Order Code RL31181

Research Tax Credit: Current Status, Legislative Proposals in the 109th Congress, and Policy Issues

Updated September 22, 2006

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Summary

Technological innovation makes crucial contributions to long-term economic growth, and research and development (R&D) is the lifeblood of innovation. In economies dominated by free markets, a large share of R&D investment is undertaken by private firms seeking to become more competitive and improve their prospects for future growth. Because firms generally cannot capture all the returns to their R&D investments, they are inclined to spend less on R&D than its overall economic benefits would warrant. The federal government supports R&D in a variety of ways, including a tax credit for increases in R&D spending.

This report examines the status of the credit, summarizes its legislative history, discusses key policy issues it raises, and describes legislation in the 109th Congress to modify or extend the credit. It will be updated as legislative activity warrants.

The research and experimentation (R&E) tax credit has never been a permanent provision of the federal tax code. Since its enactment in 1981, the credit has been extended 11 times and modified five times. In reality, the R&E tax credit has four components: a regular credit, an alternative incremental credit (AIRC), a basic research credit, and an energy research credit. All but the energy research credit are incremental in that the credit applies only to qualified research spending above a base amount. The credit expired at the end of 2005.

In effect, the research tax credit seeks to stimulate increased business R&D investment by reducing the after-tax cost to firms of undertaking qualified research beyond a base amount, which appears designed to approximate what a firm would spend on R&D if there were no credit. Although most analysts and lawmakers view research tax credits as a desirable policy instrument in theory, the current design of the federal credit has made it a target of continuing criticism. A major concern is that the design keeps the credit from being as effective as it might. Critics attribute this problem to what they claim are five flaws in its design: (1) its lack of permanence, (2) its weak and disparate incentive effects, (3) its non-refundable status, (4) its inadequate and unsettled definition of qualified research, and (5) its lack of focus on R&D projects that generate much larger social returns than private returns.

Numerous bills to extend the credit and enhance its incentive effect have been introduced in the 109th Congress. Some examples are H.R. 1736, H.R. 4845, H.R. 5115, S. 14, S. 627, S. 2109, and S. 2357. Each would extend the credit permanently, raise the three rates for the AIRC to 3%, 4%, and 5%, and establish what is known as an "alternative simplified credit." For many firms, such a credit would be equal to 12% of spending on qualified research above 50% of their average qualified research spending in the three previous tax years. A bill passed by the House on July 29, 2006 (H.R. 5970) would extend the credit through the end of 2007, increase the three rates for the AIRC, and establish the same alternative simplified credit. It is unclear whether the Senate will vote on the measure before the end of the current Congress.

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Research Tax Credit: Current Status, Legislative Proposals in the 109th Congress, and Policy Issues

Introduction

Economists may be notorious for their lack of consensus on some important policy issues (e.g., the long-term economic effects of large, permanent tax cuts; the impact of illegal immigration on domestic wages; and the best way to achieve price stability, full employment, and greater income equality). But on the questions of how technological innovation affects economic growth in the long run, and what role governments should play in the development of new technologies, there is surprisingly little disagreement.

Most economists subscribe to the notion that technological innovation has accounted for a major share of long-term growth in per-capita income in the United States.[1] Technological innovation is one of those concepts that is hard to define in a way that meets with universal acceptance. Economists with an interest in the dynamics of economic growth generally agree that innovation involves the acquisition of new scientific and technical knowledge and its application to the development of new goods and services or methods of production through a process of experimentation that can be long and convoluted. Learning-by-doing and learning-by-using often play crucial roles in this process.

In economies dominated by free markets, technological innovation is fueled by the efforts of competing firms to gain, sustain, or reinforce competitive advantage by being among the first to introduce or employ new or improved products or services; more efficient production processes; or better approaches to management, marketing and promotion, and customer service and support. The lifeblood of innovation is investment in research and development (R&D), whose principal output is new scientific and technical knowledge and knowhow.

Most economists would also agree that private R&D investment is likely to be less than adequate in the absence of government intervention. The reason is simple: firms generally cannot capture all the economic returns to their R&D investments, even through the aggressive use of patents, trademarks, and other instruments of intellectual property protection. Numerous studies have found that the average social

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[1] Linda R. Cohen and Roger G. Noll, "Privatizing Public Research," *Scientific American*, Sept. 1994, p. 72.

returns to private R&D investments greatly exceed the average private returns.[2] This finding holds true, regardless of whether a firm invests in research projects directly related to its existing lines of business, or it focuses its resources on basic research projects aimed at extending the boundaries of knowledge in a particular scientific discipline in ways that have no obvious or immediate commercial applications.

Economists refer to any excess of social over private returns as the spillover effects or external benefits of R&D. There are several channels through which the returns from innovation may elude capture by the innovating firms and spill over to society at large, including reverse engineering by competing firms and the purchase of new goods and services at prices below the prices most consumers would be willing to pay.[3] When seen through the lens of conventional economic theory, these external benefits take on the appearance of a market failure, in which too few resources are allocated to the activities leading to the discovery and commercial development of new technical knowledge and know-how. To remedy this failure, most economists favor the adoption of public policies aimed at boosting or supplementing private investment in R&D, especially those investments likely to generate relatively large external benefits.

Partly in an effort to spur increased private investment in R&D, the federal government supports R&D in a variety of direct and indirect ways. Direct support mainly comes in the form of research performed by federal agencies and federal grants for basic and applied research and development intended to support specific policy goals, such as protecting the natural environment, exploring outer space, advancing the treatment of chronic diseases, and strengthening the national defense. Indirect support is more diffuse. The chief sources are federal funding of higher education in engineering and the natural sciences, legal protection of intellectual property rights, special allowances under antitrust law for joint research ventures, and tax incentives for business R&D investment.

Federal tax law offers two such incentives: (1) a deduction for qualified research spending under Section 174 of the Internal Revenue Code (IRC) and (2) a non-refundable tax credit for qualified research spending above a base amount under IRC Section 41 — known to some as the research and experimentation (R&E) tax credit. The deduction has been a permanent provision of the IRC since it was first enacted in 1954; its main advantages are that it simplifies tax accounting for R&D expenditures and encourages business R&D investment by imposing a marginal effective tax rate of 0 on the returns to such investment. A similar policy objective undergirds the research tax credit, which has always been a temporary provision of

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[2] See, for example, Edwin Mansfield, "Microeconomics of Technological Innovation," in *The Positive Sum Strategy*, Ralph Landau and Nathan Rosenberg, eds. (Washington: National Academy Press, 1986), pp. 307-325; and John C. Williams and Charles I. Jones, "Measuring the Social Return to R&D," *Quarterly Journal of Economics*, vol. 113, no. 4, Nov. 1998, pp. 1119-1135.

[3] For a brief discussion of these channels, see Bronwyn H. Hall, "The Private and Social Returns to Research and Development," in *Technology, R&D, and the Economy*, Bruce L. R. Smith and Claude E. Barfield, eds. (Washington: Brookings Institution and American Enterprise Institute, 1996), pp. 140-141.

the IRC since it was first enacted in July 1981: the credit seeks to stimulate increased business R&D investment year after year by lowering the after-tax cost of qualified R&D beyond the amount that firms would undertake in the absence of such a subsidy.[4] But the credit complicates the task of complying with tax laws and regulations for firms claiming it. In FY2006, the combined budgetary cost of these incentives is projected to total $10.0 billion; by contrast, federal defense and non-defense R&D spending may reach $132.3 billion.[5]

This report examines the current status of the R&E tax credit, its legislative history, some important policy issues raised by it, and legislative proposals in the 109th Congress to extend the credit or enhance its incentive effect. It will be updated as legislative activity and other developments affecting the credit warrant.

Design of the Current R&E Tax Credit

The R&E tax credit actually has four components: a regular research credit, an alternative incremental research credit (or AIRC), a basic research credit, and a credit for energy research. Each is non-refundable. In any tax year, business taxpayers may claim the basic and energy research credits, as well as either the regular credit or the AIRC. All four credits expired on December 31, 2005.

Regular Research Credit

The regular research tax credit has been extended 11 times and revised five times. Under IRC section 41(a)(1), it is equal to 20% of a firm's qualified research expenditures (QREs) above a base amount. This incremental design is intended to encourage firms to spend more on R&D from one year to the next than they otherwise would by lowering the after-tax cost of the added R&D spending. (By contrast, if the credit's design were flat, the credit would be equal to 20% of a firm's total spending on qualified research in a tax year.) Under such a design, the federal government bears 20% of the cost of any qualified research above the base amount, for firms claiming the credit.[6] Given that business R&D investment hinges in part on its cost, a decline in the after-tax cost of R&D should spur a rise in business R&D investment, all other things being equal.[7]

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[4] For more information on the section 174 expensing allowance, see U.S. Congress, Senate Committee on the Budget, *Tax Expenditures*, committee print, 107th Cong., 2nd sess. (Washington: GPO, 2002), pp. 55-58.

[5] Office of Management and Budget, *Analytical Perspectives, Fiscal Year 2006* (Washington: GPO, 2005), pp. 66 and 317.

[6] For a variety of reasons, which will be discussed in a later section of the report, the actual or effective rate of the credit is much lower than 20%.

[7] Available studies indicate that the price elasticity of demand for R&D ranges from 0.2 to 2.0, which means that a 1% reduction in the cost of R&D would raise R&D spending between 0.2% and 2%.

To grasp the links between the regular credit and business R&D investment, it is essential to understand how the base amount is determined under IRC section 41(c) and which research expenses qualify for the credit under IRC section 41(b) and 41(d).

In principle, the base amount of the regular credit approximates the amount a firm would spend on qualified research in the absence of the credit, or its normal or preferred level of R&D investment. Two rules govern the calculation of the base amount under IRC section 41(c). First, it must be equal to 50% or more of a firm's QREs in a tax year — a rule that some refer to as the 50-percent rule.[8] Second, a firm's base amount depends on whether the firm qualifies as an established firm or a start-up firm. Established firms are defined as firms with gross receipts and QREs in three or more of the tax years from 1984 through 1988. Start-up firms, by contrast, are defined as firms whose first tax year with both gross receipts and QREs occurred after 1983, or firms with fewer than three tax years with both gross receipts and QREs from 1984 through 1988.[9] For all firms, the base amount is the product of a fixed-base percentage and average annual gross receipts in the previous four tax years. An established firm's fixed-base percentage is the ratio of its total QREs to total gross receipts in 1984 to 1988, capped at 16%. A start-up firm's fixed-base percentage is set at 3% during the firm's first five tax years after 1993 when it invests in qualified research. Thereafter, the percentage gradually adjusts to reflect a firm's actual experience so that by the its eleventh tax year, the percentage equals the firm's total QREs relative to its total receipts in any five tax years it chooses from the fifth through tenth tax years.

In general, the lower a firm's fixed-base percentage, the better its chances of claiming the regular credit. A firm can expect to benefit from the regular credit if its ratio of QREs in the current tax year to average annual gross receipts in the previous four tax years is greater than its fixed-base percentage. (See **Table 1** for a calculation of the regular credit for a hypothetical established firm, and **Table 2** for a calculation of the regular credit for a hypothetical start-up firm.)

Qualified Research Expenditures. Obviously, a key factor in claiming the regular credit (as well as the AIRC) is the definition of QREs. In practice, there are two critical aspects to this definition.

One aspect concerns the nature of qualified research itself. Under IRC section 41(d), research must satisfy four criteria in order to qualify for the regular or alternative incremental research tax credits. First, the research must involve activities that qualify for the deduction under IRC section 174 — which is to say that the activities must be "experimental" in the laboratory sense and aimed at the development of a new or improved product or process. Second, the research must be intended to discover information that is "technological in nature." Third, the research should seek to gain new technical knowledge that is useful in the

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[8] In other words, the expenses against which the regular research credit may be claimed can equal no more than 50% of total QREs in a given tax year.

[9] The definition of a start-up firm has changed a few times since the research credit was enacted. Presently, it denotes a firm that recorded gross receipts and QREs in a tax year for the first time after 1993.

development of a new or improved "business component," which is defined as a product, process, computer software technique, formula, or invention to be sold, leased, licensed, or used by the firm performing the research. Finally, the research must entail a process of experimentation aimed at the development of a product or process with "a new or improved function, performance or reliability or quality." The third and fourth tests were added by the Tax Reform Act of 1986, which also directed the IRS to issue regulations clarifying the definition of qualified research.

In general, according to IRC section 41(d)(3), research satisfies these criteria if it seeks to develop a new or improved function for a business component, or to improve the performance, reliability, or quality of a business component. By contrast, research fails to meet these criteria if its main purpose is to modify a business component according to "style, taste, cosmetic, or seasonal design factors."

Business taxpayers, the courts, and the IRS have clashed repeatedly over the application of the four tests for qualified research in the real world of business R&D. Although the IRS issued final regulations clarifying the definition of qualified research in December 2003 (T.D. 9104), it seems unlikely that the regulations will preclude further disputes between business taxpayers and the IRS over what activities qualify for the credit.[10]

IRC section 41(d)(4) identifies the activities that do not qualify for the credit. Specifically, the credit does not apply to research conducted after the start of commercial production of a business component; research done to adapt an existing business component to a specific customer's needs or requirements; research related to the duplication of an existing business component; surveys and studies related to data collection, market research, production efficiency, quality control, and managerial techniques; research to develop computer software for a firm's internal use (except as allowed in any regulations issued by the IRS); research conducted outside the United States, Puerto Rico, or any other U.S. possession; research in the social sciences, arts, or humanities; and research funded by another entity.

The other critical aspect of the definition of QREs is the expenses eligible for the credit. Under IRC section 41(b)(1), these expenses relate to both in-house research and contract research. In the case of in-house research, qualified expenses are limited to the wages and salaries of employees and their direct supervisors who are engaged in qualified research, the cost of materials and supplies (but not depreciable property) used in this research, and leased computer time used in this research. In the case of contract research, qualified expenses cover 75% of payments for qualified research performed under contract by nonprofit scientific research organizations and 65% of payments for qualified research performed under contract by other entities.

The credit does not apply to spending on the structures and equipment used in qualified research, overhead expenses related to such research — such as heating, electricity, rents, leasing fees, insurance, and property taxes — and the fringe benefits

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[10] See the discussion of concerns raised by the current definition of qualified research on pages 24 to 26.

of research personnel. As is discussed below, the exclusion of these costs has implications for the incentive effect of the credit. In the past, QREs have accounted for anywhere from 50% to 73% of total business R&D spending.[11]

Table 1. Sample Calculations of the Regular and Alternative Incremental R&E Tax Credits in 2003 for an Established Firm

($ millions)

Year	Gross Receipts	Qualified Research Expenses
1984	100	5
1985	150	8
1986	250	12
1987	400	15
1988	450	16
1989	400	18
1990	450	18
1991	550	20
1992	600	25
1993	550	23
1994	620	20
1995	700	25
1996	660	35
1997	710	30
1998	800	35
1999	835	45
2000	915	50
2001	1,005	53
2002	1,215	60
2003	1,465	70

Source: Congressional Research Service.

Calculation: Regular R&E Tax Credit

Compute the fixed-base percentage:

1. Sum the qualified research expenses for 1984 to 1988: $56 million.
2. Sum the gross receipts for 1984 to 1988: $1,350 million.
3. Divide the total qualified research expenses by the total gross receipts to determine the fixed-base percentage: 4.0%.

Compute the base amount for 2003:

1. Calculate the average annual gross receipts for the four previous years (1999-2002): $992.5 million.
2. Multiply this average by the fixed-base percentage to determine the base amount: $39.7 million.

Compute the regular tax credit for 2003:

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[11] U.S. Office of Technology Assessment, *The Effectiveness of Research and Experimentation Tax Credits* (Washington: 1995), p. 29.

1. Begin with the qualified research expenses for 2003 of $70 million and subtract the base amount ($39.7 million) or 50% of the qualified research expenses for 2003 ($35 million), whichever is greater: $30.3 million.
2. Multiply this amount by 20% to determine the regular R&E tax credit for 2003: **$6.06 million**.

Calculation: Alternative Incremental R&E Tax Credit

1. Calculate the average annual gross receipts for the four previous years (1999-2003): $992.5 million.
2. Multiply this amount by 1% and 1.5% and 2%: $9.925 million, $14.887 million, and $19.850 million.
3. Begin with the qualified research expenses for 2003 ($70 million) and subtract 1% and 1.5% and 2% (respectively) of the average annual gross receipts for 1999 to 2002: $60.075 million, $55.113 million, and $50.150 million.
4. Multiply the difference between $60.075 million and $55.113 million by 0.0265: $0.131 million.
5. Multiply the difference between $55.113 and $50.150 by 0.032: $0.159 million
6. Multiply $50.150 million by 0.0375: $1.881 million.
7. Sum the totals from steps 4, 5, and 6 to determine the alternative incremental R&E tax credit: **$2.17 million**.

Alternative Incremental Research Credit

Firms undertaking qualified research that cannot claim the regular credit have the option of claiming the alternative incremental R&E tax credit (or AIRC), under IRC section 41(c)(4). When a firm elects to claim the AIRC in a particular tax year, it must continue to do so in future tax years, unless the firm receives permission from the IRS to switch to the regular credit. Some are concerned that such a rule deters firms from claiming the AIRC, even though they may be better off doing so.

The definition of QREs for the AIRC is the same as the definition of QREs for the regular credit. But that is where the similarity between the two credits ends. Unlike the regular credit, which is equal to 20% of QREs in excess of a base amount, the AIRC is equal to 2.65% of a firm's QREs above 1% but less than 1.5% of its average annual gross receipts in the previous four tax years, plus 3.2% of its QREs above 1.5% but less than 2.0% of its average annual gross receipts in the previous four tax years, plus 3.75% of its QREs greater than 2.0% of its average annual gross receipts in the previous four tax years.

In general, firms can benefit from the AIRC if their QREs in the current tax year exceed 1% of their average annual gross receipts during the past four tax years. In addition, the AIRC is likely to be of greater benefit than the regular credit to business taxpayers with relatively high fixed-base percentages, or whose research spending is declining, or whose sales are growing much faster than their research spending. (See **Table 1** for a calculation of the AIRC for a hypothetical established firm, and **Table 2** for a calculation of the AIRC for a hypothetical start-up firm.)

Table 2. Sample Calculations of the Regular and Alternative Incremental R&E Tax Credits in 2003 for a Start-up Firm

($ millions)

Year	Gross Receipts	Qualified Research Expenses
1995	30	35
1996	42	40
1997	56	48
1998	60	55
1999	210	65
2000	305	73
2001	400	82
2002	475	90
2003	600	105

Source: Congressional Research Service.

Calculation: Regular R&E Tax Credit

Compute the fixed-base percentage:

1. By definition, the firm is a start-up. According to current law, a start-up firm's fixed-base percentage is fixed at 3% for each of the five years after 1993 when it has both gross receipts and qualified research expenses, and then it adjusts according to a formula over the next six years to reflect the firm's actual research intensity. Thus, the fixed-base percentages are 3% for 1995 through 1999, 7.4% in 2000, 8.8% in 2001, 12.0% in 2002, and 14.7% in 2003.

Compute the base amount for 2003:

1. Calculate the average annual receipts for the four previous years (1999-2002): $347.5 million.
2. Multiply this amount by the fixed-base percentage to determine the base amount: $51.1 million.

Compute the regular tax credit:

1. Begin with the qualified research expenses for 2003 ($105 million) and subtract the base amount ($51.1 million) or 50% of the qualified research expenses for 2003 ($52.5 million), whichever is greater: $52.5 million.
2. Multiply $52.5 million by 20% to determine the regular R&E tax credit for 2003: **$10.5 million**.

Calculation: Alternative Incremental R&E Tax Credit

1. Calculate the average annual gross receipts for the four previous years (1999-2002): $347.5 million.
2. Multiply this amount by 1%, 1.5%, and 2%: $3.475 million, $5.212 million, and $6.950 million.
3. Begin with the qualified research expenses for 2003 ($105 million) and subtract 1.0%, 1.5%, and 2.0% (respectively) of the average annual gross receipts for 1999 to 2002: $101.525 million, $99.788 million, and $98.05 million.

4. Multiply the difference between $101.525 million and $99.788 million by 0.0265: $0.046 million.
5. Multiply the difference between $99.788 million and $98.05 million by 0.032: $0.056 million.
6. Multiply $98.05 million by 0.0375: $3.779 million.
7. Sum the totals from steps 4, 5, and 6 to determine the alternative incremental R&E tax credit: **$3.78 million**.

Basic Research Credit

Firms joining with certain nonprofit organizations to perform basic research under contract may claim a tax credit for some of their expenditures for this purpose under IRC Section 41(e). A primary aim of the credit is to foster collaborative research between U.S. firms and colleges and universities. The credit is equal to 20% of total payments for qualified basic research above a base amount, which is known as the "qualified organization base period amount." This amount has little in common with the base amount for the regular R&E tax credit, except that both amounts are intended to approximate what firms would spend on qualified research if there were no credits.[12] Basic research is defined as "any original investigation for the advancement of scientific knowledge not having a specific commercial objective." The credit does not apply to basic research done outside the United States, or to basic research in the social sciences, arts, or the humanities. In addition, the basic research credit applies only to payments for basic research performed under a written contract by the following organizations: educational institutions, nonprofit scientific research organizations (excluding private foundations), and certain grant-giving organizations. Payments made to joint research consortia involving two or more firms, or to federal laboratories, for basic research do not qualify for the credit.

Firms conducting their own basic research may not claim the credit for their expenditures for this purpose, but they may be added to their QREs for the regular credit. And basic research payments eligible for the credit that do not exceed the base amount are treated as contract research expenses and may be included in the QREs for the regular credit.

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[12] Calculating a firm's base amount for the basic research credit is more complicated than calculating its base amount for the regular credit. For the basic research credit, a firm's base period is the three tax years preceding the first year in which it had gross receipts after 1983. The base amount is equal to the sum of a firm's minimum basic research amount and its maintenance-of-effort amount in the base period. The former is the greater of 1% of the firm's average annual in-house and contract research expenses during the base period, or 1% of its total contract research expenses during the base period. For a firm claiming the basic research credit, its minimum basic research amount cannot be less than 50% of the firm's basic research payments in the current tax year. The latter is the difference between a firm's donations to qualified organizations in the current tax year for purposes other than basic research and its average annual donations to the same organizations for the same purposes during the base period, multiplied by a cost-of-living adjustment for the current tax year.

Energy Research Credit

Under IRC section 41(a)(3), business taxpayers may claim a tax credit equal to 20% of payments to certain entities for energy research. To qualify for the credit, the payments must be made to a nonprofit organization that is exempt from taxation under IRC section 501(a) and "organized and operated primarily to conduct energy research in the public interest." In addition, a minimum of five discrete entities must contribute to the organization for energy research in a calendar year, and none of these entities may account for more than half of funds received by the organization for such research.

The credit also applies to the full amount of payments to colleges and universities, federal laboratories, and certain small firms for energy research performed under contract. In the case of small firms, q business taxpayer may claim the credit only under two conditions. First, the taxpayer cannot own 50% or more of the firm's stock (if the firm is a corporation), or capital and profits (if the firm is a non-corporate entity such as a partnership). Second, the firm must have employed an average of 500 or fewer individuals in one of the previous two calendar years.

Because the credit is flat rather than incremental, it is more generous than the any of the three other components of the research tax credit.

Legislative History of the Research Tax Credit

The R&E tax credit entered the tax code as a temporary provision through the Economic Recovery Tax Act of 1981 (P.L. 97-34). In establishing the credit, the 97th Congress was seeking to reverse a decline in spending on R&D by the private sector as a share of U.S. gross domestic product that commenced in the late 1960s and continued through the late 1970s. Some analysts thought the decline played a significant role in the slowdown in U.S. productivity growth and the unsettling loss of competitiveness by a variety of U.S. industries in that decade. Congress concluded that a "substantial tax credit for incremental research and experimental expenditures was needed to overcome the reluctance of many ongoing companies to bear the significant costs of staffing and supplies, and certain equipment expenses such as computer charges, which must be incurred to initiate or expand research programs in a trade or business."[13]

The initial credit was equal to 25% of qualified research spending above a base amount, which was equal to average spending on such research in the three previous tax years or 50% of current-year spending, whichever was greater. It is not clear from available information why a statutory rate of 25% was chosen. Nonetheless, the rate does not appear to have been based on a rigorous assessment of the gap between private and social returns to business R&D investment, or the sensitivity of R&D expenditures to declines in the after-tax cost of R&D. Any taxpayer that claimed the

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[13] U.S. Congress, Joint Committee on Taxation, *General Explanation of the Economic Recovery Tax Act of 1981,* joint committee print, 97th Cong., 1st sess. (Washington: GPO, 1981), p. 120.

credit but could not apply the entire amount against its current-year federal income tax liability was allowed to carry the excess back as many as three tax years or carry it forward as many as 15 tax years. The credit was in effect from July 1, 1981, to December 31, 1985.

Congress made the first significant changes in the original credit with the passage of the Tax Reform Act of 1986 (P.L. 99-514). Among of host of changes in the tax code, the act extended the credit through December 31, 1988 and made it part of the general business credit, thereby subjecting it to a yearly cap. In addition, the act lowered the statutory rate to 20%, modified the definition of QREs so that the credit applied to research intended to produce new technical knowledge useful in the commercial development of new products and processes, and created a separate 20% incremental tax credit for payments to universities and certain other nonprofit organizations for the conduct of basic research under a written contract. The reduction in the credit's rate seemingly was not based on an analysis of the credit's effectiveness in the first five years. Rather, it reflected the intent of Congress to subject the credit to the overriding goals of the act — which were to lower income tax rates across the board, broaden the income tax base, and narrow the differences among the tax burdens on most business assets — and a recognition that business R&D investment already received preferential treatment under the IRC section 174 expensing allowance.[14]

The regular research and basic research credits were further altered by the Technical and Miscellaneous Revenue Act of 1988 (P.L. 100-647). Specifically, the act extended the credits through December 31, 1989. It also curtailed the overall tax preference for R&D investment by requiring business taxpayers to reduce any deduction they claim for qualified research spending under IRC section 174 by half of the total amount of any regular and basic research credits they claim. This rule had the effect of lowering the maximum effective rate of the regular research tax credit by a factor equal to 0.5 times a taxpayer's marginal income tax rate.

Continuing disenchantment with the design of the original credit among interested parties led to the enactment of further important changes in the regular credit through the Omnibus Budget Reconciliation Act of 1989 (OBRA89, P.L. 101-239). Much of the disenchantment was directed at the formula for determining the base amount of the credit. Critics rightly pointed out that under the formula — which was based on a three-year moving average of a firm's annual spending on qualified research — an increase in a firm's research spending from one year to the next would increase its base amount in each of the following three years by one-third of the increase in research spending, making it more difficult to claim the credit in that period. Some maintained that such a design would be less cost-effective in spurring continuous increases in business R&D investment than one in which a firm's base amount is independent of its spending on qualified research.[15]

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[14] U.S. Congress, *General Explanation of the Tax Reform Act of 1986*, joint committee print, 100th Cong., 1st sess. (Washington: GPO, 1987), p.130.

[15] See U.S. Congress, Joint Economic Committee, *The R&D Tax Credit: An Evaluation of Evidence on Its Effectiveness*, joint committee print, 99th Cong., 1st sess. (Washington: GPO, (continued...)

To address this concern, OBRA89 modified the formula for the base amount so that the amount was equal to the greater of 50% of its current-year QREs, or the product of the firm's average annual gross receipts in the previous four tax years and its "fixed-base percentage." This percentage was set equal to the ratio of a firm's total QREs to total gross receipts in the four tax years from 1984 to 1988, with the percentage capped at 16%. OBRA89 also made the credit available on more favorable terms to start-up firms, which it defined as firms that did not have gross receipts and QREs in three of the four years from 1984 to 1988; these firms were assigned a fixed-base percentage of 3%. In addition, the act effectively extended the credits to December 31, 1990 by requiring that QREs incurred before January 1, 1991 be prorated, permitted firms to apply the regular credit to QREs related to current lines of business and to possible future lines of business, and required firms claiming the regular and basic research credits to reduce any deduction they claim under IRC section 174 by the entire amount of the credits.

In 1990 and 1991, Congress passed two bills that, among other things, temporarily extended the credits. The Omnibus Budget Reconciliation Act of 1990 (P.L. 101-508) extended the credits through December 31, 1991 and repealed the requirement that QREs made before January 1, 1991 be prorated. The Tax Extension Act of 1991 (P.L. 102-227) further extended the credits to June 30, 1992. A major obstacle to longer extensions of the credits — then and now — was the revenue cost of doing so in the midst of rising federal budget deficits.

Although Congress passed two bills in 1992 that would have extended the credits beyond June 30 of that year, President George H. W. Bush vetoed both for reasons that had nothing to do with the credit. As a result, the credits expired and remained suspended from July 1, 1992 until the enactment of the Omnibus Budget Reconciliation Act of 1993 (OBRA93, P.L. 103-66) in August 1993. The act extended the credits retroactively from July 1, 1992 through June 30, 1995. It also modified the fixed-base percentage for start-up firms. Under OBRA93, firms lacking gross receipts in three of the years from 1984 to 1988 were assigned a percentage of 3% for the first five tax years after 1993 in which it reported QREs. Starting in a firm's sixth year, the percentage was to adjust gradually so that by its eleventh year the percentage would reflect its actual ratio of total QREs to total gross receipts in five of its previous six tax years.

Congressional inaction allowed the credits to expire again on June 30, 1995. They remained in abeyance until the enactment of the Small Business Job Protection Act of 1996 (P.L. 104-188) in August 1996. The act retroactively reinstated the credits from July 1, 1996, to May 31, 1997, leaving a one-year gap in the credit's coverage from its inception in mid-1981. It also expanded the definition of a start-up firm to include any firm whose first tax year with both gross receipts and QREs was 1984 or later, added an alternative incremental research credit (i.e., the AIRC) with initial rates of 1.65%, 2.2%, and 2.75%, and made 75% of payments for qualified research to nonprofit organizations "operated primarily to conduct scientific research" eligible for the regular or alternative incremental credits.

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[15] (...continued)
1985), pp. 17-22.

The credits yet again expired in 1997, but they were extended retroactively from June 1, 1997, to June 30, 1998, by the Taxpayer Relief Act of 1997 (P.L. 105-34), which President Clinton signed in October 1997. In the following year, the revenue portion of the Omnibus Consolidated and Emergency Supplemental Appropriations Act, 1998 (P.L. 105-277) further extended the credits from July 1, 1998, to June 30, 1999.

In a reprise of 1997, the credits expired again in 1999, and Congress passed a bill late in the year reinstating them retroactively. Under the revenue portion of the Ticket to Work and Work Incentives Improvement Act of 1999 (P.L. 106-170), the credits were extended from July 1, 1999, to June 30, 2004. The act also increased the three rates of the AIRC to 2.65%, 3.2%, and 3.75% and expanded the definition of qualified research to include qualified research performed in Puerto Rico and the other territorial possessions of the United States.

On October 4, 2004, President Bush signed into law the Working Families Tax Relief Act of 2004 (P.L. 108-311), which included a provision extending the research tax credit through December 31, 2005.

Finally, the Energy Policy Act of 2005 (P.L. 109-58) added a fourth component to the research tax credit by establishing a credit equal to 20% of all payments to qualified consortia, colleges and universities, federal laboratories, and eligible small firms for contract energy research.

Beginning in the mid-1990s, a cycle emerged every time the credits were about to expire, one that seems to have persisted to the present. The cycle starts with supporters of the credit in Congress and among influential business groups calling for a permanent extension of the credits and issuing stern denunciations of what they see as the folly of repeated temporary extensions.[16] In the next stage of the cycle, leaders in both houses of Congress undertake serious negotiations on tax legislation that often includes a permanent extension of the credit. But in the end, Congress and the President agree to extend the credit one or two years, stymied by a recurring inability to reconcile the revenue cost of such an extension with their budget priorities.

Effectiveness of the Research Tax Credit

Perhaps the most important policy issue raised by the credit concerns how effective it has been in the 25 years of its existence. There are two basic approaches to assessing the credit's effectiveness.

Among economists, the preferred approach is to compare the social benefit from any added R&D engendered by the credit with the social cost of that R&D. Such a comparison involves measuring the returns to society of the added R&D spending and the social cost of all other possible public uses of this R&D (e.g., corporate

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[16] Martin A. Sullivan, "Research Credit Hits New Heights, No End in Sight," *Tax Notes*, vol. 94, no. 7, Feb. 18, 2002, p. 801.

income tax rate cut, deficit reduction, increased federal spending on higher education, or pollution abatement). The social cost of the credit can be thought of as the net loss of tax revenue because of the credit and the public and private costs of administering the credit. Unfortunately, this approach to assessing the effectiveness of the research tax credit cannot be used because of difficulties in measuring the social returns to R&D.[17]

As a result, economists have been forced to rely on a second, less sweeping approach: estimating the additional R&D (if any) stimulated by the credit and comparing the value of that R&D to the tax revenue lost because of the credit. Such an approach rests on two assumptions: (1) that the social returns to R&D far exceed the private returns and (2) that it is possible to determine the optimal size of the subsidy for R&D.

An interesting policy question raised by this approach concerns whether the subsidy should be offered as a tax credit or as a direct payment (e.g. research grant or subsidized loan). If the value of the added R&D engendered by the credit were to exceed the credit's revenue cost, then it may be the case that the tax credit is a more cost-effective way to boost private R&D investment than direct payments. But if the revenue cost were to exceed the value of the added R&D, then it may be more cost-effective for the federal government to pass up the credit in favor of direct payments.[18]

Nonetheless, the question of whether the credit is more desirable than direct payments as a means of boosting business R&D investment cannot be answered solely on the basis of such a narrow comparison of cost and benefit. There are circumstances in which a ratio of less than one does not necessarily mean that direct payments are preferable to the credit as an R&D subsidy, and there are circumstances in which a ratio of more than one does not necessarily mean that the credit is preferable to a direct payment. On the one hand, if the average social returns to business R&D investment are much higher than the average private returns, then it is possible for social welfare to be enhanced through the use of the credit even though the revenue cost of the credit exceeds the value of the added research it induces. In this case, the credit could be considered a desirable and effective policy instrument for raising business R&D investment. On the other hand, if the average social returns to business R&D investment are only slightly greater than the average private returns, then use of the credit might encourage firms to engage in too much R&D from the perspective of social welfare, even if the added R&D induced by the credit were to exceed its revenue cost. In this case, social welfare might be enhanced more if the

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[17] The principal barriers to measuring the social returns to R&D are developing adequate price indices for the cost elements of R&D for specific industries, specifying the time period in which to assess the productivity gains from R&D, and determining the depreciation rate for a society's stock of R&D assets. For a detailed discussion of these issues, see Bronwyn H. Hall, "The Private and Social Returns to Research and Development," in *Technology, R&D, and the Economy*, Bruce L. Smith and Claude E. Barfield, eds. (Washington: Brookings Institution, 1996), pp. 141-145.

[18] This argument assumes that government research grants to the private sector do not lead firms receiving the grants to reduce their own R&D spending by similar amounts.

federal government were to use the tax revenue lost to the credit for purposes with greater social returns, and the credit could be seen as a less than desirable policy instrument.

What do existing studies of the credit's effectiveness say about its benefit-to-cost ratio? For the most part, the studies are an exercise in counterfactual analysis. They seek to answer the following question: how much more R&D did firms undertake as a result of the credit than they would have undertaken if there were no credit? Researchers use a variety of methods to estimate the amount of R&D undertaken with and without the credit. These methods were examined in a 1995 study by economist Bronwyn Hall.[19] She found that studies based on data from 1981 to 1983 differed markedly from those based on data from years after 1983. More specifically, she found that the former set of studies generated estimates of the additional R&D undertaken per dollar of the credit that were considerably lower than the estimates offered by the latter set of studies. Taking into consideration the strengths and weaknesses of both sets of studies, Hall concluded that the credit (as of 1995) led to a "dollar-for-dollar increase in reported R&D spending on the margin."[20] This meant that it had a benefit-to-cost ratio of one. (In other words, each dollar of the credit stimulated one additional dollar of R&D investment.)

In theory, the credit stimulates increased business R&D investment by lowering the after-tax cost of undertaking another dollar of R&D beyond some normal (or base) amount. Firms can be expected to respond to this reduction in cost by spending more on R&D, all other things being equal. So the critical considerations in determining the share of business R&D investment in a year that can be attributed to the credit are the responsiveness of business R&D investment to decreases in its after-tax cost and the extent to which the credit lowers the average after-tax cost of conducting R&D.

Little research has been done on how responsive business R&D investment is to changes in its after-tax cost — as measured by the price elasticity of R&D spending. The few available studies have come up with estimates of the long-run price elasticity ranging from -0.2 to -2.0. These results imply that a decline in the after-tax cost of R&D of 10% can be expected to produce a rise in R&D spending in the long run of anywhere from 2% to 20%. In an analysis of the President Bush's FY2004 budget proposal, the Joint Tax Committee noted that "the general consensus when assumptions are made with respect to research expenditures is that the price elasticity of research is less than -1.0 and may be less than -0.5."[21]

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[19] See Bronwyn H. Hall, *Effectiveness of Research and Experimentation Tax Credits: Critical Literature Review and Research Design*, report prepared for the Office of Technology Assessment, June 15, 1995, pp. 11-13, available at [http://emlab.berkeley.edu/users/bhhall/papers/BHH95%200Artax.pdf].

[20] Ibid., p. 18.

[21] U.S. Congress, Joint Committee on Taxation, *Description of Revenue Provisions Contained in the President's Fiscal Year 2004 Budget Proposal*, joint committee print, JCS-7-03, 108th Cong., 1st sess. (Washington, March 2003), p. 250.

Much less doubt surrounds the impact of the credit on the after-tax cost of qualified research: basically, one dollar of the credit reduces this cost by one dollar. In offering such a credit, the federal government (or U.S. taxpayers) effectively is sharing the cost of qualified research. Consequently, a measure of the overall reduction in the after-tax cost of domestic business R&D investment as a result of the credit is the credit's average effective rate, which is the ratio of the total amount of claims for the credit in a year to some measure of domestic business R&D spending, such as QRE.

From the figures in **Table 3**, this rate can be computed for both QRE and industry R&D spending. In 1996 to 2003, the average effective rate of the credit was 3.3% for industry R&D spending and 5.5% for QRE. This implies that the credit lowered the after-tax cost of domestic business R&D by 3.3% and the after-tax cost of qualified research by 5.5% over that period.

The gap between the rates reflects the differences between QRE and industry R&D spending, as estimated by the National Science Foundation (NSF). On average, total QRE was about 60% of business R&D spending from 1996 to 2003. The NSF estimate aims to measure all R&D performed in the United States by firms and funded by industry and other non-federal entities. It is based on annual surveys of R&D in industry and covers the wages, salaries, and fringe benefits of research personnel, as well as the cost of materials and supplies, overhead expenses, and depreciation related to research activities; expenditures on plant and equipment used in research are excluded, however.[22] By contrast, QRE is the sum of spending on research eligible for the credit, as reported by firms claiming the credit on their tax returns, and covers wages and salaries, materials and supplies, leased computer time, and 65% or 75% of contract research funded by these firms. One would expect industry R&D spending to be greater, because it covers a broader array of R&D expenses than QRE.

What can be said about the overall impact of the credit on domestic R&D? The figures in **Table 3** indicate that the credit delivered a modest stimulus to domestic business R&D investment from 1996 to 2003. Specifically, assuming that the price elasticity of demand for R&D is between -0.5 and -1.0 and the average effective rate of the credit is .033, the credit might have boosted business R&D investment by 1.65% to 3.3% over that period.

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[22] National Science Foundation, Division of Science Resource Statistics, *The Methodology Underlying the Measurement of R&D Expenditures: 2000 (data update)* (Arlington, VA: Dec. 10, 2001), p. 2.

Table 3. U.S. Industrial R&D Spending, Federal R&D Spending, and the Research Tax Credit, 1996 to 2003
($ billions)

	1996	1997	1998	1999	2000	2001	2002	2003
Industry R&D Spending[a]	121.0	133.6	145.0	160.3	180.4	181.6	177.5	183.3
Qualified Research Spending[b]	38.3	85.3	95.9	102.7	109.9	99.8	116.1	124.5
Federal R&D Spending[c]	70.6	73.5	75.3	80.3	83.1	91.2	102.0	117.4
Current-Year Research Tax Credit[d]	2.2	4.5	5.3	5.3	7.2	6.5	5.8	5.6

Source: National Science Foundation, Division of Science Resources Statistics, *InfoBrief: Increase in U.S. Industrial R&D Expenditures Reported for 2003 Makes Up For Earlier Decline*; National Science Foundation, Division of Science Resources Statistics, *Survey of Federal Funds for Research and Development: Fiscal Years 2000, 2001, and 2002*; Internal Revenue Service, Statistics of Income Division, e-mail data transmissions.

a. Total spending on domestic industrial R&D by companies and other non-federal entities, including nonprofit organizations and state and local governments.
b. Spending on research that qualifies for the regular and alternative incremental research tax credits as reported by business taxpayers claiming the credit on their federal income tax returns.
c. Budget authority for Federal defense and non-defense R&D spending by fiscal year.
d. Total value of claims for the regular, incremental and basic research tax credits included on federal income tax returns. Because of limitations on the use of the general business credit, of which the research credit is a component, the total amount of the research credit allowed in a particular year is likely to differ from the amount claimed.

Policy Issues Raised by the Current Research Tax Credit

Although most policy analysts and lawmakers back the use of tax incentives to spur increased domestic business R&D investment, the research tax credit authorized by IRC Section 41 seems to attract more criticism than praise. A major concern is that the credit is less effective than it might be because of what critics see as flaws in its present design. In their view, the credit will yield its intended benefits only if these problems are fixed. Critics cite five problems in particular: (1) the credit is not a permanent provision of the IRC; (2) it has weak and arbitrary incentive effects; (3) it is not refundable; (4) the definition of qualified research is inadequate and remains unsettled; and (5) the credit appears to subsidize R&D investment that generates greater private returns than social returns. Each problem is examined in turn below.

Lack of Permanence

The R&E tax credit expired on December 31, 2005, and a variety of bills are being considered in the current Congress to extend the credit retroactively. It has never been a permanent provision of the IRC, despite repeated attempts in Congress to extend it permanently in the past decade.[23] In fact, the credit has been extended 11 times, most recently by the Working Families Tax Relief Act of 2004 (P.L. 108-311).

This lack of permanence is a matter of concern because it is thought to diminish the credit's incentive effect. As critics of the design of the current credit are wont to point out, many R&D projects have planning horizons extending beyond a year or two. They also point out that if business managers cannot count on receiving the credit over the expected life of an R&D project, then it is unlikely to influence decisions on the size of annual R&D budgets, even if a credit exists when the decisions are made. Instead of boosting R&D investment, a temporary R&D tax credit could end up restraining it by compounding the considerable uncertainty that typically surrounds projected after-tax returns on planned R&D investments. This added uncertainty may convince managers not to pursue R&D projects they would be inclined to undertake if the credit were permanent.

Nonetheless, not all firms investing in R&D are likely to be equally affected by a temporary research tax credit. Those with relatively long R&D planning horizons and relatively high fixed R&D investment costs can be expected to be more sensitive to uncertainty in the availability of the credit than those with shorter horizons and more flexible investment costs. For example, the R&D investment plans of pharmaceutical firms could be affected more by a temporary research tax credit than those of software firms, simply because pharmaceutical R&D projects tend to have much longer planning horizons and require much greater initial investment in plant and equipment and staff training than do software R&D projects.

Weak and Disparate Incentive Effect

Critics maintain that another major problem with the credit lies in its incentive effect. In their view, this effect varies among firms conducting qualified research in ways that are not supported by economic theory and that thwart the credit's purpose. The incentive effect is also thought to be too weak to produce the levels of business R&D investment warranted by its overall returns. Critics attribute these shortcomings to the design of the regular and alternative incremental credits.

Uneven Incentive Effect. The regular credit's incentive effect appears to vary widely among firms investing in qualified research, including those that steadily increase their R&D investment over an extended period. Evidence for such variation can be found in a 1996 study by economist William Cox that looked at the firms with sizable research budgets in 1994 that could have claimed the regular R&E tax credit.

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[23] The R&E tax credit has been in effect for each year between July 1, 1981, and the present except for period from July 1, 1995, to June 30, 1996, when it expired. Since July 1, 1996, the credit has not been renewed to include this period.

The starting point for the study was a sample of 900 publicly traded U.S.-based firms with the largest R&D budgets culled by Cox from a database maintained by Compustat, Inc. On the defensible assumption that combined QREs for these firms in 1994 were equal to 70% of their reported R&D spending, Cox determined that 62.5% of the firms could be considered established firms because they had both business revenue and QREs in three of the years from 1984 to 1988; the remainder were treated as start-up firms. Cox found that 78% of the 900 firms in the sample (44.4% of the established firms and 33.5% of the start-up firms) could have claimed the R&E tax credit in 1994, while 22% could have claimed no credit (18% of established firms and 4% of start-up firms).[24] He also found that 34% of all firms (32.3% of established firms and 1.7% of start-up firms) had QREs greater than their base amounts but less than twice those amounts, allowing them to claim credits with a marginal effective rate of 13%, and that 43.8% of all firms had QREs greater than double their base amounts, enabling them to claim credits with a marginal effective rate of 6.5%.[25] These rates measure the reduction in the after-tax cost of qualified research because of the credit. In addition, Cox discovered that some of the most research-intensive firms could claim either no credit or credits with marginal effective rates half as large as the rates of the estimated credits claimed by firms with much lower research intensities.

The results indicated that the credit was most beneficial to firms whose research intensities had grown since their base periods and least beneficial to firms whose research intensities had changed little or not at all or had shrunk since their base periods. Firms whose research intensities had diminished found themselves in that position for two reasons: (1) their R&D spending was lower in 1994 relative to their base period; or (2) their sales revenue had grown faster than their R&D expenditures over the same time span.

Critics of the current research credit say that such a pattern of R&D subsidization is unfair and arbitrary, has no justification in economic theory, and contravenes the intended purpose of the credit, which is to encourage firms to spend more on R&D than they otherwise would in an effort to bolster their competitiveness and the prospects for future growth in the U.S. economy. Cox noted that the widely varying marginal effective rates of the research credit that R&D-performing firms included in his study could claim "imply that society places a higher value on adding R&D at certain firms than at others and on adding R&D of certain types than others, when little or no basis for such different valuations exists."[26]

There are two basic reasons for the credit's disparate incentive effects: the rule requiring the base amount for the regular credit to be equal to no less than 50% of

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[24] CRS Report 96-505, *Research and Experimentation Tax Credits: Who Got How Much? Evaluating Possible Changes*, by William A. Cox, pp. 5-10. (The report is out of print. Copies may be obtained from Gary Guenther (202) 707-7742, upon request.) (Hereafter cited as Cox, *Research and Experimentation Tax Credits*.)

[25] Their effective credit rate was lower because each firm was subject to the 50-percent rule, which reduced the marginal effective rate of the credit on R&D spending above the base amount by 50%.

[26] Cox, *Research and Experimentation Tax Credits*, p. 10.

QREs, and the rule requiring established firms to use a fixed-base period of 1984 to 1988 in computing their fixed-base percentages. This period bears no relationship to current economic or competitive conditions in most industries. As a result, many of the firms that have existed since the early 1980s and invested heavily in R&D relative to revenue back then now face a different set of incentives to invest in R&D. In some cases, these incentives have led to much lower research intensities. Firms in this position cannot claim the R&E tax credit, even though they still spend substantial sums on R&D.[27]

Weak Incentive Effect. In claiming that the credit's incentive effect is too weak, critics have in mind some estimate of the credit rate necessary to raise business R&D investment to socially optimal levels, as well as differences between the regular credit's statutory rate and its average marginal effective rate. Both aspects of this alleged weakness are examined here.

Current R&D Tax Incentives are Inadequate. Some maintain that the average effective rate of the credit is too low to boost business R&D investment to levels commensurate with its overall economic benefits. To lend empirical support to this contention, they point to another study by Cox, one that focused on the efficacy of the R&E tax credit.[28] Cox built his analysis around the premise that tax incentives can overcome the private sector's disposition to invest too little in the creation of new technical knowledge and know-how. For this to happen, the incentives must be designed so they target spending on R&D beyond what firms would undertake on their own, and they must be large enough to "raise private after-tax returns on R&D investments to the levels that would result from applying the same rate of taxation to the social rate of return from R&D."[29] A variety of researchers have concluded that the median private rate of return on R&D investment is roughly 50% of the median social rate of return.[30] Thus, assuming that the average social pre-tax rate of return is double the average private pre-tax rate of return, the optimal R&D tax subsidy would double the private after-tax rate of return to R&D investment. For example, at a corporate tax rate of 35%, after-tax returns would equal 65% of pre-tax returns for firms organized as corporations. In this case, the optimal R&D tax subsidy would double the private after-tax returns to R&D investment by elevating them to 130% of pre-tax returns [2 x (1 - 0.35)], thereby subsidizing private pre-tax returns by 30%.[31]

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[27] Two examples are aerospace and semiconductor chip manufacturers. See McGee Grisby and John Westmoreland, "The Research Tax Credit: A Temporary and Incremental Dinosaur," *Tax Notes*, vol. 93, no. 12, Dec. 17, 2001, p. 1633.

[28] See CRS Report 95-871, *Tax Preferences for Research and Experimentation: Are Changes Needed?*, by William A. Cox. (This report is out of print. Copies may be obtained from Gary Guenther at (202) 707-7742, upon request.) (Hereafter cited as Cox, *Tax Preferences for Research and Experimentation*.)

[29] Ibid., p. 8.

[30] See, for example, Edwin Mansfield, *The Positive Sum Strategy*, pp. 309-311.

[31] Cox, *Tax Preferences for Research and Experimentation*, pp. 7-8.

Cox's analysis implied that the optimal average effective rate for an R&D tax subsidy, or a combination of such subsidies (e.g., a research tax credit combined with expensing of research expenditures), was around 30%. In sorting through the policy implications of this finding, Cox noted that such a rate is an average and thus does not take into consideration the fact that the gap between private and social returns varies considerably among R&D projects and may shift over time. As a result, using the tax code to boost pre-tax returns on R&D investment by 30% across all industries would provide excessive subsidies for projects with below-average spillover benefits and insufficient subsidies for projects with above-average spillover benefits. According to Cox, lawmakers should be aware that "this imprecision is unavoidable, and its consequences are hard to assess."[32]

How do existing federal tax subsidies for R&D investment compare with Cox's estimate of the optimal R&D tax subsidy? To assess the incentive effect of current federal subsidies, he estimated the pre-tax and after-tax rates of return under then-current tax law for a variety of hypothetical R&D projects. The projects differed according to the share of R&D expenditures devoted to depreciable assets like structures and equipment, the share of R&D expenditures eligible for both expensing under IRC section 174 and the R&E tax credit, and the economic lives of the intangible assets created by the investments. Cox compared the combined effect of expensing and the credit on after-tax returns to investment in capital-intensive, intermediate, and labor-intensive R&D projects producing intangible assets with economic lives of 3, 5, 10, and 20 years.[33]

Expensing has the effect of equating the pre-tax and after-tax rates of return on an investment, as it taxes the income earned by affected assets at a zero marginal effective rate.[34] For the average business R&D investment, it is likely that only part of the cost may be expensed under IRC section 174, as the cost of tangible depreciable assets like structures and equipment does not qualify for such treatment. Therefore, the effect of expensing on an R&D investment's after-tax rate of return depends on both the percentage of the total cost that is eligible for expensing and the effective tax rate on income earned by assets eligible for expensing.

At the same time, the R&E tax credit raises the after-tax rate of return only on QREs above a base amount. So its effect on the after-tax returns to R&D investment depends on both the percentage of a project's cost that qualifies for the credit and the effective tax rate on income earned by assets eligible for the credit.

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[32] Ibid., p. 9.

[33] In the case of capital-intensive projects, 50% of outlays go to structures and equipment, 35% qualify for expensing and the credit, and 15% qualify for expensing alone. In the case of intermediate projects, 30% of outlays go to structures and equipment, 50% qualify for expensing and the credit, and 20% qualify for expending alone. And in the case of labor-intensive projects, 15% of outlays go to structures and equipment, 65% qualify for expensing and the credit, and 20% qualify for expensing only.

[34] See Jane G. Gravelle, "Effects of the 1981 Depreciation Revisions on the Taxation of Income from Business Capital," *National Tax Journal*, vol. 35, no. 1, Mar. 1982, pp. 2-3.

After allowing for these limitations on the benefits of expensing and the research tax credit, Cox estimated that expensing and the credit together give rise to median after-tax rates of return ranging from 101.0% of pre-tax returns for a hypothetical capital-intensive project yielding intangible assets with an economic life of 20 years to 124.7% for a hypothetical labor-intensive project yielding intangible assets with an economic life of three years.[35] The results led him to conclude that existing R&D tax subsidies did not increase private after-tax returns to R&D investments to the "levels warranted by the spillover benefits that are thought to be typical" for these investments.[36]

Significant Gap Between Average Effective Rate of the Credit and Its Statutory Rate. Some critics of the current research tax credit view the credit's incentive effect from a different perspective. To them, the critical consideration is any difference between the credit's average effective rate and its statutory rate of 20%. Such a difference would arise from three of the rules governing the use of the credit discussed earlier.

One of the rules is the basis adjustment under IRC section 280C(c)(1), which requires business taxpayers claiming the credit to reduce any deduction for research expenditures under IRC section 174 by the amount of the credit they claim. The adjustment has the effect of taxing the credit at a firm's marginal income tax rate. Consequently, at the maximum corporate and individual tax rates of 35%, the basis adjustment lowers the marginal effective rate of the credit from 20% to 13%. Business taxpayers have the option of computing the regular research credit at a rate of 13%, instead of reducing any deductions taken under section 174 and computing the credit at the rate of 20%.

A second rule is the 50% rule, which requires that the base amount for the credit not be less than 50% of a firm's current-year QREs. The rule affects established firms whose ratio of current-year QREs to gross income is more than double their fixed-base percentages, or more than double the 16% cap on the fixed-base percentage. It also affects start-up firms whose current-year ratio of QREs to gross income exceeds 6% during their first five tax years, or whose current-year ratio is more than double their fixed-base percentages in the next six tax years. For both sets of firms, the rule further reduces the marginal effective rate of the credit to 6.5%.

Yet another rule lowering this rate is the exclusion of expenditures for equipment and structures and overhead costs from expenses eligible for the credit — even though many business R&D investments involve the purchase of elaborate buildings and sophisticated equipment, and all R&D projects have overhead costs. The effect of the exclusion on the marginal effective rate of the credit depends on the share of an R&D investment that is ineligible for the credit: as this share rises, the rate falls, all other things being equal. For example, if expenditures for physical capital account for half of the cost of an R&D investment, then the marginal effective rate of the credit for the entire investment is half of what it would be if the entire cost were eligible for the credit. For firms that invest in R&D projects where physical capital represents 50%

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[35] Cox, *Tax Preferences for Research and Experimentation,* p. 15.

[36] Ibid., p. 17.

of the total cost and are subject to 50% rule, the marginal effective rate of the credit could drop to 3.25%.

The key to bolstering the credit's incentive effect is to increase its average effective rate. There are two ways to do so. One is to keep its current statutory rate and modify one or more of the three rules driving a wedge between the credit's marginal effective rate and its statutory rate. The second approach is to retain these rules but to increase the credit's statutory rate.

Cox assessed the impact of both options on after-tax rates of return for the same set of hypothetical R&D investments discussed above. In the case of labor-intensive R&D projects, he estimated that existing R&D tax preferences yielded median after-tax returns that were 124.7% of pre-tax returns for projects producing intangible assets with an economic life of three years, and 115.5% for projects producing intangible assets with an economic life of 20 years. Getting rid of the basis adjustment for the credit caused median after-tax returns to increase to 146.0% of pre-tax returns for assets with a three-year economic life, and 130.1% for assets with a 20-year economic life.[37] Increasing the statutory rate of the credit to 25% but retaining existing rules (including the basis adjustment) led to similar results: median after-tax returns for assets with a three-year economic life were an estimated 133.9% of pre-tax returns, and 121.9% for assets with a 20-year economic life.[38] As one might expect, increasing the rate to 25% and removing the basis adjustment led to the biggest boost in the ratio of after-tax returns to pre-tax returns: 165.8% for assets with a three-year economic life, and 143.4% for assets with a 20-year economic life.

Assuming that the optimal R&D tax subsidy would raise after-tax returns to 130% of pre-tax returns, Cox's analysis suggests that leaving the credit's statutory rate at the current level of 20% but removing or relaxing the three rules governing the credit's use might be the best policy option for significantly enhancing the credit's incentive effect.

Non-refundable Status

The R&E tax credit is non-refundable, which means that only firms with sufficiently large income tax liabilities may benefit from it. In addition, the credit is a component of the general business credit (GBC) and therefore subject to its limitations. For firms undertaking qualified research, a key limitation is that the GBC cannot exceed a taxpayer's net income tax liability, less the greater of its tentative minimum tax under the alternative minimum tax or 25% of its regular income tax liability above $25,000. Unused GBCs may be carried forward 20 years or back one year. Although there are some advantages to having an inventory of tax credits to apply against future tax liabilities, the disadvantages may outweigh the advantages. For smaller, newly created firms with sizable net operating losses, there is no certainty that stored credits can be used before they expire. In addition, the time value of

[37] Ibid., p. 27.

[38] Ibid., p. 27.

money means that a business taxpayer is better off using a tax credit now rather than five or 10 years from now.

Critics of the credit's design say that its non-refundable status poses a special problem for small, fledgling research-intensive firms. In recent decades, numerous commercially successful technological innovations have originated with such firms. Many of these firms have spent substantial sums on R&D, even though they lost large sums of money in their first few years of existence. In the view of critics, the credit's lack of refundability diminishes the typical small start-up firm's prospects for survival or growth because it cannot count on the credit as a possible source of funding for R&D investments. They argue that making the credit wholly or partially refundable for firms under a certain asset or employment size and age would strengthen the domestic climate for technological innovation.[39]

Unsettled Definition of Qualified Research

Another policy issue raised by the current research tax credit relates to the definition of qualified research. More specifically, firms investing in R&D face continuing uncertainty over how the IRS will interpret final regulations on the definition of qualified research issued in December 2003, and when the IRS will address certain key issues left unresolved by those regulations. Critics say this double-edged uncertainty undermines the effectiveness of the credit and inflates the cost of compliance with it. Lasting doubt about which research projects do and do not qualify for the credit may deter some firms from claiming it and may encourage others to re-label or repackage certain ordinary business expenses to make them eligible for the credit. Additionally, a lack of clarity over where the line is drawn between research that does and does not qualify for the credit sets the stage for costly, prolonged legal disputes between business taxpayers and the IRS over which claims for the credit are valid.

From 1981 through 1985, research that could be expensed under IRC section 174 also qualified for the credit, with three exceptions: the credit did not apply to research conducted outside the United States, research in the social sciences or humanities, or research funded by another entity. In response to mounting concerns that business taxpayers were claiming the credit for activities that had little to do with technological innovation, Congress tightened the definition by adding two tests through the Tax Reform Act of 1986.[40] Under the act, qualified research still had to satisfy the criteria for qualified research under IRC section 174. But it also was required to serve the purpose of discovering information that is technological in nature and useful in the development of a new or improved product, process, or some other kind of intellectual property with commercial applications. And "substantially all" of the research had to involve a process of experimentation aimed at developing a new or improved

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[39] For further discussion of the possible benefits to small firms of making the credit wholly or partially refundable, see Scott J. Wallsten, "Rethinking the Small Business Innovation Research Program," in *Investing in Innovation*, Lewis M. Branscomb and James H. Keller, eds. (Cambridge, MA: MIT Press, 1998), pp. 212-214.

[40] See P.L. 99-514, Section 231.

function, performance, or quality for a product or process. The act also directed the IRS to issue regulations clarifying and implementing the new tests.

Nearly 12 years passed before the IRS issued proposed regulations on the definition of qualified research in December 1998. Its release provoked a storm of controversy. Two key issues addressed by the proposal were how to identify information that is technological in nature and what it means to discover such information. Most of the comments on the proposed regulations received from tax practitioners and business taxpayers were critical of positions staked out by the IRS. In response, the agency made some changes in the proposal and issued what was intended to be a final set of regulations in December 2000 (T.D. 8930). But about a month later, the Treasury Department published a notice (Notice 2001-19) retracting those regulations, requesting further comment "on all aspects" of them, promising a careful review of all questions and concerns raised about the suspended regulations, and pledging to issue any changes to the final regulations in proposed form for additional comment.[41] In December 2001, the IRS fulfilled the pledge by releasing a another set of proposed regulations (REG-112991-01). Tax practitioners generally responded favorably to the proposal.[42]

On December 30, 2003, the IRS published final regulations (T.D. 9104) in the *Federal Register* clarifying the definition of qualified research.[43] The regulations made some important changes to previous guidance, while reassuring business taxpayers that the IRS would not challenge positions taken by them if they were consistent with previous regulations.

Under T.D. 9104, information is considered technological in nature if the process used to discover the information draws on the principles of the physical or biological sciences, engineering, or computer science. In addition, the regulations state that taxpayers do not need to demonstrate that the information "exceeds, expands, or refines the common knowledge of skilled professionals in the particular field of science or engineering in which the taxpayer is performing the research" for it to be considered technological in nature.

The regulations also explain what it means to engage in a "process of experimentation." Basically, such a process has three elements. First, the outcome of a process of experimentation must be uncertain at the outset. Second, the process must enable researchers to identify a variety of alternative approaches to achieving a desired outcome. And third, the researchers must use certain scientific methods for

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[41] Sheryl Stratton, "Treasury Puts Brakes on Research Credit Regs; Practitioners Applaud," *Tax Notes*, vol. 90, no. 6, Feb. 5, 2001, pp. 713-715.

[42] For more details on the latest set of proposed regulations and reactions to them in the business community, see David Lupi-Sher and Sheryl Stratton, "Practitioners Welcome New Proposed Research Credit Regulations," *Tax Notes*, Dec. 24, 2001, vol. 93, no. 13, pp. 1662-1665.

[43] Alison Bennett, "IRS Issues Final Research Credit Rules With Safe Harbor For Qualified Activities," *Daily Report for Executives*, Bureau of National Affairs, Dec. 23, 2003, p. GG-2.

evaluating these alternatives (e.g., modeling, simulation, and a systematic trial-and-error investigation).

Although the regulations clarified a number of important questions, they did not address an issue that is important to many firms: whether or not research to develop internal-use software is eligible for the credit. In proposed regulations issued in 2001, the IRS stated that any costs incurred to develop such software were eligible for the credit only if the software was intended to be unique or novel and to differ in a "significant and inventive" way from previous software. Not surprisingly, the meaning of "significant and inventive" has been a subject of contentious debate between IRS examiners and taxpayers ever since. The regulations offer no guidance on this question.

Another unresolved issue with widespread reach is the definition of gross receipts for an affiliated group of companies. How these receipts are characterized helps determine a business taxpayer's base amount for the credit. Contradictory rulings by the IRS on this issue have caused considerable confusion for some U.S.-based multinational corporations with majority-owned foreign subsidiaries.[44]

Lack of Focus on R&D With Large Social Returns

Another key policy issue raised by the credit relates to its efficacy in spurring increased business investment in R&D projects yielding relatively large spillover benefits — or its "bang for the buck." Critics question whether an additional dollar of the credit leads to more investment in R&D with relatively high social returns than does an additional dollar of direct government spending on basic or applied research.

For many analysts and lawmakers, an advantage of the credit over direct spending is that private companies, and not the federal government, decide which R&D projects are subsidized. Under current federal tax law, firms claim the credit for projects they decide to fund, and the federal government ends up bearing some of the cost.[45] The tax subsidy enables market forces to determine which projects are pursued and which are jettisoned. Supporters of the credit believe that such an approach is more likely to promote valuable diversity in the search for new technical knowledge and knowhow than a direct subsidy such as federal R&D grants.

But some critics of the credit say that it does a poor job of targeting R&D projects with large external benefits. While there are no known data to test this claim, it seems plausible. In general, business managers and owners are driven to seek the highest possible return on investment. Consequently, in selecting R&D projects to pursue, they are likely to assign a higher priority to projects likely to earn substantial profits for their firms in the short run than to projects likely to expand the frontiers of knowledge in a scientific field but to yield relatively meager returns in the short run. Such a predisposition is reflected in domestic industrial R&D spending: in 2001,

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[44] Annette B. Smith, "Continuing Uncertainty on Research Credit Definition of Gross Receipts," *Tax Adviser*, vol. 35, no. 7, July 1, 2004, p. 407.

[45] Joseph E. Stiglitz, *Economics of the Public Sector* (New York: W.W. Norton, 2000), p. 348.

according to data published by the National Science Foundation, U.S. industry spent a total of $184.9 billion on R&D, of which 5% went to basic research, 22% to applied research, and 73% to development.[46] Such an allocation creates the impression that the credit is mainly subsidizing R&D projects with relatively modest social returns.

Some would modify the credit to give firms a stronger incentive to invest in basic research than in applied research or development. Among the options are redefining qualified research so that it applies only to basic research, and altering the basic research credit so that it applies to all basic research undertaken by a business taxpayer and offers a higher statutory rate than the regular R&E tax credit.

In deciding whether to modify the credit to make it a more effective tool for stimulating business investment in R&D projects with relatively high social returns, lawmakers should keep in mind that the federal government has long served as the primary source of funding for basic research performed in the United States. In 2004, the federal government funded 62% of this research, compared to shares of 16% for industry, 13% for colleges and universities, and 9% for other nonprofit organizations.[47] This preponderance is neither surprising nor unjustified, given that most firms are reluctant to invest more in basic research than applied research or development because of the difficulty of capturing all or most of the returns on investment in basic research and the greater uncertainty surrounding those returns.

Legislation in the 109th Congress to Change the Research Tax Credit

The research tax credit has enjoyed strong bipartisan support since its inception, and there is no reason to think that this support has weakened in the current Congress.

Numerous bills that would permanently extend the research tax credit have been introduced in the 109th Congress, most notably H.R. 1454, H.R. 1736, H.R. 2665, H.R. 4845, H.R. 5058, H.R. 5115, S. 14, S. 627, S. 2109, S. 2199, S. 2357, and S. 2720. Three of these measures (H.R. 1454, H.R. 1736, and S. 627) focus solely on

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[46] National Science Foundation, Division of Science Resource Studies, *National Patterns of Research and Development: 2003*, NSF 05-308 (Arlington, VA: 2005), tables B-4 to B-6, pp. 74, 76, and 78.

For industry, the NSF defines basic research as "original investigations for the advancement of scientific knowledge ... which do not have specific commercial objectives, although they may be in fields of present or potential interest to the reporting company;" applied research as "research projects which represent investigations directed to the discovery of new scientific knowledge and which have specific commercial objectives with respect to either products or processes;" and development as "the systematic use of the knowledge or understanding gained from research directed toward the production of useful materials, devices, systems or methods, including design and development of prototypes and processes," but excluding quality control, routine product testing, and production.

[47] See Brandon Shackelford, "U.S. R&D Continues to Rebound in 2004," *InfoBrief*, NSF06-306 (Arlington, VA: Jan. 2006), p. 3.

altering the existing credit; H.R. 1736 and S. 627, which are companion bills, have garnered substantial bipartisan backing.[48] The other bills have broader aims and would modify the credit as a key element of strategies aimed at achieving goals as varied as improving the domestic climate for technological innovation (S. 2199 and S. 2720), reducing U.S. dependence on foreign sources of oil (H.R. 2665), and encouraging an increased flow of equity capital into biomedical research corporations (H.R. 5115).

Many of the bills that would permanently extend the credit would also change its design with the intent of enhancing its effectiveness. For example, H.R. 1736, H.R. 2665, H.R. 4845, H.R. 5115, S. 14, S. 627, S. 1020, S. 2109, and S. 2357 would raise the three rates for the AIRC to 3%, 4%, and 5%. Most of these bills (H.R. 1736, H.R. 4845, H.R. 5115, S. 14, S. 627, S. 1020, S. 2109, and S. 2357) would also establish a second alternative research tax credit — known as the "alternative simplified credit" — that would be equal to 12% of a firm's spending on qualified research in a tax year above 50% of its average QREs in the three previous tax years; for firms that did not have qualified research expenditures in at least one of the preceding three tax years, the credit would be equal to 6% of qualified research expenditures in the current tax year. In addition, S. 2199 would raise the statutory rates for the regular and basic research credits from 20% to 40%, and S. 14, S. 2199, S. 2357 would make 100% of payments made to private research consortia for qualified research eligible for a 20% tax credit. S. 2720 would break new ground by scrapping the current research credit starting in 2008 and replacing it with a credit equal to 20% of QREs above 50% of a firm's average QREs in the three previous tax years (the credit would be 10% of all QREs in the current tax year for firms with no QREs in one or more of the three previous tax years) and making 80% of contract research expenses and 100% of payments for basic research conducted by certain organizations eligible for the credit.

Recent legislative activity in the 109th Congress suggests that it is more likely to pass a temporary extension of the credit rather than a permanent one. Two measures with a provision extending the credit have been considered by either the House or Senate: H.R. 4297, the tax reconciliation bill, and H.R. 5970, the so-called "trifecta bill."

In the case of H.R. 4297, the version passed by the House would have extended the expired credit through the end of 2006, whereas the version passed by the Senate would extended it through the end of 2007. In addition, both versions would have increased the rates of the AIRC to 3%, 4%, and 5% and established the same alternative simplified credit described above. The conference committee formed to reconcile differences between the two versions of H.R. 4297 agreed to remove the provision extending and modifying the credit (along with a number of other popular expired tax benefits, such as the work opportunity tax credit and the deduction for state and local sales taxes) from the version that was enacted (the Tax Increase Prevention and Reconciliation Act of 2005, P.L. 109-222). Two considerations lay behind this decision: (1) a $70 billion cap on total revenue losses from FY2006 through FY2010 under the FY2006 budget resolution approved by the House and

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[48] As of April 25, 2006, H.R. 1736 had 127 cosponsors (52 Democrats and 75 Republicans), and S. 627 had 47 cosponsors (20 Democrats and 27 Republicans).

Senate; and (2) a resolve on the part of the leadership of the House and Senate to include in H.R. 4297 certain tax provisions (e.g., an extension through 2008 of the current 15% tax rates on capital gains and dividends) that would be unlikely to pass in the Senate without the protections the offered by the budget reconciliation process. Conferees reportedly agreed to include an extension of the expired tax provisions in a "trailer" bill that could be attached to a pension reform bill (H.R. 4) then in conference.[49]

A trailer bill (better known as the trifecta bill) emerged about two months after President Bush signed H.R. 4297 into law in May 2006 in the form of H.R. 5970. The bill would combine an extension of various expired tax provisions with an increase in the federal minimum wage and a reduction in the estate tax. One of its provisions would retroactively extend the research tax credit through 2007, raise the rates of the AIRC to 3%, 4%, and 5%, and create an "alternative simplified credit" equal to 12% of a firm's QREs in excess of 50% of its average QREs in the three previous tax years (or 6% of QREs in the current tax year for firms without QREs in each of the three previous tax years). The increase in the rates for the AIRC and the creation of the new alternative credit would take effect in 2007. After a brief debate, the House passed the measure by a vote of 230 to 180 on July 29, 2006. In the Senate, a procedural motion to end debate on H.R. 5970 and proceed to a vote fell four votes short of passage on August 3. It now appears unlikely that the Senate will reconsider the bill before it adjourns near the end of September for the mid-term elections.[50] As a result, there is growing concern among proponents of the credit that it will not be renewed before the end of the current Congress.

The Bush Administration favors a permanent extension of the research tax credit and has expressed a willingness to work with Congress to improve its incentive effect.[51]

An important consideration (some would say an insurmountable barrier in the current fiscal climate) for Congress in deciding whether to extend or enhance the credit is the projected revenue cost of doing so. Recent and projected federal budget deficits have heightened concern over this cost and are making it difficult to enact legislation addressing perceived problems with the current credit. The Bush Administration estimates that a permanent extension of the credit would entail a revenue loss of $86.4 billion from FY2007 through FY2016.[52] Obviously, the revenue loss would be greater if a permanent extension were coupled with changes in the design of the credit intended to improve its incentive effect.

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[49] Wesley Elmore, "Congress Sends $70 Billion Tax Cut to President's Desk," *Tax Notes*, vol. 777, no. 7, May 15, 2006, pp. 743-745.

[50] Kurt Ritterpusch and Jonathan Nicholson, "Estate Tax Cut Dead Before Elections But Extenders to Remain as Sweetner," *Daily Report for Executives*, BNA, Sept. 22, 2006, p. G-2.

[51] Department of the Treasury, *General Explanations of the Administration's Fiscal year 2007 Revenue Proposals* (Washington: Feb. 2006), p. 131.

[52] Ibid., p. 131.

Table 4 summarizes the provisions of bills in the 109th Congress that would modify the credit.

Table 4. Bills in the 109th Congress to Extend or Modify the R&E Tax Credit

Bill Number	Provisions Related to the Credit
H.R. 1454, H.R. 1736, H.R. 2665, H.R. 4845, H.R. 5058, H.R. 5115, S. 14, S. 627, S. 2109, S. 2199, and S. 2357	Permanently extends the regular, alternative incremental, basic research, and energy research credits.
House-Passed Version of H.R. 4297	Extends the regular, alternative incremental, basic research, and energy research credits through the end of 2006.
Senate-Passed Version of H.R. 4297, H.R. 5970, and S. 1020	Extends the regular, alternative incremental, basic research, and energy research credits through the end of 2007.
H.R. 1736, H.R. 2665, the House- and Senate-Passed Versions of H.R. 4297, H.R. 4845, H.R. 5115, H.R. 5970, S. 14, S. 627, S. 1020, S. 2109, and S. 2357	Raises the three rates of the alternative incremental credit to 3%, 4%, and 5%.
H.R. 1736, the House- and Senate-Passed Versions of H.R. 4297, H.R. 4845, H.R. 5115, H.R. 5970, S. 14, S. 627, S. 1020, S. 2109, and S. 2357	Creates an alternative simplified credit equal to 12% of qualified research expenses in excess of 50% of the taxpayer's average qualified research expenses in the three previous tax years, and 6% of qualified research expenses in the current tax year for taxpayers with no qualified research expenses in at least one of the three previous tax years.
S. 14	Makes 100% of payments to certain small firms, universities, and federal laboratories for contract research eligible for the credit.
Senate-Passed Version of H.R. 4297, S. 14, S. 2199, and S. 2357	Makes the full amount of payments to tax-exempt private research consortia with at least five contributing members eligible for what is now a 20% research credit.

Source: Congressional Research Service.