Appendix B:
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Table B-1. Difference in agency-reported and performer-reported Federal R&D, all performers: 1980-96

Year	Reported by Federal Agencies			Performer-reported Expenditures
	Authorizations	Obligations	Outlays	
	[millions of current dollars]			
1980	29,739	29,830	29,154	29,455
1981	33,735	33,104	32,459	33,415
1982	36,115	36,433	34,391	36,583
1983	38,768	38,712	36,659	40,838
1984	44,214	42,225	39,691	45,649
1985	49,887	48,360	44,171	52,128
1986	53,249	51,412	50,609	54,283
1987	57,069	55,254	51,612	57,914
1988	59,106	56,769	54,739	59,382
1989	62,115	61,406	59,450	59,799
1990	63,781	63,559	62,135	61,342
1991	65,898	61,295	61,130	60,120
1992	68,398	65,593	62,935	60,192
1993	69,884	67,314	65,241	60,323
1994	68,331	67,256	66,159	60,234
1995 (preliminary)	70,309	70,094	67,400	62,500
1996 (preliminary)	70,503	68,842	67,653	61,900

SOURCES: NSF/SRS, Survey of Federal Funds for Research and Development; Survey of Industrial Research and Development; Survey of Scientific & Engineering Expenditures at Universities and Colleges; and Office of Management and Budget, *Historical Tables, Budget of the United States Government-Fiscal Year 1997* (1996)

Table B-2. Difference in agency-reported and performer-reported Federal R&D: industrial performers by agency source, 1980-94

Year	Industry Survey			Federal Survey			Difference in Report Totals		
	Total	Department of Defense	Other agencies	Total	Department of Defense	Other agencies	Total	Department of Defense	Other agencies
	[millions of current dollars]								
1980	14,029			14,377			-348		
1981	16,382	10,540	5,842	16,282	10,931	5,351	100	-391	491
1982	18,545			18,698			-153		
1983	20,680	14,571	6,109	18,522	14,670	3,852	2,158	-99	2,257
1984	23,396			20,218			3,178		
1985	27,196	20,948	6,248	23,496	19,069	4,427	3,700	1,879	1,821
1986	27,891			25,898			1,993		
1987	30,757	22,252	8,505	28,629	24,258	4,371	2,128	-2,006	4,134
1988	30,343			28,630			1,713		
1989	28,554	NA	NA	30,603	25,043	5,560	-2,049	NA	NA
1990	28,125			31,696			-3,571		
1991	26,372	NA	NA	28,589	21,349	7,240	-2,217	NA	NA
1992	24,722			31,862			-7,140		
1993	22,809	15,044	7,765	31,777	23,856	7,921	-8,968	-8,812	-156
1994	22,463			31,748			-9,285		

KEY: NA=not available

NOTES: Data from the Industry Survey are R&D expenditures as reported by performing firms. Data from the Federal Survey are R&D obligations to industry as reported by Federal agencies. The last three columns report the difference between the two data series.

SOURCES: NSF/SRS, Survey of Federal Funds for Research and Development and Survey of Industrial Research and Development

Table B-3. Revisions in industry R&D performance totals: 1982-87

Year	Total R&D			Non-Federal funds			Federal funds		
	1989 National Patterns	Revision	1990 National Patterns	1989 National Patterns	Revision	1990 National Patterns	1989 National Patterns	Revision	1990 National Patterns
	[millions of current dollars]								
1982	57,995	655	58,650	39,512	593	40,105	18,483	62	18,545
1983	63,403	1,865	65,268	42,861	1,727	44,588	20,542	138	20,680
1984	71,470	3,330	74,800	48,308	3,096	51,404	23,162	234	23,396
1985	78,269	5,970	84,239	51,439	5,604	57,043	26,830	366	27,196
1986	80,631	7,548	88,179	52,848	7,084	59,932	27,783	464	28,247
1987	85,500	8,617	94,117	55,500	7,306	62,806	30,000	1,311	31,311

NOTE: These methodological revisions were first reported in *National Patterns of R&D Resources:1990.* These data may have been subsequently revised since the methodological revisions were first introduced. Any such subsequent revisions are not reflected in this table.

Table B-4. Revisions in industry R&D performance, and their impact on other variables: 1987-91

Year	Total industry R&D		industry		Federal funds to industry	
	Previous estimates	National Patterns	Previous estimates	National Patterns	Previous estimates	National Patterns
	[millions of current dollars]					
1987	92,155	92,155	61,403	61,403	30,752	30,752
1988	97,889	97,015	65,772	66,672	32,117	30,343
1989	101,854	102,055	70,562	73,501	31,292	28,554
1990	104,606	109,727	73,980	81,602	30,626	28,125
1991	102,246	116,952	25,308	90,580	25,308	26,372

Table B-4. - Continued

Year	National R&D funds		R&D/GDP		Federal funds as percent of total		Defense R&D as percent of total	
	Previous estimates	National Patterns	Previous estimates	National Patterns	Previous estimates	National Patterns	Previous estimates	1994 National Patterns
	[millions of current dollars]							
1987	125,376	125,376	2.76	2.76	46.2	46.2	31.3	31.3
1988	133,764	132,890	2.73	2.71	45.8	44.8	30.2	29.5
1989	140,824	141,025	2.68	2.68	44.5	42.5	28.4	27.1
1990	146,424	151,545	2.64	2.73	43.7	40.6	27.0	25.1
1991	145,383	160,096	2.54	2.80	40.7	37.6	24.3	22.3

NOTE: These methodological revisions were first reported in *National Patterns of R&D Resources:1994.* These data may have been subsequently revised since the methodological revisions were first introduced. Any such subsequent revisions are not reflected in this table.

Table B-5. Distribution of industry R&D performance, by character of work: 1985-94

Year	Non-Federal funds					Federal funds				
	Census imputation					Census imputation				
	Total R&D	Basic research	Applied research	Development	Undistributed residual	Total R&D	Basic research	Applied research	Development	Undistributed residual
	[millions of current dollars]									
1985	57,043	2,140	11,640	37,659	5,604	27,196	482	5,275	21,073	366
1986	59,932	2,162	9,914	29,081	18,775	27,891	370	3,444	17,074	7,003
1987	61,403	2,332	10,558	30,819	17,694	30,752	534	3,510	18,770	7,938
1988	66,672	2,315	11,507	33,061	19,789	30,343	731	3,255	18,829	7,528
1989	73,501	2,741	13,328	37,599	19,833	28,554	1,050	3,567	16,224	7,713
1990	81,602	3,519	14,867	38,610	24,606	28,125	981	3,684	17,495	5,965
1991	90,580	5,270	17,511	51,568	16,231	26,372	1,220	4,808	14,749	5,595
1992	94,388	5,076	18,223	58,907	12,182	24,722	910	4,325	16,780	2,707
1993	94,591	5,345	17,345	60,991	10,910	22,809	952	4,698	16,561	598
1994	97,131	5,453	16,894	63,719	11,065	22,463	921	4,040	16,217	1,285
	Reported in 1996 National Patterns					Reported in 1996 National Patterns				
1985	57,043	2,373	12,908	41,762	0	27,196	489	5,347	21,360	0
1986	59,932	3,496	15,082	41,354	0	27,891	551	4,678	22,662	0
1987	61,403	3,583	15,153	42,667	0	30,752	740	4,660	25,352	0
1988	66,672	3,507	16,531	46,634	0	30,343	993	4,217	25,133	0
1989	73,501	3,832	17,993	51,676	0	28,554	1,384	4,698	22,472	0
1990	81,602	3,760	18,432	59,410	0	28,125	1,368	6,353	20,404	0
1991	90,580	6,125	21,425	63,030	0	26,372	1,712	6,021	18,639	0
1992	94,388	5,816	21,184	67,385	0	24,722	1,186	4,983	18,555	0
1993	94,591	5,961	19,956	68,678	0	22,809	958	4,730	17,118	0
1994	97,131	6,078	19,372	71,683	0	22,463	939	4,119	17,405	0

NOTES: Because of rounding, detail may not sum to totals. These methodological revisions were first reported for the years 1985-87 in *National Patterns of R&D Resources: 1990* ; and for the years 1988-91 are being reported in this edition of National Patterns for the first time.

Table B-6. Revisions in university & college performance by Federal source of funds: 1974-90

Year	Universities and colleges				University-administered FFRDCs			
	1990 National Patterns		1992 National Patterns		1990 National Patterns		1992 National Patterns	
	Applied research	Development	Applied research	Development	Applied research	Development	Applied research	Development
	[millions of current dollars]							
1974	438	71	438	71	178	297	178	297
1975	516	78	516	78	213	335	203	345
1976	584	87	584	87	264	371	235	400
1977	607	112	607	112	371	413	290	494
1978	673	122	644	194	431	419	319	531
1979	873	150	709	314	468	452	342	578
1980	1,043	200	880	361	503	619	424	698
1981	1,087	225	943	364	529	696	424	801
1982	1,142	225	957	406	606	556	430	732
1983	1,217	225	1,052	387	726	539	456	809
1984	1,401	200	1,187	410	804	671	541	934
1985	1,515	200	1,261	458	835	939	591	1,183
1986	1,611	225	1,329	512	774	1,262	565	1,471
1987	1,706	250	1,452	512	693	1,501	538	1,656
1988	2,229	275	1,857	694	697	1,612	534	1,775
1989	2,300	300	2,118	724	720	1,680	605	1,795
1990	2,325	325	2,219	857	740	1,760	630	1,799

KEY: FFRDC = federally funded research and development center

NOTE: These methodological revisions were first reported in *National Patterns of R&D Resources:1992.*

These data may have been subsequently revised since the methodological revisions were first introduced. Any such subsequent revisions are not reflected in this table.

Table B-7. Sources of data in compiling estimates on the level of R&D expenditures in the United States: 1973 and 1992-96

Year	United States	Federal Govt. Total used	Industry			Universities and colleges					U&C FFRDCs	Other nonprofit institutions			
			Total used	Sources		Total used	Sources				Total used	Total used	Sources		
				Federal Govt.	Industry		Federal Govt.	Industry	U&C	Non-profits			Federal Govt.	Industry	Non-profits
	National expenditures for R&D, by performing sectors and sources of funds														
1973	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P
1992	A	P	P	P	P	P	P	P	P	P	P	A	S	Same as %	Same as %
1993	A	P	P	P	P	P	P	P	P	P	P	A	S	change of	change of
1994	A	P	P	P	P	P	P	P	P	P	P	A	S	industry	nonprofits
1995 (preliminary)	A	P	A	S-model	P	P	P	P	P	P	P	A	S	funds to	funds to
1996 (preliminary)	A	P	A	S-model	P	A	S-model	TS-model of EACH sector			TS-model	A	S	ind. & U&C	U&C
	National expenditures for basic research, by performing sectors and sources of funds														
1973	A	P	P	P	P	P	P	---Telephone follow-up---			P	P	P	------Estimated------	
1992	A	P	P	P	P	P	P	Non-Federal basic as % of			P	A	S	Assumed:	Assumed:
1993	A	P	P	P	P	P	P	non-Federal total R&D			P	A	S	46	40
1994	A	P	P	P	P	P	P	Same for EACH sector			P	A	S	percent	percent
1995 (preliminary)	A	P	A	Percent share of		A	P	Time series model total			P	A	S	of	of
1996 (preliminary)	A	P	A	1994 R&D totals		A	S-model	non-Fed. basic research			TS-model	A	S	R&D	R&D
	National expenditures for applied research, by performing sectors and sources of funds														
1973	A	P	P	P	P	P	P	---Telephone follow-up---			P	P	P	------Estimated------	
1992	A	P	P	P	P	A	P-S	For EACH non-Federal			P-S	A	S	Assumed:	Assumed:
1993	A	P	P	P	P	A	P-S	sector, applied research			P-S	A	S	34	36
1994	A	P	P	P	P	A	P-S	is the residual of total			P-S	A	S	percent	percent
1995 (preliminary)	A	P	A	Percent share of		A	S-model	R&D support minus basic			S-model	A	S	of	of
1996 (preliminary)	A	P	A	1994 R&D totals		A	S-model	research and development			S-model	A	S	R&D	R&D
	National expenditures for development, by performing sectors and sources of funds														
1973	A	P	P	P	P	P	P	---Telephone follow-up---			P	P	P	------Estimated------	
1992	A	P	P	P	P	A	P-S	For EACH non-Federal			P-S	A	S	Assumed:	Assumed:
1993	A	P	P	P	P	A	P-S	sector, development			P-S	A	S	20	24
1994	A	P	P	P	P	A	P-S	equals 7% of reported			P-S	A	S	percent	percent
1995 (preliminary)	A	P	A	Percent share of		A	S-model	or modeled			S-model	A	S	of	of
1996 (preliminary)	A	P	A	1994 R&D totals		A	S-model	total R&D support			S-model	A	S	R&D	R&D

NOTE: Data are preliminary for 1995 and 1996.

KEY: A = There is no single survey for this item. It is obtained by adding the appropriate expenditure details.

P = Based on surveys of R&D performers.

S = Based on surveys of Federal agencies which are the source of R&D funds.

P-S = Based on data from surveys of both performers and Federal agency sources.

S-model = Based on analytical or statistical models using Federal source-reported data.

TS-model = Based on times series modeling, such as Box-Jenkins techniques.

FFRDC = federally funded research and development center

U&C = universities and colleges

Table B-8. Revisions in number of R&D scientists and engineers: 1985 and 1989

Sector and primary work activity	1985		1989	
	Previous data	Revised data	Previous data	Revised data
	Thousands			
Total United States R&D scientists and engineers	841.6	801.9	949.3	924.2
Industry: Number of full-time equivalent R&D S&Es	646.8	646.8	726.0	733.1
Federal Government: Number of S&Es, Total	55.0	52.1	60.0	58.8
Research	22.3	22.3	22.9	24.6
Development	29.7	29.7	33.2	34.2
R&D management	2.9	--	3.9	--
Educational institutions: Full-time equivalent R&D S&Es, total	81.1	--	93.7	--
Doctoral S&Es, total	--	64.7	--	83.5
Basic research	--	43.6	--	52.7
Applied research	--	15.7	--	26.0
Development/design	--	1.4	--	0.9
Management/administration of R&D	--	4.0	--	3.9
FTE S&E graduate students with research assistantships	27.2	30.5	35.1	39.5
Nonprofit organizations: Full-time equivalent R&D S&Es, total	31.5	--	34.5	--
Doctoral S&Es, total	--	7.8	--	9.2
Basic research	--	3.4	--	3.8
Applied research	--	2.2	--	3.2
Development/design	--	0.5	--	0.5
Management/administration of R&D	--	1.7	--	1.7
R&D S&Es per 10,000 labor force	71.8	68.4	75.6	73.0

KEY: FTE = full-time equivalent

NOTES: These methodological revisions were first reported in *National Patterns of R&D Resources: 1994.* These data may have been subsequently revised since the methodological revisions were first introduced. Any such subsequent revisions are not reflected in this table.

SOURCES: NSF/SRS, Survey of Industrial Research and Development; Survey of Doctorate Recipients; Survey of Graduate Students and Postdoctorates in Science and Engineering; U.S. Office of Personnel Management; and Bureau of Labor Statistics, *Employment and Earnings* (annual)