



**BUSINESS COUNCIL OF AUSTRALIA**

**SURVEY**

**OF**

**RESEARCH AND DEVELOPMENT EXPENDITURE**

**BY**

**AUSTRALIAN BUSINESSES**

## EXECUTIVE SUMMARY

A recent survey of business expenditure on research and development (BERD) suggest that tax concessions are an excellent way of assisting R&D.

Some have argued that assistance to R&D should be confined to direct budgetary assistance such as the START grants scheme and/or some more general R&D bounty scheme. There is certainly a case for these schemes within the policy mix, but the BCA's survey results suggest that tax concessions are an extremely effective policy tool in increasing BERD.

The 1996 changes to the tax concession – in which eligibility was restricted and the rate of assistance was reduced – provide a perfect means of testing the responsiveness of business to tax concessional R&D assistance. If the concession was having a major effect in encouraging increased BERD, then the changes would have a substantial effect on BERD. And if it was ineffectual, this too would be revealed – BERD would not be greatly influenced by a reduction in the tax concession.

The survey which captures a third of Australia's total BERD suggests that, BERD fell by 3 per cent last financial year and another 5 per cent this financial year. Based on firms' forecasts of future spending, R&D is still falling. There is evidence, though it is not unambiguous, that further declines will be large.

This means that total BERD is now about one third or \$1.5 billion lower than it would have been if past growth had continued. Of course the cuts produce cost savings for both business and government. But over the long term they will cost the Australian economy something like \$300 million each year.

Hardest hit was 'non-core' or more strategic and speculative R&D.

This study argues that:

- Government agencies commission work to understand more fully the effects of the changes;
- Greater security of funding be given to R&D assistance;
- Reviews of R&D assistance which substantially reduce assistance or conditions of eligibility for assistance be conducted in public by independent and expert bodies such as the Productivity Commission;
- Recommendations of the Mortimer Report and Industry Commission be implemented. Both endorsed assistance at or above the level provided by the 150% tax concession and called for this measure to be broadened to allow firms to receive equivalent assistance more directly as grants.
- The tax concession is a very efficient – in fact probably 'super-efficient' – vehicle for encouraging BERD. That is, R&D decision makers tend to overestimate the benefits of the R&D tax concession to their firm's shareholders.

More generally the results suggest that action needs to be taken to get BERD back into strong growth. We need action which is positive, strategic and integrated if we are to turn this situation around.

We need a national summit on R&D and innovation. It should focus on Australia's R&D effort in an integrated way and all sectors should be involved – business, government and educational/research agencies.

Australia should have – it must have – an innovation policy which is driven by an integrated and strategic approach to Australia's needs for knowledge into the future to harness the great talents and aspirations of Australians.



## 1 INTRODUCTION

There is general agreement in the policy community that business expenditure on research and development (BERD) should be supported by government. This is because new know-how once it is created, benefits everyone. Because of this the firm which invested in developing it cannot capture the full benefits of what they have produced.

But how should BERD be supported? There has been considerable debate in recent years about whether assistance should be through direct outlay measures or through the tax system. Currently BERD is assisted through both mechanisms, with a discretionary grants scheme and a generally available tax concession (providing certain criteria is met).

Although supportive of assistance for BERD in principle, the Commonwealth Treasury is generally antagonistic towards doing this through the tax system. They have good reasons for these views. In principle, assistance should be transparent. Firms should know how much they are getting, and get the same level of assistance whatever their circumstances, and governments should know what this costs. Further support through a tax concession assists different companies in quite different ways depending on their circumstances (see below).

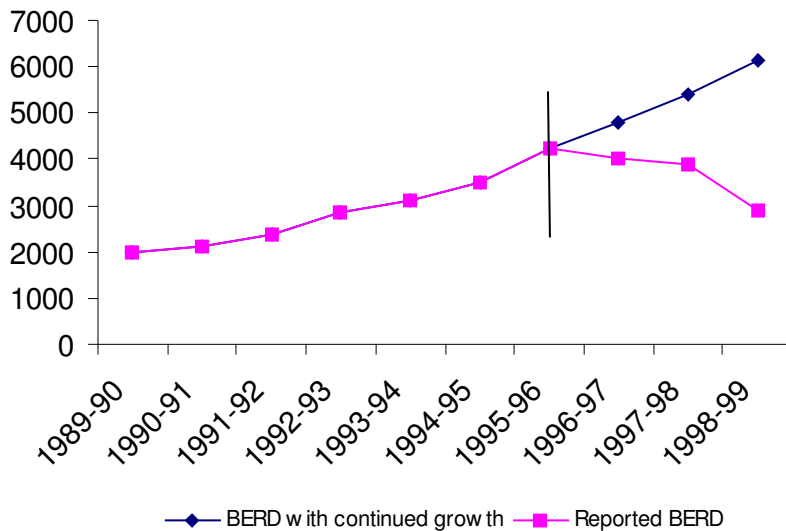
However there are also good reasons for assistance through the tax concession. Firstly, business has worked within this framework for a decade and so there is an argument that things which are working well should not be changed without a compelling reason. Secondly, there is the possibility that the tax concession actually induces managers to think that they are getting more assistance than they actually are.

Under dividend imputation, a good deal of the assistance available through the tax concession is ultimately 'clawed back' in the form of higher tax on shareholders. This is because for every dollar the firm saves in tax, it receives that many fewer franking credits to distribute to its shareholders (see below). If managers were fully taking this into account, it is likely that they would consider the tax concession to be of limited assistance.

The recent reduction in the rate of, and tightening of eligibility for the tax concession allows us to test this proposition. If managers were fully discounting the value of the tax concession, the effect of the removal of the concession would be relatively minor. If it is not worth a great deal, reducing it will be of little consequence. It may have been this thinking – the belief that the tax concession had low 'inducement rates' (see below) – which led to support for the removal or reduction in the concession.

In the five years to 1995-96 BERD increased each year by an average of 16% or a little over 13 per cent after adjusting for inflation. And BERD increased each year whether measured in terms of the real or nominal amount of money spend or as a proportion of GDP. As a proportion of GDP, R&D lifted sharply over the period, from just over .5% to just under .9%. In addition to the 'carrot' of increased R&D assistance, the 'stick' of increased competition within markets for goods, services and capital from micro-economic reform saw a dramatic transformation in Australian business's R&D performance.

**Chart 1 Gross Australian Business Expenditure on Research & Development (BERD) (\$ M)**



Source: ABS: Research and Experimental Development: Business Enterprises, Australia, 1995-96, ABS Catalogue No. 8104.0, p. 6.

📖 See Appendix, Table 1

In the 1996 Budget the Commonwealth government narrowed the range of expenditures which received concessional tax treatment, and reduced the extent of the tax concession available from 150 to 125 per cent of eligible expenditure. With a company tax rate of 36% this reduces the immediate tax benefit of the concession from 18 per cent to 9 per cent.<sup>1</sup>

To date, what information we have on the effects of the changes has been generated by industry and has tended to focus on reduced claims for business research and development (Johnson, 1997). The results from such studies suggest that firms' claims have fallen considerably.

However the extent to which reduced claims for the tax concession reflected falling total R&D spending has been unclear. Any reported falls in claims might reflect falling R&D spending, or simply the fact that a smaller proportion of firms' R&D expenditure was claimable within the terms of the tax concession.

<sup>1</sup> This calculation assumes that 100 per cent deductibility for R&D is not concessional. One could quibble with this assumption on the grounds that R&D expenditure is directed towards generating an asset - knowledge - which should be depreciated over the period of time it takes to become obsolete rather than written off in the year of expenditure. However it is not clear what the appropriate non-concessional rate of depreciability should be, and where technology is rapidly becoming obsolete, rates of depreciation should be high. Against the 100 per cent benchmark of deductibility, 150 per cent deductibility provides an additional 50 per cent deductibility which is worth  $50\% * 36\%$  (the company tax rate) = 18%. Reducing deductibility to 125% reduces the benefit to  $25\%$  of  $36\%$  = 9%.

Against this background the BCA's Business Development Task Force decided to embark upon the survey which is reported here. A major theme of the survey was to ensure that results were generated which were capable of distinguishing between total business expenditure on research and development and tax-concessional expenditure.

For this reason firms were asked for information about both total and 'concessionable' expenditure. Approximately 150 businesses were surveyed in early March 1998. Replies were received from 66 firms with a total turnover of \$125 billion and total R&D expenditure of \$1.55 billion. This represents about a third of all business R&D.

The firms cover a good cross-section of industry sectors, of domestic and foreign firm ownership, of rates of intra-firm R&D expenditure growth and intra-firm R&D intensity (proportion of R&D to turnover). The sample is clearly biased towards larger firms. However, there are also a few smaller firms in the sample and these permit a tentative analysis of the extent to which and the direction in which this might bias the overall result.

Research executives in each firm were asked to report their firm's total R&D expenditure in 1995-96 and 1996-97 along with their anticipated expenditure in the current financial year (1997-98) and in 1998-99. They were also asked to nominate their tax concessional R&D expenditure. The questions replicated those in the regular ABS survey of these topics and firms were encouraged to quote from ABS surveys which they had either returned or which they were preparing.

**The major conclusion is that business R&D, which was growing rapidly before 1996, appears to have declined substantially (by about 8 per cent) from the time of the policy changes to the end of the current financial year. The evidence suggests that R&D is continuing to fall and it is possible that a further major decline is in prospect.**

**Amongst the firms in the survey, BERD is now about one third or \$1.5 billion lower than it would have been had it maintained its previous rate of growth of 13 per cent per annum since the policy change.**

**Firms indicated that they expected R&D expenditure to fall by 23% in the coming financial year. However it should be noted that firms have consistently underestimated their forward R&D expenditure in previous ABS surveys. Whilst their underestimates have been between 16 and 21 per cent – slightly smaller than the 23 per cent fall suggested in this survey – this survey asked firms to look out further than ABS surveys do. The survey's forward estimates should therefore be treated with caution.**

## **2 THE RESULTS**

After growing rapidly in the five years to 1995-96, aggregate R&D expenditure declined in 1996-97 and again in 1997-98, by which year the aggregate for the whole sample had fallen to 92 per cent of the 1995-96 peak.

Within the survey sample, BERD fell by 3% in 1996-97 and was expected to fall by a further 5% by June of this year. If this were reflected more broadly amongst firms outside the survey, this would represent a fall in total BERD of over \$320 million.

When compared with the trend rate of growth before the change in assistance, the effect of the changes on BERD during 1996-67 and 1997-98 may have been of the order of 17% of total BERD or approximately \$750 million of expenditure in each year.

Because the definition of eligible R&D was tightened at the same time that the rate of assistance was cut, falls in the amount of R&D claimed under the tax concession have been larger than the falls in total R&D conducted.

If the forward expenditure estimates are to be believed, a further major decline is in prospect for 1998-99. Respondents were also asked to estimate their firm's R&D expenditure in the financial year commencing this July. It should be remembered that, in past ABS surveys, firms have typically underestimated their forward expenditure on R&D. This is presumably because some R&D expenditure is only initiated as technical opportunities are discovered or as requirements arise. In the ABS surveys for 1993-94 and 1994-95 firms underestimated their ultimate R&D expenditure by 16% and 21% respectively.<sup>2</sup> Further, this survey asked firms to identify expected expenditure over a slightly longer time horizon than the ABS survey typically does. This could lead firms to be even more pessimistic about forward R&D expenditure than they are with ABS surveys. It is unclear how one should weigh these considerations against the fact that the projected fall in total R&D is substantially larger than has been expected in recent years.

Survey respondents indicated that their total R&D is expected to fall in 1998-99 by a further 23%. However, it is possible that this major decline will not be fully realised, and further comment in this paper is mostly limited to the realised trend over the two years since the reduction in R&D support.

Following data analysis of 41 firm responses, the Council received an additional 25 responses. The total R&D expenditure of the later 25 firms was aggregated and is included in the aggregate data reported above. The breakdown of trends by firm characteristics appearing below only includes data from the additional 25 firms (total 66 firms) in the sections on R&D expenditure by firms' prior R&D growth, by firm size and by dividend policy. The other sections have not yet been updated.

Inclusion of the later 25 responses had only a very slight effect on the aggregate results. (The first 41 survey returns produce a 9 per cent reduction in BERD between 1995-96 and the end of this financial year whilst including the full 66 survey returns brings the reduction to 8 per cent.)

## **2.1 Response by firms' prior R&D growth rate**


The firms in which R&D had previously been growing most rapidly, at over 30 per cent a year, comprised 20 per cent of the sample. They were smaller than the sample average, with 8 per cent of total turnover, and their research intensity was about average. Growth in research effort continued for these firms in 1996-97, but declined in 1997-98. Interestingly, it is expected to increase again in 1998-99. It would appear that technical opportunities and needs are dominating the increased after tax cost of R&D within in these firms.

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<sup>2</sup> Note also that this survey suggests that firms were much more accurate in their estimation of expected expenditure for 1996-97. The ABS results have expected expenditure for 1996-97 down by 11.6 per cent on 1995-96 levels. If this survey is representative, that figure will be substantially closer to the actual result than has been the case with expected expenditure over the previous two years.

### **Chart 2.1 Growth (decline) in BERD since 1995-96 by prior annual rate of R&D growth**

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 See Appendix, Table 2.1

#### **2.2 Response by firm size**

The survey is clearly biased towards large firms. 44 of the 66 firms in the survey employed over 1,000 people placing them in the ABS category of the largest firms. They conducted 95 per cent of the R&D of all firms in the survey. However, analysis of the smaller firms' R&D performance did not suggest that this large firm bias biased the survey downwards. If anything the opposite was the case with the smallest 11 firms cutting their R&D expenditure between 1995-96 and 1997-98 by 30%. This is substantially more than the 8 per cent figure by which all firms in the sample cut their R&D expenditure. Nevertheless, the poor coverage of small firms remains an important omission from the survey. There were no firms in the survey with fewer than 200 employees, even though 37 per cent of all BERD is performed by such firms.

**Chart 2.2 Growth (decline) in gross R&D expenditure since 1995-96 by firm size (number of employees)**

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 See Appendix, Table 2.2

### **2.3 Response by R&D intensity (R&D/turnover)**

Firms with both very high and very low R&D intensity continued to increase their R&D despite the reductions in assistance. Accordingly the reduction in R&D generated over the whole sample is driven by firms with more moderate R&D intensity.

One might speculate that those firms with low R&D intensity are not responsive to R&D assistance because R&D in such firms may be on an identified needs basis and may not be particularly sensitive to total after-tax costs because the cost of R&D makes so little difference to their overall after-tax profitability. There were only 4 firms which had R&D intensity of over 10 per cent. Accordingly their R&D growth may be a statistical artifact. However, if their performance was representative, a possible explanation is that firms with such high R&D intensity accord R&D such a high strategic priority that they too are relatively insensitive to its after tax cost.

**Chart 2.3 Growth (decline) in BERD by firm's R&D intensity (ratio of R&D to turnover) since 1995-96**

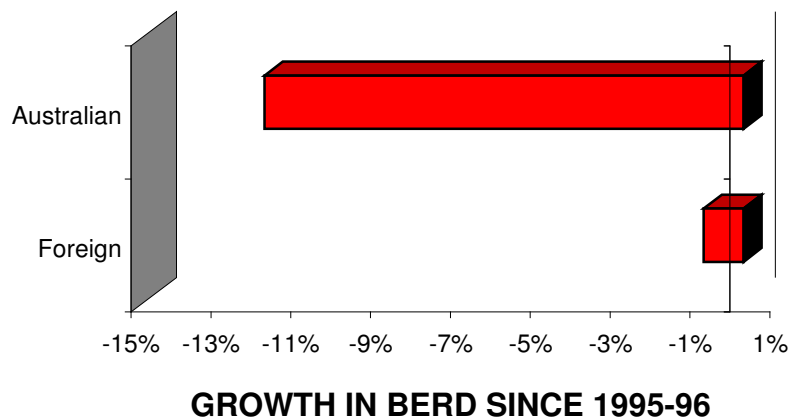
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📖 See Appendix, Table 2.3

**2.4 Response by firm ownership**

Over the two years, the reduction in R&D was more severe for locally-owned than for foreign-owned firms, though if expectations for 1998-99 are taken into account, the overseas-owned firms have been more severely affected.

**Chart 2.4 Growth (decline) in BERD by ownership of firm.  
(1997-98 levels compared with 1995-96: 1995-96 = 100)**



📖 See Appendix, Table 2.4

**2.5 Response by sector**


Confidentiality considerations prevent the publication of results by industry sector at the two and three digit ANZSIC level as reported in ABS data. The data reported here have been grouped within four sectors. The first 'research intensive' sector comprises nearly one-third of all R&D captured by the survey. 'Research intensive' sectors were defined to include pharmaceutical and biomedical manufactures, electrical goods manufacturing, telecommunications and scientific research. Other categories were defined as 'other manufacturing', 'mining' and 'other sectors'.

Research intensive sectors reduced their R&D expenditure by about the same amount as the sample overall. However, their tax-concessional expenditure fell by 33 per cent - much more

than the other sectors. This suggests that the research intensive sectors have been hit harder than other sectors by the tightening of eligibility for the tax-concession.

**Chart 2.5 Growth (decline) in BERD by sector.  
(1997-98 levels compared with 1995-96: 1995-96 = 100)**

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 See Appendix, Table 2.5

## 2.6 Response by dividend franking practice

In theory, the attractiveness of the R&D tax concession can vary depending upon two factors. Firstly there is the ownership structure of a firm; it must be in a tax-profit situation in order to benefit from any reduction in its tax liability. The second factor impacting on the attractiveness of the R&D tax concession is the dividend policy of the firm which claims it. During the mid-eighties the Government moved to eliminate the double taxation of company dividends by amending the income tax legislation to introduce a dividend imputation system. Where a company pays tax, the dividend imputation system allows it to pass credit for payment of tax onto its domestic shareholders as franking credits attached to dividend payments. Under this system, where firms claim the tax concession, they reduce the tax they pay, but they also reduce the franking credits they have available to pass onto their domestic shareholders when they pay dividends. As a result, the tax saved by the firm is in principle ultimately 'clawed back' over time in the form of higher taxation liabilities on shareholders as they receive dividends.

The clearest example of 'claw-back' is in the case of a company which is paying partially franked dividends. Any tax concession the company receives reduces the tax the company pays, but at the same time reduces by the same amount the extent to which its dividends can be franked. The shareholder's ultimate tax liability is thus increased by the amount of tax the concession saves the company. In these circumstances, from the shareholder's perspective, the tax concession does not reduce tax liability so much as defer it.

In other situations it is less clear when the imputation system 'catches up' with the R&D tax concession by reducing the after tax value of dividends passed back to the shareholder. In most cases a company has an ultimate ambition to become profitable (and so to pay tax) and it will then pass its tax payments back to its shareholders in the form of franked dividends. Accordingly, 'claw-back' can be expected to occur eventually. Nevertheless, where a company is currently not paying dividends or where it pays fully unfranked dividends, 'claw-back' of the tax concession can be expected to occur over a long time frame. A company paying fully franked dividends, may be able to delay 'claw-back' of the concession from its shareholders by drawing on a reserve of excess credits if they are available - nine firms in the sample were in this position - or by reducing its fully franked dividend. However this latter course has immediate implications for shareholder value.

These considerations lead to an interesting question. *To what extent do managers within companies take the after tax returns of their shareholders into account when making R&D investment decisions?*

If we assume management do *not* fully take shareholder returns into account when making R&D investment decisions, the R&D concession would be a 'super efficient' assistance

instrument.<sup>3</sup> BIE research has suggested that managers tend to discount the effect of tax 'claw-back' from shareholders through the dividend imputation system which suggests that the tax concession is indeed super-efficient. (BIE, 1993, p. 83).

If managers did factor in the way in which dividend imputation 'claws back' the value of the tax concession, one would expect companies which benefit most from the R&D tax concession to cut their R&D expenditure the most in response to the reduction. One would therefore expect companies paying partially franked dividends to be *least* affected by changes in the rate of the tax concession. This is because their shareholders have least to gain from it in any event. Likewise one would expect firms paying either no dividends or completely unfranked dividends, to cut their R&D most. They have the most to gain from the tax concession and so the most to lose from its reduction. Companies paying fully franked dividends would be between these two extremes.

It appears that this phenomenon is observable in the data. Firms which do not pay dividends, or which pay unfranked dividends, cut their R&D most; those which pay fully franked dividends cut it somewhat, and those paying partly franked dividends increased it although not by as much the trend growth rate of all firms before the changes.

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<sup>3</sup> The public policy rationale for R&D assistance is that firms are unable to capture all the benefits of their R&D expenditure. (There are spillovers as others learn new techniques from the firm doing the R&D without paying it for the privilege). Accordingly, without assistance, firms will under-invest in R&D. But assistance is not without its own costs. It requires more tax revenue to be raised elsewhere and this imposes its own costs on the economy. Thus, to the extent that the tax concession 'fools' managers of firms into thinking that it provides more assistance than it does, the policy is super efficient - it moves firms' R&D decisions closer to the 'right' amount from the economy's perspective without fully incurring the cost of so doing. It gets something for nothing.

**Chart 2.6 Growth (decline) in BERD by dividend franking practice.  
(1997-98 levels compared with 1995-96: 1995-96 = 100)**

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 See Appendix, Table 2.6a

Further investigation would be necessary to enable there to be confidence in this result. The number of firms in some of the categories was not large and so the result may be a statistical artifact. Also, firms' dividend policies are functions of other matters within the firm - their profitability, growth, opportunities and their 'maturity' for instance - and it may be these underlying features that are driving this result. Firms unable to pay dividends or unable to frank them may be subject to more stringent desires to cut costs to return to profit and this may lie behind their disproportionate reduction in R&D expenditure.

To the extent that these results are representative, they suggest that managers do take 'claw-back' into account. The results however do not rule out the possibility suggested by the evidence cited above that 'claw-back' is not fully discounted by managers - that there is still some 'super-efficiency' in the tax concession as an assistance mechanism. In this context it should be noted that, where the data was organised according to different categories, the greatest reductions in R&D come from firms least affected by 'claw-back'. Thus:

- domestic firms responded more strongly than foreign firms (Table 2.4);
- firms with excess franking credits responded less strongly than firms without excess franking credits (Table 2.6b);
- firms with lower dividend yields responded less strongly than firms with higher dividend yields (Table 2.6c).

Each of these results suggests that managers inadequately take 'claw-back' into account and that the tax concession is, accordingly, super-efficient. The very high responsiveness of BERD to reductions in the concession also strongly suggests that the mechanism is super-efficient (see below).

## **2.7 Responses to new R&D assistance initiatives**

The survey contained some brief questions about firms responses to the new R&D initiatives in the Federal Government's December 1997 industry statement. Respondents were asked

1. whether they were aware of the new initiatives,
2. whether they intended to apply for assistance through them and
3. whether they expected they would increase their R&D spending.

Of the 26 firms recording answers to these questions, all but two had heard of the new initiatives, but only ten intended to apply for assistance. Of these, six expected the schemes to increase their R&D expenditure.

### 3 CONCLUSIONS

As suggested above, at the time the reduction in R&D assistance occurred it appears the advice available to government was that R&D was not particularly sensitive to assistance. What work had been done suggested that the concession had an ‘inducement rate’ – that is it increased R&D expenditure – by between 10 and 17 per cent. The implication of this is that between 83 and 90 per cent of the funds provided by the concession went to assist R&D which would have been conducted in any event. This was when company tax was 39 per cent and the tax concession was at 150 per cent (disregarding the effect of imputation ‘claw-back’). The implicit rate of subsidy involved here was just under 20 per cent suggesting that BERD was relatively insensitive to tax concessional assistance. The example suggests a price elasticity of R&D supply between .5 and .87.<sup>4</sup>

Assuming a price elasticity of R&D supply in between these two figures - that is an ‘inducement rate’ of 15 per cent - the Industry Commission modelled the removal of the tax concession. It concluded that, the welfare reducing effects of reducing R&D assistance would build up quite slowly by reducing the growth of the stock of knowledge within the economy. Nevertheless, after ten years, the effect of removing assistance would reduce the nation’s output (GDP) by \$360 million each year. This was more than the (then) fiscal cost of the tax concession.

It is worth briefly pondering this result. Even where a subsidy is justified, it is most unusual for its removal to yield greater losses across the whole economy than the fiscal cost of the subsidy. This is because, as a subsidy is removed, the money used for the subsidy can be used for other government programs or rebated as lower taxes. Thus losses in the subsidised activity are balanced by gains in other activities and the total loss or gain to the economy is a function of the *difference* between the productivity with which the funds were used before and after the policy change. Thus for instance, although the subsidy equivalent of automotive tariffs comes to billions of dollars, the Industry Commission calculated the gains to the whole economy from reducing automotive tariffs to be a very small fraction of this (Industry Commission, 1997, p. xl-xli).

**The message from the Industry Commission’s R&D study is that R&D is different. R&D assistance is both more justifiable, and per dollar, more important than most other forms of assistance.** This is because although they are hard to measure directly, returns to the whole economy of R&D may be very high. Moreover there is a dynamic element which is not present in most industry assistance issues. One firm’s R&D today contributes to that firm’s ‘internal stock of knowledge’ and provides a more developed base from which to work in the future. It also contributes to other firms’ ‘external stock of knowledge’ upon which they build their own technological improvements in the future.

The current survey suggests that R&D is much more sensitive to tax concession assistance than earlier work suggests. With company tax at a rate of 36 per cent, the value of the R&D tax concession has been halved from a subsidy equivalent of 18 per cent to 9 per cent.<sup>5</sup> This has been matched by a fall of R&D expenditure within the sample of eight percentage points

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<sup>4</sup> Technically these figures might be better expressed as negatives ie. -.5 and -.87. However to simplify the presentation this has not been done.

<sup>5</sup> These figures do not allow for the issue of ‘claw-back’ through dividend imputation and so to that extent overstate the extent of assistance the tax concession provides.

over two years. Of itself this suggests an elasticity of nearly one. However there are at least two strong reasons for believing this estimate to be too low. Firstly, it assumes that R&D would not have grown if the concession was maintained. This is an assumption which seems highly unlikely given the rapid and steady rise in BERD before the changes. Secondly, the survey suggests that R&D will continue to fall into 1998-99.

Leaving aside the second more speculative consideration, if R&D growth would have maintained its previous rate of growth of 13 per cent per annum without policy change, the reduction in R&D assistance has reduced BERD within the sample by about a third of what it would otherwise have been. This suggests an elasticity of nearly 4. Given that these very high elasticities emerge from a framework which ignores the effects of 'claw-back' through the dividend imputation system, it seems very likely that managers do not fully discount for the effects of 'claw-back', that the tax concession is 'super-efficient'.

In this context it should be noted that the Industry Commission modelled a 'high elasticity' scenario in its study of the effects of the tax concession. Its modelling suggested that, if the inducement rate of the tax concession was 40%, the elimination would reduce GDP over the long run by \$700 million per annum. Whilst this scenario modelled the total elimination of the subsidy, the elasticity it used was approximately half that suggested above.<sup>6</sup> On balance, it seems conservative to conclude - based on the Industry Commission modelling - that the reduction of assistance may reduce GDP over the long term by a figure somewhere between \$300 and \$700 million per annum.

One possible explanation for this remarkable responsiveness of BERD to government assistance in this survey could be that the survey picked up a number of firms who were in R&D syndicates which were wound down as a result of the Government's decisions in that area. The data was checked with this in mind. However if anything, the survey is biased in the opposite direction with very little firm involvement in syndicates before or after the policy changes.<sup>7</sup>

### **Policy change and sovereign risk**

The very high responsiveness to reduced R&D assistance also appears to reflect changing firm attitudes to sovereign risk in R&D assistance. The Commonwealth Treasury has traditionally been hostile to assistance through the tax system and for some years before the concession was reduced in scope, commentators had speculated that Treasury was campaigning for its abolition or reduction. Against such a background, the maintenance of the R&D concession gave business growing confidence to plan on it remaining in place. As

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<sup>6</sup> Thus the IC modelled a 40 per cent fall in BERD - more than the 35 per cent fall implied in the scenario being considered. However in the IC simulation, the whole of the cost of the tax concession was available for recycling through the economy which offset the fall in GDP. In the scenario our survey investigates, only half the value of the tax concession is available for recycling through the economy.

<sup>7</sup> The first 41 returns to the survey were examined for their participation in syndicates. Only three were involved in syndicates. Two of those companies were only involved in one syndicate each. The other company was involved in six. In all but one of these eight cases, the company from the list was involved only as marketer/promoter/researcher and/or minority investor. The total amount invested by the listed companies for these seven cases was less than \$1m out of total syndicate value of approximately \$150 million. In the one remaining case, the listed company was the major investor in a substantial syndicate - over \$40 million (both investment and total syndicate value). However in this case the syndicate's project had been completed before the base year of the survey 1995-96.

the Industry Commission commented with regard to the low inducement rates which the BIE had produced in 1993:

*[T]he 1992-93 announcement that the scheme would be a permanent measure, and subsequent evidence of its durability, could increase the extent to which it is factored into companies' R&D decisions and enhance its effectiveness relative to this estimate (Industry Commission, 1995, p. 653).*

Once a change was made, it may be that business' confidence to plan and invest on the strength of what assistance remained was undermined. As one firm commented in the survey:

*These changes, together with uncertainty about future Government attitudes to R&D have put new initiatives on hold to some extent.*

Another firm commented that, in addition to a swing towards more 'tactical' research, it had become more generally risk averse about its R&D. In such an environment, it is very difficult for businesses planning R&D to be confident that, after they have invested in R&D projects, government programs will deliver what they had promised. This is surely now an important ongoing problem for R&D assistance policy in Australia.

#### **4 RECOMMENDATIONS**

Opinions might differ over whether or not the sharpness of the business response to that measure could have been predicted. However the strategic importance of business research and development to the industrial transformation which is underway in Australia is hard to underestimate.

We should learn from this episode by understanding more fully than this survey has been able to, just how business has reacted to the policy change - and why. And we should look forward to put in place mechanisms which prevent these kinds of problems happening in the future.

If we knew too little before the event, we cannot be as easily excused for a failure of curiosity after the event. As part of its own survey, the BCA approached the ABS with a view to generating a more thorough set of results than was possible from our own survey, using early data entry from the ABS's own survey to produce 'preliminary estimates' of the full survey results. (The BCA understands that these are currently expected to be released in late June.) The BCA considered that such data might be important if any further measures on R&D were being considered within the context of the Budget. Despite the prospect that the BCA and others might help fund such an exercise, the ABS declined the proposal.

Publication of the ABS survey in June provides an opportunity to do just that. It is to be hoped that, in addition to its usual publication of the data, the ABS or some other agency undertakes further analysis designed to shed light on the effect of the policy changes on businesses in different sectors and circumstances.

In the area of mooted further restrictions on the definition of eligible R&D, it is to be hoped that the Government appreciates the effect which such changes can have on business certainty and the reliability with which firms can plan.

In this regard there is merit to the Mortimer Report's proposal for guaranteed five-year funding. It was probably inevitable that such a proposal was vigorously opposed by central departments because of the role which changes in outlays programs can have on the flexibility

of fiscal policy. In this regard it is suggested that R&D is different. Even before the changes (and excluding R&D syndicates), the cost of the R&D concession was less than half of one percent of government outlays. Yet over time it was capable of making a contribution of that order of magnitude to GDP. R&D is different partly because it forms such a small part of the economy and yet the technical change into which it is an essential input, is the single greatest source of economic growth.

If some level of funding security cannot be guaranteed, a more modest means of providing greater policy security in this area would be to commit - by ministerial statement or (preferably) in legislation - not to reduce firms' entitlements to R&D assistance programs without a full, open and independent inquiry. Even today firms' tariff assistance is assured by such a guarantee - but not their much more important access to assistance for their expenditure on R&D. The Government might indicate its intention to move in such a direction in the first instance by committing not to narrow the definitions of R&D which qualify for the tax concession until such a full and independent study had been conducted. The Productivity Commission would be the appropriate forum for such an inquiry.

There remains the form in which across the board assistance to BERD is provided. It seems highly likely that one explanation of the responsiveness of BERD to tax concessional assistance is that the tax concession is 'super efficient' (See above). Certainly anecdotal evidence suggests that firms do not always fully factor in the prospect of 'claw-back' from the dividend imputation system when making decisions in which the R&D tax concession plays a part. If this were confirmed with further research, it might be hoped that the tax concession might be less vigorously opposed by central agencies keen to move industry assistance from tax concessions into outlays. The principle of confining assistance to outlays measures is certainly understandable. But where the evidence suggests that there are other efficiency benefits from providing assistance to R&D through the tax system, this should be taken into account.

The provision of assistance by way of a tax concession is of differential value to firms in different circumstances - for instance depending on their tax profitability and their dividend policy (see above). It may be appropriate in such circumstances, to give firms some choice about the form in which they take their assistance. Both the Mortimer Report and the Industry Commission have proposed that firms be given a choice as to how to access broad-based assistance. Both suggested access to grants at rates which equate with tax-concessional assistance. Another way of covering the field would be to use the same mechanism used by the tax concession in an inverse way. Thus firms would be given the choice between taking their assistance in the form of the tax concession or taking it as franking credits to pass onto their shareholders. Whatever mechanism is chosen, it is important to ensure that assistance is available for BERD on as broad a basis as possible in a manner which does not discriminate for or against different firms simply because their ownership structures or financial circumstances differ.

Finally we need to turn the situation around rapidly. Like any other area of policy, R&D policy must be financed soundly. But decisions on R&D must be driven by medium and long term strategic priorities. There are several aspects of R&D that are under active review by Government - they include R&D in Australia's higher education institutions, and eligibility for the tax concession. In addition, new rounds of CRC funding have been announced and bids for new and existing CRCs are being made.

We need a national summit on R&D and innovation. It should focus on Australia's R&D effort in an integrated way and all sectors should be involved – business, government and educational/research agencies.

Australia should have – it must have – an innovation policy which is driven by an integrated and strategic approach to Australia's needs for knowledge into the future to harness the great talents and aspirations of Australians.

## Appendix

**Table 1 Business Expenditure on Research and Development (\$M)**

	<b>1989-90</b>	<b>1990-91</b>	<b>1991-92</b>	<b>1992-93</b>	<b>1993-94</b>	<b>1994-95</b>	<b>1995-96</b>	<b>1996-97</b> (Expected)	<b>1997-98</b> (Expected)	<b>1998-99</b> (Expected)
BERD (Current prices)	1990	2100	2365	2863	3120	3489	4243	4128	3916	3011
BERD(1989-90 Prices)	1989	2002	2204	2589	2757	3065	3637			
Nominal Growth		5.5%	12.6%	21.1%	9.0%	11.8%	21.6%	-2.7%	-5.1%	-23.1%
Real Growth		0.6%	10.1%	17.5%	6.5%	11.2%	18.7%			

Source: ABS: Research and Experimental Development: Business Enterprises, Australia, 1995-96, ABS Catalogue No. 8104.0, p. 6, BCA Survey.

**Table 2.1 Total Gross R&D expenditure (\$ M) by annual rate of R&D growth 1990-91 to 1995-96 (per cent)**

	<10%	10 – 19%	20 – 29%	30%+	Total
Number of firms	24	17	9	13	63
1995-96	334	490	265	106	1 230
1996-97	269	434	318	120	1 163
1997-98	281	414	302	99	1 117
1998-99 (expected)	113	321	228	110	793
<b>1997-98/1995-96 (%)</b>	<b>84%</b>	<b>84%</b>	<b>114%</b>	<b>94%</b>	<b>91%</b>

*Total includes one firm which did not give an estimate of previous growth.*

**Table 2.2 Gross R&D by firm size (\$ M)**

	No. of employees per firm			Total
	< 500	500 to 999	> 1000	
Number of firms	15	7	44	66
1995-96	55	36	1455	1546
1996-97	62	32	1410	1504
1997-98	38	29	1360	1427
1998-99 (expected)	29	31	1038	1097
<b>1997-98/1995-96 (%)</b>	<b>70%</b>	<b>80%</b>	<b>94%</b>	<b>92%</b>

**Table 2.3 Gross R&D expenditure (\$ M) by firm's R&D intensity (ratio of R&D to turnover) – per cent**

	<0.5	0.5 < 1.0	1.0 < 5.0	5.0 < 10.0	10.0+	Total
Number of firms	10	12	11	3	4	41
1995-96	13	348	530	239	97	1 230
1996-97	25	384	471	180	98	1 163
1997-98	16	367	422	201	103	1 117
1998-99 (expected)	14	293	343	54	81	793
<b>1997-98/1995-96 (%)</b>	<b>118%</b>	<b>106%</b>	<b>80%</b>	<b>84%</b>	<b>106%</b>	<b>91%</b>

*Total includes one firm which did not provide ratio to turnover.*

**Table 2.4 Gross R&D expenditure by ownership of firm (\$ M)**

	Australian	Foreign	Total
Number of firms	26	15	41
1995-96	948	281	1 230
1996-97	903	260	1 163
1997-98	838	279	1 117
1998-99 (expected)	652	141	792
<b>1997-98/1995-96 (%)</b>	<b>88%</b>	<b>99%</b>	<b>91%</b>

**Table 2.5 Gross R&D expenditure by Sector (\$ M)**

	Research intensive Manufacturing	Other manufacturing	Mining	Other sectors	Total
Number of firms	7	23	6	5	41
1995-96	377	428	415	10	1230
1996-97	370	361	417	16	1163
1997-98	350	398	359	10	1117
1998-99 (expected)	327	227	229	10	793
<b>1997-98/1995-96 (%)</b>	<b>93%</b>	<b>93%</b>	<b>87%</b>	<b>100%</b>	<b>91%</b>

**Table 2.6a Gross R&D expenditure by dividend franking practice (\$ M)**

	No dividends	Unfranked dividends	Partly franked dividends	Fully franked dividends
Number of firms	16	4	11	27
1995-96	116	68	243	953
1996-97	82	61	232	987
1997-98	94	61	264	895
1998-99 (expected)	65	64	116	837
<b>1997-98/1995-96 (%)</b>	<b>81%</b>	<b>89%</b>	<b>109%</b>	<b>94%</b>

NB: 8 firms did not respond to this question



**Table 2.6b Gross R&D by availability of franking credits**

	Excess credits available	All credits passed onto shareholders
Number of firms	20	21
1995-96	333	539
1996-97	358	497
1997-98	340	495
1999-99 (expected)	303	268
<b>1997-98/1995-96 (%)</b>	<b>102%</b>	<b>92%</b>

NB: 25 firms did not respond to this question

**Table 2.6c Gross R&D by dividend policy in relation to total capital value (\$ million)**

	<1.5 per cent	1.5+ per cent
Number of firms	18	35
1995-96	273	1154
1996-97	262	1165
1997-98	266	1064
1998-99 (expected)	99	912
<b>1997-98/1995-96 (%)</b>	<b>97%</b>	<b>92%</b>

NB: 13 firms did not respond to this question

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