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Report to the Chairman, Special Committee on Aging, U.S. Senate

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TAX POLICY

Pharmaceutical Industry's Use of the Research Tax Credit

GAO/GGD-94-139

GAO

United States
General Accounting Office
Washington, D.C. 20548

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General Government Division

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May 13, 1994

The Honorable David Pryor
Chairman, Special Committee on Aging
United States Senate

Dear Mr. Chairman:

This report is the second part of a response to your request to review the major tax benefits used by the pharmaceutical industry. The report provides information about the amount of research and experimentation tax credit claimed by the pharmaceutical industry, the characteristics of the pharmaceutical companies claiming the credit and IRS' administration of the credit.

As agreed with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days from the date of this letter. At that time we will send copies to the Secretary of the Treasury and other interested parties. We will also make copies available to others upon request.

The major contributors to this report are listed in appendix II. Please contact me at (202) 512-5407 if you or your staff have any questions concerning the report.

Sincerely yours,

Jennie S. Stathis

Jennie S. Stathis
Director, Tax Policy and
Administration Issues

Executive Summary

Purpose

In 1981, Congress enacted the research and experimentation tax credit to encourage businesses to do research. Congress believed that increased research was necessary to enhance the competitiveness of the U.S. economy.

This report is the second part of a response to a request by the Chairman of the Senate Special Committee on Aging that GAO review major tax benefits used by the pharmaceutical industry. As agreed with the Committee, GAO's objectives were to (1) determine the research tax credits claimed by the pharmaceutical industry from 1981 through 1990 and the characteristics of the companies claiming them and (2) describe any difficulties the Internal Revenue Service (IRS) might have in ensuring that pharmaceutical companies claiming the credit comply with provisions of the Internal Revenue Code relating to the credit.

Background

Beginning in July 1981, taxpayers could reduce their tax liability by 25 percent of qualified research spending that exceeded a base amount. Qualified expenditures are for product innovation but not product development. The base amount was equal to the average research expenditure for the 3 previous years or 50 percent of the current year's expenditures, whichever was greater.

The Tax Reform Act of 1986 modified the credit by reducing the rate to 20 percent of qualified spending above the base and more narrowly defining qualified expenditures. The credit was changed again in November 1988 to require that taxpayers reduce their deductions for research expenses by an amount equal to 50 percent of the credit they claim. In 1989, this amount was increased to 100 percent of the credit they claim.

The Omnibus Budget Reconciliation Act of 1989 changed the method for calculating the base amount. The 3-year moving average base was replaced by a base equal to the ratio of total qualified research expenses to total gross receipts for 1984 through 1988 multiplied by the average amount of the taxpayer's gross receipts for the preceding 4 years. This base change removed the link between increases in current spending and future base amounts that had reduced the incentive to undertake additional research spending under the 3-year moving average base.

The credit has never been a permanent part of the tax code but has been extended 6 times since 1981. It is currently scheduled to expire on July 1, 1995.

Results in Brief

GAO estimates that the pharmaceutical industry earned $1.24 billion of research and experimentation tax credits between 1981 and 1990. The industry's credits as a share of the credits earned by all industries increased from 4 percent in 1981 to 12 percent in 1990.

These credits were earned primarily by large companies. Between 1981 and 1990, companies with assets of $250 million or more earned, on average, about 90 percent of the industry's credits. The biotechnology sector of the industry, which consists largely of smaller companies, benefited very little from the credit. Although their research spending has been increasing, the biotechnology companies typically cannot claim the credit because they have low or no tax liabilities.

The research and experimentation tax credit is difficult for IRS to administer because (1) auditors have to distinguish stages of research, (2) audit issues are often highly technical, and (3) successive proposed regulations caused uncertainty. IRS examiners reported that they had difficulty distinguishing research for product innovation from research for product development. Examiners who audited four large pharmaceutical companies also said that the technical nature of the issues made the audits difficult. The issuance of three successive proposed regulations since 1983 defining qualified research has created uncertainty for both the taxpayer and IRS. Although this uncertainty may be resolved soon because Treasury expects to finalize regulations some time during the second quarter of 1994, the regulations are not expected to distinguish between research for product innovation and research for product development.

GAO's Analysis Credit Claimed

Using IRS data, GAO estimated that the pharmaceutical industry earned $1.24 billion in research credits between 1981 and 1990. The credit earned is the calculated amount of the tax credit, while the credit claimed is the amount actually applied to tax liabilities. IRS does not report the amount of research credit claimed after 1985 because the research credit became part of the general business credit in 1986. The pharmaceutical industry claimed $1.16 billion in research credits and general business credits between 1981 and 1990. GAO's analysis shows that most of the general business credits claimed by the industry were research credits.

Administration of the Credit

On the basis of a 1989 survey of IRS revenue agents who audited companies in all industries, GAO concluded that the credit was relatively difficult to administer. The survey found that agents had difficulty determining whether research was for truly innovative products. The agents also had difficulty because Treasury has issued different definitions of qualified research in a series of proposed regulations for section 174 of the tax code. Section 174 offers taxpayers the option of writing off qualifying research expenses over a minimum 5-year period or deducting them on a current basis.

The uncertainty about the definition of qualified research continues because proposed regulations have not been finalized. The regulations that were proposed in May 1989 were withdrawn, and new proposed regulations were issued in March 1993. The lack of finalized regulations under section 174 creates uncertainty because all spending that qualifies for the credit must first qualify under section 174. This uncertainty may be resolved soon because the proposed regulations are expected to be finalized some time during the second quarter of 1994.

IRS officials responsible for audits of pharmaceutical companies said that distinguishing routine from innovative research continues to be a problem. IRS officials also said that determining whether research expenses supported activities that qualify for the credit required difficult audits. They said that such determinations often require on-site interviews with company personnel that occur long after the spending has taken place.

Recommendations

GAO is not making any recommendations.

Agency Comments

GAO discussed the information contained in this report on April 20, 1994, with responsible officials at the Department of the Treasury, Office of Tax Analysis, including the Directors of Tax Legislative Counsel and Business Taxation. The officials generally agreed with the information in the report, clarifying the history of revisions to section 174 regulations. GAO incorporated their oral comments where appropriate.

Contents

Abbreviations

GBC	General business credit
IRS	Internal Revenue Service
NOL	Net operating loss
R&D	Research and development
R&E	Research and experimentation
SOI	Statistics of Income

Introduction

The research and experimentation (R&E) tax credit has had an eventful history. Believing that an increase in research was necessary to enhance the overall competitive position of the U.S. economy, Congress created the credit in 1981 to encourage businesses to do research. Since that time, Congress has made many changes to the credit. In its current form, the credit reduces a company's tax liability by 20 percent of the amount of additional research expenditures above a computed base.

This report on the R&E tax credit is the second part of our response to a request by the Chairman, Senate Special Committee on Aging, that we review major tax benefits used by the pharmaceutical industry,[1] which has been an increasingly important recipient of the R&E tax credit. It is well known by pharmaceutical industry analysts that high amounts of research and development (R&D)[2] are necessary for discovering new products.

Federal Tax Subsidies Related to Research Activities

Two sections of the Internal Revenue Code provide guidance related to research and experimentation. Section 174 covers the tax deductibility of corporate R&E activities, and section 41 pertains to the R&E tax credit.

Deducting Research Expenses Under Section 174

Section 174 offers taxpayers two ways of treating funds invested in R&E activities. They may capitalize these investments and write them off over a minimum 5-year period, or they may deduct the costs of R&E expenditures on a current-year basis. The Joint Committee on Taxation has projected that the tax expenditures related to deducting R&E expenditures under the two options will be $11.4 billion from 1994 through 1998 for all industries.[3]

The tax code does not specifically define R&E for section 174 purposes, except to exclude such costs as expenditures for exploration or for the acquisition or improvement of depreciable or depletable property or land. Treasury regulations adopted under section 174 defined qualified research as "research and development costs in the experimental or laboratory

[1]In Pharmaceutical Industry: Tax Benefits of Operating in Puerto Rico (GAO/GGD-92-72BR, May 4, 1992), we reported on the industry's use of the possessions tax credit under section 936 of the Internal Revenue Code.

[2]R&D is used by pharmaceutical companies to describe general research activities. The Internal Revenue Service (IRS) uses the term R&E to describe all research activities.

[3]Tax expenditures are defined as those revenue losses attributable to provisions of the federal tax laws that allow a special exclusion, exemption, or deduction from gross income or that provide a special credit, a preferential rate of tax, or a deferral of tax liability.

sense." It includes all expenditures to develop, and some expenditures to improve, plant processes, products, formulas, or inventions.

Ambiguities have existed in identifying research expenditures under section 174. Treasury issued regulations in 1957 defining research expenditures. However, in order to clarify the definition of qualified research expenses, Treasury proposed regulations redefining R&E in January 1983. In May 1989, regulations were proposed that replaced the 1983 proposal.[4] In March 1993, Treasury issued new proposed regulations. Proposed regulations do not have the full force of the law.

Until 1989, taxpayers were allowed to use R&E expenditures to decrease their tax liabilities both under section 174 and through the R&E tax credit. Congress limited this dual benefit with the Technical and Miscellaneous Revenue Act of 1988,[5] reducing the amount of R&E expenditures taxpayers could otherwise deduct under section 174 by 50 percent of the R&E tax credit determined for the year. The Omnibus Budget Reconciliation Act of 1989[6] reduced the deduction under section 174 by the full amount of the R&E tax credit determined for the year.

Claiming the Research Tax Credit Under Section 41

Section 41 of the Internal Revenue Code allows taxpayers to claim the R&E tax credit, which is equal to 20 percent of the excess of qualified research expenses of the taxable year over a base amount. The base amount is a product of a fixed-base percentage multiplied by the taxpayer's average annual gross receipts for the 4 preceding tax years. The fixed-base percentage is calculated by dividing the company's qualified research expenditures for the years 1984 through 1988 by gross receipts for the same period.

Those companies that do not have gross receipts in at least 3 years during the 1984 through 1988 period are considered start-up firms and are assigned a fixed-base percentage of 3 percent for each of their first 5 taxable years after 1993 in which they incur qualified research expenditures. The taxpayers' fixed-base percentage will be gradually increased for their 6th through 10th taxable years after 1993 in which they incur qualified research expenditures. After the 10th year, the fixed-base

[4]Proposed regulations are issued prior to finalization in order to permit public comments and administrative consideration.

[5]Public Law 100-647, Nov. 10, 1988.

[6]Public Law 101-239, Dec. 19, 1989.

percentage will be the actual ratio of qualified research expenditures to gross receipts for 5 years selected by the taxpayer from its 5th through 10th taxable years.

Although the R&E tax credit has additional restrictions on qualified research, before a research expenditure can be used in calculating the tax credit, it must first qualify under section 174. Qualified research expenditures, in general, include (1) in-house expenses for wages paid for qualified research services and supplies used in research, (2) payments for the right to use computers for qualified research, and (3) 65 percent of the payments made for contract research done on the taxpayer's behalf.

Table 1.1 gives a sample calculation of a claim for the R&E tax credit under the most recent provisions.

History of the R&E Tax Credit

Since its enactment in 1981,[7] the R&E tax credit has been modified four times and extended six times. It originally contained the following provisions:

- It equaled 25 percent of the qualified research expenditures that exceeded the base amount.
- It had a base period amount that equaled the average expenditures for the 3 previous years, or 50 percent of the current year's expenditures, whichever was greater.
- It contained a 3-year carryback and a 15-year carryforward provision.
- The credit was effective from July 1, 1981, through December 31, 1985.
- The credit excluded the following from the definition of qualified research: research done outside the United States, research in the humanities or social sciences, and research funded by another person or governmental entity.

[7]Economic Recovery Tax Act (P.L. 97-34, Aug. 13, 1981).

Table 1.1: Sample Calculation of the R&E Tax Credit for 1990

Dollars in thousands

Year	Receipts	Qualified research expenditures
1984	$150,000	$25,000
1985	$300,000	$45,000
1986	$400,000	$30,000
1987	$350,000	$35,000
1988	$450,000	$50,000
1989	$500,000	$55,000
1990	$650,000	$73,000

Calculations	
Compute the fixed base percentage	
1.Total the qualified research expenditures for 1984-1988	$185,000
2.Total the gross receipts for 1984-1988	$1,650,000
3.Divide qualified research expenditures by gross receipts to determine the fixed-base percentage	11.21%
Compute the base amount for 1990	
1.Calculate the average receipts for the 4 preceding years (1986-1989)	$425,000
2.Multiply by fixed-base percentage to determine base amount	$47,643
Compute the tax credit	
1.Take research expenses for 1990 ($73,000) and subtract base amount ($47,643) or 50% of 1990's qualified research expenses ($36,500), whichever is more	$ 25,357
4.Multiply this amount by 20% to determine the R&E tax credit for 1990	$5,071

Note: The example is that of an established firm. A start-up company's calculation of the credit would differ because start-up companies are assigned an initial fixed base of 3 percent, which is gradually increased after the fifth taxable year in which it incurs qualified research expenditures.

Source: Hypothetical example by GAO.

The Tax Reform Act of 1986[8] modified the tax credit so that it targeted research undertaken to discover technological information that pertained to the functional aspects of products. In addition, the act

- reduced the credit to 20 percent;

[8]Public Law 99-514, Oct. 22, 1986.

- narrowed the definition of qualified expenditures by clarifying that the research was to be technological in nature;
- excluded expenses of leasing personal property;
- established a separate 20-percent tax credit for payments to a university for basic research;
- made the tax credit part of the general business tax credit (GBC),[9] thus subjecting it to a yearly cap; and
- made the tax credit effective from January 1, 1986, to December 31, 1988.

The Technical and Miscellaneous Revenue Act of 1988 extended the credit for 1 year. It also reduced deductions allowed under section 174 for qualified research expenses by 50 percent of the credit determined for the year.

The Omnibus Budget Reconciliation Act of 1989 removed the original 3-year moving average method of computing the base, which had reduced the incentive for companies to undertake additional R&E spending. Under the 3-year moving average, the amount a taxpayer spent on R&E in a given year became part of the base in following years. The increase in R&E spending also increased the future base, thus lowering the credit the taxpayer would receive in subsequent years. Specifically, the 1989 act made the following stipulations:

- The 3-year moving average was replaced by a base amount equal to a ratio of total qualified research expenses to total gross receipts for the period 1984 through 1988 (the "fixed-base percentage"), multiplied by the average amount of the taxpayer's gross receipts for the 4 preceding years.
- The credit was made available to start-up companies that planned to use the results of their research on a future trade or business. Companies that did not have both qualified research expenses and gross receipts during each of at least 3 years between 1984 through 1988 were assigned a fixed-base percentage of 3 percent.
- The deduction allowed under section 174 for qualified research expenses was reduced by 100 percent of the R&E credit determined for the year.
- The act effectively extended the credit for 9 months by prorating qualified expenses incurred before January 1, 1991.

[9]The GBC combines several tax credits, including the R&E credit, for the purpose of computing an overall dollar limitation on the reduction of a company's tax liability. The GBC may not exceed net income tax minus the greater of (1) the tentative minimum tax or (2) 25 percent of the net regular tax liability above $25,000.

The Omnibus Budget Reconciliation Act of 1990[10] extended the credit through December 31, 1991, and repealed the special rule to prorate qualified expenses incurred before January 1, 1991. The Tax Extension Act of 1991[11] extended the credit through June 30, 1992.

The Omnibus Budget Reconciliation Act of 1993[12] made the credit effective from July 1, 1992, through June 30, 1995, and modified the fixed-base percentage for start-up companies.

Previous GAO Work

In September 1989, we issued a report on the R&E tax credit to the Chairman, House Committee on Ways and Means.[13] We found that the credit stimulated between $1 billion and $2.5 billion of additional research spending between 1981 and 1985 at a cost of $7 billion in tax revenues.

Although the amount of stimulated spending was well below the tax credit's revenue cost, total benefits might have been much higher. We noted in this report that there is a commonly held belief that research spending was, on average, more beneficial to society than nonresearch spending. If the credit encouraged research activities that were more beneficial to society than the activities that were discouraged by the additional taxes needed to fund the credit, then the credit might have been sound tax policy.

The report also stated that the credit could provide more of an incentive if the moving-average base were replaced with a fixed-base indexed to the growth in the gross national product or to another indexing factor. In 1989, the base percentage was fixed. The fixed-base percentage now depends on research spending only between 1984 and 1988 and is not affected by current research spending. After 1989, the yearly base amount increases or decreases as the indexing factor, the 4-year average of gross receipts, increases or decreases.

In addition, we reported that the credit was relatively difficult for IRS to administer. From a survey of IRS revenue agents, we found that IRS

[10]Public Law 101-508, Nov. 5, 1990.

[11]Public Law 102-227, Dec. 11, 1991.

[12]Public Law 103-66, Aug. 10, 1993.

[13]The Research Tax Credit Has Stimulated Some Additional Research Spending (GAO/GGD-89-114, Sept. 5, 1989).

questioned the tax credit claimed by 79 percent of the corporations that had the credit audited. Many revenue agents reported that the definition of qualified research expenses was unclear.

Description of the Pharmaceutical Industry

The pharmaceutical industry is dominated both in sales and assets by 20 large, mature companies. According to COMPUSTAT (a publicly available database) data, in 1990 these companies accounted for 94 percent of all sales and had 93 percent of all assets within the industry. Their average asset size was around $2.7 billion, and their average net sales were around $5 billion for the same year. These companies have been in business a long time, with 1905 being the average year of incorporation. During the late 1970s and throughout the 1980s, there was a large influx of companies into the pharmaceutical industry. Around 65 percent, or 157, of the companies in the pharmaceutical industry as of the end of 1990 were incorporated after 1975.

Many of the recently incorporated companies were engaged in biotechnology, which uses recombinant-DNA, cell fusion, and other novel bioprocessing techniques to develop products. Biotechnology companies do a great deal of R&D, but most have little or no sales. Because they lack large sales revenues, these companies also rely on the issuance of common stock and contract research/joint ventures with other firms for positive cash flows. Because most biotechnology companies have been losing money since their inception, they have low or no tax liabilities. Most biotechnology companies have yet to use the R&E tax credit, because a tax liability is necessary to claim it.

Objectives, Scope, and Methodology

In response to the request of the Chairman of the Senate Special Committee on Aging, our objectives were to (1) determine the R&E tax credits claimed by the pharmaceutical industry from 1981 through 1990 and the characteristics of the companies claiming them, and (2) describe any difficulties IRS might have in ensuring that pharmaceutical companies claiming the tax credit comply with the Internal Revenue Code.

To determine the R&E tax credits claimed by the pharmaceutical companies, we used data from IRS' Statistics of Income Division (SOI). SOI published its estimates of the credit claimed between 1981 and 1985. In 1986, the research credit became part of the general business credit, and SOI stopped reporting estimates of the research credit claimed. However, we determined from the SOI pharmaceutical industry file that most of the

claimed general business credits reported by SOI after 1986 were research credits. Therefore, we report the SOI estimates of research credit claimed between 1981 and 1985 and the GBC between 1986 and 1990.

In order to describe characteristics of the companies claiming the credit, such as the amount of R&D spending, asset size, and net income, we used COMPUSTAT, a publicly available database, to give us an initial composite of the industry. We compiled company-specific financial information for the 20 largest pharmaceutical companies from corporate annual reports and Compact Disclosure, another publicly available database. We then indexed the amounts to equal 1990 dollars.

Although the 20 companies comprised most of the industry's sales, assets, and R&D expenses, our background research and initial analysis led us to also examine biotechnical companies, an increasingly important segment of the pharmaceutical industry. We took a weighted average of R&D, sales, and various ratios from 1988 to 1991 for those companies known to use primarily biotechnology in their R&D. For the top 25 biotechnical companies, we compiled as much financial information as possible from annual reports and indexed these amounts to equal 1990 dollars.

To describe any difficulties IRS might have had in administering the tax credit, we reviewed our 1989 study and IRS regulations and interviewed revenue agents and case managers at the National Office and at the Manhattan District Office concerning their experiences auditing the credit. We selected the Manhattan District Office because it is responsible for several large pharmaceutical companies.

We discussed the information contained in this report with responsible officials at the Department of the Treasury and have incorporated their oral comments where appropriate.

We did our work for this report in Washington, D.C., and New York City from May 1992 to May 1994, in accordance with generally accepted government auditing standards.

Amount of R&E Tax Credit Earned by Pharmaceutical Companies and IRS Administration of the Credit

Pharmaceutical companies earned $1.23 billion in R&E tax credits between 1981 and 1990, and their share of the credit earned by all corporations increased from about 4 percent in 1981 to 12 percent in 1990. The credit earned by pharmaceutical companies in 1990 represented 0.22 percent of their gross receipts, making corporations in the pharmaceutical industry more intensive users of the credit than companies in most other manufacturing industries. About 90 percent of the pharmaceutical industry's credit for 1981 through 1990 was earned by large companies with assets worth $250 million or more.[1]

IRS' administration of the current credit is difficult because audits often require highly technical judgments about whether research is for truly innovative products or processes. The credit is also difficult to administer because the definition of qualified research expenditures is uncertain due to the issuance of three successive proposed regulations since 1983. This uncertainty may soon be resolved because Treasury expects to finalize proposed regulations some time during the second quarter of 1994.

The Amount of R&E Tax Credit Earned by Pharmaceutical Companies Increased Between 1982 and 1990

In order to maintain a competitive edge within the industry and introduce new drugs into the marketplace, pharmaceutical companies must invest in R&E. As table 2.1 indicates, the amount of R&E credit earned by the pharmaceutical corporations increased 62 percent between 1982 and 1990, from $116 million to $188 million.[2] The amount earned declined in 1986, following a more narrow definition of qualified research spending and a lower credit rate introduced by the Tax Reform Act of 1986, but the amount of credit earned exceeded the 1985 level of credit earned by 1988.

In contrast, the amount of R&E tax credits earned by all corporations decreased by around 25 percent in real terms between 1982 and 1990. The pharmaceutical companies' percentage share of the credit earned as compared to the credit earned by all companies increased, from 5.6 percent to 12.1 percent, between these same years.

[1]The amount of R&E credit earned is the actual amount calculated under section 41. This is opposed to the amount of R&E credit claimed, which is the amount of credit actually applied toward a tax liability.

[2]Because research spending qualified for the credit only after June 30, 1981, use of the partial amounts for 1981 as the base in our calculations would have distorted the percentage increase (decrease) in qualified research and credit earned. Therefore, we calculated the percentage increased (decreased) beginning with 1982, the first full year of the credit.

Table 2.1: R&E Tax Credit Earned by All Corporations and by the Pharmaceutical Industry

Dollars in millions

	All corporations	Pharmaceutical corporation	
Year	Credit earned	Credit earned	Percentage of industry total
1981	$1,261	$56	**4.4%**
1982	2,074	116	**5.6**
1983	2,335	127	**5.4**
1984	2,387	116	**4.9**
1985	2,371	119	**5.0**
1986	1,356	91	**6.7**
1987	1,210	115	**9.5**
1988	1,382	152	**11.0**
1989	1,439	152	**10.6**
1990	1,551	188	**12.1**
Total	**$17,366**	**$1,232**	**7.1%**

Note: All amounts are in 1990 dollars.

Source: GAO analysis of SOI annual sample of corporate income tax returns of the pharmaceutical industry.

Pharmaceutical Companies Use the R&E Tax Credit More Intensively Than Companies in Most Other Manufacturing Industries

To compare the R&E tax credit earned by corporations in the pharmaceutical industry with the R&E tax credit earned by corporations in other manufacturing industries, we computed the percentage of the credit to total receipts for companies in each manufacturing industry for 1990.[3] As indicated in table 2.2, we found that companies in the pharmaceutical industry were second only to those in the computer industry in R&E credit earned as a percentage of total receipts. Within manufacturing, pharmaceutical companies earned 15 percent of the total credit, and computer companies earned 19 percent of the total credit. The R&E credit amounted to 22 cents per $100 of gross receipts for pharmaceutical companies and 25 cents per $100 of gross receipts for computer companies.

[3]We analyzed only manufacturing, since it accounted for around 83 percent of the R&E credit in 1990.

Table 2.2: R&E Tax Credit Earned by Corporations in the Manufacturing Industry as a Share of Total Industry Credit and Receipts in 1990

Dollars in millions

Industry	R&E tax credit earned	Credit earned as percentage of manufacturing tax credit	Total receipts	Credit earned as percentage of total receipts
Chemical & allied:	$312	24%	**$363,139**	0.09%
Drugs[a]	188	15	**86,632**	0.22
Machinery:	295	23	**259,036**	0.11
Construction	16	1	**32,161**	0.05
Computers	245	19	**97,530**	0.25
Electrical equipment:	234	18	**288,839**	0.08
Radio & T.V.	32	2	**38,717**	0.08
Electronic components	122	9	**112,093**	0.11
Other electrical	76	6	**122,417**	0.06
Motor vehicles:	182	14	**254,908**	0.07
Transportation equipment:	18	1	**166,342**	0.01
Aerospace	16	1	**144,175**	0.01
Instruments:	91	7	**93,654**	0.10
Scientific	27	2	**37,130**	0.07
Medical & optical	63	5	**37,278**	0.17
Photographic	1	[b]	**19,246**	0.01
All other industries	154	12	**2,008,223**	0.01
Total: Manufacturing	**$1,285**	**100%[c]**	**$3,434,141**	**0.04%**

Note: The indented items in the first column are subindustries whose credit, percentages, and receipts are included in the major industry totals.

[a]SOI categorizes companies in the pharmaceutical industry as drugs.

[b]Less than 1 percent.

[c]Total may not add due to rounding.

Source: Analysis by GAO of SOI annual sample of corporate income tax returns.

The R&E Credit Provides a Smaller Tax Benefit Than Some Other Credits

Pharmaceutical corporations claimed $402 million in R&E credits between 1981 and 1985. As indicated in table 2.3, the R&E tax credit claimed was not reported after 1985 because the credit became part of the general business credit (GBC) in 1986, and Statistics of Income (SOI) reports only the total amount of GBC claimed. However, with the repeal of the investment tax

credit in 1986, the R&E tax credit became by far the largest credit in the GBC claimed by the pharmaceutical industry.[4] By 1990, the industry was earning less than $1 million in GBCs other than the R&E credit while claiming $142 million in total GBCs. Pharmaceutical corporations claimed $755 million in GBCs between 1986 and 1990. Thus, the total R&E credits and GBC that includes the R&E credits was $1.2 billion between 1981 and 1990.

The R&E tax credit represented a smaller tax benefit for the pharmaceutical industry compared to some other credits in the tax code. Between 1981 and 1985, the $402 million in R&E tax credits claimed by the industry represented 7.5 percent of the $5,395 million of possessions tax credits claimed and 11.1 percent of the $3,608 million of foreign tax credits claimed. Between 1986 and 1990, the $755 million in GBCs claimed by the pharmaceutical industry represented 10 percent of the $7,520 million in possessions tax credits claimed and 15.1 percent of the $4,992 million of foreign tax credits claimed.

[4]The investment tax credit was repealed for most taxpayers.

Table 2.3: Tax Credits Claimed by Pharmaceutical Corporations, 1981-1990

Dollars in millions

Year	Possessions tax credit	Foreign tax credit	R&E tax credit	Orphan drug credit	General business credit[d]
1981	$1,178	$533	$33	n/a[b]	n/a
1982	1,292	779	61	n/a[b]	n/a
1983	798	765	96	[c]	n/a
1984	1,044	773	107	[c]	n/a
1985	1,083	758	105	[c]	n/a
1986	1,709	873	n/a[a]	7	210
1987	1,584	1,052	n/a[a]	5	98
1988	1,141	861	n/a[a]	8	177
1989	1,420	1,001	n/a[a]	12	128
1990	1,666	1,205	n/a[a]	15	142
Total	**$12,915**	**$8,600**	**$402**	**$47**	**$755**

Note: All amounts in 1990 dollars.

[a]The R&E tax credit became part of the general business tax credit in 1986. We obtained data on the amount of R&E credit earned within the pharmaceutical industry between 1981 and 1990, which is shown in table 2.1.

[b]The orphan drug credit was created in 1983.

[c]The dollar amount was less than $500,000.

[d]The general business credit (GBC) was created by the Tax Reform Act of 1984. It consists of such tax credits as the investment tax credit, the targeted jobs credit, the alcohol fuels credit, the R&E tax credit, the low-income housing credit, and the disabled access credit.

Source: GAO analysis of SOI annual sample of corporate income tax returns of the pharmaceutical industry.

Between 1981 and 1990, both the possessions and foreign tax credits reduced the tax liabilities of pharmaceutical companies more than the R&E tax credit. The pharmaceutical companies claimed more of the first two credits because these credits are based on income of the companies. The possessions tax credit is based on income of certain subsidiaries operating in Puerto Rico, while the foreign tax credit is based on income generated abroad. The R&E tax credit, on the other hand, is based on research spending above a base amount. The pharmaceutical companies earned larger amounts of income in Puerto Rico and abroad than they spent on incremental research.

The possessions tax credit, or section 936, provides a tax credit equal to the federal tax liability on certain income earned in Puerto Rico and certain U.S. possessions. The credit is equivalent to giving qualifying U.S. corporations operating in Puerto Rico complete exemption from federal income taxes. We reported in May of 1992 that throughout the 1980s, the pharmaceutical industry received a relatively large share of the tax benefits from section 936.

The foreign tax credit allows multinational corporations to credit tax payments to foreign governments against their domestic income tax obligations. All major pharmaceutical companies have multinational operations and therefore utilize the foreign tax credit.

The orphan drug tax credit is small relative to the R&E credit because it applies to research spending on only a limited number of drugs. It is equal to 50 percent of qualified R&E expenditures for human clinical trials on therapies that have received official orphan drug status by the Food and Drug Administration. Firms can receive such status for drugs that treat diseases or conditions affecting fewer than 200,000 people in the United States.

The R&E Credit Is Difficult for IRS to Administer

The R&E credit is difficult for IRS to administer because audits require technical judgments about whether research is for new products and functions. This difficulty of determining whether spending is for truly innovative research has existed since the inception of the credit, as documented by our 1989 report, and continues to be a problem in current IRS audits. The R&E credit is also difficult to administer because since 1983 there have been three successive proposed regulations, none of which were finalized. The succession of proposed regulations has created uncertainty about what spending qualifies for the credit. Although this uncertainty may be resolved soon because Treasury expects to finalize regulations some time during the second quarter of 1994, problems distinguishing the type of research conducted will still remain.

In our 1989 report, we concluded that the credit was relatively difficult to audit. This conclusion was based on a survey of IRS revenue agents on audits of large companies from all industries for the tax years between 1981 and 1986. The survey estimated that 54 percent of all revenue agents found at least one issue or aspect of the credit difficult to audit. The four reasons most frequently cited by revenue agents for adjusting research expenditures claimed by corporations in five major industries were

adaptation of existing capabilities, routine or cosmetic alterations, expenses being made part of overhead and administration, and ordinary testing. Agents auditing selected pharmaceutical companies within the sample also cited the same reasons most often. Most agents within all industries as well as selected pharmaceutical companies found it difficult to distinguish spending for new products or functions from spending that made routine or cosmetic alterations.

Our interviews with IRS officials indicate that many of the difficulties found in our 1989 report remain problems in their current audits. IRS officials reported that they are required to make difficult technical judgments in their audits concerning whether research is directed to produce truly innovative products or processes. Our interviews with members of examination teams on audits covering tax years between 1984 and 1988 of four large pharmaceutical companies suggest that distinguishing routine from innovative research continues to be a problem for IRS. An IRS official stated that although the examination teams often include engineers and other specialists to address the technical issues that arise, IRS might still have difficulty matching the technical expertise of the companies' specialists.

IRS audits of the R&E credit are labor-intensive because the audits must determine whether research expenses like wages and supply costs were made in support of research activities that qualify for the credit. For example, the audits may involve the examination of the work performed by company personnel to determine whether their activities supported qualified research. Such determinations often require on-site interviews with company personnel that occur long after the spending has taken place. When detailed project accounting does not exist, both IRS and the taxpayer may find it difficult to separate out the cost of personnel employed in specific projects. The cost of administering the credit, according to an IRS official, is substantial for both IRS and the taxpayer.

In the 1989 survey, about one-fifth of the revenue agents found the definition of qualified expenditures unclear. The succession of proposed regulations to define qualified research contributed to the difficulty in auditing the R&E credit. Treasury issued regulations in 1957 that defined research expenditures under section 174 of the tax code. Proposed regulations redefining qualified research were issued in January 1983. In May 1989, regulations redefining qualified research were proposed that replaced the 1983 proposal. In March 1993, the 1989 proposed regulations were withdrawn, and new proposed regulations were issued. The

regulations proposed in 1993 revert back to the definition of qualified research found in the 1957 regulations, with some clarifications to the definition.

Although proposed regulations do not have the full force of the law, this issuance of successive proposed regulations created uncertainty about the definition of qualified research. An IRS official stated that uncertainty concerning a final definition of qualified research remains a problem for IRS examiners. A coordinator in the Industry Specialization Program[5] stated that a major difficulty in administering the credit was a lack of guidance in the regulations on qualified research spending. Because all research spending that qualifies for the credit must first qualify under section 174, the lack of finalized proposed regulations creates uncertainty for IRS examiners and taxpayers about what spending for research actually qualifies for the credit. IRS officials expect to finalize the proposed regulations some time in the second quarter of 1994. These regulations should resolve the uncertainty concerning the definition of qualified research spending. However, the problem of distinguishing innovative from routine research will remain.

Conclusions

The share of R&E credit earned by the pharmaceutical industry compared to all industries increased from about 4 percent in 1981 to 12 percent in 1990. Compared to other credits available in the tax code, the credit was a smaller benefit to the industry.

The requirement that research be truly innovative to qualify for the credit means that administering the credit will continue to be labor-intensive and to involve judgments about highly technical matters. Uncertainty about the definition of R&E spending will continue until Treasury finalizes proposed regulations for section 174 deductions. These regulations are expected to be issued some time in the second quarter of 1994.

[5]The Industry Specialization Program coordinates the examination of issues from 22 industries that warrant uniform treatment.

Financial Characteristics of the Pharmaceutical Industry

The pharmaceutical industry is dominated by 20 large, well-established companies whose positive cash flow arises from operating activities in the form of sales. From 1987 through 1992, R&D spending represented about 9.6 percent of sales.

Another group of companies within the industry—one that did not benefit much from the credit—consisted of start-up or recently established companies whose R&D was dedicated to biotechnology. Their main positive cash flow came from financing activities, in the form of issuance of common stocks and warrants. Although cash was earned in operations, through sales and contract research/joint ventures, it was more than offset by operating costs and expenses. Around 37.2 percent of these funds were spent on R&D activities. Because these companies generally did not make profits and therefore did not pay taxes, their benefit from the R&E tax credit was minimal.

Characteristics of Large Pharmaceutical Companies

As noted in chapter 1, the pharmaceutical industry is dominated in both sales and assets by 20 companies. As indicated in table 3.1, these companies have been in business a long time, with 1905 being the average year of incorporation. From 1981 to 1990, around 90 percent of the R&E tax credit within the pharmaceutical industry was earned by companies with assets of $250 million or more. The average asset size of the 20 large, mature companies was around $6 billion as of 1992, which puts these companies in the asset category earning 90 percent of the credit. In 1990, the pharmaceutical industry earned $188 million in the R&E tax credit. Eighteen of the 20 large companies earned 63 percent, or $119 million, of the total industry credit in 1990.[1]

Sources of Funds and R&E Investment of the Large Pharmaceutical Companies

The primary source of funds for R&E investment by the 20 large pharmaceutical companies was retained earnings from the sales of their products. Sales were the primary component of operating cash flows, which were the only positive total cash flow for the 20 large pharmaceutical companies. As detailed in appendix I, these companies earned $93.9 billion in operating activities between 1987 and 1992. Over the same period, they had negative cash flows in investing and financing activities of $46.9 billion and $41.4 billion, respectively.

[1]Two of the large companies identified as pharmaceutical companies in the COMPUSTAT file did not appear in the SOI pharmaceutical file. SOI industry classifications are similar, but not identical, to the classifications used by COMPUSTAT.

The 20 large pharmaceutical companies invested $52.6 billion in R&D between 1987 and 1992. As shown in table 3.1, between these same years, these companies had approximately $549 billion in sales. Thus, the 20 mature corporations invested about 9.6 percent of each sales dollar in R&D.

Other cash outflows during this period included $43.9 billion in capital additions, $31.3 billion in payment of income tax between these same years, and $36.5 billion in common stock dividends. Issuance of common stock dividends by companies may indicate that the expected returns from available investments do not exceed the opportunity cost of capital. A breakdown of specific cash outflows for the top 20 pharmaceutical companies can be found in table I.3 of appendix I.

Characteristics of Biotechnology Companies

During the 1970s and 1980s, there was a large increase in the number of companies operating in the pharmaceutical industry. Around 65 percent of the companies operating in the industry as of 1991 were incorporated after 1975. Many new companies within the industry use biotechnology processes in their research and development of new products.

Table 3.1: Information on the Top 20 Pharmaceutical Companies for Years 1987 Through 1992, Assets as of 1992

Dollars in millions

Company	Year of incorporation	Total assets 1992	Total sales 1987-1992	R&D 1987-1992
Abbott	1888	$6,499.1	$36,077.4	$3,358.4
Allergan	1948	829.4	4,011.5	363.5
American Home Products	1926	6,686.6	41,586.8	2,364.0
Baxter	1931	8,571.9	37,854.6	1,350.5
Bristol-Myers Squibb	1900	10,115.9	57,811.4	5,041.7
Carter-Wallace	1880	562.3	3,581.4	271.4
Eli-Lilly	1876	8,120.4	28,418.3	3,986.5
Glaxo[b]	1935	9,629.0	30,052.0	3,839.2
Johnson & Johnson	1887	11,127.1	65,124.9	5,013.9
Marion Merrell Dow	1950	2,980.3	10,099.8	1,439.5
Merck	1891	10,379.9	44,020.2	4,996.1
Novo Nordisk[b]	1940	2,615.1	7,563.7	980.0
Pfizer	1849	8,979.3	37,208.2	3,698.5
Rhone-Poulenc Rorer	1910	3,612.6	13,847.1	1,599.3
Schering-Plough	1908[a]	3,891.9	20,180.2	2,226.2
SmithKline Beecham[b]	1830	4,508.3	42,015.2	3,590.1
Syntex	1957	2,630.2	9,290.6	1,616.1
Upjohn	1886	4,311.6	18,099.1	2,652.8
Warner-Lambert	1920	3,817.7	27,320.8	2,096.5
Wellcome[b]	1880	3,349.3	15,267.4	2,121.6
Total		**$113,218.1**	**$549,430.2**	**$52,605.7**

Note: All amounts equal to 1990 dollars. Annual data were not available for some years.

[a]Schering-Plough was reorganized in 1970.

[b]Amounts calculated using average exchange rate for given year. All amounts, except Novo-Nordisk's R&D, taken from Compact Disclosure.

Source: Corporate annual reports and SEC 10K reports.

The top 25 of the biotechnology companies had $5.4 billion in sales and royalties from 1987 to 1992, or 0.99 percent of the 20 large pharmaceutical companies' sales, and they owned $6.2 billion in assets, or 5.1 percent of the 20 large pharmaceutical companies' assets in 1992. Unlike the 20 large

pharmaceutical companies, the biotechnology companies are new to the industry. As shown in table 3.2, the top 25 biotechnology companies' average year of incorporation was 1981.

Cash Flows for the Biotechnology Companies

As detailed in appendix I, table I.2, the main positive cash flow for the top 25 biotechnology companies was in financing activities. Between 1987 and 1992, these companies obtained about $4.8 billion in financing activities. Over the same time period, they had negative cash flows in operating activities of $263.7 million and $4.2 billion in financing activities. Some positive cash flow arose from operating activities in the form of sales, contract research, and joint ventures. This was offset by operating costs and expenses. Most of the cash flow from financing activities arose from the issuance of common stock.

As summarized in table 3.3, between 1987 and 1992, the top 25 biotechnology companies received $1.9 billion from contract research/joint ventures, $5.4 billion from sales, and $3.7 billion from the issuance of common stock and warrants. Thus, biotechnology companies had to rely on several cash flow sources unlike the more mature pharmaceutical companies, which relied mainly on sales.

Table 3.2: Year Incorporated and 1992 Assets for the Top 25 Biotechnology Companies

Dollars in millions

Company	Year incorporated	1992 Assets
Amgen	1980	$1,286.8
Biogen	1978	291.4
Centocor	1979	327.1
Chiron	1981	667.0
Cytogen	1980	49.4
Enzon	1981	36.8
Genelabs Technology	1983	26.5
Genentech	1976	1,222.0
Genetics Institute	1980	431.2
Gensia	1986	97.6
Genzyme	1981	450.1
IDEC	1983	49.2
Immune Response	1986	96.5
Immunex	1981	220.8
Immunogen	1981	58.1
Interferon Sciences	1980	19.8
Liposome Technology	1981	56.6
Molecular Biosystems	1980	67.2
Quidel	1979	19.8
Regeneron	1988	91.7
Repligen	1981	59.5
Somatix Therapy	1979	36.3
Synergen	1980	336.4
U.S. Bioscience	1987	78.0
Xoma	1981	102.3
Total		**$6,178.0**

Note: All amounts equal to 1990 dollars.

Source: Corporate annual reports and SEC 10K reports.

Table 3.3: Information on the Top 25 Biotechnology Companies for Years 1987 Through 1992

Dollars in millions

Company	Cash flow from common stocks and warrants[a]	Cash flow from sales	Cash flow form joint ventures/ contract research	R&D
Amgen	$219.2	2,008.5	249.6	$525.6
Biogen	107.7	263.0	23.8	217.3
Centocor	221.9	200.6	227.1	330.2
Chiron	244.7	195.5	315.7	374.4
Cytogen	64.9	.3	40.1	101.2
Enzon	39.8	11.9	.9	31.7
Genelabs Technology	39.4	1.8	27.5	52.2
Genentech	633.3	2,113.2	249	1,064.1
Genetics Institute	426.6	51.4	250.5	359.5
Gensia	143.1	13.5	23.9	89.5
Genzyme	208.6	291.4	99.9	105.4
IDEC	43.0	0	20.6	43.5
Immune Response	116.1	0	16.9	23.8
Immunex	150.6	92.3	90.0	120.9
Immunogen	96.0	0	2.6	41.2
Interferon Sciences	23.1	6.7	1.1	24.7
Liposome Technology	73.3	1.0	6.0	43.1
Molecular Biosystems	58.3	.6	45.9	47.9
Quidel	9.0	114.2	7.1	21.8
Regeneron	107.9	0	16.5	43.5
Repligen	53.0	8.3	59.6	81.3
Somatix Therapy	35.3	17.3	11.3	38.5
Synergen	336.8	0	76.7	126.8
U.S. Bioscience	112.5	7.4	.5	34.8
Xoma	125.2	15.5	50.2	157.5
Total	**$3,688.9**	**5,414.3**	**1,913.1**	**$4,100.5**

Note: All amounts equal to 1990 dollars. Annual data were not available for some years.

[a]Amount minus stock repurchases.

Source: Corporate annual reports and SEC 10K reports.

The biotechnology companies raised about $3.7 billion from the issuance of common stock and warrants between 1987 and 1992. Although many biotechnology companies have been initally successful in raising funds,

their ability to continue to attract funds over the long term is uncertain. The Food and Drug Administration (FDA) must approve new drugs, which can take as long as 10 to 12 years. This process substantially adds to biotechnology companies' costs, thereby increasing the need for funds. Many companies find it difficult to attract investors without a product on the market. As of August 1991, only 15 biotechnology-based drugs and vaccines were on the market. According to the Office of Technology Assessment (OTA), there is evidence that a two-tiered structure has evolved among Dedicated Biotechnology Companies, where leading firms are able to raise cash and others find sources increasingly unavailable. Some analysts believe that only a few biotechnology firms will generate significant annual revenues and thus be able to survive over the long term.

Amount Biotechnology Companies Invested in R&D

The biotechnology companies invested a larger share of their funds in R&D than mature pharmaceutical companies. As indicated in table 3.3, between 1987 and 1992, the top 25 biotechnology companies invested around $4.1 billion into R&D, or 37.2 percent of cash from sales, common stock, and contract research/joint ventures. In contrast, although the 20 large pharmaceutical companies invested around $52.6 billion into R&D, it was only around 9.6 percent of their sales.[2]

Importance of R&E Tax Credit

The R&E tax credit offers little or no encouragement for biotechnology companies to increase R&E spending. Most biotechnology companies are not profitable and do not have tax liabilities. As shown in table 3.4, between 1987 and 1992, the top 25 biotechnology companies generated only $264.8 million in income tax payments, with $220 million coming from one company. Because a tax liability is necessary in order to claim the credit, most biotechnology companies cannot claim the tax credit in the year earned. Also, as of 1992, the top biotechnology companies had $1.7 billion in unused net operating losses (NOLs). A company can use NOLs to reduce past or future taxable income, which in turn reduces its tax liability.[3] As long as a biotechnology company has a large amount of unused NOLs, the amount of R&E tax credit that is applied toward any eventual tax liability will be small. Even after a biotechnology company depletes its NOLs and starts claiming the majority of the R&E tax credit, the

[2]In these calculations, the primary source of funds for the mature companies is sales and the primary sources of funds for the biotechnology companies are sales, contract research, joint ventures, and the issuance of common stock. Because biotechnology companies have low sales, calculating a ratio of R&D to sales would provide an inaccurate measure of R&D intensity.

[3]NOLs can be carried forward 15 years and backward 3 years to offset taxable income up to the amount of the loss.

delay will have greatly diminished the credit's present value to the company.

Table 3.4: Top 25 Biotechnology Companies' Provisions for Income Tax for Years 1987 Through 1992 and NOL Carryforwards at the End of Fiscal Year 1992

Dollars in millions

Company	Income tax expense	NOL carry-forward
Amgen	$220.1	$0
Biogen	1.7	104.9
Centocor	7.6	230.0
Chiron	0.4	55.2
Cytogen	0.0	84.3
Enzon	0.0	111.2
Genelabs Technology	0.0	34.6
Genentech	7.5	87.1
Genetics Institute	0.0	100.9
Gensia	0.0	69.2
Genzyme	23.3	30.1
IDEC	0.0	26.2
Immune Response	0.0	20.4
Immunex	0.0	84.3
Immunogen	0.1	41.2
Interferon Sciences	0.0	16.1
Liposome Technology	0.0	28.1
Molecular Biosystems	4.1	30.9
Quidel	0.0	65.4
Regeneron	0.0	26.9
Repligen	0.0	44.7
Somatix Therapy	0.0	45.2
Synergen	0.0	40.9
U.S. Bioscience	0.0	34.9
Xoma	0.0	165.0
Total	**$264.8**	**$1,577.9**

Note: All amounts equal to 1990 dollars. Annual data were not available for some years.

Source: Corporate annual reports and SEC 10K reports.

Conclusion

The large pharmaceutical companies were the primary beneficiaries of the R&E tax credit, since they are able to apply the credit to tax liabilities. Although biotechnology companies invested more of their primary sources

of funds in R&D than the large companies, the credit was of little use to them, because most had little or no tax liabilities. As long as biotechnology companies have large amounts of unused NOLs, the amount of R&E tax credit that can be applied toward tax liabilities will be small. Even when the biotechnology companies deplete their NOLs and start claiming the majority of the R&E tax credit, the delay will greatly diminish its present value to the companies.

Financial Data for Large Pharmaceutical Companies and Biotechnology Companies

Tables I.1 and I.2 describe cash flows arising from the operating, investing, and financing activities of the 20 large, mature pharmaceutical companies and the top 25 biotechnology companies for 1987 through 1992. Tables I.3 and I.4 describe capital additions, common stock dividends, and income tax payments for the same companies.

Table I.1: Operating, Investing, and Financing Activities for the Top 20 Mature Pharmaceutical Companies for Years 1987 Through 1992

Dollars in millions

Company	Operating activities	Investing activities	Financing activities
Abbott	$6,953.5	$(3,336.6)	$(3,767.3)
Allergan	594.1	(317.5)	(226.1)
American Home Products	7,901.7	(3,454.5)	(4,954.6)
Baxter	2,943.2	(2,377.1)	(645.8)
Bristol-Myers Squibb	9,738.3	(1,508.2)	(7,238.4)
Carter-Wallace	329.7	(276.3)	(107.0)
Eli-Lilly	6,798.1	(3,769.8)	(3,020.3)
Glaxo[a]	9,138.5	(6,960.8)	(1,175.0)
Johnson & Johnson	8,781.3	(5,442.9)	(3,323.2)
Marion Merrell Dow	2,263.6	(1,220.9)	(917.4)
Merck	10,990.1	(4,592.1)	(4,262.7)
Novo Nordisk[a]	1,155.9	(1,393.2)	306.8
Pfizer	5,529.1	(3,033.3)	(1,897.7)
Rhone-Poulenc Rorer	989.9	(289.2)	(724.9)
Schering-Plough	3,760.4	(1,022.4)	(2,726.2)
SmithKline Beecham[a]	5,027.8	(1,774.4)	(2,582.3)
Syntex	2,444.3	(1,557.5)	(1,028.6)
Upjohn	3,185.1	(1,892.1)	(1,220.0)
Warner-Lambert	3,200.8	(1,557.2)	(1,480.5)
Wellcome[a]	2,186.8	(1,154.5)	(372.8)
Total	**$93,911.9**	**$(46,930.3)**	**$(41,363.9)**

Note: All amounts are in 1990 dollars. Annual data were not available for some years.

[a]Amounts calculated using average exchange rate for given year. All amounts, except Glaxo's 1992 figures, taken from Compact Disclosure.

Source: Corporate annual reports and Compact Disclosure.

Table I.2: Operating, Investing, and Financing Activities for the Top 25 Biotechnology Companies for Years 1987 Through 1992

Dollars in millions

Company	Operating activities	Investing activities	Financing activities
Amgen	$498.1	$(913.5)	$530.0
Biogen	18.1	(101.6)	160.1
Centocor	(252.1)	(200.8)	474.8
Chiron	(56.1)	(232.7)	265.7
Cytogen	(77.8)	(21.1)	86.2
Enzon	(35.2)	(23.1)	56.1
Genelabs Technology	(32.1)	(17.5)	47.3
Genentech	274.4	(986.3)	746.2
Genetics Institute	(77.2)	(361.4)	428.4
Gensia	(95.0)	(52.2)	174.6
Genzyme	6.1	(259.3)	300.0
IDEC	(17.7)	(43.2)	57.3
Immune Response	(6.4)	(110.6)	116.4
Immunex	(20.3)	(141.5)	175.5
Immunogen	(35.4)	(25.3)	95.7
Interferon Sciences	(32.0)	(11.0)	41.4
Liposome Technologies	(32.9)	(47.0)	71.3
Molecular Biosystems	0.4	(69.4)	62.6
Quidel	(18.3)	(4.4)	12.1
Regeneron	(29.6)	(71.9)	113.6
Repligen	(18.1)	(32.7)	68.2
Somatix Therapy	(28.1)	(0.0)	45.4
Synergen	(38.7)	(308.8)	336.2
U.S. Bioscience	(31.8)	(80.8)	112.9
Xoma	(126.0)	(52.5)	181.4
Total	**$(263.7)**	**$(4,168.5)**	**$4,759.4**

Note: All amounts are in 1990 dollars. Annual data were not available for some years.

Source: Corporate annual reports.

Table I.3: Capital Additions, Common Stock Dividends, and Payment of Income Tax for the Top 20 Mature Pharmaceutical Companies for Years 1987 Through 1992

Dollars in millions

Company	Capital additions	Common stock dividends	Payment of income tax
Abbott	$3,946.3	$2,048.7	$2,674.7
Allergan	264.1	185.0	180.3
American Home Products	1,780.5	3,949.0	2,661.2
Baxter	2,186.8	866.5	472.8
Bristol-Myers Squibb	3,210.8	5,700.4	3,720.6
Carter-Wallace	147.8	74.2	102.8
Eli-Lilly	4,333.3	2,661.3	2,285.2
Glaxo[a]	3,615.7	2,904.3	2,257.0
Johnson & Johnson	4,900.1	2,538.7	2,995.4
Marion Merrell Dow	462.6	744.3	1,092.5
Merck	3,815.3	4,211.7	4,582.0
Novo Nordisk[a]	1,209.0	118.4	246.1
Pfizer	2,892.5	2,347.6	1,575.3
Rhone-Poulenc Rorer	1,000.1	285.2	481.8
Schering-Plough	1,444.4	1,296.9	821.1
SmithKline Beecham[a]	2,288.7	2,714.7	2,020.2
Syntex	1,067.3	966.7	183.4
Upjohn	1,526.7	1,087.8	681.4
Warner-Lambert	1,498.0	1,173.1	957.8
Wellcome[a]	1,245.3	609.8	1,275.5
Total	**$43,874.5**	**$36,484.4**	**$31,267.2**

Note: All amounts are in 1990 dollars. Annual data were not available for some years.

[a]Amounts calculated using average exchange rate for given year. All amounts, except Glaxo's 1992 amounts for capital additions and common stock dividends and Wellcome's payment of income tax and common stock dividends, were taken from Compact Disclosure.

Source: Corporate annual reports and Compact Disclosure.

Table I.4: Capital Additions and Payment of Income Tax for the Top 25 Biotechnology Companies for Years 1987 Through 1992

Dollars in millions

Company	Capital additions	Payment of income tax
Amgen	$505.2	$220.1
Biogen	35.7	1.7
Centocor	141.3	7.6
Chiron	75.3	0.4
Cytogen	21.2	0.0
Enzon	9.8	0.0
Genelabs Technology	1.4	0.0
Genentech	456.0	7.5
Genetics Institute	117.7	0.0
Gensia	7.6	0.0
Genzyme	88.9	23.3
IDEC	2.6	0.0
Immune Response	7.9	0.0
Immunex	86.8	0.0
Immunogen	6.3	0.1
Interferon Sciences	6.7	0.0
Liposome Technologies	4.4	0.0
Molecular Biosystems	15.4	4.1
Quidel	4.6	0.0
Regeneron	5.1	0.0
Repligen	16.9	0.0
Somatix Therapy	1.5	0.0
Synergen	80.3	0.0
U.S. Bioscience	4.3	0.0
Xoma	22.7	0.0
Total	**$1,725.6**	**$264.8**

Note: All amounts are in 1990 dollars. No company has issued common stock dividends. Annual data were not available for some years.

Source: Corporate annual reports and SEC 10K reports.

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