The Research & Experimentation Tax Credit

By:

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### Table of Contents

1. Overview .......................................................... 1
2. Rationale for a Research Tax Credit ...................... 2
3. The Structure of the Research Tax Credit ................. 4
   3.1 Statutory Rate ............................................... 4
   3.2 Definition of Research ................................... 5
   3.3 Base Calculation for the Credit ....................... 6
   3.4 University Basic Research ............................... 9
4. Other Features of the Tax Code Impact on Research .... 10
   4.1 Research Tax Deduction ................................. 10
   4.2 The Alternative Minimum Tax ........................... 10
   4.3 Foreign Source Income ................................... 11
5. Effectiveness ..................................................... 12
6. Other Countries .................................................. 13
7. Current Proposals ............................................... 14
   7.1 President Clinton's Research Credit Proposal ....... 14
   7.2 The Omnibus Budget Reconciliation Act of 1993 ..... 14
   7.3 The Danforth and Baucus Research Credit Proposal 14
8. Conclusion .......................................................... 15
The Research Tax Credit

1. Overview

As part of the Economic Recovery Tax Act (ERTA) of 1981, Congress enacted a temporary 25 percent tax credit designed to spur research spending by business. The credit was available to businesses with research spending in excess of a base period amount. As an incremental credit, it was designed to encourage additional research spending while minimizing revenue loss to the federal Treasury.

Concerns about the "competitiveness" of U.S. businesses and studies showing low research spending by U.S. business have prompted Congress to renew the research credit repeatedly since 1981. The credit was extended and lowered to 20 percent in the Tax Reform Act of 1986 (TRA'86), extended in 1988 and 1989, modified and extended in 1990, and extended in 1991. The credit expired temporarily on June 30, 1992.

President Clinton had proposed to reenact the research credit on a permanent basis in his FY'94 budget. Congress instead enacted yet another temporary extension to the credit as part of the recently passed budget bill. The credit is extended, with no major changes, retroactive to July 1, 1992, and will expire on June 30, 1995, unless it is extended.

However, Congress may act to modify the credit and establish it on a permanent basis. Senator John Danforth (R-Mo.), the original author of the credit, has been joined by Senator Max Baucus (D-Mont.) in introducing S. 666 in the current Congress. S. 666 makes the credit permanent and further refines the credit to make it more effective.

The research tax credit provides an additional incentive for research spending beyond the incentive provided by the research deduction. Research expenditures may be viewed as capital spending since they provide future benefits and would normally generate future amortized deductions. However, since 1954 businesses under section 174 have been able to expense all qualified research spending in the current year, thus providing a tax benefit.

The research tax credit has encouraged some additional private research investment since being implemented in 1981. However, the credit's incentive effects have been
substantially diminished by its structure and because businesses have been hesitant to invest in additional research when the tax benefit of doing so has been temporary and transient.

This paper provides an overview of the purpose, legislative history, and effectiveness of the research tax credit and summarizes recent proposals to reauthorize the credit.

2. Rationale for a Research Credit

Concern has been raised in recent years that the United States, as a nation, under-invests in technological research. While the United States defense industry has provided a large stimulus to military research, concern has focused on civilian research spending.

Statistics indicate that U.S. spending on civilian research, in proportion to the size of our economy, falls short of some other advanced nations, in particular, Germany and Japan. This is a concern of the Clinton administration, which noted in its February discussion paper on technology policy that, "currently, the United States invests 1.9 percent of GDP in non-defense research, as compared to 3.0 percent in Japan and 2.7 percent in West Germany." (See Figure 1 for the most recent National Science Foundation comparative data.) While these statistics show a marked difference in research spending between countries, the interpretation of the figures and policy prescriptions is not clear. The figures may indicate a statistical measurement difference between countries or may indicate a structural difference between economies.

Figure 2 indicates that for total research spending, including defense spending, the United States is more in line with Japan and Germany. (Figure 3 offers total research spending for the U.S. in constant 1993 dollars.) Since the United States specializes in defense research, it is not surprising that if one excludes this industry from the tally, the U.S. research effort appears lower. Nonetheless, some researchers are quick to conclude that, "these [non-defense research] figures suggest that greater amounts of corporate resources should be allocated to R&E." (Billings and McGill 1992)

Aside from conclusions based on aggregate statistics, two arguments are commonly given in support of government action to increase research spending. Both views are given in support of a permanent extension to the research tax credit in the February 1993 Clinton administration technology discussion paper.

The first view, supported by Billings and McGill, among others, is that government
should support private research to strengthen U.S. "competitiveness." The concern is that, "without additional allocations of R&E funds to the private sector, the ability of U.S. companies to meet the international competitive threat on a long-term basis may be impaired." With government tax incentives, U.S. businesses would presumably be more competitive, both because of the extra research performed and as a result of lower tax costs.

Economic theory is usually offered in support of a government subsidy to research
spending, as well. A 1993 report by the Congressional Research Service (CRS), for example, states that, “there is widespread agreement that investment in research and development is under-provided in a market economy.” Research, like education, is assumed to provide spillover benefits to the rest of society, in addition to the private benefits of such investment. Because private investors cannot reap the full benefit from their research expenditures, a “market failure” occurs and private research spending is lower than the most desirable amount for society as a whole. So, while businesses may optimize the amount of research they do for their own benefit, “society” would be better off if they did more.

In effect, by foregoing some tax revenue through the research tax credit, the government is making additional private investment in research possible and promoting higher productivity growth and an increase in spillover benefits. These benefits will quickly be spread in the modern economy where information about technologies and market opportunities are disseminated more and more easily. It has become easier for one company to capture the benefits of another company’s research spending. This may, on the one hand, reduce a business’s incentive to invest in research, but, on the other hand, may increase the benefit of government offering research spending incentives.

The implications for policy of this reality of the modern economy are more unclear given today’s global economy. Technological advancements are diffused quickly in an integrated world economy without regard for national borders. If in response to “market failure” the U.S. government subsidizes research, it will be the world economy, not just the U.S. economy, which will benefit. Extra research performed by U.S. businesses will have spillover benefits, not just to other U.S. businesses and citizens, but also to Japanese and German businesses and citizens.

3. The Structure of the Research Tax Credit

The Economic Recovery Tax Act of 1981 implemented a tax credit for businesses which increased qualified research spending above a base period amount. Since then, the statutory rate, the definition of research, and the base for the credit, have all been modified as Congress has sought to make the credit as effective as possible.

3.1 Statutory Rate

ERTA implemented a 25 percent tax credit for a five-year period expiring in 1986. With the Tax Reform Act of 1986, the credit was reduced to a statutory rate of 20 percent.
However, as discussed below, the statutory rate does not give a good reflection of the overall effective rate of the credit.

3.2 Definition of Research

For the research tax credit implemented in 1981, Congress borrowed the definition of research used for the research deduction (section 174). This definition is fairly broad and
includes, “all such costs incident to the development of an experimental or pilot model, a plant process, a product, a formula, an invention, or similar property and the improvement of already existing property.” However, ERTA disallowed certain expenditures from qualifying for the credit, including expenditures made outside the U.S., expenditures in the social sciences, arts, and humanities, and expenditures funded by another person, from the credit.

Qualified research costs primarily include salaries and wages of research staff and payments for research supplies. Capital expenditures, for assets such as buildings to be used for research, generally do not qualify for the deduction or the credit. And although the credit is often termed the “R&D credit,” development costs, such as marketing costs, are generally not eligible for the credit.

Concerns about an overly broad definition of research led to a narrowing of the credit’s definition in TRA’86. In particular, Congress was concerned that real technological advancements only, and not just routine product development, should be eligible for the credit. For example, expenditures to improve a product’s styling or cosmetic design were ineligible for the research credit after 1986.

Research expenditures eligible for the credit now include a) expenses for research salaries and supplies, b) some computer use costs, and c) 65 percent of contract research payments by a business. To qualify for the credit, research must be technical in nature and not related to management functions, and must be part of a “process of experimentation,” thus not taking place after the beginning of commercial production.

3.3 Base Calculation for the Credit

The research credit is designed as an incremental credit. By establishing an incremental credit, Congress has attempted to maximize the incentive effect of the credit while minimizing revenue loss to the Treasury. However, such an approach adds complexity to the tax credit as a base amount of research expenditures must be defined by legislation.

Until 1990, businesses claiming the credit calculated current year qualified research expenditures in excess of the average of the previous three years research expenditures. This meant that a business which increased its research spending one year raised the base and lowered the benefit of the credit for future years.

This moving average base approach was changed in the Omnibus Budget Reconcili-
Figure 3: Total and Nondefense R&D in the United States (Constant 1993$)

Source: National Science Foundation.

The allocation Act of 1989 (OBRA'89) to a more complicated fixed base percentage formula. The fixed base percentage is the average ratio of qualified research expenditures to gross receipts for at least three years during the 1984-1988 time period. This percentage is then applied to the business's gross receipts for the most recent four years to come up with a base above which incremental research is measured.

As a benefit to businesses, the fixed base percentage cannot exceed 16 percent.
But as a restriction, the minimum base amount cannot be less than 50 percent of qualified research expenses in any given year. For start-up businesses, the fixed based percentage is set at three percent if the business does not have sufficient taxable years between 1984-1988.

The following example shows a business which maintains research expenditures at a constant 4 percent of sales over the time period.

**Example:**

<table>
<thead>
<tr>
<th>Year</th>
<th>Sales ($ mils.)</th>
<th>Qualified Research ($ mils.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1984</td>
<td>100</td>
<td>4.0</td>
</tr>
<tr>
<td>1985</td>
<td>105</td>
<td>4.2</td>
</tr>
<tr>
<td>1986</td>
<td>110</td>
<td>4.4</td>
</tr>
<tr>
<td>1987</td>
<td>116</td>
<td>4.6</td>
</tr>
<tr>
<td>1988</td>
<td>122</td>
<td>4.9</td>
</tr>
<tr>
<td>1989</td>
<td>128</td>
<td>5.1</td>
</tr>
<tr>
<td>1990</td>
<td>134</td>
<td>5.4</td>
</tr>
<tr>
<td>1991</td>
<td>150</td>
<td>6.0</td>
</tr>
</tbody>
</table>

Fixed Base Percentage = \[
\frac{(4 + 4.2 + 4.4 + 4.6 + 4.9)}{(100 + 105 + 110 + 116 + 122)} / 5
\]

\[= \frac{4.42}{110.6} = 0.04 \text{ million or } $40,000\]

Base Amount for 1990 = \[0.04 \times \frac{(110 + 116 + 122 + 128)}{4}\]
\[= 4.8 \text{ million}\]

Base Amount for 1991 = \[0.04 \times \frac{(116 + 122 + 128 + 134)}{4}\]
\[= 5 \text{ million}\]

Credit for 1990 = \[(5.4 - 4.8) \times 0.20 = 0.12 \text{ million or } $120,000\]

Credit for 1991 = \[(6.0 - 5.0) \times 0.20 = 0.20 \text{ million or } $200,000\]

This example illustrates that even though a business may keep its research spending at a constant percentage of sales, it can increase the research credit if its sales are expanding. On the flip side, a business with declining sales that manages to keep research to the same percentage of sales may not be eligible for the credit. Some people argue this latter business is the type of business that should be assisted by a research subsidy in order to encourage research in tough business climates when a business might be under cost-cutting pressure.
The new base calculation method established in OBRA'89 is generally regarded as an improvement over the previous method. According to a study by Hall (1992) the change raised the effective rate of the credit substantially. A recent report by the CRS agrees and points out that this method reduces the disincentive effect of the old moving average calculation where each increase in research spending by a business led to a higher base and lower tax benefits in future years. Billings and McGill support these assessments and estimates that the effective credit rate was raised, on average across all industries, to 2.11 percent with the new base calculation method, from 1.98 percent under the old method.

However, Billings and McGill argue that the new credit calculation is unfair to businesses in tough economic climates. A “perverse consequence” of the new base calculation method, he states, “is an increased after-tax cost of R&E activities for businesses that are increasing R&E activity in a period of stagnant sales. In fact, such businesses should be the target of R&E tax incentives.” On this point the CRS agrees and notes that, “[r]esearch by businesses whose outlays are shrinking is, in principle, just as valuable as research by expanding businesses.”

The semiconductor industry, for example, argues that the base calculation for the research tax credit is unfavorable to their industry because of conditions in the mid-1980s, which are the years the fixed base for the credit are based on. Sales by U.S. businesses were depressed below normal, resulting in a high fixed base percentage and reduced tax benefits for current research spending levels.

A more general flaw of the incremental credit is that it provides no benefit to businesses whose market condition mandates stagnant or declining R&D spending. Consider, for example, a business that invested $100 million in R&D in 1992, and suppose that business must cut R&D spending in 1993, for whatever reason, to $70 million in the absence of any tax credit. Had the business qualified for a credit in 1993, it might have increased spending to $80 million or more. The extra $10 million in R&D spending made possible by the credit is no less valuable than if the business had been able to increase 1993 spending from $100 million to $110 million. In effect, the current incremental credit works only as long as the businesses can continually increase their R&D spending.

3.4 University Basic Research

The research tax credit features a distinction regarding expenditures to support university research. Prior to 1986, the credit was applicable to only 65 percent of a corporation’s payments to a university to perform basic research. TRA’86 legislation elimi-
nated this 65 percent distinction and set up a separate base calculation for support of university basic research to increase the incentive for this type of activity.

4. Other Features of the Tax Code Effect on Research

While the statutory rate of the research credit is 20 percent, the credit's interaction with other aspects of the tax code alter its effective rate for particular businesses.

4.1 The Research Tax Deduction

As noted, since 1954 Congress has supported research by allowing businesses to expense qualified research spending rather than amortizing expenditures over a number of years. The Office of Technology Assessment (OTA) notes that this ability to expense research spending “reduces the cost of a dollar’s worth of research performed today from $1.00 to about $0.66.”

Prior to 1988 legislation, a business could utilize the research tax credit while at the same time getting the full benefit from expensing all research under section 174. After 1988, research expenditures available for deduction were reduced by 50 percent of the value of the credit claimed in that year. OBRA legislation in 1989 further reduced the benefit of the deduction to businesses as 100 percent of the research claimed for credit purposes must be subtracted from expenditures deducted under section 174.

Billings and McGill provide an example of how this provision, combined with the restriction that the base amount cannot be less than 50 percent of qualified research expenses, reduces the credit’s effective rate to a maximum of 6.6 percent.

Example: Corporation A spent $10 million on qualified research in 1990. Because of the 50 percent restriction, the base amount cannot be less than $5 million. Therefore, the maximum credit is 20 percent of this, or $1 million. However, the section 174 research deduction is reduced by the $1 million credit so that the federal income tax liability will increase by $340,000 (34 percent * $1 million). Therefore, Corporation A will receive a net benefit from the credit of $660,000 or 6.6 percent of $10 million.

4.2 The Alternative Minimum Tax

The interaction of the Alternative Minimum Tax (AMT) also serves to reduce the benefit of the research credit. If a business is subject to AMT, it cannot claim the research credit in the current year. A business may carry the credit forward but this of course re-
duces its value, particularly since once businesses become subject to the AMT they rarely return to paying regular income tax.

The denial of the research credit for businesses paying AMT is difficult to justify on either tax or research policy grounds. Businesses are subject to AMT for reasons unrelated to their research spending. Moreover, there is no reason to presume that research spending by these businesses is any less valuable to society than spending by businesses paying regular income tax. In fact, businesses paying AMT are often the research-intensive businesses that Congress had in mind when it enacted the credit.

The legislation offered by Senators Danforth and Baucus, S. 666, recognizes this problem and allows businesses paying AMT to offset a portion of their AMT liability with the research credit.

4.3 Foreign Source Income

A significant complication to calculating the tax benefit of research spending for U.S. multinationals involves the allocation of research expenses between U.S. and foreign source income. The tax rules regarding allocation are an important issue for multinationals, who must consider tax liability when making decisions on the level and location of new research expenditures.

The complicating factor involves the foreign tax credit that the United States allows against income taxes paid to foreign governments. In basic terms, allocating research expenses to domestic income will reduce tax liability on U.S. source income, and allocating research expenses to foreign source income will reduce U.S. tax liability on foreign source income through the foreign tax credit. However, for companies in an excess foreign tax credit position (that is, when tax payments to foreign governments exceed U.S. tax liability on foreign source income), allocating U.S. research expenses to foreign source income effectively denies them the benefit of the research tax deduction.

Rules for the allocation of expenses to foreign source income are specified in Treasury Regulation 1.861-8 adopted in 1977. In 1981 ERTA suspended these rules and allowed all research expenditures to be allocated against U.S. income. But since then the rules have been repeatedly modified and, currently, 36 percent of research expenditures must be allocated to either foreign or domestic income on the basis of sales or income. The Omnibus Budget Reconciliation Act of 1993 (OBRA'93) modifies this rule to alter the 36 percent allocation to 50 percent for one year. That is, 50 percent of research must be
allocated on the basis of sales or income and the other 50 percent is allocated automatically to income sourced to the place of performance of the research.

5. Effectiveness

A number of statistical studies have been conducted on the effectiveness of the research tax credit. Most studies conclude that the research credit has had only a modest impact on research spending. In a 1989 study, the General Accounting Office (GAO) found that the credit stimulated less than $0.5 billion of additional research per year over the period 1981 to 1985. A 1992 study by Baily and Lawrence (1992) estimated the credit stimulated about $2.8 billion in additional research per year between 1981 and 1989 (in 1982$).

In a recent study of about 1,000 U.S. businesses, Hall (1992) found a stimulus to research spending of about $2 billion annually during the 1980s from the credit. However, Hall argues that changes in the credit in 1990 have made the credit significantly more effective. Hall estimates that the effective rate of the credit was less than five percent from 1981 until 1990, but that the change in base calculation implemented in 1989 in OBRA raised the effective rate of the credit to more than 10 percent. The CRS also believes the latest version of the credit is more effective, stating, “[f]or many businesses, the 1989 changes probably increased the incentive effect of the credit substantially.”

Nonetheless, most researchers point to the incremental nature of the credit as a continuing weakness. Billings and McGill point to inconsistencies with both the old and new base calculation methods. In particular, he points out that businesses facing tough competition and experiencing declining sales are the businesses that need an extra incentive to invest in research, but that the current mechanism may penalize them. He suggests these problems may warrant replacing the incremental credit with a credit based on total research spending. Hall (1992) agrees, stating, “[i]t is this [incremental] feature of the credit which, although admirable in intent, has led to the weak incentive effects observed....”

Clearly, few businesses can increase research expenditures continually, as such a credit seems to assume. And businesses cannot sustain an artificially high level of research unless they receive an ongoing tax benefit which an incremental credit does not provide. Nonetheless, the pressure to preserve the tax base has forced Congress to arrive at this compromise of an incremental incentive, thus diluting its effectiveness.

Another factor frequently cited for the credit’s ineffectiveness is that, like many
features of the tax code, it has been temporary and continually changing. Researchers have noted that the high adjustment costs associated with the long-term nature of research projects makes research spending particularly vulnerable to uncertainty in tax policy (see Hall, 1992). Moreover, many smaller, research-intensive businesses are limited by cashflow constraints when making research investment decisions. It is very risky for them to begin a research project assuming the associated expenses will qualify for the credit, if there is a chance the credit will expire halfway through the project.

Appraisals of the research tax credit’s effectiveness must consider the many changes in the U.S. economy over the past decade. Most obviously, business cycle upturns and downturns, structural shifts in the economy, and the defense buildup and subsequent reductions will influence any aggregate measures of research spending.

In addition, the frequent changes in corporate tax rates and bases since 1981 have influenced research spending. For example, capital expenditures to support research spending have become variably more or less expensive as Congress has lowered corporate income tax rates and expanded and contracted corporate tax bases. For example, ERTA lowered the cost of research by allowing businesses to depreciate all capital expenditures for research over a three-year period. TRA'86 increased the cost of research by requiring businesses to depreciate these capital expenditures over five years. Also, the reduction of the corporate rate to 34 percent under TRA’86 made the research deduction relatively less beneficial since the tax on alternative, less-favored investments was lowered.

6. Other Countries

Most other developed countries encourage research spending through the tax code. In a recent survey of 23 developed nations the OTA (1993) found that “most nations permit research spending to be deducted from taxable income in the year incurred,” generally with a provision to carry forward unused deductions to future years. In addition, many countries have a tax credit mechanism to stimulate research spending. For example, Canada, France, and Japan all have incremental credits similar to the U.S. research tax credit.

Interestingly, the top two research countries statistically, Japan and Germany, differ markedly in research tax policy. Notably, Germany does not have a research tax credit. In contrast, the Japanese government grants a 20 percent credit for research expenditures greater than 10 percent of taxable income or the highest dollar amount in any prior year, whichever is less. As a further encouragement for small- and medium-size businesses, these companies are permitted to use six percent of current research expenditures as the
tax credit amount. In addition, a seven percent research investment tax credit is available for all businesses for the acquisition cost of certain defined basic technology capital assets. All in all, Japan's tax provisions for research appear quite generous.

7. Current Proposals

As a tax expenditure, the research tax credit has produced a revenue loss to the federal Treasury of between $700 million and $2 billion annually since being implemented in 1981. While the concern for revenue loss in Congress is more acute than ever, there is a great concern over the competitiveness of U.S. business, particularly with a continuing sluggish economy and persistently large trade deficits. For this reason, a tax credit to support research has wide, bipartisan support in Congress. President Clinton proposed reenacting and making permanent the research tax credit in his FY'94 budget.

7.1 The President's Proposal

President Clinton's FY'94 budget proposed to extend the research tax credit retroactively to June 1992 and to make it permanent. In addition, the proposal added a new rule regarding the calculation of a fixed-base percentage for start-up companies. The president's budget estimates the proposal would have resulted in a revenue loss to the Treasury of $9.6 billion between FY'93 and FY'98.

7.2 The Omnibus Budget Reconciliation Act of 1993

While the House of Representatives originally passed the budget bill with the president's permanent extension of the research credit; the Senate passed only a one-year extension. The final budget package passed by Congress contains a compromise three-year extension of the credit. Once again, the dominance of the deficit in budget negotiations took precedence. By repeatedly enacting temporary extensions to the credit, Congress can appear to show smaller revenue losses in the five-year budget tallies while denying businesses the benefit of stability in the tax code and denying society the benefits of a fully effective research tax credit.

7.3 The Danforth and Baucus Research Credit Proposal

Senators Danforth and Baucus have introduced S. 666, legislation that would modify and make permanent a research tax credit. The principle modifications to the credit include a liberalized method for calculating the fixed-base percentage. Rather than using the arbi-
trary period 1984-1988 as a base, the bill allows the taxpayer to use the lowest percentage obtained from any four consecutive years between 1983 and 1993.

The bill also provides for:

- a flat 10 percent credit to small businesses with sales under $100 million, in the hopes of simplifying the credit calculation;

- businesses paying AMT to offset 50 percent of their AMT liability with the research credit;

- a separate base calculation for civilian research by defense businesses so as to encourage the transition to civilian research in the economy.

In general, this latest research tax credit proposal reflects a further fine-tuning of the credit, a process which has been ongoing since 1981. The enactment of a permanent credit would simplify use of the credit for business whereas further fine-tuning may make the credit more effective at the expense of added complexity.

8. Conclusion

Many factors determine the level of research spending by business. Tax policy can encourage increased spending by lowering the cost of additional research spending. However, in practice, Hall (1992) notes, "[t]he R&E tax credit as it has been implemented during the 1980s is a good example of how even a simple public policy idea which has bipartisan support can emerge from Congress both greatly complicated and weakened in its effects."

In particular, the fact that the credit has been both temporary and incremental have weakened the incentive effect for businesses. However, modifications to the credit's base calculation method in 1990 and current proposals to make the credit permanent promise to make the credit more effective.

It is doubtful, however, that such marginal changes in the tax code could make up the difference between U.S. levels of nondefense research spending compared to level attained by the Japanese. Since the United States spends about two percent of GDP on nondefense research and Japan spends three percent, it would take a $63 billion research spending increase in this country to reach the Japanese level. This figure is an order of magnitude greater than the relatively small impact of perhaps a few billion dollars of extra
spending generated from the current research tax credit. Therefore, if increasing the level of private nondefense research spending to levels approaching those of our major competitors is to become a national priority, many additional measures will need to be taken, including expanding the research tax credit.