

## THE U.S. RESEARCH AND EXPERIMENTATION TAX CREDIT IN THE 1990s

by Francisco Moris

Industrial R&D and the policy tools that stimulate it are increasingly important, owing to the role of R&D in economic growth (Smith and Barfield 1996). In recent decades, industry has funded and performed a growing share of R&D in the United States (NSB 2004). The new knowledge that results from R&D and other innovation activities, however, is often intangible and may benefit its users without fully compensating its producers. In such cases, private incentives for R&D are diminished, resulting in levels of R&D that may not maximize potential economy-wide or social benefits.

Various policy tools are needed in fostering R&D because of the diversity of R&D practices across industries, technologies, and innovation environments (Martin and Scott 2000, Tassej 1996). Fiscal policy tools used by the U.S. federal government include direct funding, such as grants or contracts, and indirect incentives, such as tax credits or allowances.<sup>1</sup> U.S. R&D tax credits, and those in other advanced economies, vary in how they are structured or targeted, their effect on public budgets, and their effectiveness in stimulating innovation (Bloom et al. 2002, OECD 2003).

One of the better-known indirect federal incentives is the research and experimentation (R&E) tax credit for corporations, examined here. U.S. corporate claims for the R&E tax credit totaled an estimated \$6.4 billion in 2001, the latest year for which data are available. From

<sup>1</sup> Both tax incentives and direct federal funding represent federal expenses. In terms of the budget, tax incentives generate tax expenditures—government revenue losses due to tax exclusions or deductions. For estimates of tax expenditures arising from the R&E tax credit see OMB (2005).

1990 to 2001 the annual dollar amount of R&E tax credit claims grew twice as fast as company and other nonfederally funded R&D expenditures (industry-funded R&D), after adjusting for inflation. In contrast, direct federal funding for industrial R&D declined throughout the 1990s, both in absolute terms and relative to industry-funded R&D.

This *InfoBrief* examines R&E tax credit data from the Statistics of Income (SOI) program of the U.S. Internal Revenue Service (IRS) and selected data on R&D funding from the National Science Foundation (NSF). For tax purposes, R&D expenses are restricted to research and experimental expenditures (see “Data Notes” for more detail). Federal funding for industrial R&D performers can be accounted for by either federal outlays from agency sources or by R&D expenditures data from industrial recipients. The latter set of funding statistics is used here.

### R&E Tax Credit History and Structure

The R&E tax credit, part of the U.S. Internal Revenue Code, was established by the Economic Recovery Tax Act of 1981.<sup>2</sup> The credit was one of several policy tools put in place in the 1980s to address perceived problems in the competitive position of U.S. companies (Guenther 2005).<sup>3</sup> It is subject to periodic extensions

<sup>2</sup> Section 41 of the Internal Revenue Code (U.S. Code of Federal Regulations, Title 26).

<sup>3</sup> An older indirect incentive for which there are no data available is the expensing allowance for qualified R&E (Internal Revenue Code, Section 174), in place since 1954 (Guenther 2005). The R&E tax credit covers a more restricted subset of qualified expenses compared to the R&E expensing allowance.



given its temporary status (it was allowed to expire between July 1995 and June 1996). The credit was renewed most recently by the Working Families Tax Relief Act of 2004 (Public Law 108-311) through 31 December 2005. The Bush administration and several congressional bills propose making the R&E tax credit permanent (Guenther 2005, OMB 2005).

The credit is designed to stimulate company R&D over time by reducing after-tax costs. Specifically, companies that qualify for the credit can deduct or subtract from corporate income taxes an amount equal to 20 percent of qualified research expenses above a base amount.<sup>4</sup> For established companies, the base amount depends on historical expenses over a statutory base period relative to gross receipts, whereas start-up companies follow other provisions (Guenther 2005).

An alternative R&E tax credit has been available since 1996 (Small Business Protection Act, Public Law 104-188). This credit has a lower base amount and a maximum statutory rate of 3.75 percent. The alternative credit benefits established companies that have smaller annual increases relative to their base period (Hall 2001). Companies may select only one of these two credits on a permanent basis, unless the IRS authorizes a change. Both credits include provisions for basic research payments paid to qualified universities or other research organizations.

### **Trends in the R&E Tax Credit and Industrial R&D Funding**

According to SOI/IRS, R&E tax credit claims reached an estimated \$6.4 billion in 2001 (\$6.2 billion in 2000 constant or inflation-adjusted dollars), compared with a high of \$7.1 billion in 2000 (table 1).

From 1990 to 2001 the average annual growth rate for claims was 11 percent, compared with 5 percent for company-funded R&D expenditures (table 2), after adjusting for inflation. The number of corporate tax

<sup>4</sup> The effective rate is considered to be lower than this statutory rate, in part because the credit reduces the expenses available for deductions under the R&E expensing allowance (Billings et al. 2001, Guenther 2005).

TABLE 1. R&E tax credit claims and U.S. corporate tax returns claiming the credit: 1990–2001

Year	R&E tax credit claims		Number of returns
	Current \$millions	2000 constant \$millions	
1990	1,547	1,896	8,699
1991	1,585	1,877	9,001
1992	1,515	1,754	7,750
1993	1,857	2,101	9,933
1994	2,423	2,684	9,150
1995	1,422	1,544	7,877
1996	2,134	2,274	9,709
1997	4,398	4,609	10,668
1998	5,208	5,399	9,849
1999	5,281	5,396	10,019
2000	7,079	7,079	10,495
2001	6,356	6,207	10,388

R&E = research and experimentation.

NOTES: Data exclude IRS forms 1120S (S corporations), 1120-REIT (Real Estate Investment Trusts), and 1120-RIC (Regulated Investment Companies). Constant \$ based on calendar year 2000 gross domestic product price deflator.

SOURCE: U.S. Internal Revenue Service, Statistics of Income program, unpublished tabulations.

returns claiming the credit grew at a slower rate than claims, fluctuating between 8,000 and 10,000 over most of the 1990s. From 1990 to 1996 companies claimed between \$1.5 billion and \$2.4 billion in R&E tax credits annually; since then annual claims have exceeded \$4 billion (table 1). Even so, R&E tax credit claims accounted for less than 4 percent of industry-funded R&D expenditures as of 2001 (figure 1).

In contrast to trends in corporate R&E tax credits, direct federal funding for industrial R&D declined throughout the 1990s, both in absolute terms (table 2) and relative to industry-funded R&D (figure 2).

Estimates at the industry level for R&E tax credit claims and R&D expenditures and are not strictly comparable because of methodological differences (see “Data Notes”). However, industry-level trends in these indicators can be discussed separately. Table 3 shows corporate claims for the R&E tax credit from 1998 to 2001 by industry classification, using the North American Industry Classification System (NAICS). Since 1998, corporate tax returns classified in five industries have accounted for 80 percent or more of R&E tax credit

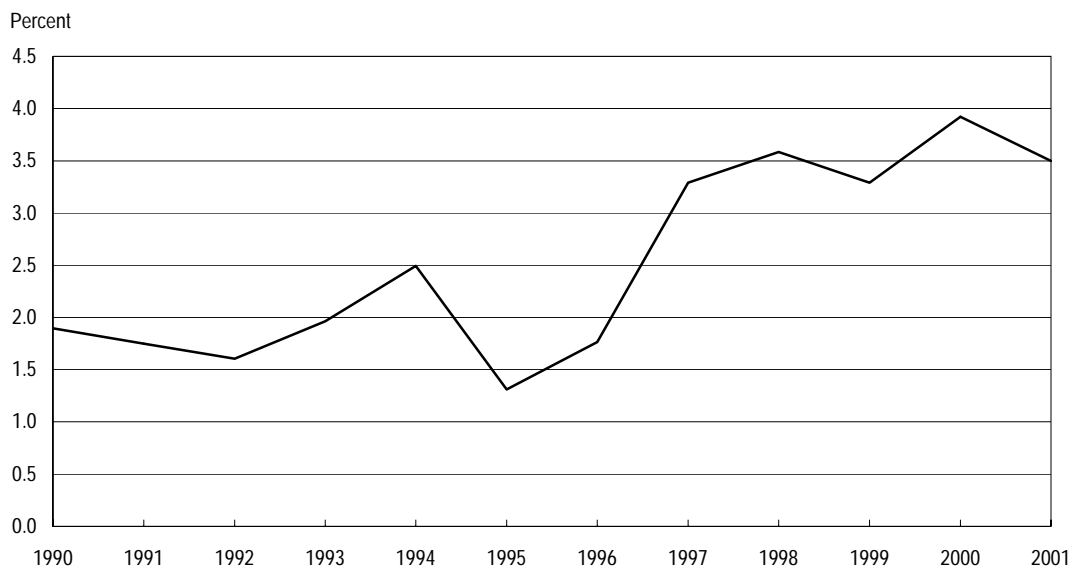
TABLE 2. U.S. industrial R&D expenditures, by source of funds: 1990–2001

Year	Company and other			Company and other		
	All Industry R&D	Federal funds	nonfederal funds	All Industry R&D	Federal funds	nonfederal funds
	Current \$millions			2000 constant \$millions		
1990	107,404	25,802	81,602	131,638	31,624	100,015
1991	114,675	24,095	90,580	135,801	28,534	107,267
1992	116,757	22,369	94,388	135,159	25,895	109,265
1993	115,435	20,844	94,591	130,612	23,585	107,028
1994	117,392	20,261	97,131	130,062	22,448	107,614
1995	129,830	21,178	108,652	140,957	22,993	117,964
1996	142,371	21,356	121,015	151,696	22,755	128,941
1997	155,409	21,798	133,611	162,880	22,846	140,034
1998	167,102	22,086	145,016	173,213	22,894	150,320
1999	180,672	20,496	160,176	184,608	20,942	163,665
2000	197,539	17,118	180,421	197,539	17,118	180,421
2001	198,505	16,899	181,606	193,854	16,503	177,351

NOTES: Constant \$ based on calendar year 2000 gross domestic product price deflator. Industrial R&D expenditures exclude federally funded R&D centers administered by industry.

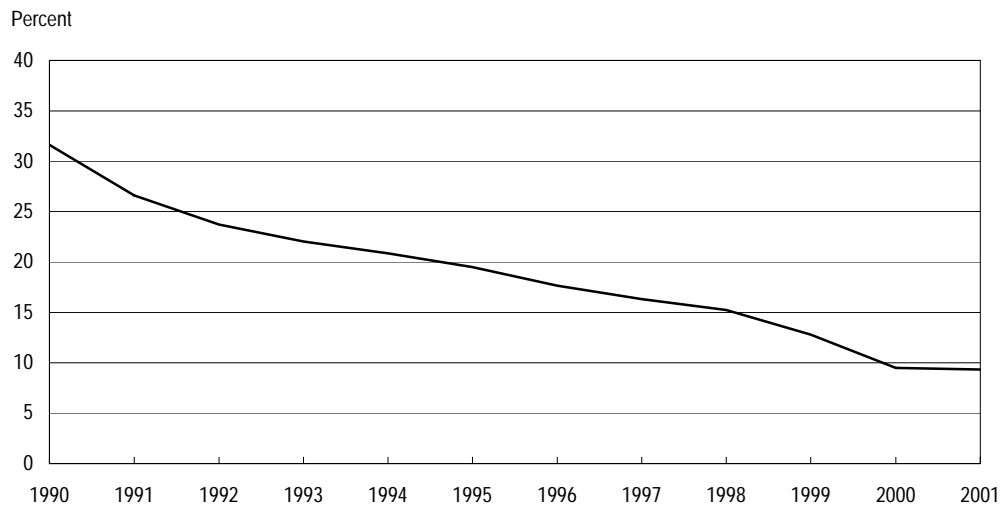
SOURCE: National Science Foundation, Division of Science Resources Statistics, *National Patterns of Research and Development Resources: 2003*, NSF 05-308.

FIGURE 1. Research and experimentation tax-credit claims as percentage of industry-funded R&D expenditures: 1990–2001



SOURCES: U.S. Internal Revenue Service, Statistics of Income program, unpublished tabulations; National Science Foundation, Division of Science Resources Statistics, *National Patterns of Research and Development Resources: 2003*, NSF 05-308.

FIGURE 2. Federal funds for industry R&D as percentage of industry-funded R&D expenditures: 1990–2001



SOURCE: National Science Foundation, Division of Science Resources Statistics, *National Patterns of Research and Development Resources: 2003*, NSF 05-308.

claims, and in 2001 these industries accounted for \$5.1 billion of the total \$6.4 billion in claims:

- computer and electronic products (26 percent)
- information, including software (16 percent)
- chemicals, including pharmaceuticals and medicines (16 percent)
- transportation equipment, including motor vehicles and aerospace (12 percent)
- professional, scientific, and technical services, including computer services and R&D services (10 percent)

The same five industries accounted for two-thirds of company-funded R&D expenditures from the NSF Survey of Industrial R&D in 2001. Federal funding for industrial R&D is even more concentrated: three industries—computer and electronic products; professional, scientific, and technical services; and transportation equipment—accounted for 94 percent of federal funding for industrial R&D in 2001.

Companies in the professional, scientific, and technical services industry filed more corporate tax returns claiming the R&E tax credit than did any other industry in 2001 (figure 3). That industry represented about 28 percent of all returns claiming the credit, followed by

computer and electronic products and information, each with about 15 percent.

Across all industries, the average R&E tax credit claim per corporate tax return in 2001 was largest for returns classified in motor vehicles, trailers, and parts (\$7.7 million per return), followed by pharmaceuticals and medicines (\$2.7 million per return) and aerospace products and parts (\$2.5 million per return). Among nonmanufacturers, returns classified in management of companies and enterprises; broadcasting and telecommunications; and finance, insurance, and real estate had the largest average claim per return.

### Data Notes

Data reported here are from the NSF Survey of Industrial R&D and from SOI/IRS. The NSF Survey of Industrial R&D expenditures (<http://www.nsf.gov/statistics/industry/>) is based on a nationally representative sample of all for-profit companies in the United States with five or more employees. Data are collected on a calendar year basis. Industry classification has been based on NAICS since the 1999 survey. Estimates are subject to sampling and non-sampling errors. For a description of the survey methodology see <http://www.nsf.gov/statistics/srvyindustry/>.

TABLE 3. R&E tax credit claims and U.S. corporate tax returns claiming the credit, by selected NAICS industry: 1998–2001

Industry	NAICS code	R&E tax credit claims (current \$millions)				Number of returns			
		1998	1999	2000	2001	1998	1999	2000	2001
All industries	11, 21–23, 31–33, 42, 44–81	5,208	5,281	7,079	6,356	9,849	10,019	10,495	10,388
Manufacturing	31–33	3,395	3,891	4,854	4,209	4,990	4,721	4,826	4,765
Food	311	27	28	37	34	105	99	122	132
Beverage and tobacco products	312	16	8	8	12	10	8	7	10
Textiles, apparel, and leather	313–16	7	9	8	8	41	41	36	31
Wood products	321	1	2	2	2	34	29	26	31
Paper, printing, and support activities	322, 323	48	35	35	59	127	101	110	78
Petroleum and coal products	324	20	10	NA	35	26	27	NA	30
Chemicals	325	861	961	1,070	999	711	580	564	650
Pharmaceuticals and medicines	3254	628	713	801	806	381	250	247	297
Plastics and rubber products	326	21	26	25	19	163	113	108	118
Nonmetallic mineral products	327	11	11	8	10	42	36	36	27
Primary metals	331	7	7	6	6	31	36	55	43
Fabricated metal products	332	24	25	23	24	368	310	271	260
Machinery	333	179	130	149	154	446	417	450	425
Computer and electronic products	334	1,145	1,566	2,210	1,677	1,623	1,626	1,617	1,604
Computers and peripheral equipment	3341	346	587	691	488	279	252	245	346
Communications equipment	3342	362	433	651	433	424	377	285	344
Semiconductor and other electronic components	3344	338	427	740	567	555	539	596	552
Navigational, measuring, electromedical, and control instruments	3345	68	82	72	139	291	304	331	209
Electrical equipment, appliances, and components	335	119	136	178	181	418	401	397	411
Transportation equipment	336	748	778	903	786	162	125	195	186
Motor vehicles, trailers, and parts	3361–63	612	663	762	639	80	72	84	83
Aerospace products and parts	3364	108	96	123	131	43	34	47	53
Furniture and related products	337	7	6	7	9	43	38	57	32
Miscellaneous manufacturing	339	154	154	162	193	639	734	751	699
Medical equipment and supplies	3391	131	133	138	155	382	488	433	431
Nonmanufacturing	11, 21–23, 42, 44–81	1,813	1,390	2,224	2,147	4,859	5,298	5,669	5,623
Agriculture, forestry, fishing, and hunting	11	12	10	4	3	55	36	39	35
Mining, extraction, and support activities	21	9	4	15	10	15	12	15	44
Utilities	22	22	18	10	9	44	34	29	23
Construction	23	2	7	13	9	31	33	11	15
Trade	42, 44, 45	140	124	187	186	392	751	608	693
Transportation and warehousing	48, 49	14	14	21	16	18	17	21	19
Information	51	1,020	634	1,147	1,001	953	1,466	1,506	1,502
Publishing	511	699	277	707	623	635	858	913	975
Software	5112	686	264	686	603	612	840	890	952
Broadcasting and telecommunications	513	198	188	211	185	111	206	182	179
Finance, insurance, and real estate	52, 53	94	111	141	126	109	98	109	124
Professional, scientific, and technical services	54	420	418	612	650	2,383	2,645	2,959	2,887
Architectural, engineering, and related services	5413	15	34	43	43	142	211	163	136
Computer systems design and related services	5415	230	171	261	231	741	1,193	1,329	1,204
Scientific R&D services	5417	150	174	254	308	1,298	929	1,122	1,190
Management of companies and enterprises	55	43	13	37	82	55	39	66	52
Health care services	621–23	NA	4	1	1	NA	7	5	5

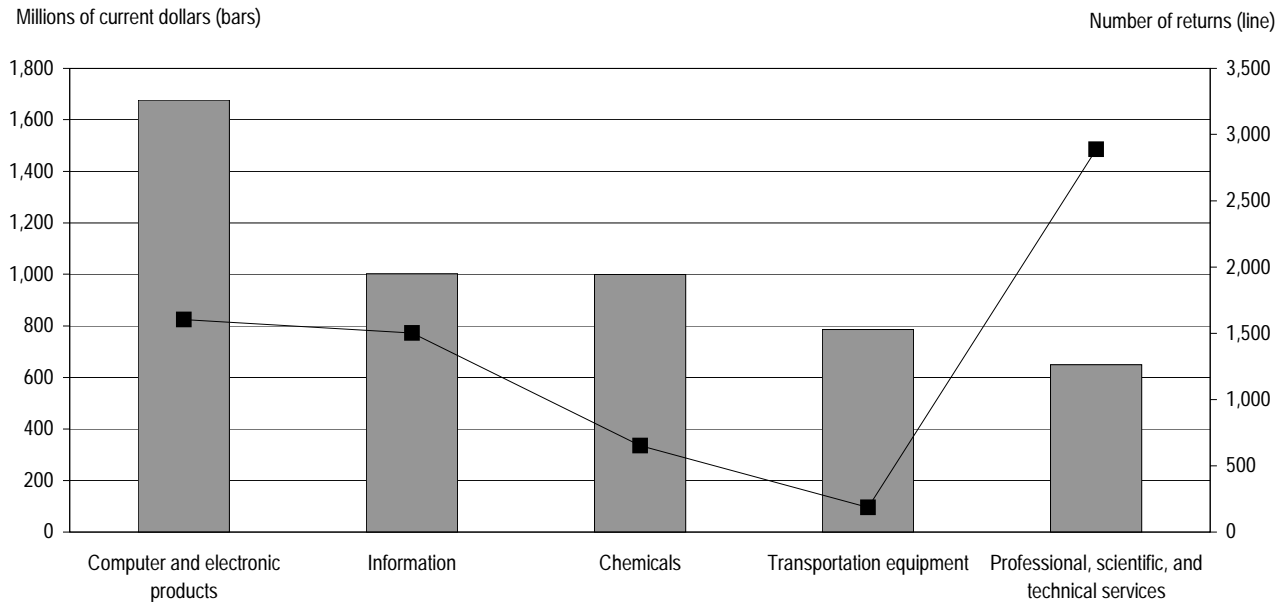
NA = not available.

NAICS = North American Industry Classification System.

R&E = research and experimentation.

SOURCE: U.S. Internal Revenue Service, Statistics of Income program, unpublished tabulations.

FIGURE 3. Industries with largest R&amp;E tax-credit claims and number of corporate tax returns claiming the credit: 2001



SOURCE: U.S. Internal Revenue Service, Statistics of Income program, unpublished tabulations.

Estimates on the R&E tax credit were obtained from special tabulations of SOI/IRS. Companies requesting the credit must complete IRS Form 6765 (<http://www.irs.gov/pub/irs-pdf/f6765.pdf>). Qualified costs include company-funded expenses for wages paid, supplies used in the conduct of qualified research, and certain contract expenses. For tax purposes, R&D expenses are restricted to the somewhat narrower concept of research and experimental expenditures. Such expenditures are limited to experimental or laboratory costs aimed at the development or improvement of a product (defined to include any pilot model, process, formula, or technique) in connection with the taxpayer's business (26 U.S. Code of Federal Regulations [CFR] 1.174).<sup>5</sup> Further, tax-credit regulations define qualified research expenses as a subset of research and experimental expenses that satisfy additional tests involving the experimental and technological nature of the activities (26 CFR 1.41-2; Oliver 2003). In February 2004 the IRS published final regulations on the

<sup>5</sup> In contrast, R&D expenditures for purposes of NSF surveys include basic research, applied research, and development. However, similarities also exist. In particular, both the NSF Survey of Industrial R&D and IRS definitions exclude routine testing, adaptation of existing components, marketing, and research in the social sciences, arts, or humanities.

definition of qualified research for purposes of the tax credit, reflecting changes to the tax code made by the Tax Reform Act of 1986 (IRS 2004).<sup>6</sup>

Data reported here exclude IRS forms 1120S (S corporations), 1120-REIT (Real Estate Investment Trusts), and 1120-RIC (Regulated Investment Companies). The R&E tax credit covers activities performed in the United States by domestic and foreign-owned firms but excludes those conducted abroad by U.S. companies. The Tax Relief Extension Act of 1999 extended the R&E tax credit to include qualified expenses in Puerto Rico and the U.S. possessions.

Estimates on corporate tax statistics are based on a stratified probability sample of unaudited returns selected from a population of active returns. Active corporate returns include returns having current income or deductions. IRS data are for tax years, which cover accounting periods ended any month between July of the calendar year of reference through June of the

<sup>6</sup> These regulations do not include final rules on computer software for internal use. For guidelines on software development expenses see Revenue Procedure 2000-50, IRB 2000-52, December 26, 2000, as modified by Revenue Procedure 2004-11, IRB 2004-3, January 20, 2004.

following calendar year. In tax year 2001 more than 80 percent of all corporate tax returns (not just the returns claiming the R&E tax credit) were calendar-year returns, or returns with accounting periods ending in December 2001. Industry classification has been based on NAICS since tax year 1998.

Estimates are subject to sampling and non-sampling errors. For a full description of the IRS statistical methodology see <http://www.irs.gov/pub/irs-soi/01cosec3.pdf>.

Although both IRS and NSF statistics use NAICS as the underlying industry classification system, comparisons of R&D-related estimates at the industry level are problematic due to differences in methodology. For example, the assignment of industry codes for tax purposes is based on gross receipts, whereas the classification in the NSF survey is based on dollar payrolls.

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For more information, contact

Francisco Moris  
Research and Development Statistics Program  
Division of Science Resources Statistics  
National Science Foundation  
4201 Wilson Boulevard, Suite 965  
Arlington, VA 22230  
703-292-4678  
[fmoris@nsf.gov](mailto:fmoris@nsf.gov)

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