J Technol Transfer (2007) 32:617–628
DOI 10.1007/s10961-007-9046-y

# Expanding the R&E tax credit to drive innovation, competitiveness and prosperity

**Robert D. Atkinson**

Published online: 24 July 2007


**Abstract** The research and experimentation (R&E) tax credit has long been the subject of criticism. Some argue that if the goal is more research and innovation, it's better to increase direct federal funding of research. Others argue that the credit is not effective, that companies would do the research in any case. Some object the very notion of using tax policy to influence private sector behavior, preferring instead a more "neutral" tax code. Still others, including Tassey in this volume, point to what they see are a host of design flaws in the current credit, including that its incremental nature reduces its effectiveness. I will argue here that most of these arguments are mistaken. To promote innovation in a global economy both direct funding and indirect tax incentives are needed. The credit, while it can be improved, has been shown to be effective in stimulating research. Moreover, far from distorting the market, the credit corrects for a market failure where firms are unable to capture all of the benefits of corporate research, leading them to under invest in research. Finally, while reform and expansion are needed, it would be a mistake to shift to a completely flat credit. However, several important changes should be made including doubling the current value of the credit, modifying the Alternative Simplified Credit to become incremental, and expanding the flat credit for collaborative R&D.

**Keywords** R&E tax credit · Tax policy · Innovation policy · R&D policy · R&D investment · Innovation

**JEL Classifications** O31 · O38 · H25

R. D. Atkinson (✉)
Information Technology and Innovation Foundation, 1250 I Street, NW, Washington, DC 20005, USA
e-mail: ratkinson@itif.org

## 1 Introduction

The research and experimentation (R&E) tax credit has long been the subject of criticism. Some argue that if the goal is more research and innovation, it's better to increase direct federal funding of research. But to promote innovation in a global economy both direct funding and indirect tax incentives have advantages and disadvantages. The credit has several advantages. The choice of projects is left up to firms. Compliance costs are relatively low. And the credit is the principal tool government has for influencing the overall level of corporate R&D. Federally-supported research programs also have advantages and should be expanded. These programs can help shape the kind of R&D that is done, particularly in supporting more early stage, higher risk research (Tassey 2007).

Others argue that the credit is not effective, that companies would do the research in any case. But as discussed below, while the credit can be improved, a significant body of scholarly research suggests that the credit effectively stimulates increased corporate research.

Still others object to the very notion of using tax policy to influence private sector behavior, preferring instead a more "neutral" tax code. However, far from distorting the market, the credit corrects for a market failure where firms are unable to capture all of the benefits of research investments, leading them to under invest in research.

Finally, others, including Tassey in this volume, point to what they see are a host of design flaws in the credit, including that its incremental nature reduces its effectiveness. While reform and expansion are needed, it would be a mistake to shift to a completely flat credit for firm research. However, several important changes should be made including doubling the current value of the credit, modifying the Alternative Simplified Credit to become incremental, and expanding the flat credit for collaborative R&D.

### 1.1 How the R&E credits work

The R&E credit, codified in Section 41 of the Internal Revenue Service Code, is an important tool for boosting innovation and competitiveness and creating higher wage jobs. Companies can choose from three versions of the credit. Under the regular credit a taxpayer's current-year "qualified research expenses," in excess of a specified base amount, are eligible for a 20% tax credit, although in practice the *effective rate* is 13% because the expensing of research costs is reduced by the amount of the credit taken. Under the Alternative Incremental Research Credit (AIRC) firms can take a much smaller credit on total amounts of research above certain base levels. Additionally, under the Alternative Simplified Credit (ASC) companies can take a credit of 12% of the amount of qualified expenses that exceed 50% of the average qualified research expenses for the preceding 3 years.

## 2 The R&E credit effectively stimulates research

Since the credit was first introduced, it has had its critics. Perhaps the central criticism is that the credit simply rewards companies for what they would have done anyway. One difficulty in assessing the effectiveness of the credit stems from having to reconcile survey and anecdotal evidence that sometimes suggests the credit is less than fully effective with econometric evidence that largely finds that the credit is a cost-effective tool for spurring more R&D.

There is no lack of anecdotal evidence that says that the credit is not very effective. In this volume, Tassey cites a 1996 Industrial Research Institute R&D spending survey that found that 55% of responding companies indicated that the credit was "not at all" influential even in establishing the *level* of their companies' R&D investment. Some very early studies of the credit found its effect to be modest, reinforcing this finding. However, many of these studies suffered from serious methodological limitations (Hall and van Reenen 2000).

In contrast, almost all scholarly studies conducted since the early 1990s, including newer analyses conducted in the last 5 years, have found that the credit is an effective tool and that at minimum it produces at least one dollar of research for every tax dollar forgone. The former Congressional Office of Technology Assessment concluded that, "for every dollar lost in tax revenue, the R&D tax credit produces a dollar increase in reported R&D spending, on the margin." (Hall 1995). Bloom, Griffith and Van Reenen found that in the long run the credit stimulates $1.10 of research for every dollar of lost tax revenue. Other studies have found even greater benefits, with the research investment to tax-cost ratio between 1.3 and 2.9. (Coopers and Lybrand 1998) For example, Hall examined the credit from 1981 to 1991 (when it was more generous) and found that approximately two dollars in research were generated for every one dollar in tax expenditure. (Hall 1992) Klassen, Pittman and Reed found that the R&D tax credit induces $2.96 of additional R&D investment for every dollar of taxes foregone (Klassen et al. 2004).

Until recently most studies have focused on the US credit. However, a number of studies have examined the effect of other nations' tax incentives for R&D and found similar results. A study of the Australian R&D tax incentives found that it produced about one dollar of R&D for every dollar of tax expenditure.[1] A study of the French credit found an even larger impact, with the credit producing an increase in research of 3–4 times the budgetary cost. (Mulkay and Mairesse 2003) The Canadian tax credit—one of the most generous in the world—generates between 98 cents and $1.38 in additional R&D for every dollar of credit, according to three separate studies. (Dagenais and Therrien 1997) Another study found that not only did the credit stimulate R&D but also had a "positive impact" on sales and the number of product innovations. The authors examined Canadian innovations that were the first to emerge anywhere in the world—and found that the R&D credit was responsible for doubling the number of these innovations by Canadian companies, in turn making them more competitive (Czarnitzki et al. 2005).

Several recent studies have looked at the effect of tax incentives for research across a number of nations. In examining R&D tax incentives in 17 OECD nations, Guellec and van Pottelsberghe found that incentives effectively stimulated business R&D (Guellec et al. 2003). Likewise, Falk concluded that R&D tax incentives "have a strong and significant positive impact on R&D intensity." (Falk 2005) In particular, he found that every dollar of R&D tax expenditure stimulates at least 90 cents in additional business R&D.[2] Another cross-national study by Reinthaler and Wolff determined that R&D tax subsidies stimulate at least one dollar of R&D for every dollar of tax expenditure. (Volker and Wolff 2004) Likewise, in a study of nine OECD nations, Bloom, Griffith and Van Reenen found that

[1] Australian Bureau of Industry Economics, cited in Hall and van Reenen, p. 466.

[2] One reason that figure is lower than the estimates usually found in studies focusing on the US R&D credit is that it looks at nations with both incremental and flat credits, and flat credits tend to have a less stimulative effect on R&D than incremental ones for each tax dollar invested.

every dollar of R&D tax expenditure stimulates approximately one dollar of business R&D. It is interesting to note that they also found that among the three countries to make significant changes in their credits (Australia, Canada and Spain), increases in the credit led to increases in private R&D while decreases had the opposite effect.

This is not to say that the current R&E credit cannot and should not be redesigned to be more effective. However, to claim that the credit has little positive impact on research expenditures does not appear to be supported by the research.

### 2.1 Relocation effects of research tax incentives

Until recently most scholarly analysis of tax incentives for research measured their impact on the overall amount companies invested in research. Recently, however, scholars have begun to examine the effectiveness of the credit not just in stimulating more R&D but also in attracting and retaining potentially mobile research investments within the taxing jurisdiction. Until recently corporate R&D was generally not very mobile, certainly not in comparison to manufacturing. But in a "flat world" companies can increasingly locate R&D activities anywhere skilled researchers are located.

As a result, in order to effectively judge the impact of the credit it's important to not just measure its effect on the amount of R&D performed, but the location of it. From a global perspective where R&D is performed may not be important, but from a national perspective it certainly is. To the extent that the United States economy can retain and grow R&D spending it will perform better economically. While few studies have examined this second distributional effect of the credit, some have. A recent study of the California R&D tax credit found that it stimulated considerably more R&D than was usually thought, in part because it appears to have not only induced firms in California to perform more R&D, but also to have induced firms outside California to relocate R&D there (Paff 2005). Likewise the Federal Reserve Bank found that state R&D tax credits stimulate a relocation of R&D from states with less generous credits to states with more generous ones (Wilson 2006). At the international level, Bloom and Griffith found that R&D in one country responds to a change in its price in another "competitor" country (Bloom and Griffith 2001). Likewise, Billings found that the growth rate of R&D of US foreign affiliates was higher in countries with tax-based R&D incentives than without (Billings 2003).

### 2.2 The competitiveness context of the credit

The debate over the R&E tax credit needs to be broadened from the question of does it cost-effectively stimulate more research to does it cost-effectively stimulate more research in the United States. In other words, the R&E credit has potential to become a central policy tool for ensuring that the United States is an internationally attractive location for research activities.

After President Reagan signed legislation creating the R&D tax credit in 1981 the United States had the distinction of providing the most generous tax treatment of R&D of all OECD nations. Few nations focused their national development policies on technological innovation. The competitive threat from low-wage nations with significant pools of technical talent was largely non-existent. In this environment, the major function of the R&E credit was to boost corporate R&D to spur domestic innovation and growth.

Almost three decades later, the competitiveness environment is much different and one of the roles of the R&E credit is to make nations more competitive for research investments. Many nations, including many in Southeast Asia and Europe, have made innovation-led development a centerpiece of their national economic strategies. Europe's Lisbon Agenda has set an ambitious (albeit somewhat unrealistic) goal of becoming "the most competitive and dynamic knowledge-based economy in the world by 2010." Many European nations, including Sweden, Finland, the United Kingdom, Switzerland, Netherlands, and Belgium are now acting not only to boost R&D funding but to introduce policy changes and government initiatives to more effectively transfer technology from universities and government labs to the private sector for commercialization. South Korea set a goal in 1997 to raise R&D as share of the government budget from 3.6 to 5% and almost got there, increasing it to 4.7%. Many other nations have set similar goals. As a result, while investments in R&D as a share of GDP actually fell for the United States from 1992 to 2002, they increased in most other nations, including Japan (15%), Ireland (24%), Canada (33%), Korea (51%), Sweden (57%), China (66%), and Israel (101%).

Moreover, US companies are shifting R&D overseas. Between 1998 and 2003 investment in R&D by US majority-owned affiliates increased twice as fast overseas as it did at home (52 vs. 26%).[3] In contrast, corporate R&D spending in the United States as a share of GDP fell every year between 2000 and 2003, from 1.84 to 1.67%.[4] As a share of GDP, corporate-funded R&D fell in the United States by 7% from 1999 to 2003, while in Europe it grew 3% and in Japan 9% (Organisation for Economic Co-operation and Development 2005). Developing nations, particularly China and India are a source of much of the new investment. In the last decade the share of US company R&D sites in the United States declined from 59 to 52%, while the share in China and India increased from 8 to 18% (Booz Allen Hamilton & INSEAD 2006). Of 1,773 new R&D projects set up between 2002 and 2004, 953 were from companies in developed countries establishing projects in developing nations, with 70% of those in China and India (United Nations Conference on Trade and Development 2006).

While there are several motivations for US firms to shift R&D offshore, for many firms cost reduction is the most important driver (Bardhan and Jaffee 2005). In fact, one study found that when it comes to moving R&D to developing nations, access to a "low cost skills base" is a key driver for establishing new R&D sites.[5] A recent survey of corporate R&D managers found that the two most important factors in determining why companies offshore R&D relate to cost (lower cost scientific and engineering talent and lower cost facilities and materials) (Battelle R&D Magazine 2006). Financial incentives (including R&D tax credits) were also important.[6]

In an environment where R&D investments are increasingly mobile, R&D tax incentives have become a more important policy tool. Of 27 OECD nations examined, 70% had R&D tax incentives in place in 2005, up from 50% in 1996 (Warda 2006). Moreover, other nations have boosted their R&D tax credits. In the late 1980s the United States provided

[3] Majority-owned foreign affiliates (MOFA), which are foreign business enterprises that are owned at least 50% by US parent(s).

[4] However, this is not unprecedented. Corporate R&D fell in the recession of the early 1990s and took 5 years to regain its peak. National Science Foundation, *Science and Engineering and Indicators*, 2006.

[5] Booz Allen Hamilton and INSEAD, op. cit.

[6] Respondents ranked "local incentives" as 2.62 (with 5 as very important and 1 as unimportant). This was more important than "required to do business locally," "continuing support of infrastructure" and "support host country's industry."

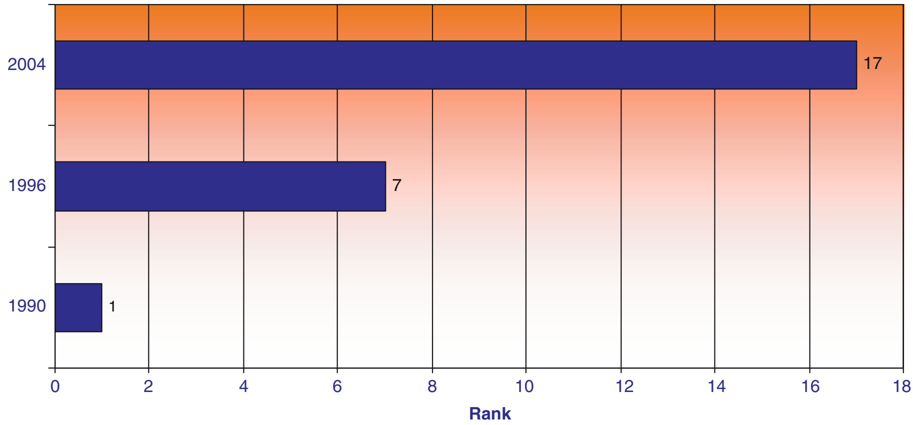


**Fig. 1** US Rank in tax generosity of R&D among OECD Nations, 2004[9]

the most generous tax treatment of R&D in the world (Hall 2000). By 1996, we had fallen to seventh most generous among OECD nations, behind Spain, Australia, Canada, Denmark, the Netherlands, and France (Guellec et al. 1997). By 2004, we had fallen to 17th in generosity for general R&D; 16th for machinery and equipment used for research; and 22nd for buildings used for research (see Fig. 1).[7] In 2006 Congress added a new Alternative Simplified Credit (ASC). While clearly a step in the right direction, it is important to note that the addition of the ASC increased our rank only to 15th in tax generosity for R&D (assuming that other nations did not increase their R&D incentives last year).[8]

Among nations with a tax incentive for research, the United States now provides one of the weakest incentives, below our neighbors Canada and Mexico, and behind many Asian and European nations (see Fig. 2). It's ironic that at a time of increased concern about America's growing competitiveness challenge, our credit, until just last year, had been getting weaker, both in absolute terms and relative to other nations in part because of changes made by Congress over the years that have diminished its generosity.[10] In fact, by 2006 credit was about half as generous as it was in the early 1980s (Whang 1998). Moreover, in the last decade, all other nations with R&D tax incentives (with the exception of Canada) have boosted the generosity of their R&D tax incentives, particularly since 2000 (Falk 2005). As a result, companies can receive significantly more generous tax incentives if they invest in R&D in these other nations.

[7] It would be one thing if our tax treatment of R&D became less generous, but direct government support increased. In fact, government support declined significantly over this period and as a result, the United States was one of the few nations where the share of R&D to GDP ratio fell between 1991 and 2002.

[8] Measuring the exact impact of the ASC is difficult. Using a rough estimate that the cost of the regular credit is \$7 billion and that the ASC costs \$2.5 billion (\$3 billion a year minus \$500 million from a less used Alternative Incremental Research Credit), this suggests that the ASC expanded US research tax generosity by approximately 36%. Using Warda's calculations of R&D generosity, the US tax subsidy (1 – B-index) would increase from .07 to 0.95. With this, the United States would only move up past Austria in R&D tax generosity (Warda, op. cit.). The reason why the United States does not move up more is because the tax generosity of higher ranked nations is significantly greater than the United States.

[9] OECD data including Jacek Warda (op. cit.).

[10] In 1985 the rate was reduced from 25 to 20%, and other restrictions (such as the 50% rule and the recapture of benefits through reductions in expensing) were put in place in the late 1980s.

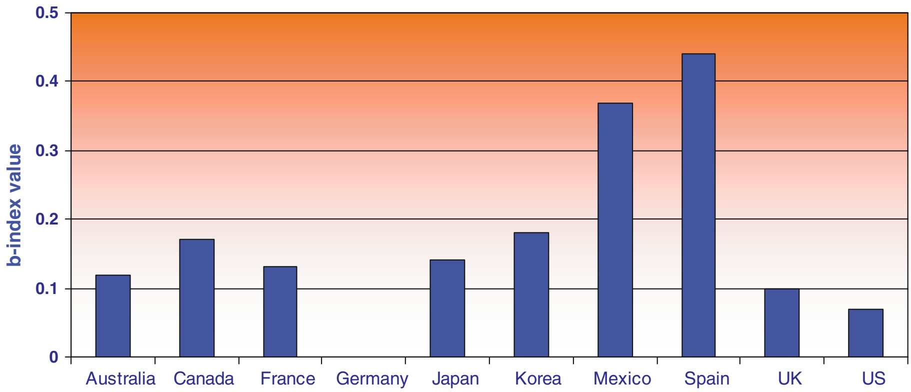


**Fig. 2** Tax Subsidy Generosity for R&D by Large Firms in Selected OECD Nations, 2004.[11]

For example, the UK and Australia provide the equivalent to a 7.5% flat credit on R&D, meaning that their effective credit is almost twice that of the United States. Japan's credit is almost three times as generous as the United States' and for small companies it's four times as generous. On top of salaries for R&D personnel that are as low as 1/6th of the costs in the United States, China provides a 150% deduction on R&D expenses (provided that R&D spending increased 10% over the prior year). In an explicit effort to attract US corporate R&D, our neighbor to the north is even more generous. In Canada large companies are eligible for a flat 20% credit while small firms can receive a 35% credit. In many provinces equally generous credits can be taken on top of the federal credit. Even France, who many pundits deride as a socialist basket case, has acted with resolve, adopting in 2004 a credit essentially equivalent to a 40% incremental R&D tax credit.

## 3 Issues in the optimal design of R&D tax incentives

If the United States is to remain globally competitive in R&D-based activities, increasing the generosity of the R&E credit will be important. How to do that is not as clear. Perhaps the most important issue in the design of an R&D tax credit is whether it should be a volume credit, an incremental credit, or some mix of the two. An incremental credit defines some base level of R&D with incremental R&D defined as R&D above this base level. Most economists favor an incremental credit because it rewards only increases in research investments. As a result, for the same amount of tax expenditures the incentive value of the incremental credit can be higher than a flat credit.

However, an incremental credit has three main disadvantages. First, as discussed below, determining the appropriate base level can be difficult. That is even more difficult now that it is so easy for firms to locate R&D in a wide number of nations. In this case, all of a firm's R&D may be incremental in the sense that a firm may choose to perform the research in the United States or outside of it. Second, the compliance costs for industry and government from incremental credits can be higher. Finally, because of the complexity and lack of transparency, incremental credits can send an uncertain signal to business mangers who decide on R&D levels, reducing its effectiveness.

[11] Warda, op. cit.

If an incremental credit is used, it can be on either absolute increases in R&D investments or on increases in the ratio of R&D to some other measure, usually sales. The regular credit is based on a ratio of R&D to sales. One advantage to this approach is that it is intended to provide a credit only for increases in R&D intensity and not on increased R&D resulting from a firm simply getting bigger. While elegant in theory, the use of a sales denominator can make the credit quite complex and in some cases, is an inaccurate measure of R&D intensity. Since many factors influence the R&D to sales ratio that may have little to do with R&D investments this approach can inaccurately target incremental increases. Firms that have grown rapidly in sales, have merged with firms that are less R&D-intensive, or for a particular reason had either low sales during the base period or very high spikes in R&D spending may find that a sales denominated qualified research base period provides an inaccurate metric to gauge incremental research increases.

Finally, if a base period is used, it's not clear if it should be fixed or rolling. A fixed base period assigns one or more years as the base and any R&D investments going forward above R&D levels in the base period are eligible for a credit. In contrast, a rolling base period is updated every year. One advantage of a fixed base period is that increases in research by a company in one year do not lead to a reduced credit the next year. For example, with a purely incremental credit, if a company's average R&D in the fixed base period was $10 million per year and the company invests $13 million the next year, it will receive a credit on $3 million ($13–$10). With a rolling base period, however, increases in R&D raise the base level of R&D the next year making it harder to take a credit in the future. For example, if a company invested $13 million in R&D its base amount would increase to $11 million (($10 + $10 + $13)/3) the next year, reducing the amount of credit it would receive by one third. With a rolling base period and an incremental credit the incentive is realized at a declining rate due to base creep. And since companies cannot infinitely expand their R&D (especially as a share of sales), eventually incremental credits with a rolling base period provide limited benefits to firms. Finally, shorter rolling base periods generally provide companies with a smaller credit than longer periods, are more volatile than longer base periods since sharp increases (or decreases) can more significantly affect the average R&D, and have higher rates of base creep. Ultimately, there is a tradeoff between a rapid resetting of the base (or a shorter rolling base period) to keep the base close to current R&D expenditures and a slow re-setting of the base (or a longer rolling base period) to reduce the disincentives to raising R&D expenditures.

There are several other factors in the design of R&D tax incentives. One is whether incentives should differentiate between types of research, with more generous incentives for basic and earlier stage research. The advantage of this is that economists generally agree that earlier stage research is not only riskier, but benefits of it are harder to be fully captured by the company, as they spill over into other uses. One disadvantage is that it can be very difficult to distinguish for tax purposes what intramural research is basic and what is applied. However, it is easy to distinguish between intramural and extramural research, and much extramural research, particularly at universities, is earlier stage and more risky.

These factors suggest that the optimal credit is a combination of volume and incremental; on amounts of R&D investments (rather than as a share of sales); over a moderately long rolling base period; with some incentives for research equipment as well as labor; and with more generous incentives for earlier stage collaborative research. Finally, given the significant international competition for research spending, an optimal credit would be a more generous one that makes the United States more competitive for corporate research.

Therefore, a first step in reforming the credit should be to double the regular credit's rate to 40%. In a global economy where scientific and engineering talent is available in many nations, companies' decisions as to where to conduct R&D will be influenced by cost factors, including R&D tax incentives. Because the R&D tax credit lowers the cost of doing research, expanding it would play an important role. Doubling the credit would make an important statement that the United States is serious about keeping and growing research-based economic activities.

A second step should be to expand the Alternative Simplified Credit. Under the regular credit firms can only get an incentive if their research expenses (as a share of sales) increase each year (or are higher than they were in the base period). However, many firms do not qualify for the credit because their current R&D-to-sales ratio is lower than their base period ratio. To provide these firms with an R&D incentive, Congress created the Alternative Incremental Research Credit (AIRC) in 1996 and expanded it in 2006 to between 3 and 5%, depending on the share of R&D to sales. While the AIRC helps firms that do not qualify for the regular credit, its minimal rate provides a small incentive at best for firms to increase research investments in the United States.[12]

Because of these limitations, in 2006 Congress created a new Alternative Simplified Credit (ASC) that let companies receive a credit of 12% of the amount of qualified expenses that exceed 50% of the average qualified research expenses for the preceding 3 years. One advantage of limiting the credit to expenditures greater than 50% (instead of to all expenditures) is that it allows the credit to be larger with the same fiscal impact. However, firms must choose either the ASC or regular credit. Firms taking the ASC have less incentive to expand research (12 vs. 20%) than firms taking the regular credit, but the regular credit is relatively modest compared to many other nations' R&D tax incentives.

One solution is to combine the best features of both credits. Some nations do this, providing incentives for maintenance of effort (as the ASC does) but more generous incentives for increases in research investments (as the regular credit does). Australia allows 125% of expenditures to be deducted with a 175% deduction for expenditures that exceed the average R&D expenditures over the prior 3 years. Portugal and Spain offer credits of 20 and 30% of R&D respectively, with increases in R&D qualifying for a 50% credit. Hungary and Austria also provide mixed incentives.

The advantage of mixed incentives is that they reward firms for maintaining R&D effort, but also provide a larger incentive to spur firms to expand their R&D investments. This means that the credit can be larger with the same fiscal impact as a completely flat credit. As a result, the ASC should be changed in two ways. First, it should be expanded by enacting a three-tier credit. Firms would continue to receive a credit of 12% of the amount of qualified expenses greater than 50% and below or equal to 75% of the average qualified research expenses. For qualified expenses greater than 75% and below or equal to 100% firms would receive a credit of 20% and for qualified research exceeding 100% of the base the credit would increase to 40%. Second, the ASC base period should be lengthened from 3 to 5 years. Compared to the 3-year base period, a 5 year rolling average reduces the negative feedback incentive from firms increasing R&D only to see their new base period be significantly higher.

Third, Congress should expand the flat credit for collaborative R&D. Increasingly, firms are collaborating with other firms or institutions in order to lower the costs of research and increase its effectiveness by maximizing idea flow and creativity. Indeed, a growing share

[12] The most recent legislative revision to the R&D credit, signed by President Bush at the end of 2006, raised the alternative incremental rates from 2.65, 3.2, and 3.75% to 3, 4, and 5%, respectively.

of research is now conducted not only on the basis of strategic alliances and partnerships but also through ongoing networks of learning and innovation (Fountain and Atkinson 1998). Moreover, participation in research consortia has a positive impact on firms' own R&D expenditures and research productivity (Branstetter and Sakakibara 1998).

Yet, most collaborative research, whether in partnership with a university, national laboratory, or industry consortium, is more basic and exploratory than research typically conducted by a single company. Moreover, the research results are often shared, often through scientific publications. As a result, firms are less able to capture the benefits of collaborative research, leading them to underinvest in such research relative to socially optimal levels (Link 1981). This risk of underinvestment is particularly true as the economy has become more competitive, and a reflection of this is the fact that for the first time since the data were collected in 1953 the percentage of US academic R&D supported by industry has declined in each of the last 5 years (Rapoport 2006). This may stem from the fact that university contracts are often undertaken as discretionary activities and are the first to be cut when revenues are down (Bozeman and Link 1984).

Other countries, including Norway, Spain and the UK, provide firms more generous tax incentives for collaborative R&D. Denmark and Hungary provide more generous tax deductions for collaborative R&D with public research institutions.[13] Japan's R&D incentive is almost twice as generous for research expenditures companies make with universities and other research institutes.[14]

The US tax code allows firms a basic research credit of 20% of expenses above a base period amount.[15] But the credit is not significantly more generous than the regular credit. Moreover, its applicability is limited because rules require that such research not have any "specific commercial objective." At minimum, Congress should delete such language from current law and allow any research expenditures at universities to qualify for the basic research credit.

But Congress should go further and provide a more generous incentive for collaborative research. As part of the Energy Policy Act of 2005, Congress created an energy research credit that allowed companies to claim a credit equal to 20% of the payments to qualified research consortia (of five or more firms); universities, and federal laboratories for energy research. In 2006, several bills were proposed allowing payments to all research consortia, not just energy-related ones, to be eligible for a 20% flat credit.[16] Congress should go further and allow firms to take a flat credit of 40% for collaborative research conducted at universities, federal laboratories, and research consortia.

[13] Denmark looks to promote public and private co-operation in R&D by having a 150% deduction of investments co-financed by a public university or research institute and the industry.

[14] Warda, op. cit., Appendix 1.1.

[15] Currently the expenditures firms make to outside organizations are treated two ways. Qualified expenses cover just 65% of payments for contract research, unless the payments are to a qualified non-profit research consortium at which point the company can count 75% of the payments as qualified expenses. However, firms contracting with certain nonprofit organizations (e.g., universities) to perform basic research may claim a credit of 20%.

[16] The 109th Senate considered versions of HR.4297 (Thomas, (R-CA)), S.14 (Stabenow (D-MI)), S.2199 (Domenici (R-NM)), and S.2357 (Kennedy (D-MA)). S.2357 would institute a flat credit for payments to qualified research consortia.

## 4 Conclusion

Addressing the new competitiveness challenge will require policy makers to take a host of steps, including improving education and significantly increasing funding for research (Atkinson 2007). Yet while these steps are necessary, they are not sufficient to win the competitiveness challenge. Policy needs to do more than boost the supply of innovation resources (e.g., a better trained workforce and increased basic research discoveries); it must also spur demand by companies to locate more of their innovation-based production in the United States. If the United States is to remain the world's preeminent location for technological innovation (and the high paying jobs that result), Congress will need to significantly expand and reform the Research and Experimentation Tax Credit.[17]

## References


Atkinson, R. D. (2007). Deep competitiveness. *Issues in Science and Technology, Winter*, 69–75.

Bardhan, A. D., & Jaffee, D. M. (2005). *Innovation, R&D and Offshoring*. University of California Berkeley: Fisher Center for Real Estate & Urban Economics.

Battelle, & R&D Magazine (2006). *2007 Global R&D Report*. Retrieved from Web site: www.rdmag.com/pdf/RD_GR2006.pdf.

Billings, A. B. (2003). Are US tax incentives for corporate R&D likely to motivate American firms to perform research abroad? *Tax Executive, 55*(4), 291–315.

Bloom, N., & Griffith, R. (2001). The internationalization of R&D. *Fiscal Studies, 22*(3), 337–355.

Booz Allen Hamilton, & INSEAD. (2006). Innovation: Is global the way forward?

Bozeman, B., & Link, A. N. (1984). Tax incentives for R&D: A critical evaluation. *Research Policy, 13.1*, 21–31.

Bransetter, L., & Sakakibara, M. (1998). Japanese research consortia: A microeconometric analysis of industrial policy. *Journal of Industrial Economics, 46,* 207–233.

Coopers and Lybrand. (1998). Economic Benefits of the R&D Tax Credit.

Czarnitzki, D., Hanel, P., & Rosa, J. M. (2005). Evaluating the impact of R&D Tax Credits on Innovation: A microeconomic study of Canadian Firms. *CIRST,* 21.

Dagenais, P. M., & Therrien, P. (1997). Do Canadian firms respond to fiscal incentives to research and development? *CIRANO Working Papers,* 97s-34.

Falk, M. (2005, June). *What Drives Business R&D Intensity Across OECD Countries?* DRUID 10th Anniversary Summer Conference, Copenhagen, Denmark.

Fountain, J. E., & Atkinson, R. D. (1998). *Innovation, social capital, and the new economy: New federal policies to support collaborative research*. Washington, D.C.: Progressive Policy Institute.

Guellec, D., & van Pottelsberge de la Potterie, B. (1997). Does government support stimulate private R&D? *OECD Economic Studies, 29*, 95–122.

Guellec, D., & van Pottelsberge de la Potterie, B. (2003). The impact of public R&D expenditures on business R&D. *Economics of Innovation and New Technology, 12–3,* 225–243.

Hall, B. (1992). R&D tax policy during the eighties: Success or Failure? *NBER Working Paper, 4240*.

Hall, B. (1995). The effectiveness of research and experimental tax credits: Critical literature review and research design. *U.S. Congress, Office of Technology Assessment.*

Hall B., & van Reenen, J. (2000). How effective are fiscal incentives for R&D? A review of the evidence. *Research Policy, 29,* 449–469.

Klassen, K., Pittman, J., & Reed, M. (2004). A cross-national comparison of R&D expenditure decisions: Tax incentives and financial constraints. *Contemporary Account Research, 21*(3), 639–680.

Link, A. N. (1981). Basic research and productive increase in manufacturing: Additional evidence. *The American Economic Review, 71*(5), 1111–1112.

Mulkay, B., & Mairesse, J. (2003). *The Effect of the R&D Tax Credit in France*. EEA-ESEM Conference, Stockholm Sweden.

Organisation for Economic Co-operation and Development. (2005). OECD STI Scoreboard 2005.

Paff, L. (2005). State-level R&D tax credits: A firm-level analysis. *Topics in Economic Analysis and Policy, 5*(1), 1272.


[17] Referred to in this report as the R&D tax credit.

Rapoport, A. I. (2006). Where has the money gone? Declining industrial support of Academic R&D. *National Science Foundation, Division of Science Resources and Statistics*. Retrieved from Web site: www.nsf.gov/statistics/inbrief/nsf06328.

Tassey, G. (2007). *The technology imperative*. London: Edward Elgar.

United Nations Conference on Trade and Development. (2006). World Investment Report 2005: Transnational Corporations and the Internationalization of R&D.

Volker, R., & Wolff, G. B. (2004). The effectiveness of subsidies revisited: Accounting for wage and employment effects in business R&D. *ZEI Working Paper Series*.

Warda, J. (2006). Tax treatment of investment in intellectual assets: An international comparison. *OECD Science, Technology and Industry Working Papers, 4*.

Whang, K. C. (1998). A guide to the research tax credit: Why we have it, how it works, and how it can be improved. *U.S. Congress, Working Papers Series, Offered to the Joint Economic Committee Minority*.

Wilson, D. J. (2006). Beggar thy neighbor? The In-State, Out-of-State, and Aggregate Effects of R&D Tax Credits. *FRBSF Working Papers Series, April*.