Creating a Collaborative R&D Tax Credit

BY MATTHEW STEPP AND ROBERT D. ATKINSON | JUNE 2011

The R&D tax credit falls short of effectively incentivizing collaborations between businesses and universities, national labs, and research consortia.

Restoring America's leadership in innovation-based competitiveness is one of our greatest challenges. But to do so is going to require significant changes to the U.S. innovation system. One way is to reform how the federal government incentivizes the private sector to invest more in the building blocks of innovation, specifically collaborative research and development (R&D). Many sectors of the economy increasingly rely on collaborative research (e.g. research funded by businesses but performed at a university, federal lab, or industry consortium). Yet, the R&D tax credit – the principle way government incentivizes the private sector to invest in more R&D – falls short of effectively incentivizing research collaborations.[1] This is in contrast to a growing number of competing nations which provide a more generous tax incentive for collaborative R&D. To make the R&D tax credit more competitive, Congress has a range of options including:

1. *Expand the definition of basic research.* Congress should eliminate language in the tax code that restricts the definition of basic research to projects "not having a specific commercial objective."

2. *Double the rate for energy research consortia.* In order to spur the expansion of more energy research consortia, Congress should boost the flat energy research consortia tax credit from 20 percent to 40 percent.

3. *Create a Collaborative R&D Tax Credit.* If Congress is serious about making the United States the premier destination for innovation, it should make all collaborations between a business and a university, federal lab, or any research consortia eligible for a 40 percent flat tax credit.

THE ROLE OF COLLABORATIVE R&D

Businesses seldom capture all of the benefits of R&D, particularly early-stage and risky research. The results of R&D investments are used by other businesses to improve their own products and processes even when original firms patent inventions. This "spillover" effect has been demonstrated by a wide array of studies that find the societal rate of return on private sector R&D investment to typically be much higher than the firm's own rate of return.[2] In addition, firms are often unwilling to commit limited resources to high-risk research projects because shareholder and competitive pressures require short-term payoffs.[3] In combination, firms' inability to capture the full benefits of R&D and their unwillingness to fully invest in high-risk research results in firms investing less in R&D. U.S. corporations reduced their investment in R&D by four percent as a share of GDP from 1999 through 2008.[4] And from 1991 until the 2008-2009 recession corporations reduced their investment in basic and applied R&D by 3.6 percent and 3.7 percent respectively as a share of corporate R&D.[5]

Because businesses are cutting back on basic and applied research, they are increasingly turning to universities, federal labs, small businesses, and other external sources. For example, Motohashi found that 70 percent of Japanese firms engaging in R&D engage in R&D collaborations, mainly between small and large sized firms.[6] Audretsch and Feldman found that between 1988 and 1996 the biotechnology sector formed 20,000 collaborative alliances globally among small startups, large firms, and universities, with an annual growth rate in the number of collaborations reaching 25 percent.[7] And University of California-Berkeley Professor Fred Block found that the number of top ranked innovative commercial products borne from in-house private sector R&D declined from 47 percent in 1975 to 13 percent in 2006.[8] In 2006, the remaining 87 percent of innovative U.S. technologies were developed through collaborations between businesses and federal labs, universities, and other businesses.[9]

As Director of the University of California-Berkeley's Center for Open Innovation Henry Chesborough explains, many global industries are gradually moving from an in-house R&D model to an "open innovation" model where firms engage in a "distributed inter-organization network" of research with other entities.[10] While the private sector continues to underinvest in research, many firms view collaborative R&D as a means to remain competitive in the global economy. The problem though is that this is a bit like the story of the little red hen. Everyone wants the benefits from collaborative R&D, but few want to keep expanding their own R&D, much less collaborative R&D funding. It's easier to reap the rewards from others' investments.

BENEFITS OF COLLABORATIVE R&D

Collaborative R&D allows firms to rapidly import new, innovative ideas without having to "reinvent the wheel."[11] The economics and management literature suggests collaborative R&D is beneficial for a number of reasons:

First, collaborative R&D reduces research costs by allowing firms to share results. Sakakibara found that this is most apparent in partnerships developing complex

technologies that require vastly different skill sets and knowledge sources. Collaborative partnerships bring together different industries and institutions that can quickly fill knowledge gaps.[12] Such collaborations are becoming increasingly important in emerging, complex industries like clean energy and nanotechnology and continue to remain important in the information technology and biotechnology industries. Studies have found that firms entering into collaborations are more likely to increase profits and overall economic success from their R&D investments.[13]

Collaborative R&D also enhances technology innovation and development. Reagans and Zuckerman found that as R&D collaborations strengthen over time, social capital among the collaborators increases, enhancing and increasing knowledge transfer among firms and institutions.[14] As a result, spillover becomes a two way street. The spillover of R&D benefits become internalized in the collaboration and all firms benefit, reducing risk and increasing the likelihood that firms invest in higher-impact R&D.

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Finally, collaborative R&D enhances innovation by potentially strengthening the back-end, or deployment phase, of technology development. Garud and Karnoe found that collaborative R&D facilitates the take-up of new technologies and prevents lock-in of obsolete or mature equipment, methods, and knowledge.[15] Therefore, collaborative R&D can have a significant impact in industries emerging in entrenched economic sectors, such as clean energy.

THE ROLE OF GOVERNMENT IN SPURRING COLLABORATIVE R&D

Policymakers have developed a number of tools to boost cooperative R&D. The National Science Foundation's (NSF) Industry/University Cooperative Research Program (I/UCRP) attempts to forge collaborations between industry and universities to solve industrial engineering problems. The Stevenson-Wydler Act empowered federal labs to collaborate with industry through the creation of Cooperative Research and Development Agreements (CRADAs), which give partnering firms the right to the projects intellectual property. And the federal government has occasionally supported research partnerships and industry consortia to facilitate technology transfer, most notably the semiconductor industry research consortia SEMATECH, but also smaller research consortium established through the Technology Innovation Program (formerly the Advanced Technology Program) and the Small Business Technology Transfer Program.

These policies have helped spur collaborative R&D. In 2007, U.S. businesses contracted $19 billion (7.8 percent of private sector R&D) of R&D investment with other U.S. firms and institutions compared to $3.5 billion (3.7 percent of private sector R&D) in 1993.[16] Federal agencies forged 7,327 formal collaborative R&D relationships in 2007, double the number in 2001.[17] And U.S. technology alliances – interfirm cooperative arrangements among a number of firms sharing the same research goals - increased from 116 in 1980 to 605 in 2006.[18]

But a closer look at the data shows that private sector investment in collaborative R&D has essentially stagnated in the last decade. According to the National Science Foundation, as a percentage of GDP, industry funded university R&D was slightly less in 2008 (0.019 percent) as it was in 1998 (0.02 percent).[19] Industry funded collaborations with non-profit institutions grew slightly as a percentage of GDP from 0.0081 percent in 1998 to 0.0092 percent in 2008. But R&D collaborations between government and industry declined from 0.25 percent of GDP in 1998 to 0.18 percent of GDP in 2008.[20] This overall stagnation is likely attributed to the upfront risk of collaborating. Most collaborative R&D is early stage and exploratory and the research results are typically shared, such as through scientific publications. So even though collaborative R&D has significant economic upside, firms remain apprehensive to create partnerships because of the continued belief that they will not be able to capture the full benefits of their investment.[21] This reaction intensifies as the global economy becomes more competitive and firms look to cut costs, often targeting R&D-related projects first when revenue decreases.[22] So, while government policies have played a vital role in boosting collaborative R&D and spurring innovation, it's obvious more needs to be done.

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CURRENT POLICY RESPONSE TO U.S. COMPETITIVENESS CRISIS

The stagnation in private sector collaborative research is one factor in the United States' overall competitiveness crisis. ITIF found in the *Atlantic Century* that the United States' is ranked 6th out of 40 nations or regions in innovation-based competitiveness, but ranked last in the rate of improvement over the last decade. The United States also ranks near the bottom (23rd of 30 countries) in the growth of business funded university R&D (figure 1).[23] Simply put, competitor nations are racing ahead by strengthening their innovation capacity while the United States is stuck in neutral.

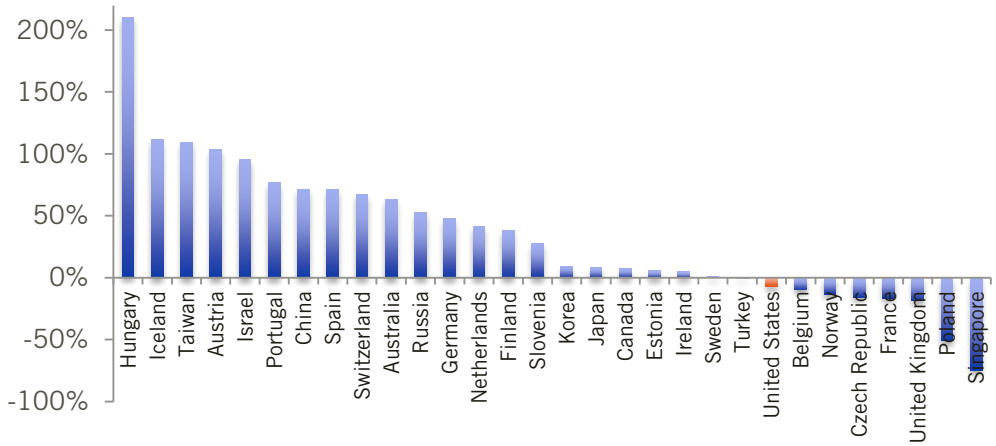

Figure 1: Percentage Change in Business-Funded Research Performed in the Higher Education Sector as a Share of GDP: 2000-2008[24]

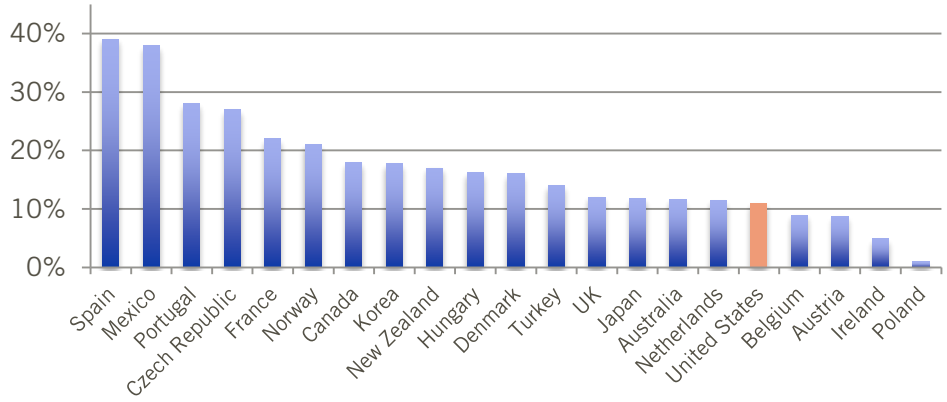

Figure 2: R&D tax credit generosity ranking of OECD countries

Table 1: Selected foreign collaborative R&D tax credits.[25]

COUNTRY	TYPE OF INCENTIVE	TYPE OF COLLABORATION
Belgium	75% payroll withholding tax credit[26]	For all companies collaborating with a university or research institute
Denmark	150% taxable income deduction[27]	For all companies collaborating with a university or research institute
Hungary	Up to 400% taxable income deduction	Full deduction offered if company co-locates lab at a university or research institute. Half (200%) deduction is offered for all other collaborations.
Italy	40% flat tax credit, capped at 50 million Euros per company	For all companies collaborating with a university or research institute
Netherlands	14% (large companies) or 42% (small companies) flat tax credit	For wages paid to scientists and researchers in a collaborative agreement between a business and another organization
Spain	10% flat tax credit	For all companies collaborating with a university or research institute
Quebec	35% refundable tax credit of 80% of qualified research expenditures	For all companies collaborating with eligible university, research institutes, or research consortia.
Chile	46% flat tax credit	For all companies collaborating with a university or research institute and certified by the Chilean Economic Development Agency.
Japan	12% flat tax credit (large firms) or 15% flat tax credit (small firms)	For all companies collaborating with a university or research institute
France	60% flat tax credit	For all companies collaborating with research institute or federal laboratory
Norway	18% (small companies)	For all companies collaborating with

	or 20% (large companies) deduction of R&D expenses, capped at NOK 11 million[28]	a university of research institute
United Kingdom	175% (small companies) or 130% (large companies) taxable income deduction	Contracted R&D with external organizations are eligible for the regular R&D credit

By definition, businesses have some commercial objective in mind when performing R&D, thus signaling that collaborating with a university on such projects is not eligible for the credit amounts to a disincentive to collaborate.

Other nations are also offering more generous R&D tax incentives (Figure 2). The United States ranks 17th among 30 OECD nations in the generosity of its R&D tax incentive, a rank that has continued to decline since the early 1990s. But competing countries have also recognized the importance of boosting collaborative R&D.[29] Many countries are now offer more generous incentives for firms to partner with universities, government labs, non-profits, and research consortia (Table 1). For example, Hungary reduces a company's taxable income by up to 400 percent of the amount invested in collaborating with a university or research institution. Japan and Italy offer flat tax credits for collaborating with a university of research institution of up to 14 percent and 40 percent respectively. And in France firms can receive a 60 percent flat credit on R&D investments at universities and federal labs. For many of these countries, collaborative tax credits play an important part of an overall competitiveness and innovation policy that encourages businesses to invest more than twice as much in collaborative research than in the United States.[30]

This puts the United States at a significant disadvantage. The United States R&D tax credit – the principle way the United States incentivizes the private sector to invest in more R&D – doesn't effectively provide a strong incentive for firms to collaborate. Specifically, the credit offered to firms that collaborate with universities, federal labs, research consortia, and other research institutions is both less generous and more restrictive than competing nations'. Businesses have less of an incentive to forge R&D partnerships in the United States than elsewhere. In addition, the credit restricts firms from taking a slightly more generous credit for collaborating with universities for only those projects that do not have a commercial objective. A similar more generous credit for collaborating with research consortia is restricted to only those conducting energy R&D. Simply put, if the United States is serious about revving up its innovation and competitiveness engine, policymakers need to expand the R&D tax credit and create strong incentives for collaborative R&D.

ENHANCING THE R&D TAX CREDIT TO SPUR COLLABORATIVE RESEARCH

Companies typically choose from two versions of the R&D credit. The regular credit is equal to 20 percent of payments for qualified research above a base amount defined as the average of research payments made in the four preceding years. However, increasingly companies take the Alternative Simplified Credit (ASC) which is equal to 14 percent of the amount of qualified research expenses that exceed 50 percent of the average research expenses of the preceding three years.[31] Under both credits firms can claim credit against 65 percent of payments to institutions for basic research (such as universities), 75 percent of payments to research consortia, and 100 percent of payments to federal laboratories.

However, if the research performed at a university, has no specific commercial objective, they can apply 100 percent of the expenditures to their overall R&D credit (e.g., the 20 percent incremental credit or the 14 percent ASC). In addition, the Energy Policy Act of 2005 created a special 20 percent flat credit for expenditures made to energy research consortia between at least one firm and a mix of four firms, universities, or federal laboratories.

Given the fact that collaborative research is more risky and has greater spillovers, the R&D tax credit does not adequately spur research collaboration. However, there are a number of steps Congress can take.

BROADEN THE DEFINITION OF BASIC RESEARCH

To start, Congress could make simple changes to the definition of basic research. The R&D tax credit defines basic research in Section 41(e) (7) (A) as "any original investigation for the advancement of scientific knowledge *not having a specific commercial objective*." The credit reduces the incentive for commercially-viable basic research by making only 65 percent of payments made to universities eligible for the credit.

By narrowing the definition of basic research, the credit provides less incentive for business to invest in university-based research. By definition, businesses have some commercial objective in mind when performing R&D, thus signaling that collaborating with a university on such projects is not eligible for a more generous credit amounts to a disincentive to collaborate. Congress should eliminate the language excluding commercially-aimed research and allow 100 percent of expenditures on research made at universities to qualify as research expenditures under the regular or ASC credits. This would immediately signal that research collaborations, such as between universities and industry, are a priority.

DOUBLE THE ENERGY RESEARCH CONSORTIA TAX CREDIT

In addition, Congress should boost the energy research consortia tax credit. In establishing the credit in 2005, Congress' intention was to single out collaborative energy research with a more generous tax credit than the regular credit or ASC offered. It was a significant step towards providing a more generous credit for collaborative R&D. And given the importance of spurring energy innovation, in part to ensure U.S. energy independence, more energy innovation is needed. But more needs to be done.

Currently, claims of the credit have been largely limited to a small subsection of utilities and petroleum manufacturers. In 2008, the energy consortia tax credit only received 71 claims and was only two percent of total R&D tax credit claimed by corporations.[32] One reason for its limited use is that it appears that few firms, universities or federal labs are even aware of the credit. The Department of Energy has done almost nothing to make entities aware of it, not even bothering to list it on their web page that lists business energy research incentives.[33] Therefore, Congress should double the credit from a 20 percent flat credit to a 40 percent flat credit.

CREATE A COLLABORATIVE R&D CREDIT

If Congress is truly serious about expanding collaborative R&D (and strengthening U.S. competitiveness) it should make all collaborative R&D eligible for a 40 percent flat tax credit. This would include all collaborations between a business and university, federal lab, and any research consortia. It could do this by simply deleting the word "energy" from the legislative language creating the energy consortia R&D incentive and add collaborations between businesses and universities or federal labs as eligible for the credit.

If Congress wants to support innovation and boost U.S. competitiveness, it should expand and enhance the credit to reflect the growing importance of collaborative R&D.

CONCLUSION

The United States faces a significant and growing competitiveness problem. The rest of the world is catching up and numerous countries have already surpassed the United States in innovative capacity. Nothing less than future economic growth, jobs, and wealth creation are at stake. And the seriousness of the problem requires a multifaceted policy response across a range of issues, including education, public R&D investment, trade policy, intellectual property policy, and tax reform. Expanding the R&D tax credit is an important first step. If Congress wants to support innovation and boost U.S. competitiveness, it should expand and enhance the credit to reflect the growing importance of collaborative R&D.

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33. See http://www.dsireusa.org/incentives/index.cfm?state=us&re=#re#&EE=#ee# for list of federal tax credits DOE cites for interested businesses. As of June 2011, the energy research consortia tax credit was not listed.

ABOUT THE AUTHORS

Matthew Stepp specializes in clean energy innovation. Prior to joining ITIF, Stepp served as Fellow at the Breakthrough Institute, a California think tank focused on energy policy issues. There, he coauthored a report aimed at presenting an alternative strategy for building a green U.S. economy through innovation-focused policies. He earned a B.S. in Meteorology from Millersville University and an M.S. in Science, Technology, and Public Policy from the Rochester Institute of Technology.

Dr. Robert D. Atkinson is one of the country's foremost thinkers on innovation economics. With has an extensive background in technology policy, he has conducted ground-breaking research projects on technology and innovation, is a valued adviser to state and national policy makers, and a popular speaker on innovation policy nationally and internationally. He is the author of *The Race for Global Innovation Advantage and Why the U.S. is Falling Behind* (Yale, forthcoming) and *The Past and Future of America's Economy: Long Waves of Innovation That Power Cycles of Growth* (Edward Elgar, 2005). Before coming to ITIF, Atkinson was Vice President of the Progressive Policy Institute and Director of PPI's Technology & New Economy Project. *Ars Technica* listed Atkinson as one of 2009's Tech Policy People to Watch. He has testified before a number of committees in Congress and has appeared in various media outlets including CNN, Fox News, MSNBC, NPR, and NBC Nightly News. He received his Ph.D. in City and Regional Planning from the University of North Carolina at Chapel Hill in 1989.

ABOUT ITIF

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