addressed from an operational and policy viewpoint and finally explore what pricing strategies might be implemented by a publicly funded research agency. The perspective taken is that of a public enterprise such as CSIRO which performs a mix of publicly funded research and contract research funded from both public and private sources (Box 1).

BACKGROUND

Over the past decade the environment for publicly funded scientific research has undergone marked change. Reductions in government spending through the 1980s and the achievement of budget surpluses were accompanied by steadily declining research budgets funded directly from Commonwealth appropriation (Figure 1).

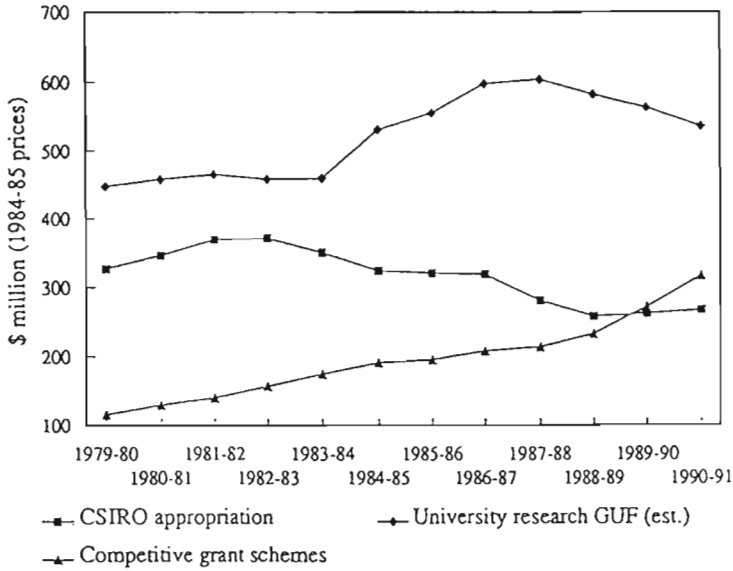

Figure 1. Trends in Commonwealth R&D funding, 1979-80 to 1990-91

Source: ASTEC, *Funding the Fabric: Should Commonwealth Government Competitive Research Granting Schemes Contribute More to Research Infrastructure Costs?,* Occasional Paper No. 14, AGPS, Canberra, 1991.

Associated with tightening budgets were pressures for greater accountability and improved research management. Particular emphasis was placed on demonstrating value for money and closer links with industry. Carrots included increased competitive funding (Figure 2) and greater funding for mission oriented research, e.g., land and water care; climate change, and an array of tax concessions for investment in R&D. The stick of substantial reductions in direct appropriation funding appeared to be the most influential factor, at least in the case of CSIRO, judging by the rapid increase in external funding which began in 1983-84, one year after the first reduction in appropriation funding. The subsequent supplementary stick of an external funding target set in 1988 served to reinforce a trend which was already well established. It should be said by way of qualification that the external funding target was viewed as binding by the organisation and did act as a mechanism to ensure the continuation of that trend (Figure 3[7]).

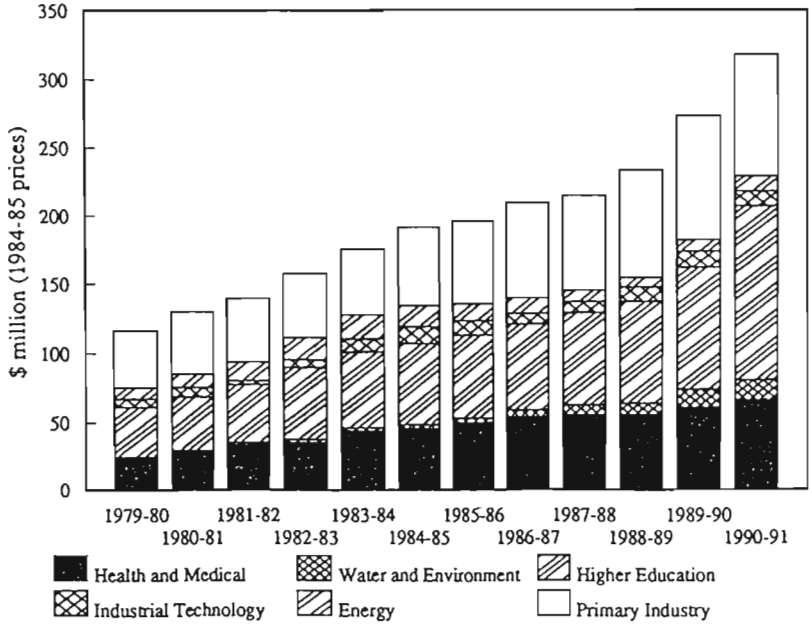

Figure 2. Growth in expenditure by Commonwealth agencies offering competitive research grants, 1979-80 to 1990-91.

Source: ASTEC, *op. cit.*

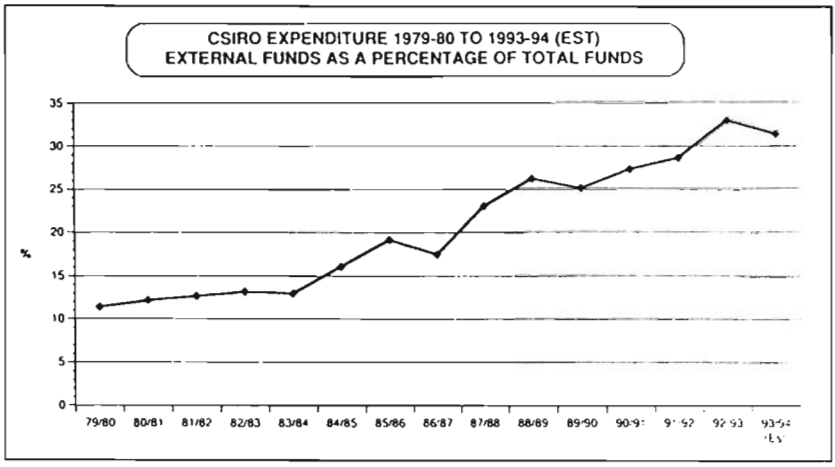

Figure 3

Source: CSIRO Corporate Finance Branch

Box 1: The Commonwealth Scientific and Industrial Research Organisation (CSIRO)

CSIRO is the premier research organisation in Australia. Its budget in 1992-93 accounted for 24% of the total Commonwealth budget support for science and innovation. With a staff of over 7000 working in some 70 laboratories and field stations throughout Australia, it is one of the largest and most diverse research institutions in the world.

The CSIRO budget in 1992-93 amounted to $677M of which $454M represented direct government appropriation funding. The balance — $223M or 33% — came from a variety of external sources including Competitive Granting Schemes, Co-operative Research Centres (CRCs) and the private business sector. Of the 7400 staff, some 44% are professional scientists.

As an independent statutory authority constituted and operating under the provisions of the *Science and Industry Research Act 1949,* CSIRO's primary functions are:

- to carry out scientific research
  - — to assist Australian industry and to further the interests of the Australian community;
  - — to contribute to national and international objectives and responsibilities of the Commonwealth Government
- to encourage or facilitate the application and use of the results of its own or any other scientific research[8].

Following major reviews by ASTEC in 1986 and McKinsey & Co. in 1987[9], CSIRO is organised in six research institutes with each institute conforming more or less to a business system relating to the sector in which research is undertaken. The aim of the restructuring was to sharpen the focus of the relationship between CSIRO's research and Australia's economic growth and other direct benefits to the community. The thirty three Divisions and Centres which form the six Institutes represent the business units in an organisation which is increasingly focusing on the commercialisation of research and on the conduct of research as a partnership exercise. The latter theme is reflected in over twenty Multi-Division Programs and participation in 43 of the 52 government approved CRCs so far. The theme "CSIRO means Business" is being enhanced by the recent establishment of a Corporate Business Department, the production of a commercial practice manual and significantly strengthened ties with private companies, reflected in part in the substantial increase in external revenue.

A major strength of CSIRO is the wide and diverse range of skills and disciplines which can be marshalled to form teams capable of tackling national problems. Recent examples include Wesley Vale pulp mill effluent, coastal zone management, mine site rehabilitation and land and water care.

More recently there appears to have been a more sympathetic attitude to S&T with the growing realisation that the 'clever country' paradigm will require R&D inputs to achieve its goals and that the elimination of the budget deficit is not sufficient to address the trade deficit problem. The engagement in political activity by research scientists also contributed to the change in attitude. The result has been a reversal in the steady decline in appropriation funds, although capital funding is still well below the levels of the early 1980s (Figure 4[10]).

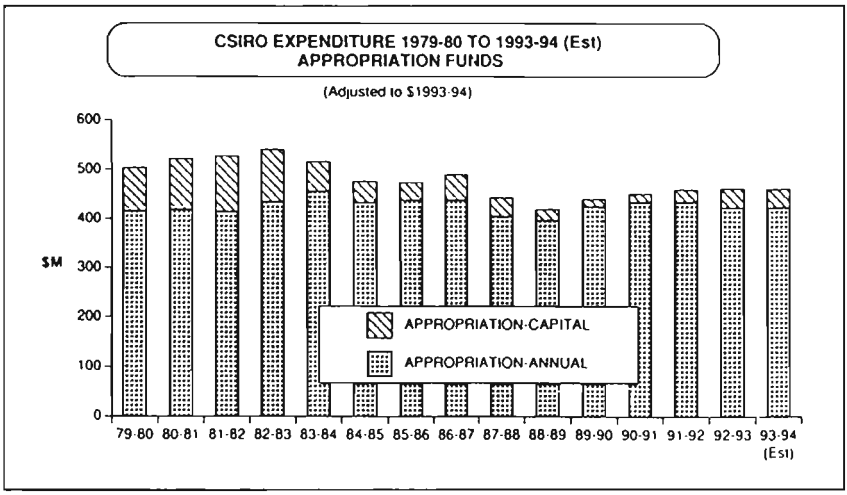

Figure 4

Source: CSIRO Corporate Finance Branch

A goal of improved competitiveness based at least in part on S&T and an R&D effort which is more accountable to funders imply a research culture which is more market driven and for which the allocation of limited resources among competing opportunities is a major issue. It is noteworthy that systematic priority setting and economic evaluation of research have become significant activities in guiding the allocation of resources in CSIRO[11].

The shift in emphasis to competitive funding has also given greater prominence to the role of the major funding bodies, e.g., NH&MRC, ARC and the RIRCs and their funding policies. Traditionally, these agencies follow a policy of marginal funding, i.e., project funding covers less than the full cost of performing the research and typically only variable costs are funded. This policy is perceived as levering greater benefits for less cost for the funding agency's constituents.

Against this background a number of important issues have been identified[12]:

- infrastructure rundown;
- cross-subsidisation;

- the appropriate balance between basic/ strategic and applied research; and
- the nature of the research market.

Related to each of these is the issue of the pricing of research. If, for example, there was full cost recovery, the price received would include provision for infrastructure renewal. In addition cross-subsidisation could be eliminated and it seems likely that competition in the research market would be enhanced. Concerns about the balance between short and longer term research would be less acute, because funding targets would be more easily achieved and hence there would be less pressure to earn revenue by reallocating resources from strategic to applied research.

The appealingly simple solution of full cost recovery however looks at only one side of the equation, and ignores many of the factors which make the market for research a complex one. Research activity operates in non-linear fashion along the spectrum from basic to applied with feedback from applied research to basic and strategic research being a major feature of the non-linear model[13]. In addition, the public good and market failure characteristics of the research may vary significantly along that spectrum. For example, if the justification for publicly funded research is to deal with public good and market failure problems, then it is likely that situations will arise where no price should be charged to users of the research results. A number of research funding agencies have begun to set their own priorities and others seem set to follow suit. If these priorities coincide with those of the research performer, then there may be justification for pricing at less than full cost recovery.

Whilst the research market in Australia is characterised by competition between Commonwealth agencies such as CSIRO, State Departments and universities, the intensity of competition is not uniform and areas of specialisation may be able to exert price leverage. On the other hand, the continuing globalisation of information and communications means that competition is not restricted to domestic players

THEORETICAL ASPECTS

The theory of the firm and its extensions into public enterprise pricing represent an obvious starting point for seeking guidance on research pricing. The work on transfer pricing[14] also has relevance, but its concern with intra-firm pricing is less relevant to the perspective of this paper.

The problems encountered in public enterprise pricing have been analysed in an extensive literature and include marginal cost pricing and its implementation, cross-subsidisation between market segments, short versus long run costs and peak demand pricing[15].

Theory points to marginal cost pricing as a necessary condition for achieving efficiency[16]. The statement by McKie that "the principle that efficient resource allocation requires prices equal at all times to short-run marginal cost (including externalities) is theoretically unassailable" is qualified by him on two counts — that "price must include all the costs that production of an additional unit imposes, regardless of when these costs are actually realised" and that the marginal costs are static "without calendar dates"[17].

A dilemma identified by Ng[18] is that whilst failure to adopt short-run marginal cost (SRMC) will result in allocative inefficiency, if SRMC is less than average cost (AC), losses will be incurred, and if SRMC is less than long-run marginal cost (LRMC), excess consumption will occur in the long run.

To address these issues, Xavier[19] offers a set of pricing principles:

- price should not fall below MC, and preferably should equal MC.
- in a situation of excess demand, e.g., peak demand, price should be set above MC to promote rationing; conversely in a situation of excess capacity, price should be lowered "to reflect the lower real opportunity cost of supply and to stimulate demand."
- if price does not generate the desired revenue, the inverse elasticity pricing or Ramsay rule[20] can be applied to market segments of differing price sensitivity.

In presenting these principles, Xavier points to their consistency with the view of Baumol that "while incremental cost should not *determine* prices or rates, they set the lower boundary and demand conditions and regulation the upper boundary, within which pricing decisions should be made."[21]

ISSUES

When it comes to practical application, these principles encounter a number of major problems. Particular issues faced by a public research organisation such as CSIRO include:

- The nature of the market for research;
- The measurement of costs such as capital, overheads and intellectual property to be included in the price of research;
- Assessment of willingness to pay on the demand side, i.e., who should pay what?; and
- External funding targets imposed by government.

The theoretical prescription for marginal cost pricing is based on the assumption of a first best world with no distortions. An organisation such as CSIRO does not operate in such a market and is faced with the task of reconciling the goal of achieving the government imposed target of 30 per cent external earnings with the goal of commercialising research in markets in many of which there are few buyers.

Recognition that the real world is characterised by numerous distortions which do not allow Pareto-optimal conditions to be met throughout the economy has led to the pricing rules prescribed by the theory of second best. However, second best rules are complicated informationally and administratively demanding, and must be followed by all sectors characterised by distortions[22]. To overcome this "unhappy situation", Ng proposes use of the theory of third best which "suggests that efficient pricing policy for a public enterprise supplying a good with no important close complements or substitutes is to price somewhat above marginal cost, that is, to adopt a price/MC ratio equal to the average ratio of the economy"[23]. For competitive goods, assessment needs to be made of the price/MC ratio for the competing/complementary industries. The challenge and the cost of obtaining the information necessary for such computations may well be insurmountable for most research agencies.

Again in the context of the problem of measurement, it is future costs rather than historical costs which are relevant[24]. Limited information and uncertainty will prevent access to precise information, and resulting ambiguity implies that virtually any pricing policy can be selected.

A particular measurement issue relates to the estimation of capital cost allowances for use in computing measures of MC. An organisation like CSIRO is concerned with pricing research results generated in a system involving capital plant and equipment of different vintages rather than one built from scratch. According to Parmenter and Webb the "crucial problem ..... is how to calculate the unit amortization charge .... in the determination of marginal cost"[25]. To overcome the severe data requirements for estimates which take account of the interdependence between costs, prices and output forecasts, Parmenter and Webb build on discounted cash flow investment procedures to derive rules of thumb which are less demanding of data and computation. These they suggest will provide a useful framework for checking the appropriate relationship between costs and prices.

Intellectual property represents a significant input into most scientific research and the question of how this should be valued is a thorny issue. Basic research as a major generator of intellectual property is widely acknowledged to be of significant economic value[26]. However, as further advancements in knowledge in the same field occur, the value of that intellectual property may diminish sharply. In this sense, intellectual property has some common characteristics with physical capital in that over time its value is likely to depreciate. This represents a cost to organisations undertaking research unless they have free access to the latest advancements in scientific knowledge. With the thrust to increased commercialisation of research, such access is increasingly unlikely to be free.

A further issue relates to the policy of marginal funding by funding agencies. In the case of CSIRO, if a funding agency does not cover the full costs of research then there will necessarily be a subsidy from appropriation funds or some other source to cover the deficit. If a loss is made on contract research due to marginal funding, should the government be prepared to cover the loss with a subsidy? In so far as such a subsidy might move prices closer to MC and thus improve efficiency of utilisation, Vickrey concludes that the theoretical case may be strong, "but experience counsels caution"[27]. A detrimental impact on managerial and technical efficiency may result, and "too often a mendicant mentality seems to develop". Xavier also makes the point that a policy of losses adversely affects management motivation The inefficiency which results may exceed any gain from pricing.

This latter point is emphasised by Ng, who points out that "conservative estimates put the extra costs of a dollar of government revenue at about 50 cents to 1 dollar [which] can hardly be justified by the usually moderate gain of MC-pricing"[28]. He concludes that "where MC-pricing leads to deficits, AC-pricing is a more appropriate policy in view of the substantial extra costs of government subsidies." Overall, Ng reaches the conclusion that "the consideration of both second best and costs of government revenue suggests that public enterprises should price their products above marginal costs"[29].

In discussing the issue of marginal funding in the context of rural research, Lloyd *et al.*[30] take a more aggressive stand in addressing the demand side by concluding that there is a significant underinvestment problem, which is a combination of market failure and government failure (core funding is politically unprofitable because of immediate cost and distant and diffuse benefits), and proposing that there is "an especially strong case for increased grower funding of research, including research overheads." This proposal is supported by the fact that in the long run, all overhead costs become variable costs, and evidence that growers contribute less than 10 per cent of the costs of rural research but according to the IAC, they receive for most products 60-90 per cent of the gains.

The call by Lloyd *et al.* for RIRCs to contribute to overhead costs is designed to address the infrastructure rundown problem, as well as the basic-strategic-applied balance problem.

On the demand side of the equation efficiency considerations suggest that the cost of research should be borne by those who receive the benefits, with the price level or share of the cost being determined by the share of the benefits received[31]. Accordingly there may be a case for a subsidy if the share of benefits going to consumers or the community is significant. Such a case should however be restricted to publicly funded research[32], otherwise subsidies would take on an "immense role"[33].

In considering research pricing by CSIRO, ABARE[34] espouses the principle of full cost recovery, including overheads, if benefits accrue to the private sector. This policy should be departed from only when benefits go mostly to consumers or there is a community service obligation. Accordingly, pricing policy will be a continuum ranging from full cost recovery to full public funding. The research management goal should be to maximise the pay-off to society subject to budget and science capacity.

The issue of whether a profit should be earned in addition to cost recovery is taken up by Xavier in relation to accumulating capital for investment. This factor underlies the specification of rates of return for public enterprises, for example, in Victoria. A related issue is that of seeking a return on intellectual property which forms an input to project research. If a research organisation is to maintain a competitive edge, it is essential that basic and strategic research be undertaken to maintain its stock of intellectual capital. To generate funding for such research, one option would be to add a margin to the research price to cover the cost of depreciation of existing intellectual capital. Whether such a pricing policy can be effectively implemented will depend on what the market will bear.

Both Xavier and ABARE take the view that to achieve efficiency, research pricing needs to be complemented by other activities. Xavier acknowledges that MC pricing is a static concept, and that what is relevant is dynamic efficiency. In a real world situation, entrepreneurship and innovation may be more important than static Pareto efficiency and he points to performance evaluation and the minimisation of entry and exit barriers to ensure contestable markets. Patenting, commercial support services and marketing are identified by ABARE as required complementary activities to the adopted charging policy.

On the basis of the foregoing discussion, it may be broadly concluded that in a prescriptive sense the contribution which economic theory can make to the practical issues associated with research pricing seems limited. In the meantime, these issues are being addressed by research funders and performers and the following sections consider them from a Commonwealth perspective and then from a CSIRO viewpoint.

A COMMONWEALTH VIEW

In recent years, the government has encouraged aligning research in public sector agencies with national and, in particular for CSIRO, industry goals and needs. In fact to encourage a closer relationship with industry, the Commonwealth Government imposed a 30 per cent external funding target on CSIRO. This closer alignment with industry has resulted in increased funding from sources other than direct government appropriation.

The growth in external earnings in CSIRO is clearly demonstrated in Figure 5. This increase in external earnings has brought with it an increased emphasis on commercial concerns; especially practices of costing and pricing of research. This issue was recently addressed by a Working Party of the Coordination Committee on Science and Technology[35] and its findings are drawn upon in this section of the paper. It is essential that it be recognised that "costing" and "pricing" of research are different issues. This distinction is elaborated on in the following two subsections.

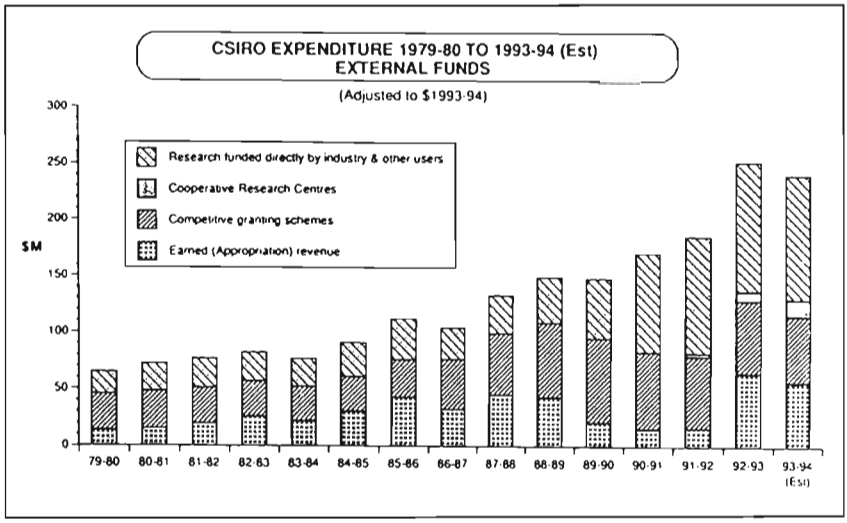

Figure 5

Source: CSIRO Corporate Finance Branch

Costing of Research

Accurate costings emanating from appropriate accrual accounting systems are essential to the information base on which decision-makers rely for improved resource allocation decisions. The reference to accrual is also an important issue, as it is essential that the full costs of any research project are able to be identified. These full costs include not only the traditional direct project costs of:

- Salaries of staff engaged on the project;
- Salary on-costs, e.g., employer's superannuation contributions; and
- Operating costs, e.g., travel consumables, equipment.

But they must also include indirect and infrastructure costs such as:

- Accrued recreation and long service leave;
- Overheads, e.g., divisional and corporate management, library, workshop, utility costs;
- Assets depreciation or lease charge (including buildings).

By this approach, the full costs of a project can be identified and informed decisions made regarding priority setting, resource allocation and pricing.

Pricing of Research

Pricing decisions are based on the market for the research service and depend upon many factors, a significant one of which is costs. Charging for services is a fundamental means of communication in a market-based economy between those seeking services and those providing them.

However, negotiating a specific price for a project can be a complex exercise requiring the assessment of the value of the research outcomes to:

- the client, e.g., the funder (individual company, R&D Corporation, government department);
- the constituents of the funder, e.g., rural industries; the community or some subset of the community;
- the nation;
- the performer, e.g., CSIRO.

The estimated value of a research project to the respective interested parties must exceed the corresponding costs of carrying it out, otherwise the project should not proceed. Some factors, by no means exhaustive, which should be considered in determining value are:

- Consistency of the research with the overall objectives of research performer and funder;
- Ownership of results of the research, including intellectual property;
- Degree to which the client or funder's constituents may appropriate the benefits of the research;
- National or public benefit from the research.

- Value to the research performer, e.g., ability to establish a market reputation, or training of staff in new areas.

Less Than Full Cost Pricing

Assessing the relevant factors and determining to whom the research is of value (performer, funder, funder's constituency and/or the nation) may mean that it is entirely appropriate to charge the funder less than full costs. Underpricing could be a problem, however, if it were based on ignorance of the full costs of the research or it is done to achieve short term benefits while adversely impacting in the longer term.

There has been considerable debate about funders meeting the infrastructure costs of public sector research agencies[36]. It should be recognised that while external funding targets are an indication from the Government that research agencies should perform a proportion of their overall research for external users, they do not imply that the research should be performed at below full cost and be subsidised from appropriation funds.

It needs to be recognised that appropriation funds are provided to public sector research agencies to maintain a strategic research base for current and future benefits to the nation.

We emphasise that within CSIRO, priorities for this strategic research are set taking into account industry and national needs as well as expected economic benefits to the nation.

The view in the report that the determination of price should be the outcome of a process of discovery between the negotiating parties based on an open exchange of information about missions, objectives and how the benefits of the research will be shared and that such a price will be in the national interest is perhaps a little naive. In the age of commercialisation, the negotiating parties will act in their own self interest and so an open process is highly unlikely in practice. As a result, there may develop a conflict between perceived self interest and the national interest. In a commercial situation, negotiations will be commercial. The fact is that certain government departments which are responsible for funding agencies which are increasingly corporate in their approach have little incentive to opt for change which will give them less bang for their research dollar.

One consequence of this in New Zealand is that some of the corporatised research institutes in pursuing their profit goals have begun exploiting offshore opportunities. It is not clear that these are in the best national interest, although such activity from the corporate view may be extremely healthy from a revenue viewpoint.

CSIRO'S APPROACH — LESSONS FOR FUTURE PRICING POLICY

In 1990-91 CSIRO received around $400M in appropriation funds from the Commonwealth to carry out strategic and applied research in support of national economic, social and environmental objectives. The Organisation also received a further $160M of non-appropriation funds from a variety of sources including Rural

Industry R&D Corporations, private sector companies, government departments and grant agencies as well as revenue from royalties and the sale of goods and services (Figure 5[37]). These funds were provided to support a range of strategic and applied research projects in areas of interest or potential benefit to the funders.

In a significant number of projects undertaken by CSIRO for external clients, the external funds do not cover the costs of the research. There are a number of reasons for this. Many externally funded projects are collaborative ventures, where risks and rewards are shared between the Organisation and funder. In other cases, agencies have been unwilling to fund more than the direct costs of research, arguing that it is not their responsibility to support CSIRO's infrastructure.

The result has been that although over 30 per cent of CSIRO's total budget comes from external funds (Figure 3), a considerably higher fraction of the Organisation's resources than this is committed to work being carried out under external contracts. Although this may not be inappropriate *per se*, it is clear that the Organisation runs the risk of losing flexibility to re-direct resources, as a result, for example, of changing national priorities, if its resources are by and large committed to externally funded activities.

The Government has set CSIRO the target of achieving 30 per cent of its total budget from external funds as an indicator of its ability to interact with industry. At the same time, the Organisation is committed to maintaining a strong effort in strategic research. Divisions of CSIRO can only maintain viable long term strategic research activities and high levels of external funds if their externally funded research projects are properly costed and priced. It is important therefore to establish principles that guide the Organisation's approach to pricing its research.

All of CSIRO's research is ultimately for the national interest. However, there are many external agencies — companies, industries and community groups — which can appropriate substantial benefits from particular programs and projects and under these circumstances, it seems reasonable that these beneficiaries should be prepared to bear the full costs of the work. In other projects, the value of appropriable benefits to clients may be less than the cost of the research, but CSIRO might still wish to undertake the research because of its broader national benefit, recovering some of the costs from a client.

There will also be projects for which the broad overall benefits to the nation are high but there is no clearly identified beneficiary. In such cases, CSIRO might fund the project entirely from appropriation funding, subject to the evaluation of the priority of the project in relation to other research activities.

Underlying these principles is the issue of project costing. Many funders have typically considered only the direct costs of the project whereas these are in fact only a fraction of the real cost. Costs such as overheads and infrastructure costs are incurred by CSIRO and other research performers and must also be covered. These costs should be attributed to specific research projects. If these costs are not recovered from clients, the work can only be undertaken if a decision is taken by CSIRO to direct funds from other activities to subsidise the project. The move from traditional public sector cash accounting to accrual accounting for management purposes will facilitate this process of cost attribution.

In summary, CSIRO is implementing systems to ensure full and accurate costing of research projects. The price of research is always a matter for negotiation between the funder and the research provider, but it seems reasonable for the research provider to take the value of the research outcomes as well as the cost of performing the research into account when negotiating the price.

CONCLUSION

Research pricing is becoming a more important issue with the growing emphasis on competitive funding, and pressures for greater accountability and improved financial management in the public sector.

The preference in public enterprise pricing from a theoretical efficiency perspective is to setting price equal to marginal cost. If this strategy does not meet revenue objectives, then there is scope for departing from MC pricing, either by applying the Ramsay rule, or following Ng's suggestion, setting price equal to average cost if MC pricing leads to deficits. This latter proposal is based on recognition of the high cost of collecting extra taxes. Considerable flexibility appears to be available to price setting agents.

In the case of publicly funded research, the market in Australia is competitive, and the research performer must pay heed to the demand side of the equation in setting prices for research. Again there appears to be scope for flexibility.

Although the research performer's preference will usually be to follow a policy of full cost recovery, such a policy will almost inevitably be in conflict with the marginal funding policy followed by virtually all competitive funding agencies.

To the extent that the Government wishes to reconcile the goals of closer industry collaboration via external funding targets imposed on publicly funded research performers, a greater degree of competitive funding and at the same time avoid subsidisation of research funded by grant agencies, there would appear to be two complementary strategies.

One is to seek a change in the funding policies of the competitive funding bodies. Lloyd *et al.* point out that marginal funding is not in the longer term interest of the funding agencies. A second strategy is for the government to encourage joint setting of research priorities by the funders and the performers of research. In a situation where the research performer already plans to do all or part of the research which a funding agency is willing to marginally fund, then less than full cost recovery may not involve a serious distortion in the allocation of resources. It is not however clear that funding bodies which are keen to set their own priorities in line with the wishes of their constituents are prepared for such a development.

Certainly, agencies such as CSIRO are giving careful consideration to the pricing principles to be adopted for contract research. Greater emphasis is likely to be placed on full cost recovery. Such a move is likely to place greater pressure on the current pricing rigidities in the market for research. If this leads to a greater degree of flexibility in price setting then there may be advantages for all players.

NOTES AND REFERENCES

1 The views expressed are those of the authors and not necessarily those of CSIRO.

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16 The policy of marginal funding by competitive grant agencies should not be confused with marginal cost pricing. In so far as funding agencies are unfamiliar with details of the cost structures and capacity utilisation of research performers, the two will coincide only by chance.

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