

LINKING MULTINATIONAL CORPORATIONS DATA FROM INTERNATIONAL INVESTMENT AND INDUSTRIAL R&D SURVEYS

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This *InfoBrief* summarizes the rationale for and key findings from a project linking company-specific R&D and international investment datasets of several federal agencies. The project demonstrated not only the feasibility of such a linkage, but also its utility. The combined data set provides a rich source of new information on the domestic and international dimensions of U.S. R&D activity, such as data on the R&D activities of U.S. and foreign multinational companies by character of work (basic research, applied research, development). The study also has produced tangible benefits for the participating agencies, through improvements in survey sampling and quality of reported data. Such data sharing among federal statistical agencies has been facilitated by the Confidential Information Protection and Statistical Efficiency Act of 2002 (CIPSEA). This study was the first data-sharing project in the U.S. government undertaken under CIPSEA (see "Conclusion").

The project was proposed and funded by Science Resources Statistics (SRS), a division of the National Science Foundation (NSF). The full report, *Research and Development Data Link Project: Final Report*, is available at <http://www.census.gov/mcd/RDD/rddatalink.pdf>.

Rationale and Methodology

NSF and the U.S. Census Bureau jointly collect a considerable amount of detailed information on the R&D activities of industrial companies in the United States through the Survey of Industrial Research and Development (SIRD). Information from the SIRD

includes whether companies' R&D activities are for applied or basic research or for development, the technology areas supported, and the U.S. state location of R&D performance. The Bureau of Economic Analysis (BEA) collects information from parent companies of U.S. multinational corporations (MNCs) about their overseas activities through the Survey of U.S. Direct Investment Abroad (USDIA) and from affiliates of foreign MNCs through the Survey of Foreign Direct Investment in the United States (FDIUS).¹ BEA data include statistics on foreign ownership and location and on performance metrics, such as sales, operating expenses, and investments, but very little on R&D activities beyond total R&D expenditures.

Combining technological and investment data from these separate but complementary sources should facilitate a better assessment of globalization trends in R&D and technological innovation. This project linked data from the 1997 benchmark FDIUS and the 1999 benchmark USDIA with corresponding years' data from the SIRD. For each link, at least 80% of the published totals were accounted for by matched companies.

¹MNCs engage in foreign direct investment, the ownership of productive assets outside the home country. An MNC comprises a parent company and its foreign affiliates. An affiliate is a business that is located in one country but is owned or controlled by a parent company located in another country. Thus, a U.S. MNC comprises a U.S. parent company and its foreign affiliates; a foreign MNC is a corporation whose parent company is located outside the United States.



This *InfoBrief* includes data on four company groupings, data for one group collected by the SIRD and data for the other three groups collected by BEA in separate direct investment surveys.

Collected by the SIRD

- R&D-performing companies in the United States, regardless of their ownership structure

Collected by BEA

- U.S. affiliates of foreign MNCs that are majority-owned by their foreign parents (owning more than 50% of their voting securities or equivalent)
- parent companies of U.S. MNCs: fully consolidated U.S. enterprises that own or control at least 10% of the voting securities, or equivalent, of their foreign affiliates
- foreign affiliates of U.S. MNCs that are majority-owned (>50%) by their U.S. parents (majority-owned foreign affiliate)

The first two company groups surveyed by BEA have business activities in the United States. Their respective R&D expenditures are, in effect, subsets of total U.S. industrial R&D (estimated separately by the SIRD). Of this total, MNCs account for a substantial—

and growing—share, based on published and nationally representative data. Affiliates of foreign MNCs in the United States performed \$29.8 billion, or about 15%, of the \$204 billion total in U.S. industrial R&D in 2003, compared with 11% in 1997. Parent companies of U.S. MNCs performed \$139.9 billion in R&D in 2003, or just under 70% of total U.S. industrial R&D; foreign affiliates of U.S. MNCs invested \$22.8 billion in R&D overseas in the same year.

Key Findings

The values reported below illustrate the kinds of information that can be obtained from linked data. Data in this section and in the tables are from the linked data set. Linked data are not nationally representative: data represent only matched companies, therefore data may not be extrapolated to the population of interest (see “Data Notes”). Additional information appears in the full report, available at <http://www.census.gov/mcd/RDD/rddatlink.pdf>. Appendix tables from that report are cited below.

U.S. Affiliates of Foreign MNCs

- In 1997, the majority of the R&D expenditures by U.S. affiliates was devoted to development activities and was funded by company and other nonfederal sources, based on data reported to the SIRD (table 1).

TABLE 1. Summary data for linked majority-owned U.S. affiliates: 1997 (SIRD data)

Characteristic	R&D expenditures							Employment	
	Total	Character of work			Undistributed	Source of funding		Total	R&D (FTE)
		Basic	Applied	Development		Company ^b	Federal government		
Companies ^a	289	84	138	227	na	288	20	289	284
	US\$millions							Thousands of employees	
Industries	11,797	1,367	1,976	8,161	294	11,706	91	1,176	66
Manufacturing	9,865	1,271	1,532	6,768	294	9,775	90	1,045	56
Trade	555	D	D	359	NA	D	D	32	3
Other	1,377	D	D	1,034	NA	D	D	99	8

D = suppressed to avoid disclosure of data of individual companies; FTE = full-time equivalent; na = not applicable; NA = not available; SIRD = Survey of Industrial Research and Development.

^aNumber of majority-owned companies in all industries that reported a nonzero value for a given item.

^bIncludes company and other nonfederal sources.

NOTES: A total 387 companies in the SIRD were linked to U.S. affiliates records from BEA's survey of foreign direct investment in the United States. Of these, 319 were majority-owned and 74 were minority-owned. Detail may not add to total because of rounding.

SOURCE: *Research and Development Data Link Project Final Report* (2005). Available at <http://www.census.gov/mcd/RDD/rddatlink.pdf>. Accessed 24 October 2006.

- R&D performed by U.S. affiliates accounted for 8% of the U.S. industrial R&D expenditures reported to the SIRD. However, the U.S. affiliate share of spending for basic research was twice as large (16%). (Appendix table 1, full report.)
- U.S. affiliates employed 8% of the U.S. industrial R&D employees of companies in the SIRD. (Appendix table 5, full report.)

U.S. Parent Companies

- In 1999, U.S. parent companies reported \$115.7 billion in R&D in the United States, based on data reported to the SIRD (table 2). Parent companies accounted for three-quarters of the U.S. industrial R&D expenditures and for two-thirds of the R&D employees. (Appendix tables 1 and 5, full report.)
- In the manufacturing sector, parent companies accounted for 86% of federally-funded U.S. R&D expenditures according to 1999 SIRD data. The corresponding share for the trade sector was 52%. (Appendix table 4, full report.)

Majority-owned Foreign Affiliates

- Two-thirds of overseas R&D by majority-owned affiliates of U.S. parent companies was performed in five countries in 1999: United Kingdom, Germany, Canada, France, and Japan (table 3), based on data reported to BEA.
- Affiliates located in the United Kingdom and Germany accounted for the largest share of R&D employment of such foreign affiliates in 1999.

Conclusion

The study unequivocally demonstrated the feasibility of linking microdata from the NSF/Census industrial R&D survey with BEA data on U.S. affiliates of foreign MNCs and on U.S. MNCs. The link provided new information on the R&D activities of multinational corporations; allowed improvements in sample design for each of the surveys; and provided useful information on the quality of reported data. For example, by combining information from the surveys federal agencies can for the first time obtain basic research, applied research, and development expenditures for MNCs

TABLE 2. Summary data for linked U.S. parent companies: 1999 (SIRD data)

Characteristic	R&D expenditures							Employment	
	Total	Character of work				Source of funding		Total	R&D (FTE)
		Basic	Applied	Development	Undistributed	Company ^b	Federal government		
Companies ^a	1,035	247	448	760	NA	1,033	97	1,035	1,009
	US\$millions							Thousands of employees	
All industries	115,690	4,945	15,004	57,307	38,435	101,027	14,663	9,360	593
Manufacturing	88,558	4,043	12,313	38,473	33,728	74,273	14,285	6,431	405
Trade	14,554	341	1,007	12,189	1,017	14,518	36	662	85
Other	12,578	561	1,684	6,644	3,689	12,237	342	2,266	103

FTE = full-time equivalent.

SIRD = Survey of Industrial Research and Development.

^a Number of U.S. parent companies in all industries that reported a nonzero value for a given item.

^b Includes company and other nonfederal sources.

NOTES: A total of 1,321 companies in the SIRD were linked to U.S. parent companies from BEA's survey of U.S. Direct Investment Abroad. Detail may not add to total because of rounding.

SOURCE: *Research and Development Data Link Project Final Report* (2005). Available at <http://www.census.gov/mcd/RDD/rddatalink.pdf>. Accessed 24 October 2006.

TABLE 3. Summary data for majority-owned foreign affiliates of linked U.S. parent companies, by selected country: 1999 (BEA data)

Host country	Matched parent companies with R&D performing MOFAs ^a	MOFAs			
		Number	R&D expenditures (US\$millions)	Employees (thousands)	
				Total	R&D
All host countries	377	1,721	16,619	1,778	107
Canada	100	131	1,547	174	6
France	106	158	1,363	135	10
Germany	130	189	2,982	253	22
Japan	71	88	1,362	59	7
United Kingdom	169	228	3,737	265	23
Other	258	927	5,627	891	39

MOFA = majority-owned foreign affiliate.

^a A linked parent company is counted once in the all-countries total. It is also counted once in each country in which it has a majority-owned foreign affiliate. Because a parent may have majority-owned foreign affiliates in more than one country, the sum across countries exceeds the all-countries total.

NOTE: R&D employees are full- and part-time employees who devote the majority of their time to R&D activities.

SOURCE: *Research and Development Data Link Project Final Report* (2005). Available at <http://www.census.gov/mcd/RDD/rddatalink.pdf>. Accessed 24 October 2006.

located in the United States or owned by U.S. companies, without adding to respondent burden or duplicating survey efforts, meeting goals anticipated under CIPSEA data-sharing activities.²

Based on these promising initial results, the Census Bureau, NSF/SRS, and BEA concur that future links of SIRD and BEA data likely would produce significant benefits and agree in principle to conduct the linking exercise involving more current data.

Data Notes

All data presented in key findings and tables represent data from the subset of firms that matched during the data-linking project. Linked data are unweighted and do not represent the full population of interest.

² The main purposes of the data-sharing aspects of CIPSEA are to authorize the sharing of business data in order “to reduce the paperwork burdens imposed on businesses that provide requested information to the Federal Government, to improve the comparability and accuracy of Federal economic statistics by allowing [agencies]...to update sample frames, develop consistent classifications of establishments and companies into industries, improve coverage, and reconcile significant differences in data...” and “to increase understanding of the United States economy, especially for key industry and regional statistics, to develop more accurate measures of the impact of technology on productivity growth, and to enhance the reliability of the Nation’s most important economic indicators, such as the National Income and Product Accounts.” For the full text of The CIPSEA Act of 2002, see <http://www.eia.doe.gov/oss/CIPSEA.pdf> (accessed 29 November 2006).

Data on R&D employment from SIRD and BEA are not directly comparable. SIRD R&D employment data are based on full-time equivalents (FTEs). To report FTE counts, companies are asked to include scientists and engineers that perform R&D functions on a full-time basis plus an adjusted number of employees whose activities are not solely devoted to R&D (based on the proportion of their time devoted to R&D activities). BEA R&D employment data are headcounts of full-time and part-time employees that devote the majority of their time to R&D activities.

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