

# Chapter 4

## Criteria for Evaluating R&D Assistance

4.1 Two key concepts in evaluating schemes to support R&D are *public spillover benefits* and *additionality*.

4.2 These concepts are reflected in the objects clause in the bill, which explains that the goal is:

...to encourage industry to conduct research and development activities that might otherwise not be conducted because of an uncertain return from the activities, in cases where the knowledge gained is likely to benefit the wider Australian economy.<sup>1</sup>

### Public spillover benefits

4.3 As the EM notes, 'innovation is recognised internationally as an important driver of economic growth'. But this is not in itself justification for tax incentives or other taxpayer support for it.

4.4 Companies will engage in R&D that they expect will generate a good return in terms of increasing their profits. Much of this R&D will result in incremental improvements in their goods, reductions in their manufacturing costs, or an addition to their product range such as a new flavour. But there is no reason for the taxpayer to subsidise such activity as the benefits will accrue totally and solely to the companies involved.

4.5 The case for taxpayer subsidy only arises when a company's R&D leads to benefits that partly accrue to those outside the company and for which the company is not rewarded; a 'spillover benefit' (or 'positive externality').<sup>2</sup>

4.6 The idea is much like that expressed by Thomas Jefferson:

He who receives ideas from me, receives instruction himself without lessening mine; as he who lights his taper at mine receives light without darkening me.<sup>3</sup>

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1 Bill, p. 5; amending subdivision 355-A.

2 Among prominent economists to have developed this idea of spillovers are Alfred Marshall, Paul Romer and Kenneth Arrow.

3 Letter to Isaac McPherson, 1813.

4.7 The *social* benefits of the R&D then exceed the *private* benefits. This sort of R&D is likely to be undersupplied as for some projects the private costs will exceed the private benefits but be less than the social benefits. A payment (or tax concession) to the company to encourage its R&D may then make everyone better off.

4.8 The idea of spillovers is important in the 'new growth theory' in the economics literature. A survey article concluded:

...the overall impression remains that R&D spillovers are both prevalent and important.<sup>4</sup>

4.9 Medicines Australia gave an example of a spillover benefit from their R&D that accrues to the community rather than to other companies:

...it provides early access to the Australian community to new medicines through being in a clinical trial. If we were not doing those clinical trials here with new medicines, the community would have to wait until that medicine is registered and marketed in Australia. Also, through running clinical trials for thousands of patients around Australia every day the pharmaceutical company is paying for their health costs by being in a clinical trial...<sup>5</sup>

4.10 The Australian Industries Group supports the spillover principle:

Ai Group agrees that the case for public support of business research and development activity arises because of the direct and indirect spillovers that arise when the full value that flows from this expenditure is not captured by the businesses making the expenditures but part of which flow to other parties. Without public support, the total quantity of business expenditure undertaken would be less than the socially optimum level.<sup>6</sup>

4.11 The Department of Innovation, Industry, Science and Research referred to spillover as the justification for support at Estimates:

There are very substantial benefits that we have talked about in actually doing the R&D. There are very substantial spillovers from doing that, and that is what gives an economic justification for providing support to it.<sup>7</sup>

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4 Zvi Griliches, 'The search for R&D spillovers', *Scandinavian Journal of Economics*, no 94, 1992, p. 29.

5 Ms Deborah Monk, Medicines Australia, *Proof Committee Hansard*, 20 May 2010, p. 8.

6 Australian Industry Group, *Submission 19*, pp 3-4. Similar comments were made by their representative Mr Innes Willox, *Proof Committee Hansard*, 21 May 2010, p. 2.

7 Mr Ken Pettifer, Head of Innovation Division, Department of Innovation, Industry, Science and Research, *Proof Committee Estimates Hansard*, 31 May 2010, p. 55.

## Additionality

4.12 Another criteria for an efficient incentive scheme is 'additionality'. A good scheme will be focused on generating additional R&D rather than just making payments to companies for R&D that they would have undertaken anyway.

4.13 The concept of additionality is accepted by most experts:

By providing an incentive, the government stimulates a level of expenditure beyond that which the primary businesses would otherwise undertake...<sup>8</sup>

Additionality is an important concept in public finance, addressing the issue of whether public support is resulting in new activity rather than substituting for private support that would have occurred in the absence of the intervention.<sup>9</sup>

Thus, spillovers are only a relevant rationale for public support when subsidies change the private decision about whether to proceed with an investment.<sup>10</sup>

4.14 The Minister for Innovation, Industry, Science and Research explained that additionality is an important reason for the changes to the scheme incorporated in the bill:

I met with some senior executives of a very large corporation and they explained to me, 'We do not make our decisions based on whether or not we are going to get a tax benefit. We make our decisions on a business case, given the scale of the projects that are involved. Once we have made the decision, we send the claim down to our accountants to clean up and submit to the government for a benefit.' Under the present regime, why wouldn't you? What we are trying to do is directly affect the way in which decisions are made. That is why we have tailored it to be of direct benefit to those companies where the sort of benefit that we can provide through the scheme will make a substantial difference to the companies as to whether or not the work is undertaken. That is the philosophy behind this. We want to make a big difference, we want to change behaviour and we wanted to change attitudes. The judgment call that I have made, based on the evidence that I have seen, is that this is the sort of thing that can affect the way companies do business.<sup>11</sup>

4.15 One of the few to argue against it is a major beneficiary of the current scheme, the advisory firm Michael Johnson Associates (MJA):

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8 Mr Innes Willox, Australian Industry Group, *Proof Committee Hansard*, 21 May 2010, p. 2.

9 L Georghiou and B Clarysse, 'Introduction and synthesis', in *Government R&D Funding and Company Behaviour*, OECD, 2006, p. 11.

10 Productivity Commission, *Public Support for Science and Innovation*, 2007, p. 65.

11 Hon Kim Carr, Minister for Innovation, Industry, Science and Research, *Proof Committee Estimates Hansard*, 31 May 2010, p. 65.

I think one of the great concerns about the idea of additionality is that people keep focusing on: ‘Prove that we are only funding things that would never have been done.’ That does not make sense to me. What the credit can do is help reduce the effective cost of the R&D that companies are doing—the priorities, not the marginal projects, that they should be doing.<sup>12</sup>

4.16 MJA did not explain why they thought taxpayers should make this gift to companies which does not result in any additional R&D.

### **Assistance to larger versus small companies**

4.17 Based on these two criteria it is generally thought that assistance to smaller companies is more likely to be preferable to assistance to larger companies. Many original ideas start out in small start-ups.

4.18 Professor Green commented:

I do support the move to something like dominant purpose and also that ventures should be innovative and risky. I think that is essential to getting those smaller companies out on the cutting edge that wish to participate.<sup>13</sup>

4.19 He added:

I would certainly be one of those who would advocate that some of those larger companies that have accessed resources on a habitual basis in the past may have to lose some of that in order that newer companies with newer ideas can access it. I think that is just a point of principle.<sup>14</sup>

4.20 A recent UK study argued that R&D assistance there should be:

...refocused to those companies where the barriers to a sustained R&D programme are greatest and the potential spillovers to the rest of the economy are greatest. That means high tech companies, small businesses and start-ups.<sup>15</sup>

4.21 The Department of Innovation, Industry, Science and Research has referred to other analysis:

The OECD has also done a lot of work on where the greatest benefits from research and development incentives are based. Their research also points to the fact that greater benefits are derived from providing incentives to

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12 Mr Kris Gale, Managing Director, Michael Johnson Associates, *Proof Committee Hansard*, 20 May 2010, p. 28.

13 Professor Roy Green, *Proof Committee Hansard*, 21 May 2010, p. 19.

14 Professor Roy Green, *Proof Committee Hansard*, 21 May 2010, p. 22.

15 James Dyson, *Ingenious Britain: Making the UK the Leading High Tech Exporter in Europe*, 2010, p. 54; cited by Professor Roy Green, *Proof Committee Hansard*, 21 May 2010, p. 19.

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smaller businesses. That is at the heart of where our policy of having a dual-rate system with a higher rate for small to medium enterprises comes from.<sup>16</sup>

4.22 A tax partner from Ernst & Young remarked:

...once companies are profitable or are earning revenue out of their R&D endeavours, there should be some limitations on the amount of assistance government is providing. Companies need government intervention most in the formative stages of any product or process development.<sup>17</sup>

4.23 Again a minority opposing view was expressed by Michael Johnson Associates:

To say that innovative companies are generally SMEs is an assertion. I have not seen the evidence.<sup>18</sup>

4.24 Even if large and small companies were equally innovative in their ideas, it is much easier for large established companies with large retained earnings and easy access to finance to fund their ideas. It is much less of a gamble to undertake a risky project if it only represents a small proportion of a large diversified company's capital than if it puts at risk a large proportion of a small company's capital. There are therefore more good ideas that are not undertaken due to financial constraints by small companies and so assisting them is more likely to result in *additional* innovation.

4.25 Another important difference between large and small companies is that new start-ups typically do not make profits in their early years so that they cannot benefit from tax concessions. This point was emphasised to the Committee by AusBiotech:

Cognisant of the unique business model required by biotechnology, where significant funds are required often over many years and up-front before any return can be realised, the tax credit, especially the refundable credit, is vital if innovations and the start-up biotechnology industry are to thrive in Australia...Start-up innovation companies applauded the government's policy announcement to move from the tax concession, which is not working for the industry as a whole, to the tax credit that will provide a much-needed lifeline.<sup>19</sup>

4.26 The Cutler Review concluded that tax concessions appeared to influence the behaviour of small companies more than large companies:

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16 Mr Weber, Department of Innovation, Industry, Science and Research, *Proof Committee Estimates Hansard*, 31 May 2010, p. 65.

17 Mr Robin Parsons, Partner, Indirect Tax, Ernst & Young, *Proof Committee Hansard*, 20 May 2010, p. 14.

18 Mr Kris Gale, Managing Director, Michael Johnson Associates, *Proof Committee Hansard*, 20 May 2010, p. 31.

19 AusBiotech, *Submission 1*, pp 1-2.

The inducement effects of a concession are likely to differ as between small technology based firms, and larger more mature firms. At one consultation with larger companies, 82 per cent of those present indicated, when polled, that the incentive value was marginal or none, and no one said the 175 per cent incremental premium scheme influenced their R&D activity...At the other end of the spectrum, the introduction of the Tax Offset element of the Concession for small tax loss firms has been highly successful...<sup>20</sup>

4.27 Treasury emphasised smaller firms when describing the aims of the bill:

Its overarching aims are to increase support for all R&D companies, to encourage more small and medium sized companies to do R&D... The tax incentive is expected to induce more R&D for a number of reasons. It tilts support to small and medium businesses...<sup>21</sup>

### **Assistance for research versus development**

4.28 It is more likely that research will lead to spillover benefits than development. And the more 'experimental' is the research, the more likely it will lead to insights with applications outside the business of the company undertaking it. The original idea with wider ramifications is more likely to arise from basic research than process improvements.

4.29 This view seems widely supported:

...there are potential benefits from public support for more basic or strategic research, where the returns can be difficult for an organisation to adequately appropriate.<sup>22</sup>

...one might expect few spillovers from applied work, that is, putting a particular idea into productive form.<sup>23</sup>

The strongest case for public support based on spillovers occurs for basic research...<sup>24</sup>

Radical innovation is also linked with spillovers much more strongly than incremental innovation.<sup>25</sup>

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20 *Venturous Australia*, 2008, p. 104.

21 Mr Paul McCullough, General Manager, Business Tax Division, *Proof Committee Hansard*, 20 May 2010, p. 46.

22 Productivity Commission, Cited by House of Representatives Standing Committee on Economics, *Inquiry into Raising the Productivity Growth Rate in the Australian Economy*, April 2010, p. 127.

23 J Haskell and G Wallis, 'Public support for innovation, intangible investment and productivity growth in the UK market sector', *Imperial College Business School discussion papers*, no. 2010/01, February 2010, p. 21.

24 Productivity Commission, *Public Support for Science and Innovation*, March 2007, p. 73.

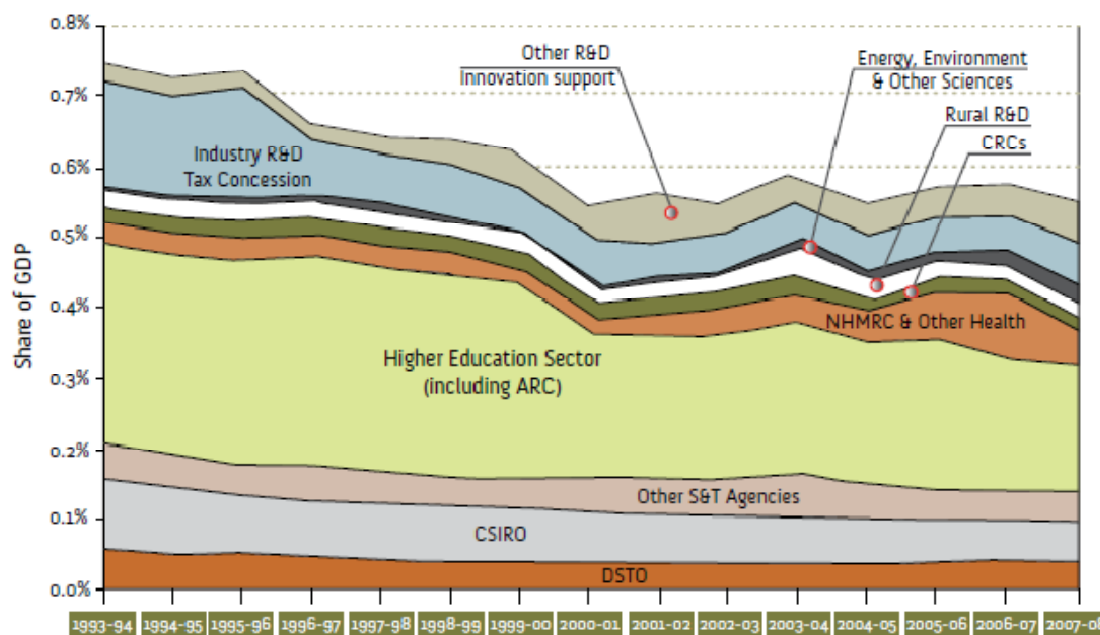
#### 4.30 There are some who question this:

No evidence has been presented throughout this entire policy debate that the public subsidy for new knowledge creation will yield greater economic benefit than the subsidy of the application of that new knowledge to the creation of new products, processes, services and devices. I believe that this premise is fundamentally flawed.<sup>26</sup>

### Grants versus tax concessions

4.31 R&D tax concessions are one form of government support for R&D. Alternatives include the direct funding of research work by universities and organisations such as CSIRO; and grants to companies, which could take the form of profit-contingent loans.<sup>27</sup> The tax concessions are placed within the context of total support for R&D (interpreted broadly) in Chart 4.1.

**Chart 4.1: Australian Government Expenditure on Science & Innovation  
% to GDP**



Source: *Venturous Australia*, 2008, p. viii.

25 CSIRO, cited in Productivity Commission, *Public Support for Science and Innovation*, March 2007, p. 384.

26 Mr Serge Duchini, Partner, Deloitte, *Proof Committee Hansard*, 21 May 2010, p. 33.

27 Another form of support without a budgetary cost is allowing companies monopoly rights (patents) for limited periods over innovation arising from their R&D.

4.32 An important difference between these various forms of assistance is the extent to which the projects supported are those chosen by the companies themselves or those selected by governments. As the House Economics Committee put it:

Unlike grants, tax concessions apply to all R&D, regardless of its quality. Views differ about whether this is a good or bad thing. Those most sceptical about the ability of governments or their advisers to 'pick winners', or judge which R&D is 'high quality', laud supporting that R&D which companies themselves see as most beneficial. They characterise the tax concession as 'market driven'. Alternatively, others view such tax concessions as 'blunt measures with no quality control' and argue that firms are most likely to choose R&D that is of specific benefit to themselves rather than to the broader economy. They also warn that some of any apparent increase in R&D following the introduction of tax concessions may reflect accountants (mis)classifying more expenditure as R&D, rather than a true increase in research activity. They advocate requiring firms to compete for more targeted funding of R&D likely to have wider benefits.<sup>28</sup>

*Committee view*

4.33 While the Committee sees merits in targeted loans with profit-contingent repayments as either a supplement or alternative to tax concessions, it is not directly related to the bill so is not considered further.

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28 House of Representatives Standing Committee on Economics, Finance and Public Administration, *Australian Manufacturing: Today and Tomorrow*, July 2007, pp 153-4.