Tax Incentives for Innovation in the United States

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I. INTRODUCTION

The U.S. tax system is extremely complex and has many features that will have some impact on innovative activity. It is beyond the scope of this study to enumerate them all so we will focus only on those that are "salient" from the perspective of the firms and economic agents that undertake innovative activity.

In general the U.S. tax system is an income tax-based system, with differing marginal rates faced by individuals, partnerships, S-corporations, and corporations.[2] In the case of sole proprietorships, partnerships, and S-corporations, the profits from business activities are passed through to the individuals concerned, so they are taxed at the individual rate.

The basic marginal corporate tax rate in the United States is 35%, for corporations with taxable income in excess of 10 million dollars and 34% for corporations with taxable income in excess of $75,000.[3] For individuals, the highest marginal tax rate is 39.6%. This rate generally takes effect at incomes above $250,000, depending on family size and filing status. Thus all non-corporate forms of business organization face higher marginal tax rates than corporations. On the other hand, corporate income is generally taxed twice, once at the corporate level, and once when it is paid out to shareholders, so the before-tax cost of capital to corporations will generally be higher, other things equal.

The following specific features of the U.S. federal corporate tax law are likely to have the greatest effect on the incentives for innovation in U.S. corporations:

1. Expensing of R&D.
2. The Research and Experimentation tax credit.
3. Foreign source allocation rules for R&D spending.
4. The preferential capital gains tax rate (a feature of the personal income tax law).
5. Accelerated depreciation and investment tax credits for capital equipment.
6. The tax treatment of acquisitions, especially as it relates to purchase accounting, in-process R&D, and the treatment of good will.

In general, these features of the corporate tax system may also be used by partnerships and sole proprietorships, which means that they apply to essentially all taxable entities that produce goods and services. Separate discussion of the provisions for individual taxpayers is largely unnecessary: the only respect in which they will differ from corporations is that they

[2] S-corporations are a special class of small business limited liability corporations, which have one class of stock, fewer than 35 shareholders, all of whom must be U.S. resident individuals or estate/trusts.

[3] There is also a surcharge on top of the corporate tax, which is administered in the following way: when a corporation has taxable income in excess of $100,000 for any taxable year, the amount of tax is increased by the lesser of (i) 5 percent of such excess, or (ii) $11,750 (which is 5 percent of $230,500). In the case of a corporation which has taxable income in excess of $15,000,000, the amount of the tax is increased by an additional amount equal to the lesser of (i) 3 percent of such excess, or (ii) $100,000 (which is 3 percent of $3,333,333). The purpose of this surcharge is mysterious and it may be a temporary revenue-increasing measure.

face a different (usually higher for the groups affected) marginal tax rate than corporations, and do not face double taxation on income.

A. A note on state-level taxation

At the state level, innovation-related tax incentives are highly variable, from nonexistent to substantial. Where there is a corporate income tax (as there is in the largest and most innovation-intensive states such as California, Massachusetts, Texas, and New York), it tends to follow the features of the federal code. In some cases, states have enacted targeted incentive programs of their own, but these tend to be fairly narrowly focused. This report will focus on the federal incentives only, since for most large to medium-sized firms that are located in several states they are by far the most important influence on decision-making.

Individual states tax in a variety of ways, using methods that include income taxes, real property taxes, and sales taxes. Most of this variety will have little impact on innovative activity since the rates are generally secondary to the federal tax rates but a few factors that might influence the location of innovation can be mentioned:

- Where a low tax state is next to a high tax state that also has a high innovative level, some of the more mobile activity may move to the low tax state (New Hampshire and Massachusetts, Nevada and California).
- Some states such as California have extremely attractive tax credits for R&D and other activities that can even dwarf the federal incentives in some cases (see Hall and Wosinska 1999 for a discussion of the California case).

II. DEFINITIONS OF INNOVATION AND R&D IN U.S. LAW AND PRACTICE

The R&D concepts defined by U.S. tax law and accounting standards are not related to the definitions in the Oslo Manual, nor does the U.S. tax legislation define these concepts completely.[4] In general, they are defined by common accounting principles and accounting regulations.

A.1. Innovation and R&D

The U.S. tax code does not provide a definition of term ***technological innovation*** or ***Research and Development (R&D)***, *per se*. However, the Internal Revenue Service (IRS) issued regulations in 1957 defining the term ***research and experimental expenditure (R&E)***. This definition has been updated by the original R&E tax credit legislation (1981) in order to clarify the meaning of "qualified" research and experimental expenditure. New IRS administrative regulations concerning the record-keeping necessary to justify the expenses were issued this year (January 2001), but their implementation has been suspended by the new Bush administration pending further comment from taxpayers (see below on administrative procedures).

[4] On the other hand, a definition similar to that in the Oslo Manual is used by the National Science Foundation when it surveys firms to obtain the aggregate data used in the national science and engineering statistics and reported to various international bodies such as the OECD. In many but by no means all cases, it appears that firms report the same or a similar number to both the NSF and to the Securities and Exchange Commission on their 10-K form. The latter number is the one called for by the Financial Accounting Standards Board (see section A.3 below). See also Hall and Long (1999) for a comparison of the two sets of numbers.

The regulations define ***research and experimental expenditure*** as expenditure incurred in connection with the taxpayer's trade or business that represents research and development costs in the experimental or laboratory sense. The regulations provide that the term generally includes all costs incident to the development of an experiment or pilot model, a plan process, a product, formula, an invention or a similar property. The regulations provide that the term ***research and experimental expenditure*** does not include expenditure such as that for the ordinary testing or inspection of materials or products for quality control or those for efficiency surveys, management studies, consumer surveys, advertising or promotions.

The costs of obtaining a patent, including attorneys' fees paid or incurred in making and perfecting a patent application, qualify as research or experimental expenditures, but the costs of acquiring another's patent, model, production or process do not qualify. When the election to defer expenses has been made, the right to amortize ceases when the patent issues. Unrecovered expenditures are recovered through depreciation over the life of the patent (rather than amortization). The effect of such a rule would be to increase the allowable deduction in the earlier years and reduce it in the later years, so a switch to depreciation from amortization would probably mean a reduction in the total amount that can be claimed.

A.2. Qualified R&E

Qualified research expenses (QR&E) are the same as research in the laboratory or for experimental purposes, whether carried on by the taxpayer or on behalf of the taxpayer by a third party. The research must be related to elements of a process of experimentation for a functional purpose. Qualified research expenses cover in-house expenses for the taxpayer's own research (wages [including income from employees´ exercise of stock options] for substantially engaging in or directly supervising or supporting research activities, supplies, and computer use charges) and 65% of amounts paid or incurred for qualified research done by a person other than an employee of the taxpayer. The percentage is increased to 75% of amounts paid or incurred for qualified research performed by a qualified research consortium.

The term ***Qualified R&E*** includes the following activities:

- Research that is undertaken for discovering information.
- Research that is technological in nature.
- Research for which the application is intended to be useful in the development of a new or improved business component on the taxpayer.
- Substantially all of the activities that constitute elements of an experimentation process related to a new or improved function, performance, reliability, or quality.

The term does *not* include any of the following activities:

- Research after commercial production. Any research conducted after the beginning of commercial production of the business component.
- Adaptation of existing business components. Any research related to the adaptation of an existing business component to a particular customer's required or need.

- Duplication of existing business component. Any research related to the reproduction of an existing business component (in whole or in part) form a physical examination of the business component itself or from plans, blueprints, detailed specifications, or publicly available information with respect to such business component.
- Surveys, studies, etc.
- Any efficiency survey.
- Any activity relating to management function or technique.
- Any market research, testing, or development (including advertising or promotions).
- Any routine data collection.
- Any routine or ordinary testing or inspection for quality control.
- Computer software, except to the extent provided in regulations, any research with respect to computer software which is developed by (or for the benefit of) the taxpayer primarily for internal use by the taxpayer, other than for use in:
    - An activity which constitutes qualified research, or
    - A production process with respect to which the requirements of "qualified research" meaning are met.
    - Certain internal use software developed for internal use by the enterprise is not eligible for credit, unless it meets high threshold of innovation test. Exceptions to this rule are made for software used in R&D (e.g., laboratory testing), software used in a production process if the development of the process qualified (e.g., robot and software), and software and hardware developed together as integrated product (e.g., telecomm switching).
    - As time as passed, two additional categories of internal use software that qualify have emerged:

        - Software used for providing computer services to customers (e.g., AOL).
        - Certain software used in providing noncomputer services which offer an attractive new feature(s) not offered by competitors.

- Foreign research. Any research conducted outside the United States.
- Social sciences, etc. Any research in the social sciences, arts, or humanities.

A.3. Basic Research

In the U.S. tax code, the term "basic research" is defined to mean any original investigation for the advancement of scientific knowledge not having a specific commercial objective. Basic research conducted outside of the United States and basic research in the social sciences, arts, or humanities are specifically excluded from the definition.

A.4. Research and Development

In contrast to the U.S. tax code, FASB (the Federal Accounting Standards Board, an independent non-profit organization whose standards are widely adhered to) defines ***R&D*** as follows:

Research -- planned search or critical investigation aimed at the discovery of new knowledge with the hope that such knowledge will be useful in developing a new product or service (hereinafter product) or a new process or technique (hereinafter process) or in bringing about a significant improvement to an existing product or process.

Development -- the translation of research findings or other knowledge into a plan or design for a new product or process or for a significant improvement to an existing product or process, whether intended for sale or use.

A more detailed discussion is given in the section below on accounting practices.

III. CURRENT INNOVATION-RELATED TAX INCENTIVES

Here follows a brief summary of the 6 major features of the tax code that impact most heavily on innovative activity.

A. Expensing of R&D

Broadly speaking, research and development expenditure (both qualified and unqualified) incurred by a taxpayer is either 1) currently deductible against income or 2) deferred and then amortized using a straight-line formula over a period of not less than 60 months. Taxpayers are required to make an election between these two methods in the first taxable year of research. The taxpayer does not need to obtain consent from the Internal Revenue Service (the IRS, the U.S. federal tax authority) when making this initial election. However, if a taxpayer wishes to change from the amortization method to the current expense method, or vice versa, for part or all of its research and experimental expenditure, then IRS permission must be obtained. It should be noted that a change in method will not be given retroactive effect; rather it will apply only to research and experimental expenditure incurred after the effective date of the election to change methods.

The costs of developing software (for taxpayer's own use or for sale or lease to others) may be deducted currently or amortized over a five-year period (or shorter if established as appropriate), so long as such costs are treated consistently.

The business deduction for research and experimental expenditures under Code Sec. 174 must be reduced by the amount of the research credit, Code Sec. 280C(c). Capitalized expenses must also be reduced by the amount of the research credit that exceeds the amount otherwise allowable as a deduction for such expenses.

An annual irrevocable election is available to claim a reduced research credit and thereby avoid reducing the research expense deduction (or capital expenditures). Under the election, the research credit must be reduced by the product of the research credit computed in the regular manner and the maximum corporate tax rate.

B. R&E Tax credit

B.1. The ordinary R&E tax credit

The U.S. tax law provides a tax credit for taxpayers engaged in qualified research and experimental activities while carrying on a trade or business.[5] The credit is computed separately for two categories or research activities:

(a) A credit is allowed for the amount of current years qualified research expenses in excess of a base amount of such expenses.

(b) A credit is allowed for certain basic research payments to universities and other qualified research organizations.[6]

The research credit for the taxable year shall be an amount equal to the sum of:

(a) 20% of the excess (if any) of the qualified research expenses for the current tax year over the amount base and

(b) 20% of the amount of basic research payments made to a qualified organization.

The ***base amount*** is the product of the taxpayer's ***fixed-based percentage*** and an average annual gross receipts for the four tax years preceding the credit period. It may not be less than 50% of qualified research expenses for the credit year. The 50% rule limits the ***base amount*** by stating that the ***base amount*** can never be less than 50% of the current year's qualified expenses. Congress adopted this rule to reduce the overall revenue loss to the government. The 50% rule can cause great disparities between the firms subject to the 50% and those that are not.[7]

The ***fixed-based percentage*** is the ratio of the aggregate qualified research expenses to the aggregate gross receipts for the 1984 through 1988 tax years and it may not exceed 16%.[8]

B.2. Alternative Incremental Computation

In 1996, the Small Business Jobs Protection Act added an alternative incremental credit (AIRC) for R&D, which was designed to compensate firms with high fixed-base percentage in 1984-89 relative to current R&D spending intensity. In general, this credit has a lower base, and lower rate. Firms that find it useful typically fall into the following classes:

- Defense contractors (because defense spending for R&D has fallen since the 1980s).
- Companies whose sales are growing more rapidly than R&D because

[5] IRS Code Section 41- credit for increasing research activities.

[6] A qualified research consortium is a tax-exempt organization under either Code Sec.501(c)(3), or 501(c)(6) that is not a private foundation and whose primary function is to conduct scientific research. This includes both educational institutions, and certain scientific research and/or tax-exempt organizations that are organized and operated primarily to promote scientific research by educational and research institutions. If they do not do the research themselves, such organizations must expend substantially all of its funds on grants for research.

[7] See Eisner (1985) and Hall (1993) on this point.

[8] As we discuss below, over time the fixed base percentage has become less relevant for more and more firms, and there has been a gradual switch to using the AIRC, which has a much less restrictive base.

  - less R&D-intensive lines of business are growing faster than other lines of business
  - a blockbuster product was discovered during or after the base period.
- Companies that have achieved large productivity increases in their R&D activities due to new technology.
- Companies that have reduced R&D budgets to cut costs.

The election of the alternative incremental computation (AIC) must be made in the first tax year that begins after June 30, 1996, and applies to all future tax years unless the election is revoked with the consent of the IRS. The credit is equal to the sum of an increasing percentage of the amount of qualified research expenses in excess of a percentage of the base amount, divided into three tiers:

- The base amount is the average gross receipts for the last four tax years.
- Tier one amount is equal to 2.65% of qualified research expenditures in excess of 1% of the base amount but not more than 1.5% of the base amount.
- Tier two amount is equal to 3.2% of qualified research expenditures in excess of 1.5% of the base amount but not in excess of 2% of the base amount.
- Tier three amount is equal to 3.75% of qualified research expenditures in excess of 2% of the base amount.

Start-up firms are assigned a fixed base percentage of 3% for the first five taxable years beginning after 1993; base percentages derived from their individual experiences were to be phased in over the subsequent five years. For example, in the 6th year, the base would be 1/6 of the percentage which the aggregate qualified research expenses of the taxpayer for the 4th and 5th such taxable years is of the aggregate gross receipts of the taxpayer for such years, meaning that a firm with an R&D to sales ratio equal to 18% would have a fixed base percentage of 3%. This 1/6 rises to 5/6 by the 10th year and after that they are allowed to use a fixed base percentage essentially equal to their own history of R&D to sales ratios. This feature of the tax law clearly presupposes a particular life cycle for R&D intensive firms that may not be appropriate for all industries.

B.3. Carryforwards and carrybacks

The R&E tax credit may be carried forward 20 years and carried back 2 years. This amounts to a hidden asset for young firms. New start-up firms may not currently be able to enjoy the benefits of the R&D credit but an unused R&D credit is a valuable asset nonetheless. In essence, the credit is a hidden asset that can be unlocked in the future when the company becomes profitable or is sold. Venture capitalist and lenders understand the importance of these hidden assets and may grant more favorable terms if they know a credit exist and can be deployed in the near future.[9]

[9]This fact has been confirmed by discussion with the CFO of a large biotechnology firm. The R&D tax credit is routinely kept on the books when doing pro forma forecasts of future earnings statements as much as 10 years in the future. (Bronwyn H. Hall, private communication).

B.4. Some Examples and an Evaluation

Tables 2a-2c show 3 scenarios for the computation of the two different R&E tax credits for three different types of firms between 1981 and 2000, using the tax code currently in place:

1. A growing firm whose R&D intensity flattens out as it matures. This firm benefits from the R&D tax credit for 5 years and then gets nothing because its QRE does not exceed that implied by the fixed base percentage (unless it is able to elect the alternative credit).
2. A firm with flat sales and growing R&D. This firm continues to benefit greatly from the R&E tax credit throughout the period.
3. A firm with declining R&D intensity. For this firm, it is better to elect the alternative credit at the beginning, since it gives a small benefit even though the firm's R&D is declining.

It is clear from these examples that the purpose of the AIRC was to provide a somewhat weaker incentive to those firms that could not benefit from the regular credit. One side benefit of this has been to broaden the base of industry support for the existence of the credit.

Table 3 gives an idea of the incidence of the R&E tax credit in 1997, the last year for which we have statistics available. This table shows that approximately 15,000 firms with about 3.6 trillion dollars of sales claimed the credits, and that firms claiming the alternative credit accounted for about 9% of these sales, about 12% of the qualified R&D expenditure, and only about 4% of the actual credits received (because of the lower rate that they faced).

The total R&E tax credit claimed by U.S. firms in 1997 was about 4.5 billion dollars, of which 89% was eventually allowed by the Internal Revenue Service. This amount was further reduced by the corporate tax recapture, so that the net amount "received" by the firms was 2.6 billion dollars. This amount is about 4 percent of the total federal R&D budget in 1997 (64.8 billion dollars) and about 2 percent of the total company R&D spending (136.3 billion dollars). For comparison, the direct funding of industrial R&D by the U.S. government in 1997 amounted to 24.3 billion dollars, or 15 percent of industry-performed R&D (158.0 billion dollars). Thus the amounts granted by the U.S. R&E tax credit are actually quite small when compared to direct government subsidy (most of which is defense and health R&D, of course).

C. Foreign Source Income and R&D

U.S. tax policy is to tax firms on worldwide income, but to allow credits against that tax for taxes paid to foreign governments (Dept. of Treasury, 1983, Hines, 1992). These credits are limited by the U.S. tax which would be due on the foreign source income. Thus, the allocation of income, and therefore costs, across jurisdictions matters to firms with excess foreign tax credits (credits they have not been able to use because their U.S. corporate income tax liability is too low).

If they already have foreign tax credits they cannot use, allocating more R&D to foreign source income does not reduce their tax liability and will only increase their taxable U.S.

income.[10] This is somewhat mitigated by the fact that they are allowed to carry back and carry forward these excess credits. Thus the rules on the allocation of R&D costs to domestic and foreign source income can affect the after-tax marginal cost of doing R&D. A firm with excess foreign tax credits that increases its R&D will find that half of that R&D is effectively not expensed, since it is deducted against income on which they are already not paying U.S. taxes.

On the other hand, foreign source income is typically lightly taxed. The U.S. has bilateral income tax treaties with approximately 50 countries that symmetrically reduce withholding tax rates on royalties and other types of income. Under these treaties, a treaty-country company doing business in the U.S. and a U.S. company doing business in a treaty country typically are subject to a withholding tax rate of 10% or less. Indeed, the model U.S. treaty calls for a zero rate of withholding on royalties. For example, here are some representative treaty withholding tax rates on royalties applicable to inward and outward U.S. investment:

Canada	0 or 10% (depending on type of royalty)
France	0 or 5%
Germany	0%
Italy	5, 8, or 10%
Japan	10%
Netherlands	0%
UK	0%

The significance of this feature of the tax system is that to the extent a firm can perform R&D that increases its foreign revenues, and then can repatriate the income as royalties, such income will be lightly taxed at the source.

Hines (1993) discusses the implication of these allocation rules for the incentives that multinational firms face to undertake R&D directed at domestic and foreign markets. As a general matter, he finds that the allocation rules tend to make R&D directed toward increasing domestic sales a relatively more expensive input than other ordinary inputs, but that R&D directed toward increasing foreign sales (but conducted in the United States) is substantially less expensive for firms with excess foreign tax credits. This latter fact is due to the relatively light royalty rates that foreign governments impose on royalties (which are the income that results from use of the R&D) paid to the United States. He studies 116 multinational corporations between 1987 and 1989, and finds that only 21 are in a deficit foreign tax credit situation. The average tax price for R&D directed toward domestic sales is 5 percent higher than that for other (non-capital) inputs, and the average tax price for R&D directed toward foreign sales is 15 percent lower, for an overall wedge of 20 percent.

In the current global environment, where U.S. firms feel free to set up plants in a variety of other countries according to the costs they face, these rules have an increasing impact on the choice of location for R&D laboratories. Many firms find it cost-advantaged to move some of

[10]This is because most foreign governments do not allow the expensing of R&D performed in the United States, and, therefore, the R&D allocated to foreign source income does not reduce the foreign tax liability (Hines, 1992; U.S. Dept. of Treasury, 1983).

their research to places such as Ireland and India, not the least because R&D tax incentives may more attractive in those locations.

D. Capital Gains Treatment

The primary way in which entrepreneurs benefit financially from turning innovative ideas into reality is by "going public" and selling shares of their firms to investors, thus enabling them, and possibly their venture capitalists, to capture the value that they have created. In the United States at the present time, such risk-taking behavior is rewarded by the tax system. Since 1986, the tax rate at which the gains from selling shares of a company held for longer than one years is somewhat lower than the tax rate on ordinary income, 28% rather than the top marginal rate of 39.6%. The implication is that investors in startups and other innovative firms receive 72% of the proceeds from their investment rather than 60%, which is a fairly good-sized incentive, and is broadly applicable.

The Taxpayer Relief Act of 1997 (TRA '97) brought major changes to the tax treatment of capital gains and losses. In general, the act lowered tax rates on long-term capital gains and increased the holding period required to qualify an asset as "long-term." The changes made by TRA '97 were modified by new legislation and a series of technical corrections contained in the IRS Restructuring and Reform Act of 1998. The 1998 legislation shortened the holding period required to qualify an asset sold in 1998 for the lowest capital gain rate and also clarified and simplified the rules for calculating capital gains and losses.

The table below provides a general summary of the changes made by the 1997/1998 acts with regard to most capital gains transactions.

Item	Holding Period	Type of Gain	Maximum Tax Rate
Property sold at any time	Exactly 12 months or less	Short-term	Ordinary income taxed at taxpayer's regular marginal rate
Sales of property acquired after 12/31/2000	More than 5 years	Long-term	18%
Property sold after 12/31/97	More than 12 months	Long-term	20%
Real estate depreciation treated as capital gain	More than 12 months	Long-term	25%
Sale of collectibles	More than 12 months	Long-term	28%

The shaded columns show the relevant entries. After 1997, the long-term capital gains rate on equity held longer than 12 months is 20%. After 2000, the long-term capital gains rate on equity held longer than 5 years falls to 18%.

D.1. Special treatment for small business

In addition, there is a special provision for "qualified small business stock," which is clearly intended to induce entrepreneurial activity. Since 1993, there has been a 50% exclusion from tax on the sale of this type of stock, when the taxpayer has held it more than 5 years. The

1997 act lowered the holding period to 6 months if the proceeds from the sale are rolled over into another small business stock within 60 days. This is designed to give investors an incentive to reinvest in new startups if a first investment is so successful that their funds are no longer needed, or they choose to cash out when a firm goes public.

When this provision was introduced in 1993, the maximum federal income tax rate applicable to capital gains was 28 percent; the 50 percent exclusion thus reduced that maximum rate for five-year qualified small business stock gains to 14 percent. The effective rate could actually have been higher, because one-half of the excluded portion of the gain (one-quarter of the overall gain) was made an item of tax preference for purposes of the alternative minimum tax.[11]

TRA 1997 reduced the maximum federal income tax rate for certain capital gains of individuals to 20 percent, but provided that the non-excluded portion of the five-year gain from qualified small business stock was still to be taxed at a maximum rate of 28 percent, not 20 percent.[12] While this approach maintains the maximum rate applicable to five-year qualified small business stock gains at 14 percent, that rate is the equivalent of only a 30 percent exclusion for gain otherwise eligible for the 20 percent maximum rate (as would generally be the case). Thus the differential between the marginal tax rate on small business capital gains and other long-term capital gains is only 6 percent, and not the 10 percent it would have been otherwise.

In the Taxpayer Relief Act of 1997, Congress did amend the alternative minimum tax rules such that only 42 percent (not one-half) of excluded qualified small business stock gain constitutes an item of tax preference.[13] More importantly, Congress also provided an elective "rollover" rule for noncorporate taxpayers such that gain is not recognized on the sale of qualified small business stock held for more than six months to the extent the taxpayer reinvests in other qualified small business stock during the 60-day period following the sale.[14]

Qualified Small Business Stock is any stock in a C corporation issued after August 10, 1993, the date of enactment of the Revenue Reconciliation Act of 1993, if as of the date of issuance of the stock, the corporation is a "***qualified small business***," the stock is acquired by the taxpayer upon its original issuance (either directly or through an underwriter) in exchange for money or other property (not including stock) or as compensation for services provided to the issuing corporation.[15]

Qualified Small Business is any domestic C corporation for which the aggregate gross assets (cash and the adjusted tax basis of other property) of the corporation at all times on or after August 10, 1993, the date of enactment of the Revenue Reconciliation Act of 1993, and before issuance of the stock in question did not exceed $50 million, such aggregate gross assets immediately after the issuance of the stock in question (taking into account amounts received for that stock) do not exceed $50 million and the corporation agrees to submit such

[11] U. S. Public Law (P.L.) 103-66 § 13113(b), enacting Internal Revenue Code (I.R.C.) § 57(a)(7).

[12] P.L. 105-34 § 311(a), enacting I.R.C. §§ 1(h)(1), 1(h)(4), 1(h)(7).

[13] P.L. 105-34 §311(b), amending I.R.C. § 57(a)(7).

[14] P.L. 105-34 § 313, enacting I.R.C. § 1045.

[15] I.R.C. § 1202(c).

reports to its shareholders and the Internal Revenue Service ("IRS") as may be prescribed by the IRS (no such reports having yet been required).[16]

Under a special rule, assets used in certain start-up and research and experimental activities related to any future qualified trade or business are treated as used in the active conduct of a qualified trade or business. A qualified trade or business is any trade or business excluding any trade or business involving the performance of services in the fields of health, law, engineering, architecture, accounting, actuarial science, performing arts, consulting, athletics, financial services, brokerage services or any trade or business the principal asset of which is the reputation or skill of one or more employees, any banking, insurance, financing, leasing, investing or similar business, any farming business (including the business of raising or harvesting trees), any business involving the production or extraction of products of a character with respect to which a deduction is allowable under Internal Revenue Code sections 613 or 613A (relating to depletion) or any business of operating a hotel, motel, restaurant or similar business.[17]

E. Acquisitions

Most of the action here is in accounting treatment rather than tax treatment, and is beyond the scope of this report. However, it is worth noting that "purchase accounting" for R&D-intensive acquisitions, where the acquiring firm records the excess of market value over book value as good will and "in-process" R&D, only to later write-off that R&D very quickly, is under scrutiny by FASB at the present time.

F. Investment Tax Credit

Measured productivity growth in the United States during the recent past has been due to a great extent to technical change in capital inputs (see Jorgenson, 2001, inter alia). This highlights the fact that the investment tax credit can be an important tax incentive for innovation, because it effectively lowers the cost of investing in new and upgraded capital equipment. Encouraging firms to replace older equipment with new models, especially those that incorporate rapidly changing information technology can be an important contributor to innovation.[18]

The U.S. investment tax credit allows all businesses, whether incorporated or not, to expense the first $20,000 of investment, rising to $24,000 next year, which amounts to highly accelerated depreciation relative to the economic life of capital equipment.

IV. EVOLUTION OF INNOVATION TAX INCENTIVES DURING THE 1990S

[16] I.R.C. § 1202(d).

[17] I.R.C. § 1202(e).

[18] To give one example, the revival of some of the "rust belt" industries such as steel and autos in the United States during the late 1980s and 1990s can be partially attributed to the transition to a more capital-intensive mode of manufacture that makes use of highly intelligent machines and computers to operate assembly lines that were formerly almost entirely manually controlled. The innovative effort required for this transition is made cheaper by tax incentives for investment.

A. Overview of tax law changes during the decade

A brief summary of the history of R&D tax policy in the United States during the past twenty years follows. U.S. tax policy towards R&D has had three primary ingredients:

1. the general expensing rules for R&D (section 174 of the corporate tax code).
2. the R&E tax credit.
3. the foreign source income allocation rules for the expensing of R&D.

The first of these policies has remained essentially unchanged since it was instituted in 1954. It allows the expensing of most R&D expenditures against corporate income for tax purposes.[19] The reduction of the corporate tax rate during the 1980s had a substantial impact on the cost of an R&D dollar, because it reduced the benefit of expensing (relative to other types of capital investment) by the fall in the tax rate (a reduction of 0.12 for firms with taxable income, possibly more if they face the alternative minimum tax of 20 percent). Note that if a firm undertaking R&D investment faces the same corporate tax rate in all periods, the corporate tax rate is irrelevant to that investment, because the firm spends after-tax dollars on the investment and receives after-tax dollars as income. However, if the tax rate is changing for one reason or another, or the firm is moving in and out of taxable status, the cost of R&D capital faced by the firm will fluctuate (Fullerton and Lyon, 1988; Hall, 1992).

The R&E tax credit was introduced in the Economic Recovery Tax Act of 1981; it was originally scheduled to be effective from July 1, 1981, to December 31, 1985. The credit was renewed for two years (January 1, 1986, to December 31, 1988) in a somewhat reduced form by the Tax Reform Act of 1986, and extended for one year through 1989 by the Technical and Miscellaneous Revenue Act of 1988.[20] The Omnibus Budget Reconciliation Act of 1989 effectively extended the credit through 1990, and The Omnibus Budget Reconciliation Act of 1990 did the same for 1991. The Tax Extension Act of 1991 extended the credit through June 30, 1992. The Omnibus Budget Reconciliation Act of 1993 extended the research tax credit for three years to June 30, 1995. Most of these pieces of legislation also made changes to the terms of the credit; see Table 1 for details.[21]

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[19]Treasury regulations (sec. 1.174-2(a)) define research or experimental expenditures to mean "research and development costs in the experimental or laboratory sense." This generally includes "all such costs incident to the development of an experimental or pilot model, a plant process, a product, a formula, an invention, or similar property, and the improvement of already existing property of the type mentioned," and excludes expenditures "such as those for the ordinary testing or inspection of materials or products for quality control or those for efficiency surveys, management studies, consumer surveys, advertising, or promotions."

[20]Another feature of the Tax Reform Act of 1986 that affected R&D incentives was the strengthening of the alternative minimum tax (AMT) system for corporations. If a firm is subject to AMT, it cannot claim the R&D tax credit in the current year, but must carry it forward (for up to fifteen years) until it is subject to regular corporate tax. Also, the rate of taxation under AMT is 20% rather than the statutory corporate rate of 34%. As Lyon (1991) has discussed, this means that firms that are temporarily subject to the AMT will face tax incentives that are slightly tilted away from investment in intangibles toward tangibles, relative to what they would face under ordinary corporate taxation. In practice, only a small number of large manufacturing firms in 1988 filed AMT returns, accounting for only 3 percent of the total tax bill paid by manufacturing firms (Statistics on Income 1988), so this was unlikely to be important. However, the reduction in the implicit subsidy to R&D that the AMT creates is likely to be more important in recession years, when corporate profits are down. In the past few years, more and more firms have become subject to the AMT as before-tax profits have risen, and more and more of the R&E tax credit is being recaptured in this way.

[21] From the perspective of a researcher on this topic, one of the most important changes occurred in 1986, when the Tax Reform Act rolled the R&D tax credit into the General Business Credit and subjected it to the General

The credit was allowed to lapse between July 1, 1995 and June 30, 1996, and then reinstated on July 1, 1996. In December 1999, Congress extended it for five additional years from July 1, 1999 to June 30, 2004. This represented a compromise between those who wanted to make it "permanent" and those who were worried about the budget cost of such a move. Currently there is a broad consensus in government and industry for making the credit permanent and the budgetary situation is such that this goal may be achieved under the current administration.

B. History of the R&D tax credit

The R&E tax credit as it has been implemented during the past 20 years in the United States is a good example of a how even a simple public policy idea that has bipartisan support can emerge from Congress both greatly complicated and weakened in its effects.[22] In the case of the tax credit, the major problems are twofold: first, the need for tax revenue caused the credit to be diluted in an attempt to focus its effects on the marginal R&D dollar, and second, poor design, indecision, and lack of agreement on the part of legislators has led to repeated tinkering with and temporary extension of the credit from year to year, rather than a permanent credit that would last at least as long as the typical planning horizon for R&D investment.

In all cases, the R&E tax credit is computed by taking qualified R&D expenditures that exceed a certain base level, multiplying by the statutory credit rate, and deducting this amount from corporate income taxes. There is a two-year carry-back and twenty-year carry-forward in the case of no taxable income in the current year; this was changed in 1999 from three and fifteen years respectively. After 1989, the credit also reduces the R&D expenditure available for deduction from current income under the old section 174 rules. A summary of the changes in the credit rate, qualified expenditure rules, base levels, and corporate income tax rates during the past 20 years is shown in Table 1.

The R&D tax credit was first enacted as a temporary provision in the Economic Recovery Tax Act of 1981. It was intended to give U.S.-based firms a robust incentive to increase their spending on R&D, which was viewed as a critical element in long-term productivity growth. Initially the credit was equal to 25% of the excess of qualified research expenditures in a given tax year over average qualified research expenses in the three previous tax years. This base amount had to equal 50% or more of a taxpayer's qualified research expenditures. Shortly after the credit took effect it became clear to many analysts that its design contained a serious flaw: over time, the credit's efficacy would wane because the more a firm spends on R&D in a given year, the harder it will be for the firm to receive the credit in future years.

Business Credit limitations. This both makes it more difficult to calculate the effective credit rate from public data, and simultaneously removed the R&D tax credit as a separate line item in the Statistics on Income. It is still shown in one of the tables for the whole corporate sector, but we no longer have the industrial detail that was available through 1985.

[22]Parts of this section are drawn from Hall (1993), updated to reflect changes in the law since that paper was written.

Congress made the first significant changes in the credit when it passed the Tax Reform Act of 1986. The Act extended the credit through December 31, 1988. In addition, it modified the credit in three ways. First, the credit rate was lowered to 20%. Second, the definition of qualified research expenses was narrowed so that it only covered activities directed at generating new technical information that could be useful in developing new commercial products or processes. And third, a separate credit was established for basic research conducted by universities under contract with taxpayers. These changes by and large reflected the general thrust of the Act, which was to curtail or eliminate existing tax benefits and lower statutory income tax rates.

The credit was further altered by the Technical and Miscellaneous Revenue Act of 1988 (TAMRA). More specifically, the Act extended the credit through December 31, 1989. It also reduced the tax savings a taxpayer can obtain from the R&E credit by decreasing the deduction allowed under section 174 for qualified research expenses by 50% of the R&D tax credit claimed in the same year. Section 174 permits taxpayers to expense (or deduct) the full cost of these expenses in the year in which they are incurred. Before TAMRA, a firm could simultaneously reap the full tax benefits or expensing and the R&D credit.

The Omnibus Budget Reconciliation Act of 1989 (OBRA 89) made additional modifications in the credit. The most consequential involved altering the method for calculating a taxpayer's base amount. Under previous law, the credit applied only to increase in a firm's R&D spending over average R&D spending during the previous three years; this average was the base amount. OBRA 89 substituted a "fixed-base percentage" for this moving average. This percentage was the ratio of a firm's research expenses to its gross income in three of the years from 1984 to 1988. The base amount, then, was determined by multiplying a firm's average gross income in the previous four years by its fixed-based percentage. Start-up firms, or firms that had no income or qualified R&E expenses in that period, were assigned a fixed-base percentage of 0.03. These changes in the base amount were intended to enhance the effectiveness of the credit by severing the link between current R&D spending and future credits. OBRA 89 also effectively extended the credit for 9 months by prorating qualified research expenses incurred before January 1, 1991. It also made research related to a firm's prospective lines of business eligible for the credit; before the enactment of OBRA 89, the credit applied only to research related to a firm's current lines of business. Lastly, the Act increased the reduction in the amount of qualified research expenses that could be expensed from 50% of the R&D credit claimed to 100%.

The Omnibus Budget Reconciliation Act of 1990 extended the R&D credit through December 31, 1991, and repealed the special rule enacted in OBRA 89 to prorate qualified research expenditures made before January 1, 1991.

The credit was further extended by the Tax Extension Act of 1991, this time through June 30, 1992. While the congress passed two major tax bills in 1992 that would have further extended the credit, President Bush vetoed both for reasons not directly related to the R&D credit. As a result, the credit lay dormant from July 1, 1992 until the Omnibus Budget Reconciliation Act of 1993 (OBRA 93) went into effect. OBRA 93 retroactively extended the R&E credit for three years: from July 1, 1992 through June 30, 1995. It also revised the method for calculating the base amount of the credit for start-up firms. The credit expired on June 30, 1995 and was allowed to lapse for one year until June 30, 1996.

In late 1996, the Small Business Protection Act of 1996 contained a provision that extended the R&D tax credit for the period July 1996, through June 1997. For the first time in its history, the credit was not extended retroactively. Part of the reason or the gap was that the Administration did not pay for the R&D credit in its budget in 1996 and 1997.[23]

The 1996 act expanded the definition of "start-up firms" to include any firm if the first taxable year in which such firm had both gross receipts and qualified research expenses began after 1983. The Act also allows taxpayers to elect an alternative incremental research credit regime. The credit was subsequently extended to June 30, 1999, and then in late December 1999, it was made quasi-permanent when then-President Clinton signed legislation renewing it for five years until June 30, 2004. At this time the alternative incremental R&E credit rates were also increased from (1.65%, 2.2%, and 2.75%) to (2.65%, 3.2%, and 3.75%).

C. Foreign source income allocation rules for R&D

The consequences of the third feature of R&D tax policy (foreign source income allocation rules) for the R&D performance of U.S. multinationals have been studied thoroughly by Hines (1992, 1994a, 1994b). The problem is one of allocation of fixed costs across income sources. Since the taxation of income is different depending on whether it is domestic or foreign source, it matters where R&D is expensed (and the credit only applies to the domestic portion of the R&D).

In 1977, Treasury regulation section 1.861-8 specified the rules by which R&D expenditure should be allocated between foreign and domestic source income: these rules specified that all government mandated R&D (R&D for safety purposes, etc.) plus 30 percent of the remainder can be exclusively allocated to U.S. sales. The 70 percent remaining must be apportioned between domestic and foreign sales using either sales or income as the method of apportionment. The allocations must be done on the basic of product lines (two-digit level). Because of concern on the part of the president and Congress that this method of allocation disadvantages U.S. corporations competing internationally, regulation 1.861-8 was suspended by Section 223(b) of the Economic Recovery Tax Act of 1981; ERTA allowed all R&D expenditure to be allocated against income earned within the United States. The allocation rules have been reviewed and revised continuously since then; a summary of the changes is shown in the last column of Table 1.

D. Summary of the policy debate

Current policy issues surrounding tax-based innovation incentives in the U.S. focus on the R&E credit and the tax treatment of R&D in general. The central problem in designing an tax incentive for performing R&D is that it is better to use an incremental tax credit because there is a great deal of infra-marginal R&D that firms will do anyway and it is quite costly to give up tax revenue for this. Because each firm is different and has a different history, it is then necessary to tailor the incentive firm-by-firm (for example, using their own R&D to sales ratio to determine what is incremental). But the catch-22 is that as soon as one does anything

[23] One other change to tax legislation in 1997 that affected firms using the R&D tax credit was the change in carry forward and carry back periods for general business credits (which include the R&E credit) from 15 and 3 years to 20 and 1 years.

firm-specific, it becomes subject to firm control, and they can endogenously respond to the tax authority's efforts in ways that may make the credit operate in a perverse way.

The following options for reform of the credit have been suggested and some of them will undoubtedly be a subject of debate during the next Congress:

- Make the credit permanent instead of temporary.
- Use an R&D jobs credit, that is, confine the eligible expense to wage & salaries of R&D workers (about 60% of the total).
- Flat-rate credit, instead of the incremental credit, so everyone benefits.
- Freshen the base period of regular credit – let the taxpayer select the years that determine the fixed base percentage.
- Use a "rolling" base period – this will have the same defect as the original (1981) credit.
- Increase the AIRC rates so it provides a greater incentive.
- Eliminate or lower the AIRC 1% research/sales threshold.
- Remove extraneous business units from the measure of gross receipts (business units such as the financing units operated by some large firms like General Motors).
- Allow the R&D credit to offset the alternative minimum tax as well as the regular tax.
- Make the R&D credit refundable ((or let firms sell it). This is intended to allow unprofitable firms to benefit from the credit.

V. ADMINISTRATIVE PRACTICES

In general research or experimental expenditures paid or incurred by a taxpayer during the taxable year in connection with his trade or business are deductible as expenses, and are not chargeable to capital account, if the taxpayers adopts the method provided in section 174(a).

The consent of the Commissioner is not required if the taxpayer adopts the method for the first such taxable year in which hey pays or incurs research or experimental expenditures. The taxpayer may do so by claiming in his income tax return for such year a deduction for his research or experimental expenditure.

If the taxpayer fails to adopt the method for the first taxable year in which he incurs such expenditures, he cannot do so in subsequent taxable years unless he obtains the consent of Commission under section 174(a)(2)(B).

A taxpayer, with the consent of the Commissioner, adopt at any time the method provided in section 174(a). The method adopted in this manner shall be applicable only to expenditures paid or incurred during the taxable year for which the request is made and in subsequent taxable years. A request to adopt this method shall be in writing and shall be addressed to the Commissioner of Internal Revenue. The request shall set forth the name and address of the taxpayer, the first taxable year for which the adoption of the method is requested, and a description of the project or projects with respect to which research or experimental expenditures are to be, or have already been, paid or incurred. The request shall be signed by the taxpayer (or his dully authorized representative) and shall be filled not later than the last day of the first taxable year for which the adoption of the method is requested.

An application for permission to change to a different method of treating research or experimental expenditures shall be in writing and shall be addressed to the Commissioner of Internal Revenue. If permission is granted to make change, the taxpayer shall attach a copy of the letter granting permission to his income tax return for the first taxable year in which the different method is effective.

If the last day prescribed by law for filing a return for any taxable year (including extensions thereof) to which section 174(a) is applicable falls consent is hereby given for the taxpayer to adopt the expense method or to change from the expense method to a different method.

The R&E credit has in fact accounted for a large fraction of the disputes between firms and the Internal Revenue Service over the past 15-20 years, and many of those disputes concern the definition of what is "qualified research." Early in the administration of the credit, there was a lack of knowledge and understanding among IRS examiners as to what research and development consisted of, and this led to large amounts of expenditure being disallowed. At the present time, there has been a considerable effort to train examiners and others within the IRS to deal with the credit, along with an effort to clarify the definition of qualified research, but this area will undoubtedly continue to be an area of contention in the future.

The current proposed sequence of tests applied by the IRS to determine whether an activity qualifies for the credit is the following:

- Section 174 test – does the activity meet the definition of R&D for expensing (as given in section A.1. above.
- Is the research "technological in nature?" Is it undertaken for the purpose of discovering information or to obtain knowledge that exceeds, expands, or refines the common knowledge of skilled professionals in a particular field of science or engineering? There is a patent "safe harbor" for this test – if a patent is issued on the outcome, presumably the knowledge was not common.
- Does the research involve a process of experimentation? – a process to evaluate more than one alternative designed to achieve a result where the capability or method achieving that result is uncertain at the outset.
- New or improved business component test.

The record-keeping requirements for the credit have been substantial and will continue to be so if these regulations are implemented. Contemporaneous records of the research program would be required in the future. In past audit situations, it has proved very difficult to obtain the information needed, given the fallible memory of scientists and engineers and their lack of desire to go over projects that are 4 or 5 years old. The IRS is currently exploring ways to qualify research contemporaneously or prospectively rather than relying on old records.

VI. ACCOUNTANCY PRACTICES

Accounting practices in the United States follow a set of standards determined by the Financial Accounting Standards Board, an independent non-profit organization.[24] There is no

[24]"Since 1973, the Financial Accounting Standards Board has been the designated organization in the private sector for establishing standards of financial accounting and reporting. Those standards govern the preparation

mention of "innovation" *per se* in these standards, although they do include standards for accounting for innovation-related investments such as rules regarding the expensing of R&D spending, the amortization of patents and other technology investments, and the accounting for acquisition of R&D-intensive assets. The key FASB statements that are relevant are the following:

- No. 2 (Issued 10/74), Accounting for Research and Development Costs.
- No. 68 (Issued 10/82), Research and Development Arrangements.
- No. 86 (Issued 8/85), Accounting for the Costs of Computer Software to Be Sold, Leased, or Otherwise Marketed.

In general, Research and Development costs are charged to expenses when they are incurred. If they are "material," they are to be disclosed on the income statement in each period for which an income statement is presented.

Those activities that shall be identified as research and development for financial accounting and reporting purposes are the following:

Research -- planned search or critical investigation aimed at the discovery of new knowledge with the hope that such knowledge will be useful in developing a new product or service (hereinafter product) or a new process or technique (hereinafter process) or in bringing about a significant improvement to an existing product or process.

Development -- the translation of research findings or other knowledge into a plan or design for a new product or process or for a significant improvement to an existing product or process, whether intended for sale or use. The design, construction and operation of a pilot plant that is not of a scale economically feasible to the enterprise for commercial production

Market research or market-testing activities, or the acquisition, development, or improvement of a process by an enterprise for use in its selling or administrative activities are specifically excluded from the definition of research and development activities. Also excluded from R&D are engineering follow-through in an early phase of commercial production, quality control during commercial production including routine testing of products, and routine, ongoing efforts to refine, enrich, or otherwise improve upon the qualities of an existing product.

Costs associated with these two activities (R&D) are to be deducted against earnings in the period incurred. Elements of cost identified with research and development activities are as follows:

Materials, equipment, and facilities -- The cost of materials and equipment or facilities that are acquired or constructed for R&D activities and that have alternative future for other uses

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of financial reports. They are officially recognized as authoritative by the Securities and Exchange Commission (Financial Reporting Release No. 1, Section 101) and the American Institute of Certified Public Accountants (Rule 203, Rules of Conduct, as amended May 1973 and May 1979) .The SEC has statutory authority to establish financial accounting and reporting standards for publicly held companies under the Securities Exchange Act of 1934. Throughout its history, however, the Commission's policy has been to rely on the private sector for this function to the extent that the private sector demonstrates ability to fulfill the responsibility in the public interest." (Financial Accounting Standards Board, January 2000, http://www.rutgers.edu/Accounting/raw/fasb/).

shall be capitalized as tangible assets when acquired or constructed. The cost of such materials consumed in R&D and the depreciation of equipment and facilities of these activities are R&D cost. However, if there is no other alternative for these materials, equipment, or facilities for future uses than an R&D project and therefore no separated economic values are R&D costs at the time the costs are incurred.

Personnel -- Related costs of personnel engaged in R&D activities shall be included in R&D costs.

Intangibles purchased from others -- The costs of intangibles that are purchased from others for use in R&D activities and that have alternative future uses shall be capitalized and amortized as intangible assets. The amortization of those intangible assets used in R&D activities is an R&D cost. However, if there are no alternative future uses and therefore no separate economic value, the acquisition of these assets is an R&D cost at the time the cost is incurred.

Contract services -- The cost of services performed by others in connection with the R&D activities of an enterprise, including R&D conducted by others on behalf of the enterprise, shall be included in R&D cost. FASB Statement No. 68 issued in October 1982 specifies how an enterprise performing such services should account for the R&D costs. It states that "the enterprise must determine whether it is obligated only to perform contractual research and development for others, or is otherwise obligated. To the extent that the enterprise is obligated to repay the other parties, it records a liability and charges research and development costs to expense as incurred."

An enterprise could be a party to a research and development arrangement through which it can obtain the results of R&D funded partially or entirely by others and the FASB standards govern the recording of some aspects of this kind of contract. To conclude that liability does not exist, the transfer of the financial risk involved with R&D from the enterprise to the other parties must be substantive and genuine. Thus the key test for which party incurs the liability to pay for the R&D depends on who is bearing the risk.

Indirect cost -- R&D costs shall include a reasonable allocation of indirect costs. However, general and administrative costs that are not clearly related to R&D activities shall not be included as R&D costs.

Computer software -- Computer software is developed for many and diverse uses. Accordingly, in each case the nature of the activity for which the software is being developed should be considered in relation to the definition of R&D and the examples above, to determine whether software costs should be included or excluded. Software is not R&D unless it was used in R&D activities. That includes tools used to facilitate R&D or components of a product or process that are undergoing R&D activities.

FASB Statement No. 86, issued in August 1985, describes how to account for the costs of computer software to be sold, leased, or otherwise marketed as a separate product or as part of a product or process. It applies to computer software developed internally and to purchased software. The statement specifies that "costs incurred internally in creating a computer software product shall be charged to expense when incurred as research and development until technological feasibility has been established for the product. Technological feasibility is established upon completion of a detail program design or, in its absence, completion of a working model. Thereafter, all software production costs shall be capitalized and

subsequently reported at the lower of unamortized cost or net realizable value. Capitalized costs are amortized based on current and future revenue for each product with an annual minimum equal to the straight-line amortization over the remaining estimated economic life of the product."

This FASB ruling became applicable, on a prospective basis, for financial statements for fiscal years beginning after December 15, 1985, changing the heretofore predominant practice of expensing all costs of developing and producing a computer software product.

VII. CONCLUSIONS

The U.S. has relatively few specific innovation-related tax incentives. Even the R&E tax credit is relatively modest, representing about 4 percent of government funding for R&D. Given an price elasticity estimate of R&D spending equal to unity (which is a number obtained in a broad range of studies), this implies that the credit may be responsible for an increase in total U.S. R&D spending of about 1.2 percent.

This absence of innovation-related tax incentives is in fact of some concern to large U.S. multinationals, who find it increasingly easier to locate their R&D and other activities wherever in the world they find that costs are lower. Several of them have pointed to the current R&D tax provisions as important in a world where other countries are offering them even more favourable tax treatment in order to attract their R&D.

However, the most important tax incentive in the United States for innovative activities is probably not R&E tax credit, but is the low tax rate on capital gains, which partly compensates entrepreneurs and venture capitalists for the risk they bear. It is this rather than the credit that encourages entrepreneurial activity and leads to the continuous entry of new firms and technologies onto the market. An interesting fact is that the already low rate of 28% was lowered even further in 1998, and the effects of that increased incentive are probably only just beginning to be felt.

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TABLE 1
History of R&D Tax Treatment in the United States 1981-1999

Period	Credit Rate	Corporate Tax Rate	Definition of Base	Qualified Expenditures	Sect. 174 Deduction?	Foreign Allocation Rules
July 1981 to Dec 1985	25%	46% (48% in 81)	Max of previous 3-yr average or 50% of current yr	Excluded: Res. done outside U.S.; Humanities and Soc Sci.; Research funded by others	none	100% deduction against domestic income
Jan 1986 to Dec 1986	20%	34%	same	Narrowed def. to "tech-nological" research. Excluded leasing.	none	same
Jan 1987 to Dec 1987	20%	34%	same	same	none	50% deduction against domestic income; 50% allocation
Jan 1988 to Apr 1988	20%	34%	same	same	none	64% deduction against domestic income; 36% allocation
May 1988 to Dec 1988	20%	34%	same	same	none	30% deduction against domestic income; 70% allocation
Jan 1989 to Dec 1989	20%	34%	same	same	-50% credit	64% deduction against domestic income; 36% allocation
Jan 1990 to Dec 1991	20%	34%	1984-88 R&D to sales ratio times current sales (max ratio of .16); .03 for startups.	same	-100% credit	same
Jan 1992 to Dec 1993	20%	34%	same; startup rules modified	same	-100% credit	same
Jan 1994 to June 1995	20%	35%	same	same	-100% credit	50% deduction against domestic income; 50% alloc.
July 1995 to June 1996	0%	35%	none	NA	NA	same
July 1996 to June 1999	20%	35%	1984-88 R&D to sales ratio times current sales (max ratio of .16) (or AIC for 24 mos.)	same definition	-100% credit	same
July 1999 to June 2004	20%	35%	1984-88 R&D to sales ratio times current sales (max ratio of .16) (or AIC for 24 mos.)	same definition	-100% credit	same

Table 2a

Scenario 1: Growing R&D and Sales

				Ordinary R&E Credit Computation				AIRC Computation			
Tax year	Revenue	QRE	QRE/Revenue	Fixed base percentage	Average Rev. over 4 years	Fixed Base	Ordinary R&E Credit	Ratio of QRE to Avg Rev	AIRC	Ordinary R&E Credit/Sales	AIRC/ Sales
1984	$ 28,000,000	$ 3,000,000	10.7%							0	0
1985	$ 32,000,000	$ 4,200,000	13.1%							0.0%	0.0%
1986	$ 31,000,000	$ 5,000,000	16.1%							0.0%	0.0%
1987	$ 34,000,000	$ 6,200,000	18.2%							0.0%	0.0%
1988	$ 43,000,000	$ 6,800,000	15.8%							0.0%	0.0%
1989	$ 48,000,000	$ 8,400,000	17.5%	15%	$ 35,000,000	$ 5,250,000	**$ 630,000**	24.0%	**$ 298,988**	1.3%	0.6%
1990	$ 60,000,000	$ 10,200,000	17.0%	15%	$ 39,000,000	$ 5,850,000	**$ 870,000**	26.2%	**$ 364,658**	1.5%	0.6%
1991	$ 68,000,000	$ 11,000,000	16.2%	15%	$ 46,250,000	$ 6,937,500	**$ 812,500**	23.8%	**$ 391,341**	1.2%	0.6%
1992	$ 76,000,000	$ 12,000,000	15.8%	15%	$ 54,750,000	$ 8,212,500	**$ 757,500**	21.9%	**$ 424,952**	1.0%	0.6%
1993	$ 80,000,000	$ 10,000,000	12.5%	15%	$ 63,000,000	$ 9,450,000	**$ 110,000**	15.9%	**$ 346,178**	0.1%	0.4%
1994	$ 84,000,000	$ 10,500,000	12.5%	15%	$ 71,000,000	$ 10,650,000	**$ -**	14.8%	**$ 361,268**	0.0%	0.4%
1995	$ 88,200,000	$ 11,025,000	12.5%	15%	$ 77,000,000	$ 11,550,000	**$ -**	14.3%	**$ 378,210**	0.0%	0.4%
1996	$ 92,610,000	$ 11,576,250	12.5%	15%	$ 82,050,000	$ 12,307,500	**$ -**	14.1%	**$ 396,572**	0.0%	0.4%
1997	$ 97,240,500	$ 12,155,063	12.5%	15%	$ 86,202,500	$ 12,930,375	**$ -**	14.1%	**$ 416,377**	0.0%	0.4%
1998	$ 102,102,525	$ 12,762,816	12.5%	15%	$ 90,512,625	$ 13,576,894	**$ -**	14.1%	**$ 437,196**	0.0%	0.4%
1999	$ 107,207,651	$ 13,400,956	12.5%	15%	$ 95,038,256	$ 14,255,738	**$ -**	14.1%	**$ 459,056**	0.0%	0.4%
2000	$ 112,568,034	$ 14,071,004	12.5%	15%	$ 99,790,169	$ 14,968,525	**$ -**	14.1%	**$ 482,009**	0.0%	0.4%

Note that this computation uses the current (2000-2001) U.S. tax code, rather than the code that would have applied in the years shown.

Table 2b

Scenario 2: Growing R&D; Constant Sales

				Ordinary R&E Credit Computation				AIRC Computation			
Tax year	Revenue	QRE	QRE/Revenue	Fixed base percentage	Average Rev. over 4 years	Fixed Base	Ordinary R&E Credit	Ratio of QRE to Avg Rev	AIRC	Ordinary R&E Credit/Sales	AIRC/ Sales
1984	$ 28,000,000	$ 2,000,000	7.1%							0	0
1985	$ 32,000,000	$ 2,100,000	6.6%							0.0%	0.0%
1986	$ 31,000,000	$ 2,205,000	7.1%							0.0%	0.0%
1987	$ 34,000,000	$ 2,425,500	7.1%							0.0%	0.0%
1988	$ 43,000,000	$ 2,668,050	6.2%							0.0%	0.0%
1989	$ 48,000,000	$ 2,934,855	6.1%	7%	$ 35,000,000	$ 2,374,698	**$ 112,031**	8.4%	**$ 94,045**	0.2%	0.2%
1990	$ 60,000,000	$ 3,228,341	5.4%	7%	$ 39,000,000	$ 2,646,092	**$ 116,450**	8.3%	**$ 103,220**	0.2%	0.2%
1991	$ 68,000,000	$ 3,600,000	5.3%	7%	$ 46,250,000	$ 3,137,994	**$ 92,401**	7.8%	**$ 113,841**	0.1%	0.2%
1992	$ 76,000,000	$ 4,000,000	5.3%	7%	$ 54,750,000	$ 3,714,706	**$ 57,059**	7.3%	**$ 124,952**	0.1%	0.2%
1993	$ 80,000,000	$ 4,500,000	5.6%	7%	$ 63,000,000	$ 4,274,456	**$ 45,109**	7.1%	**$ 139,928**	0.1%	0.2%
1994	$ 80,000,000	$ 4,950,000	6.2%	7%	$ 71,000,000	$ 4,817,244	**$ 26,551**	7.0%	**$ 153,143**	0.0%	0.2%
1995	$ 80,000,000	$ 5,445,000	6.8%	7%	$ 76,000,000	$ 5,156,487	**$ 57,703**	7.2%	**$ 169,418**	0.1%	0.2%
1996	$ 80,000,000	$ 5,989,500	7.5%	7%	$ 79,000,000	$ 5,360,032	**$ 125,894**	7.6%	**$ 188,464**	0.2%	0.2%
1997	$ 85,000,000	$ 6,588,450	7.8%	7%	$ 80,000,000	$ 5,427,881	**$ 232,114**	8.2%	**$ 210,467**	0.3%	0.2%
1998	$ 85,000,000	$ 7,247,295	8.5%	7%	$ 81,250,000	$ 5,512,692	**$ 346,921**	8.9%	**$ 234,602**	0.4%	0.3%
1999	$ 85,000,000	$ 7,972,025	9.4%	7%	$ 82,500,000	$ 5,597,502	**$ 474,904**	9.7%	**$ 261,207**	0.6%	0.3%
2000	$ 85,000,000	$ 8,769,227	10.3%	7%	$ 83,750,000	$ 5,682,313	**$ 617,383**	10.5%	**$ 290,530**	0.7%	0.3%

Note that this computation uses the current (2000-2001) U.S. tax code, rather than the code that would have applied in the years shown.

Table 2c

Scenario 3: Shrinking R&D; Constant Sales

				Ordinary R&E Credit Computation				AIRC Computation			
Tax year	Revenue	QRE	QRE/Revenue	Fixed base percentage	Average Rev. over 4 years	Fixed Base	Ordinary R&E Credit	Ratio of QRE to Avg Rev	AIRC	Ordinary R&E Credit/Sales	AIRC/ Sales
1984	$ 65,000,000	$ 3,000,000	4.6%							0	0
1985	$ 65,000,000	$ 4,200,000	6.5%							0.0%	0.0%
1986	$ 65,000,000	$ 5,000,000	7.7%							0.0%	0.0%
1987	$ 65,000,000	$ 4,900,000	7.5%							0.0%	0.0%
1988	$ 75,000,000	$ 4,802,000	6.4%							0.0%	0.0%
1989	$ 75,000,000	$ 4,705,960	6.3%	7%	$ 67,500,000	$ 4,413,090	**$ 58,574**	7.0%	**$ 145,592**	0.1%	0.2%
1990	$ 75,000,000	$ 4,611,841	6.1%	7%	$ 70,000,000	$ 4,576,537	**$ 7,061**	6.6%	**$ 140,919**	0.0%	0.2%
1991	$ 75,000,000	$ 4,519,604	6.0%	7%	$ 72,500,000	$ 4,739,985	**$ -**	6.2%	**$ 136,316**	0.0%	0.2%
1992	$ 75,000,000	$ 4,429,212	5.9%	7%	$ 75,000,000	$ 4,903,433	**$ -**	5.9%	**$ 131,783**	0.0%	0.2%
1993	$ 80,000,000	$ 4,340,628	5.4%	7%	$ 75,000,000	$ 4,903,433	**$ -**	5.8%	**$ 128,461**	0.0%	0.2%
1994	$ 80,000,000	$ 4,253,815	5.3%	7%	$ 76,250,000	$ 4,985,157	**$ -**	5.6%	**$ 124,634**	0.0%	0.2%
1995	$ 80,000,000	$ 4,168,739	5.2%	7%	$ 77,500,000	$ 5,066,881	**$ -**	5.4%	**$ 120,871**	0.0%	0.2%
1996	$ 80,000,000	$ 4,085,364	5.1%	7%	$ 78,750,000	$ 5,148,604	**$ -**	5.2%	**$ 117,173**	0.0%	0.1%
1997	$ 85,000,000	$ 4,003,657	4.7%	7%	$ 80,000,000	$ 5,230,328	**$ -**	5.0%	**$ 113,537**	0.0%	0.1%
1998	$ 85,000,000	$ 3,923,584	4.6%	7%	$ 81,250,000	$ 5,312,052	**$ -**	4.8%	**$ 109,963**	0.0%	0.1%
1999	$ 85,000,000	$ 3,845,112	4.5%	7%	$ 82,500,000	$ 5,393,776	**$ -**	4.7%	**$ 106,448**	0.0%	0.1%
2000	$ 85,000,000	$ 3,768,210	4.4%	7%	$ 83,750,000	$ 5,475,500	**$ -**	4.5%	**$ 102,992**	0.0%	0.1%

Note that this computation uses the current (2000-2001) U.S. tax code, rather than the code that would have applied in the years shown.

Table 3
1997 Corporate Returns 1120, 6765, and 3800
Source: IRS Statistics of Income Division
(Money amounts are in thousands)

INFORMATION FROM FORM 6765 (R&E Tax Credit) - 15,973 Forms Filed	
REGULAR CREDIT Basic research payments paid or incurred to qualified organizations (reg. credit)	$ 411,037
Minimum of Basic research payments and Qualified organization base period amount (reg. credit)	$ 227,708
Applicable percentage of contract research expenses (reg. credit)	$ 12,613,998
Total qualified research expenses (reg. credit)	$ 73,972,051
Regular credit claimed	$ 4,306,376
ALTERNATIVE CREDIT Basic research payments paid or incurred to qualified organizations (alt. credit)	$ 15,122
Minimum of Basic research payments and Qualified organization base period amount (alt. credit)	$ 8,009
Applicable percentage of contract research expenses (alt. credit)	$ 1,341,525
Total qualified research expenses (alt. credit)	$ 10,885,577
Alternative credit	$ 172,458
TOTAL	
Flow-through research credits	$ 53,452
Total current year credit	$ 4,523,997
Total credit allowed for current year for companies without other general business credits	$ 1,737,786

INFORMATION FROM FORM 3800 (Business Credit) - 15,461 Forms Filed	
Current year credit for increasing research	$ 4,523,997
Tentative general business credit	$ 9,980,533
General business credit allowed current year	$ 3,669,816
Maximum of 0 and (current year R&D credit - tentative general business credits + general business credits allowed for current year)	$ 2,278,803

INFORMATION FROM FORM 1120 (Corporate Tax)

Gross receipts less returns and allowances (firms claiming regular credit)	$ 3,333,245,463
Gross receipts less returns and allowances (firms claiming alternative credit)	$ 323,520,107

Table 4
Summary of Regular and Alternative R&E Credit in 1997

Item	Regular Credit	Alternative Credit	Total
QRE ($ thousands)	73,972,051	10,885,577	84,857,628
Credit claimed ($ thousands)	4,306,376	172,458	4,523,997
QRE as a percent of total QRE	87.2%	12.8%	100.0%
Credit claimed as a percent of total credit	96.1%	3.9%	100.0%
Credit claimed/QRE	5.8%	1.6%	5.3%