Is the Government Justified in Reducing R&D Tax Incentives?

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A vast majority of studies assessing the impact of R&D tax incentives provided across the world conclude that such tax incentives spur investments. However, in India only a limited number of firms, especially small and medium ones, have actually been taking advantage of the state's fiscal generosity.

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Since 2019–20, the union government provides a weighted tax deduction of 200% for any capital and revenue expenditure incurred on in-house research and development (R&D) by a company. In that year India joined a growing number of countries in offering what is referred to as "super deductions"[1] for encouraging additional investments in R&D by firms. In fact Mani (2014) had shown that India had the distinction of having the most generous tax regime for R&D investments.

This was not to last long as the Union Budget for 2016–17 reduced the tax incentives for performing R&D in business enterprises from the current 200% to 150% in the period 2017–18 onwards including 2019–20. From 2020–21, the tax incentive will be further reduced to just 100% of R&D. Simultaneously, the finance minister has also announced a patent box type of incentive for the first time wherein income received in the form of royalties and technology licence fees received by Indian companies are taxed at a reduced rate of 10% from the fiscal year 2016–17 onwards. The introduction of patent box which encourages output of R&D while the reduction of R&D tax incentives reduces the incentives for input to innovation. While an advance announcement of an R&D tax policy is creditworthy as it makes the policy a stable one, is the government justified in becoming less generous towards R&D investments by firms in that process? The only negative reaction to this reduction, hitherto, has come from the pharmaceutical and life sciences industry, which together account for over a quarter of the total business enterprise R&D expenditure in the country.[2] The proposed streamlined reduction came as a rude shock because as part of its pre-budget lobbying the industry had been clamouring for an even more generous incentive: an increase in weighted tax deduction on R&D from 200% to 250% and expansion of the scope of the benefit to include R&D expenses incurred outside the facility like bioequivalence

studies, clinical studies, patent filings and product registrations. So for the industry it was a double blow. The cliché "evidence-based policymaking" has been doing the rounds in government circles recently, but is this policy of a graduated reduction based on any empirical analysis?

There is no denying the fact that evidence does matter to sound policymaking. In order to understand the reductions in R&D tax incentive proposed in the latest union budget, we first survey the main arguments for subsidising R&D through tax incentives as a very large number of both developed and developing countries have this type of a subsidy built into their corporate income tax code (Deloitte 2014; Rashkin 2007). This is followed by a discussion of R&D tax incentives in India as it evolved time, the amount of tax foregone, the number of firms taking advantage of this scheme, etc. Finally we discuss whether the very generous scheme in India has really encouraged firms to commit additional resources to R&D.

Justification for Subsidising

In order to proceed with our analysis, it is necessary to state the reasons as to why R&D, especially by the private sector enterprises, should be incentivised in the first place by providing subsidies. Across the world and in India, the current thinking is for paring down subsidies and replacing that with reduced rates of corporate taxes is a better strategy in terms of public policy rather than providing outright subsidies. However, R&D is one of those economic activities where an outright subsidy linked to corporate taxes is justifiable. In house or intramural R&D is one of the main routes through which firms innovate. In the literature on the economics of innovation, it is widely recognised that if industrial R&D is left entirely to the hands of private sector enterprises, then there is a likelihood of these enterprises underinvesting in R&D, which means the amount of R&D undertaken will be less than the socially desirable optimum.

The tendency to underinvest is caused by the problem of appropriability or the failure of private sector agents to fully appropriate the returns of their own research. Governments across the world have sought to overcome this problem by providing subsidies to private sector firms to encourage them to make continued investments in R&D. Most countries including the US do not subsidise intramural R&D to a certain extent. The subsidy can manifest itself in the form of a direct support through provision of research grants or indirectly through R&D tax subsidies. Of the two forms of support, indirect support is preferred as it interferes less with the market mechanism and hence termed as a market-friendly instrument. In many developed countries such as Australia, Canada, France, the Netherlands, Japan and Korea, R&D tax incentives account for over 55% of total government support for R&D.

There is a long-standing debate on whether direct subsidies generate more R&D than tax incentives, or vice versa and it is not a settled debate. Governments should in principle be able to target these projects with the highest marginal social rates of return via direct subsidies. With tax incentives this is more difficult, since the general nature of tax incentives allows firms to expand their R&D activity in areas with high private rates of return (in the short-run). On the other hand, firms might lobby successfully for subsidies that are in their interest, possibly diverting subsidies in ways not conducive to innovation—an argument made by Hall and Van Reenen (2000).

Evolution of R&D Tax Incentive in India

India has been evolving its tax regime with respect to R&D over time (Table 1). There are four important features of this scheme that have to be emphasised. The first one is that there are no restrictions on the use of the intellectual property right (IPR) arising from the tax treated R&D to be used within India. The second one is that both domestic and foreign companies, which satisfy the other conditions, are eligible to seek the subsidy. But the R&D must be conducted within India. The third one is that if the firm is in a loss situation, unused benefits may be carried forward for the next eight years, but it cannot be carried back to earlier years. The fourth one is that qualifying expenditures include wages, supplies, utilities and other expenses directly related to R&D and the deduction of R&D expenditures shall be net of the grants, gifts and donations.

The R&D tax subsidy manifests itself in terms of the amount of tax foregone, which the Ministry of Finance has been estimating on a regular basis.[3] Over the years, the amount of tax foregone as a

Table 1: Evolution of the Policy on R&D Tax Incentives in India

Union Budget	Major Change	Scope of the Change
1999–2000	R&D tax incentives of 125% extended up to 2004–05	Under the current law, a weighted deduction of 125% of the expenditure made on in-house R&D is available to corporate houses up to 31 March 2000. This is now extended up to 2004–05. Further, it was proposed to extend a similar concession of permitting a weighted deduction of 125% of expenditure for R&D projects entrusted to research laboratories and universities.
2000–01	This was raised to 150% in the Finance Act of 2000	Under this, the incentive was available only to the companies engaged in the production of drugs and pharmaceuticals, electronic equipment, computers, telecommunications equipment, chemicals, manufacture of aircraft and helicopters, automobiles and auto parts.
2009–10	R&D tax incentive extended to all industries in 2009–10	The scope of the current provision of weighted deduction of 150% on expenditure incurred on in-house R&D is extended to all manufacturing businesses except for a samll negative list.
2010–11	R&D tax incentive increased from 150% to 200% until 2016–17	Weighted deduction on in house R&D expenditure increased from 150% to 200%. Further the weighted deduction on payments made to national laboratories, research associations, colleges, universities and other institutions, for scientific research increased from 125% to 175%.
2016–17	R&D tax incentive progressively reduced from 200% in 2016–17 to 150% 2017–18 and then to 100% by 2020–21	The benefit of weighted deductions for R&D would be limited to 150% from 1 April 2017 and 100% from 1 April 2020.

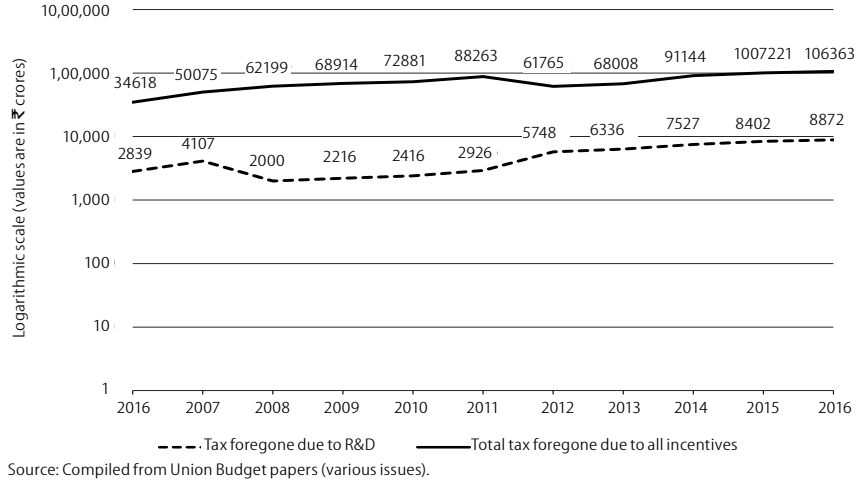
Source: Own compilation based on union budget documents.

result of this subsidy scheme has grown at an annual rate of 17% per annum and now accounts for about 8% of all corporate subsidies (Figure 1).

Over the years the tax regime has become one of the most generous ones in the world (Mani 2014). Generosity of a tax regime with respect to R&D is measured using a summary measure called the B-Index4. The lower the B-Index higher is the generosity of the tax regime. In fact, recent estimates of the summary measure-B-Index-confirms this view.

But has this generous R&D tax regime produced desirable outcomes? A tentative answer to this important policy question requires a comparison of the responsiveness of in-house R&D by private sector firms to a unit reduction in the cost of performing R&D. Pending a more sophisticated analysis of the elasticity of R&D expenditure, we settle down with an empirical analysis in which we compare the rate of growth of R&D with the growth rate of the R&D tax subsidy. The R&D tax subsidy manifests itself in terms of the amount of tax foregone, which the Ministry of Finance has been estimating on a regular basis.

Figure 1: Trends in Tax Foregone under Section 35 of Income Tax Act Due to R&D Tax Incentives Vs Tax Foregone Due to All Types of Tax Incentives



Source: Compiled from Union Budget papers (various issues).

Existing R&D Tax Subsidy Scheme

A vast majority of studies assessing the impact of R&D tax incentives provided across the world concludes that such tax incentives spur investments. The estimates of the size of this effect are widely diverging and not always comparable across methodologies. The wide range of results probably reflects differences in methodology as well as differences between countries and policies, but is difficult to disentangle those effects. Studies that are more rigorous econometrically and yield more precise estimates find that one euro of foregone tax revenue on R&D tax credits raises expenditure on R&D by less than one euro (Lokshin and Mohnen 2012; Mulkay and Mairesse 2013). Studies on effectiveness must answer two questions. The first question that most of the existing studies have attempted to answer is the impact of R&D tax incentives on R&D expenditure. While this is useful and informative, policymakers require an answer to a second question to whether R&D tax credits make firms more innovative and productive. The latter aspect has been less studied and those which have dealt with this has used exogenous variation to verify the causality of this relation.

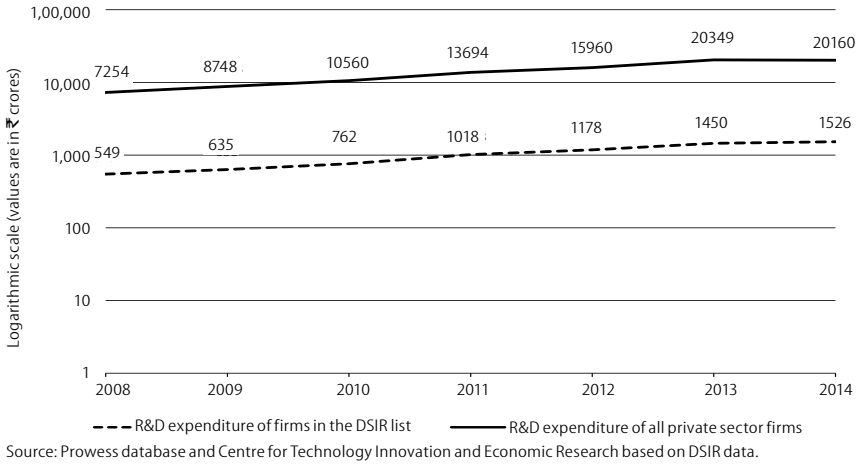
As far as India is concerned the only study that has attempted to measure the effectiveness of R&D tax incentives is by Mani (2010). This study, of course covered only the phase before 2010, when the tax incentive was less generous and also was targeted to specific industries. According to the study, while the instruments have been targeted well at the right sort of industries its effect in spurring additional investments in R&D is open to question.

In order to answer the two questions that we have raised, requires us to have a detailed data set of firms which have actually been the recipients of R&D tax incentives, and their R&D expenditure, productivity and innovation outputs before and after the receipt of the incentives. Unfortunately, such a detailed panel data does not exist, but the present authors along with Madhav Aney of Singapore Management University are engaged in the construction of such a detailed database. Pending its construction and subsequent analysis based on this data set, we could draw the following inferences:

Coverage of the Scheme: The number of business enterprises having recognised in-house R&D centres by the Department of Scientific and Industrial Research (DSIR), which is an important prerequisite for being eligible to receiving tax subsidies, stands at 1,762 by the end of 2014. Recognition by the DSIR is a necessary condition for the firms to receive the subsidy and this recognition is given for only a three-year period and will have to be further extended on a continuous basis once every three years. During the period 2008 through 2014, about 894 firms seems to have availed of this scheme. This means that about one out of every two firms recognised by the DSIR have actually availed of the scheme. We refer to these firms as the DSIR list firms.

R&D Expenditure of the DSIR List Firms: There is no official monitoring of this scheme by any agency of the government and apparently not even by the DSIR which is charged with responsibility of administering the scheme. The DSIR's latest published annual report for 2014–15 reported the total R&D expenditure of ₹25,000 crore for the 1,762 recognised enterprises thus working out on an average of just ₹14 crore per enterprise. Implicit in this computation is the conjecture that the scheme is more taken advantage of by small and medium enterprises. Further, we compared the R&D expenditure of the DSIR list firms with all private sector firms reporting R&D expenditure in the Prowess database (Figure 2, p 25). The R&D expenditure of firms in the DSIR list (that is, for the 894 firms) on an average, account for only 7.5% of all firms reporting R&D expenditures. But both have grown,

Figure 2: Trends in R&D Expenditure of Firms in the DSIR List vs All Firms



Source: Prowess database and Centre for Technology Innovation and Economic Research based on DSIR data.

almost entirely, at the same rate of about 18% per annum. In fact compared to tax foregone (presented in Figure 1), the R&D expenditure of the DSIR list firms have grown at a rate which is slightly higher (1 percentage point higher).

Based on this analysis, all that one can say is that only a limited number of firms, especially small and medium ones, have actually been taking advantage of this fiscal generosity of the state. It also seems the scheme has subsidised R&D which the firms would have undertaken even without incentives. If this line of reasoning is correct, graduated reductions in the R&D subsidy scheme will not reduce R&D investments by firms but at the same time will reduce the corporate income tax foregone by the state. As such the reductions in the subsidy as envisaged in the budget is to be welcomed. We, however, highlight the provisional nature of the conclusions reached. As noted before, introduction of the patent box is a welcome addition as it serves to incentivise R&D to generate commercialisable outputs.

Conclusions

The promotion of innovation primarily through R&D tax incentives must consider the following two issues. First, the government wants business enterprises to spend more on R&D as such investments by private sector enterprises is an important conduit for reaching government's target for its overall research intensity as stated in its successive innovation policy statements since 2003. But even if, through tax subsidies and other inducements, the amount of investment in R&D is stepped up, it will not necessarily lead to more innovation. What matters is how well companies manage the innovation process, how they organise and motivate their scientists, how they decide which ideas to pursue and which to discard. Second, innovation surveys done across the developing and developed countries including that of India had shown that in-house R&D by firms form not more than a third of the innovation expenditures incurred by a typical firm. There are a whole host of non-R&D routes like purchase of latest vintage of capital goods, training of technicians, etc, that leads to innovations in firms in addition to intra mural R&D. So defining innovation policy almost exclusively in terms of R&D policy may not actually be a prudent and holistic one.

The reductions in R&D subsidies must be combined with a rethinking on the content of innovation policy instruments that facilitate financing of innovations in general. Finally, any effective monitoring and evaluation of such a generous scheme out to be based on good quality empirical evidence rather than merely stating over and over again that policy formulation and its implementation must be evidenced-based. In the context the DSIR must be encouraged to publish a list of enterprises which have actually availed of the scheme every year, the amount of subsidy claimed (or the tax foregone) and the quantity of R&D expenditure carried out, and some indicators of the quantity of output of such innovative activity. Without such an evidence, policymaking in India will remain shrouded in the politics of lobbying and other weighty non-technical considerations.

NOTES

1 When the R&D tax incentive exceeds 100% of R&D expenditure, it is referred to as super deductions. There are, at present 16 countries which provide super deduction for R&D.

2 See Pilla (2016).

3 Income tax deduction under Section 35 of income tax act has specifically been provided for assesses who are engaged in R&D related to the businesses. Such involvement in scientific research may either be indirect or direct. The indirect involvement in scientific research involves making contribution by the business houses to the research programmes of the universities or institutions involved in research while direct involvement means incurring expenditure on the R&D themselves. The estimates of tax foregone by the Ministry of Finance encompass both indirect and direct deductions although we are in the present study more concerned with the direct deductions. However we assume, quantitatively speaking, the share of direct deductions in total tax foregone is more and also the trend in tax foregone reflects more the trend in trend in direct deductions.

4 The B-is computed by the following formula: B-Index = (1- After Tax Cost)/ (1-Corporate Income Tax Rate). 1- B-Index measures the tax subsidy rate. Higher the tax subsidy rate, higher is the generosity of the tax regime.

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