

# R&D Recognized as Investment in U.S. GDP Statistics: GDP Increase Slightly Lowers R&D-to-GDP Ratio

InfoBriefs | NSF 15-315 | March 30, 2015 | [PDF](#)  (208.4 KB)

---

## - Publication

by Francisco Moris, John Jankowski, Mark Boroush, Marissa Crawford, and Jennifer Lee<sup>[1]</sup>

Expenditures for research and development are now capitalized—incorporated as investment—in the U.S. gross domestic product (GDP) and other national income and product accounts (NIPAs) produced and published by the Bureau of Economic Analysis (BEA). R&D investment is presented in the NIPAs in a new asset category called "intellectual property products," or intangible assets, along with software and entertainment, literary, and artistic originals. Data on R&D expenditures are based on statistics from the National Science Foundation's (NSF's) National Center for Science and Engineering Statistics (NCSES), which also collaborated in developing the methodology for using R&D expenditure statistics in NIPAs.

Before R&D expenditures were capitalized, BEA estimates treated private sector R&D expenses as an intermediate cost of production and netted out these expenses in the value-added calculations defining GDP. Also, at that time, expenditures for R&D by governments and certain nonprofit institutions were included in the consumption expenditures component of GDP, but they were not separately identified.

The new BEA treatment considers R&D as investment in all sectors of the economy. As described below, investment measures are designed to capture the value of R&D, not the current costs of R&D as in NSF measures of R&D expenditures. Thus conceptual and measurement differences exist when using R&D statistics as an expenditure versus investment within economic accounts.

## BEA's Comprehensive GDP Revisions

The change in the treatment of R&D was part of the 2013 comprehensive revision of the NIPAs, the 2014 comprehensive revision of the industry economic accounts (IEAs), and the 2014 comprehensive revision of gross domestic product by state,<sup>[2]</sup> all of which included other methodological changes in addition to the treatment of intangible assets. On average, the net result from these changes increased GDP levels. The long-run GDP growth rates are similar to those in previously published estimates. BEA updated all historical GDP and related statistics going back to 1929. Quarterly and annual GDP estimates since the July 2013 release follow the new methodology. For changes in the national and industry accounts and changes in GDP by state, see Kornfeld 2013; Rassier 2014; and Broda and Tate 2014.

The 2013 comprehensive revisions of the NIPAs, IEAs, and GDP by state are consistent with the most recent international guidelines for the compilation of economic accounts, the 2008 System of National Accounts (SNA) manual (United Nations et al. 2009). Those guidelines explicitly stated—for the first time—that expenditures on R&D should be recorded as capital formation, or as investment. Including R&D investment as part of GDP is also consistent with theoretical and empirical studies documenting the long-term contribution of R&D and technological change to economic and productivity growth (Corrado et al. 2005; Jorgenson et al. 2006).

## BEA's Estimates of R&D Investment

Consistent with the 2008 SNA, BEA estimates of R&D investment across all sectors of the economy have two components: own-account R&D (funded and performed internally) and purchased R&D. <sup>[3]</sup>

Own-account R&D is estimated as the sum of the input costs used to produce the R&D plus the depreciation for the physical fixed investment used in producing R&D. The value of purchased R&D includes profits, the seller's margin above costs.

Published BEA estimates of R&D investment in all sectors excludes R&D devoted to software applications (henceforth called software R&D) to avoid double counting. Software R&D is already part of software investment. BEA also accounts for imports and exports of R&D within its investment numbers. For further details on R&D investment methodology see BEA 2013; Kornfeld 2013; Rassier 2014; Crawford et al. 2014.

## **NSF-BEA Collaboration**

### ***R&D Satellite Accounts***

NSF's NCSES supported experimental R&D "satellite accounts" at BEA before R&D investment was fully incorporated into the core NIPAs. Satellite accounts provide a means of exploring the impact of adjusting the treatment of GDP components, and they provide a framework to examine conceptual and measurement issues. Work undertaken through several versions of R&D satellite accounts allowed the two agencies to develop R&D capitalization methodologies with input from internal and external experts. [4] BEA released R&D satellite account statistics in several publications, the last of which covered data for 1959–2007 (BEA 2006; Robbins and Moylan 2007; Lee and Schmidt 2010). [5]

### ***Data Development Collaboration***

NSF R&D statistics are the primary data source for BEA estimates of R&D investment (see Data Sources and Availability). NSF R&D statistics are collected from an expenditure, or current cost, perspective, generally consistent with international reporting standards as detailed in the Frascati Manual guidelines (OECD 2002). Before estimating R&D investment, BEA performs certain data adjustments to NSF cost-based statistics. For example, NSF R&D data collected for the university sector need to be further distributed into private nonprofit and state government sectors of the NIPAs (table 1). [6]

TABLE 1. NIPA's use of NSF's R&amp;D performer surveys, by NIPA sector

NIPA sector (BEA)	R&D survey (NSF)
Within private investment	
Business	Business R&D and Innovation Survey (BRDIS): 2008 forward; Survey of Industrial Research and Development (SIRD): 1953–2007.
Nonprofit institutions serving households	
Private nonprofit universities	Higher Education Research and Development Survey: 2010 forward; Survey of R&D Expenditures at Universities and Colleges: 1972–2009
Other nonprofit institutions	Survey of R&D Funding and Performance by Nonprofit Organizations (last collected in 1997)
Within government investment	
Federal	Survey of Federal Funds for Research and Development: FY 1951 forward
State and local	
Public universities	Higher Education Research and Development Survey: 2,010 forward; Survey of R&D Expenditures at Universities and Colleges: 1972–2009
Other state and local	Survey of State Government Research and Development: 2,006 forward

BEA = Bureau of Economic Analysis; NIPA = national income and product account; NSF = National Science Foundation.

NOTE: R&D in federally funded R&D centers (FFRDCs) are included in the sector of their administrator based on the FFRDC Research and Development Survey: 2001 forward.

SOURCES: Bureau of Economic Analysis; National Science Foundation, National Center for Science and Engineering Statistics.

[Table 1 Source Data: Excel file](#)

BEA and NSF's NCSSES collaborated in developing the methodology to use R&D expenditure statistics for NIPA purposes. One area of collaboration involved developing questions used in several surveys so additional details could be obtained on software R&D. This information allowed for necessary calculations to avoid the double counting noted earlier when capitalizing both software and R&D. The resulting R&D investment methodology and survey enhancements were discussed at several domestic and international forums on official statistics (R&D and national accounts) and on economic growth research. Additional survey questions on types of costs statistics were also developed for the Business R&D and Innovation Survey (BRDIS) and the Higher Education Research and Development Survey (HERD).

To help BEA estimate depreciation rates for R&D asset types, the 2010 BRDIS collected information regarding how long R&D results generated revenue. BEA used the responses from these questions to estimate depreciation rates and services lives for various types of R&D assets.[\[7\]](#)

The extensive geographic detail in NSF's R&D surveys was also used by BEA's Regional Directorate to incorporate R&D investment in the GDP by state statistics, released in June 2014.[\[8\]](#)

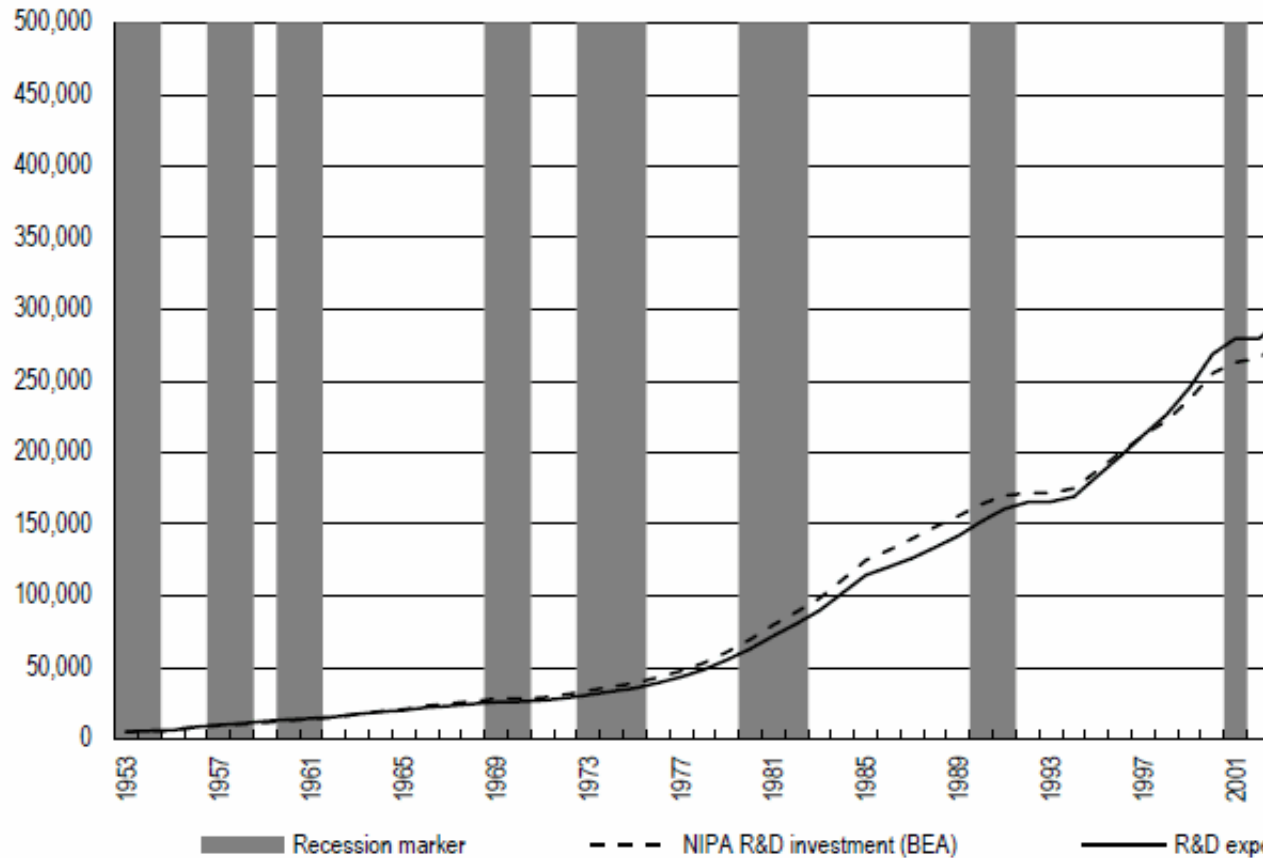
## R&D Expenditures and R&D Investment

[Figure 1](#) compares R&D expenditures (NSF) and R&D investment (BEA). When comparing the series shown in the figure, there are two broad features with opposing effects. BEA estimates of R&D investment exclude software R&D, so the scope of R&D investment presented in NIPAs is smaller than total R&D expenditures published by NSF.[\[9\]](#) On the other hand, BEA R&D investment is a

measure designed to value the economic benefit of R&D, not the current period's costs.<sup>[10]</sup> The overall impact on the relative size of these series depends on which of these features dominate in a given year, resulting in intersecting lines in figure 1. Although there are some differences between the two time series, they follow a similar pattern and behave similarly during and outside of recessions.

FIGURE 1. NIPA R&D investment versus NSF R&D expenditures: 1953–2012

Millions of current dollars



BEA = Bureau of Economic Analysis; NIPA = national income and product account; NSF = National Science Foundation.

NOTE: R&D expenditures refer to current costs.

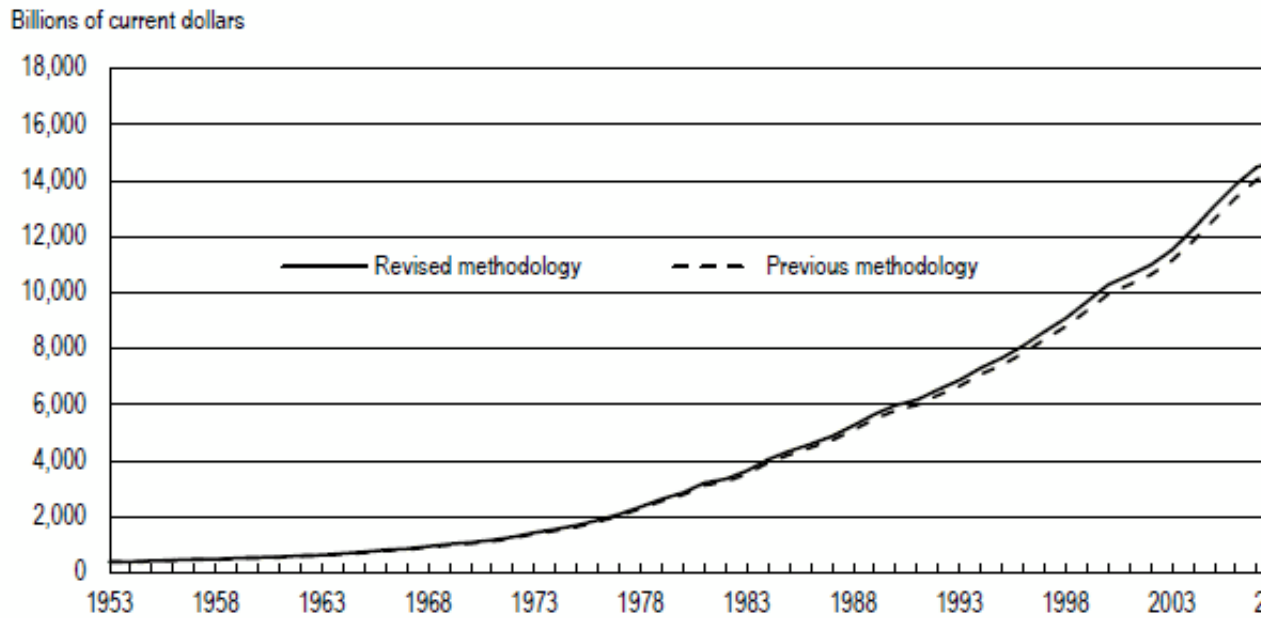
SOURCES: R&D investment statistics are from the BEA, NIPA tables 5.6.5 and 5.9.5, available at <http://www.bea.gov/ITable/index>, 2014. R&D expenditures are from the NSF, National Center for Science and Engineering Statistics. National Patterns of R&D Resour Recession dates were obtained from <http://www.nber.org/cycles/cyclesmain.html>, accessed 10 March 2014.

Figure 1 Source Data: Excel file

## Revised GDP

The 2013 comprehensive revision of the NIPAs implemented several methodological changes that resulted in higher GDP levels (see table C in Kornfeld 2013). However, the long-run growth rates of GDP are similar to those in the previously published estimates. For 1929–2012, the average annual growth rate of GDP is 0.1 percentage point higher than in the previously published estimates (Kornfeld 2013). Figure 2 shows current dollar GDP for 1953–2012 under the new and previous BEA methodologies. GDP in 2012 was \$16.245 trillion in current dollars under the revised methodology, 3.6% higher than the \$15.685 trillion following the previous methodology.

FIGURE 2. U.S. GDP, revised versus previous methodology: 1953–2012



GDP = gross domestic product.

NOTE: Revised GDP methodology refers to statistics generated after the 2013 comprehensive revision of the national income and product accounts.

SOURCES: Bureau of Economic Analysis, National Economic Accounts, Gross Domestic Product, <http://www.bea.gov/national/>, accessed 26 June 2013 (previous methodology) and 6 December 2013 (revised methodology).

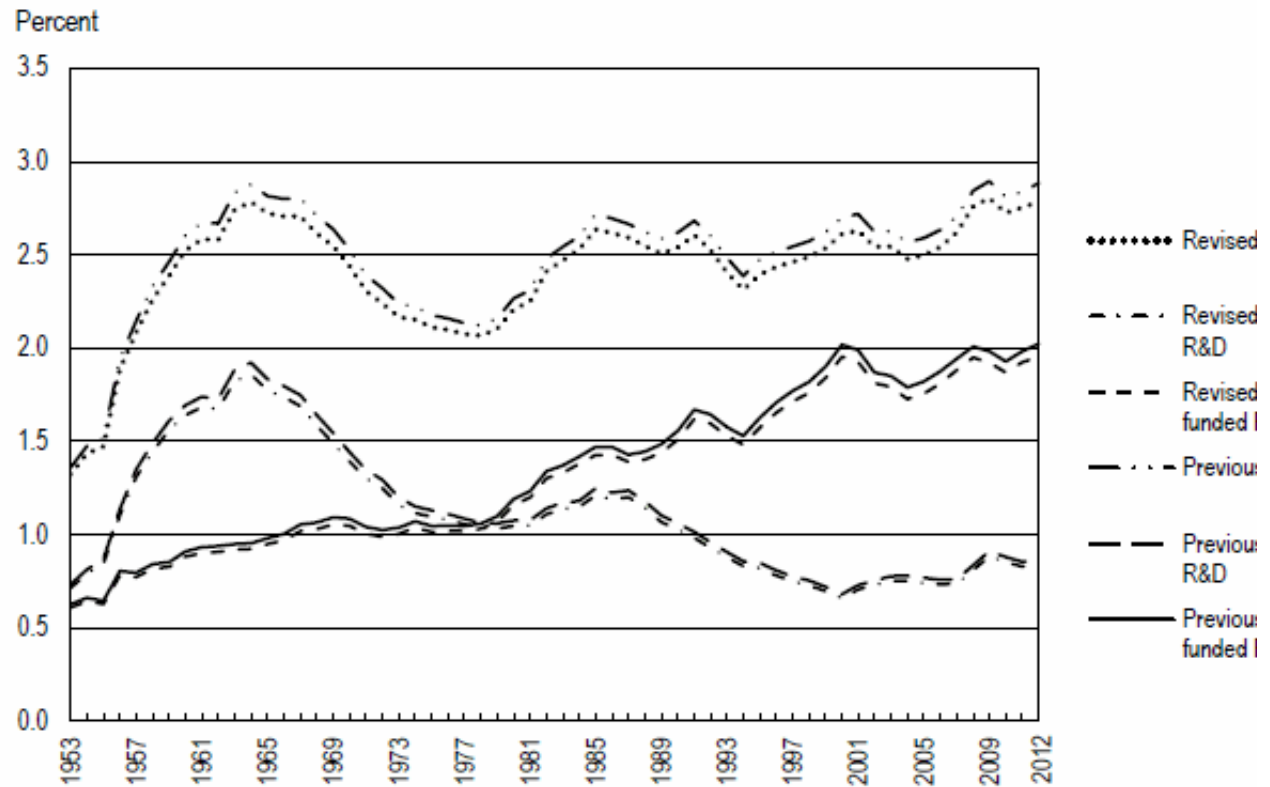
Figure 2 Source Data: Excel file

## Revised R&D-to-GDP Ratio

The ratio of total national R&D expenditures to GDP is often reported as a measure of the intensity of a nation's overall R&D effort. This metric is of interest to national policymakers, and it is widely used internationally as a benchmark for comparing countries' overall R&D systems.

Given higher GDP levels in the denominator (due to the revised methodology) and unchanged NSF R&D expenditures in the numerator, the R&D-to-GDP ratio is now modestly lower than what has previously been reported by NSF in its National Patterns of R&D Resources series. Figure 3 compares the ratios for these two series. For example, NSF reported R&D-to-GDP ratios as 2.81%, 2.84%, and 2.89% for the years 2010, 2011, and 2012, respectively, under the previous GDP methodology (NSF/NCSES 2013; Boroush 2013). After incorporating revised GDP figures, these ratios are now 2.73%, 2.76%, and 2.79%, respectively. Over the 10-year period (2002–12), the change resulting from the revised GDP methodology amounts to about a 0.1 reduction in the R&D-to-GDP ratio for any given year.

FIGURE 3. Ratio of U.S. R&D to GDP for total, federally funded, and nonfederally funded R&D, under revised and previous methodology: 1953–2012



GDP = gross domestic product.

NOTES: Revised GDP methodology refers to statistics generated after the 2013 comprehensive revision of the national income and expenditures from NSF for 2012 are preliminary. Federal R&D/GDP ratios represent the federal government as a funder of R&D by a ratios reflect all other sources of R&D funding.

SOURCES: Bureau of Economic Analysis, National Economic Accounts, Gross Domestic Product, <http://www.bea.gov/national/>, acs methodology) and 6 December 2013 (revised methodology). National Science Foundation, National Center for Science and Engineer of R&D Resources (annual series).

Figure 3 Source Data: Excel file

Figure 3 also shows the 1953–2012 time series for the R&D-to-GDP ratio for the subcomponent ratios showing R&D performed with federal government funding versus nonfederal funding. The relative roles of these differing funding sources are unchanged from the ratios based on the previous GDP methodology (Borouh 2013).

The R&D-to-GDP ratios presented in this InfoBrief represent an update of ratios reported in NSF/NCSES (NSF/NCSES 2013; Borouh 2013). See table 2 for data on GDP and R&D expenditures and GDP ratios.

TABLE 2. U.S. GDP, R&amp;D expenditures, and R&amp;D/GDP by GDP calculation methodology: 1953–2012

Year	GDP		R&D expenditures (NSF)			R&D/GDP (%)					
	Revised methodology (\$billions)	Previous methodology (\$billions)	Total (\$millions)	Federally Nonfederally funded (\$millions)		Under revised GDP methodology			Under previous GDP methodology		
				Total	funded	Federally funded	Nonfederally funded	Total R&D	Federally funded R&D	Nonfederally funded R&D	Total R&D
1953	389.7	379.3	5,160	2,783	2,378	1.32	0.71	0.61	1.36	0.73	0.63
1954	391.1	380.4	5,617	3,098	2,519	1.44	0.79	0.64	1.48	0.81	0.66
1955	426.2	414.7	6,281	3,603	2,678	1.47	0.85	0.63	1.51	0.87	0.65
1956	450.1	437.4	8,500	4,978	3,522	1.89	1.11	0.78	1.94	1.14	0.81
1957	474.9	461.1	9,908	6,233	3,676	2.09	1.31	0.77	2.15	1.35	0.80
1958	482.0	467.2	10,915	6,974	3,941	2.26	1.45	0.82	2.34	1.49	0.84
1959	522.5	506.6	12,490	8,167	4,323	2.39	1.56	0.83	2.47	1.61	0.85
1960	543.3	526.4	13,711	8,915	4,796	2.52	1.64	0.88	2.60	1.69	0.91
1961	563.3	544.8	14,564	9,484	5,080	2.59	1.68	0.90	2.67	1.74	0.93
1962	605.1	585.7	15,636	10,138	5,498	2.58	1.68	0.91	2.67	1.73	0.94
1963	638.6	617.8	17,519	11,645	5,874	2.74	1.82	0.92	2.84	1.88	0.95
1964	685.8	663.6	19,103	12,764	6,339	2.79	1.86	0.92	2.88	1.92	0.96
1965	743.7	719.1	20,252	13,194	7,059	2.72	1.77	0.95	2.82	1.83	0.98
1966	815.0	787.7	22,072	14,165	7,907	2.71	1.74	0.97	2.80	1.80	1.00
1967	861.7	832.4	23,346	14,563	8,784	2.71	1.69	1.02	2.80	1.75	1.06
1968	942.5	909.8	24,666	14,964	9,702	2.62	1.59	1.03	2.71	1.64	1.07
1969	1,019.9	984.4	25,996	15,228	10,768	2.55	1.49	1.06	2.64	1.55	1.09
1970	1,075.9	1,038.3	26,271	14,984	11,287	2.44	1.39	1.05	2.53	1.44	1.09
1971	1,167.8	1,126.8	26,952	15,210	11,742	2.31	1.30	1.01	2.39	1.35	1.04
1972	1,282.4	1,237.9	28,740	16,039	12,701	2.24	1.25	0.99	2.32	1.30	1.03
1973	1,428.5	1,382.3	30,952	16,587	14,365	2.17	1.16	1.01	2.24	1.20	1.04
1974	1,548.8	1,499.5	33,359	17,287	16,072	2.15	1.12	1.04	2.22	1.15	1.07
1975	1,688.9	1,637.7	35,671	18,533	17,138	2.11	1.10	1.01	2.18	1.13	1.05
1976	1,877.6	1,824.6	39,435	20,292	19,143	2.10	1.08	1.02	2.16	1.11	1.05
1977	2,086.0	2,030.1	43,338	22,071	21,267	2.08	1.06	1.02	2.13	1.09	1.05
1978	2,356.6	2,293.8	48,719	24,414	24,305	2.07	1.04	1.03	2.12	1.06	1.06
1979	2,632.1	2,562.2	55,379	27,225	28,154	2.10	1.03	1.07	2.16	1.06	1.10
1980	2,862.5	2,788.1	63,224	29,986	33,238	2.21	1.05	1.16	2.27	1.08	1.19
1981	3,210.9	3,126.8	72,292	33,739	38,553	2.25	1.05	1.20	2.31	1.08	1.23
1982	3,345.0	3,253.2	80,748	37,133	43,615	2.41	1.11	1.30	2.48	1.14	1.34
1983	3,638.1	3,534.6	89,950	41,451	48,499	2.47	1.14	1.33	2.54	1.17	1.37
1984	4,040.7	3,930.9	102,244	46,470	55,773	2.53	1.15	1.38	2.60	1.18	1.42
1985	4,346.7	4,217.5	114,671	52,641	62,029	2.64	1.21	1.43	2.72	1.25	1.47
1986	4,590.1	4,460.1	120,249	54,622	65,626	2.62	1.19	1.43	2.70	1.22	1.47
1987	4,870.2	4,736.4	126,360	58,609	67,751	2.59	1.20	1.39	2.67	1.24	1.43

1988	5,252.6	5,100.4	133,881	60,131	73,750	2.55	1.14	1.40	2.62	1.18	1.45
1989	5,657.7	5,482.1	141,891	60,466	81,425	2.51	1.07	1.44	2.59	1.10	1.49
1990	5,979.6	5,800.5	151,993	61,610	90,382	2.54	1.03	1.51	2.62	1.06	1.56
1991	6,174.0	5,992.1	160,876	60,783	100,093	2.61	0.98	1.62	2.68	1.01	1.67
1992	6,539.3	6,342.3	165,350	60,915	104,435	2.53	0.93	1.60	2.61	0.96	1.65
1993	6,878.7	6,667.4	165,730	60,528	105,203	2.41	0.88	1.53	2.49	0.91	1.58
1994	7,308.7	7,085.2	169,207	60,777	108,429	2.32	0.83	1.48	2.39	0.86	1.53
1995	7,664.0	7,414.7	183,625	62,969	120,657	2.40	0.82	1.57	2.48	0.85	1.63
1996	8,100.2	7,838.5	197,346	63,394	133,952	2.44	0.78	1.65	2.52	0.81	1.71
1997	8,608.5	8,332.4	212,152	64,574	147,578	2.46	0.75	1.71	2.55	0.77	1.77
1998	9,089.1	8,793.5	226,457	66,383	160,074	2.49	0.73	1.76	2.58	0.75	1.82
1999	9,665.7	9,353.5	245,318	67,366	177,952	2.54	0.70	1.84	2.62	0.72	1.90
2000	10,289.7	9,951.5	268,905	67,862	201,043	2.61	0.66	1.95	2.70	0.68	2.02
2001	10,625.3	10,286.2	279,716	74,966	204,750	2.63	0.71	1.93	2.72	0.73	1.99
2002	10,980.2	10,642.3	279,387	80,315	199,072	2.54	0.73	1.81	2.63	0.75	1.87
2003	11,512.2	11,142.2	293,060	86,705	206,355	2.55	0.75	1.79	2.63	0.78	1.85
2004	12,277.0	11,853.3	304,547	92,360	212,187	2.48	0.75	1.73	2.57	0.78	1.79
2005	13,095.4	12,623.0	327,185	97,041	230,144	2.50	0.74	1.76	2.59	0.77	1.82
2006	13,857.9	13,377.2	352,567	101,558	251,010	2.54	0.73	1.81	2.64	0.76	1.88
2007	14,480.3	14,028.7	379,681	106,858	272,823	2.62	0.74	1.88	2.71	0.76	1.94
2008	14,720.3	14,291.5	406,610	119,423	287,188	2.76	0.81	1.95	2.85	0.84	2.01
2009	14,417.9	13,973.7	404,731	127,467	277,263	2.81	0.88	1.92	2.90	0.91	1.98
2010	14,958.3	14,498.9	407,703	127,813	279,890	2.73	0.85	1.87	2.81	0.88	1.93
2011	15,533.8	15,075.7	428,163	129,068	299,095	2.76	0.83	1.93	2.84	0.86	1.98
2012	16,244.6	15,684.8	452,556	135,018	317,538	2.79	0.83	1.95	2.89	0.86	2.02

GDP = gross domestic product.

NOTES: Data are in current dollars. Revised GDP methodology refers to statistics generated after the 2013 Comprehensive Revision of the National Income and Product Accounts. U.S. R&D expenditures from the National Science Foundation for 2012 are preliminary.

SOURCES: Bureau of Economic Analysis, National Economic Accounts, Gross Domestic Product, <http://www.bea.gov/national/>, accessed 26 June 2013 (previous methodology) and 6 December 2013 (revised methodology). National Science Foundation, National Center for Science and Engineering Statistics, National Patterns of R&D Resources (annual series).

[Table 2 Source Data: Excel file](#)

## International Aspects

The interagency collaboration described earlier contributed to U.S. input on the revision of the 2008 SNA that recognized R&D as investment. BEA and NCSES also participated in the OECD Task Force on R&D and Other Intellectual Property Products (IPPs), a multiyear working group that developed practical guidance on the measurement of R&D and other IPPs. This work led to a new statistical manual documenting internationally comparable methodology for the incorporation of R&D and other



intangibles in the national accounts (OECD 2010).

Other countries have also developed R&D satellite accounts before proceeding to incorporate R&D in their GDP and related statistics. As of early 2014, Australia, Canada, Israel, and the United Kingdom have completed capitalizing R&D in their core national economic accounts.

## Data Sources and Availability

This InfoBrief presented updated R&D-to-GDP ratios. Future updates will be available at <http://www.nsf.gov/statistics/natlpatterns/>. NSF statistics from R&D surveys are available at <http://www.nsf.gov/statistics/data.cfm>. Survey forms and methodology information are available at <http://www.nsf.gov/statistics/surveys.cfm>.

For a full list of changes (including but not limited to R&D) that arose from the 2013 comprehensive revision of the NIPAs, see tables A and B and related text in Kornfeld 2013. For release materials related to the 2013 Comprehensive Revision of the NIPAs, see <http://www.bea.gov/national/an1.htm#2013comprehensive>. Details on the 2013 comprehensive revision of the industry economic accounts are available in Strassner and Wasshausen 2013; Kim, Strassner, and Wasshausen 2014. For the 2014 comprehensive revision of gross domestic product by state, see Broda and Tate 2014.

## References

Borosh M. 2013. *U.S. R&D Resumes Growth in 2011 and 2012, Ahead of the Pace of the Gross Domestic Product*. InfoBrief NSF 14-307. Arlington, VA: National Science Foundation, National Center for Science and Engineering Statistics. Available at <http://www.nsf.gov/statistics/infbrief/nsf14307/>.

Broda JE, Tate RP. 2014. Comprehensive revision of gross domestic product by state: advance statistics for 2013 and revised statistics for 1997–2012. Bureau of Economic Analysis, *Survey of Current Business* (July): 1–8.

Bureau of Economic Analysis (BEA). 2006. BEA's 2006 research and development satellite account: Preliminary estimates of R&D for 1959–2002 and effect on GDP and other measures. Bureau of Economic Analysis, *Survey of Current Business* (December): 14–44.

Bureau of Economic Analysis (BEA). 2013. Preview of the 2013 comprehensive revision of the national income and product accounts: Changes in definitions and presentations. Bureau of Economic Analysis, *Survey of Current Business* (March): 13–39.

Crawford M, Lee J, Jankowski J, and Moris F. 2014. Measuring R&D in the national economic accounting system. Bureau of Economic Analysis, *Survey of Current Business* (November): 1–15.

Corrado C, Hulten C, and Sichel D. 2005. Measuring capital and technology: an expanded framework. In Corrado C, Haltiwanger J, and Sichel D, (editors), *Measuring Capital in the New Economy*. National Bureau of Economic Research, Studies in Income and Wealth, Volume 65 Chicago, IL: University of Chicago Press.

United Nations, European Commission, International Monetary Fund, Organization for Economic Co-operation and Development, World Bank. 2009. *System of National Accounts 2008*. New York: United Nations.

Jorgenson DW, Landefeld JS, Nordhaus WD, editors. 2006. *A New Architecture for the U.S. National Accounts*. Chicago: University of Chicago Press.

Kim DD, Strassner EH, Wasshausen DB. 2014. Industry economic accounts: results of the comprehensive revision revised statistics for 1997–2012. Bureau of Economic Analysis, *Survey of*

*Current Business* (February): 1–18.

Kornfeld R. 2013. Initial results of the 2013 comprehensive revision of the national income and product accounts. Bureau of Economic Analysis, *Survey of Current Business* (August): 6–17.

Lee J, Schmidt AG. 2010. Research and development satellite account update: Estimates for 1959–2007. Bureau of Economic Analysis, *Survey of Current Business* 90(December): 16–55.

National Science Foundation, National Center for Science and Engineering Statistics (NSF/NCSES). 2013a. *National Patterns of R&D Resources: 2011–12 Data Update*, Detailed Statistical Tables, Arlington, VA (NSF 14-304), available at <http://www.nsf.gov/statistics/natlpatterns/>.

Organisation for Economic Co-operation and Development (OECD). 2002. *Frascati Manual 2002: Proposed Standard Practice for Surveys on Research and Experimental Development*. Paris, France: OECD Publishing.

Organisation for Economic Co-operation and Development (OECD). 2010. *Handbook on Deriving Capital Measures of Intellectual Property Products*. Paris, France: OECD Publishing.

Rassier DG. 2014. Treatment of research and development in economic accounts and in business accounts. Bureau of Economic Analysis, *Survey of Current Business* (March): 1–8.

Robbins CA, Moylan CE. 2007. Research and development satellite account update: Estimates for 1959–2004: New estimates for industry, regional, and international accounts. Bureau of Economic Analysis, *Survey of Current Business* (October): 49–92.

Strassner EH, Wasshausen DB. 2013. Preview of the 2013 comprehensive revision of the industry economic accounts. Bureau of Economic Analysis, *Survey of Current Business* (June): 19–33.

## Notes

[1] Francisco Moris, John Jankowski, and Mark Boroush are with the Research and Development Statistics Program, National Center for Science and Engineering Statistics, National Science Foundation, 4201 Wilson Boulevard, Suite 965, Arlington, VA 22230. Marissa Crawford is with National Economic Accounts and Jennifer Lee is with Industry Economic Accounts, both at the Bureau of Economic Analysis. For more information, contact Francisco Moris ([fmoris@nsf.gov](mailto:fmoris@nsf.gov), 703-292-4678).

[2] This InfoBrief focuses on long-term changes in U.S. GDP statistics related to R&D that were introduced by BEA's 2013 comprehensive revision of the NIPAs. This InfoBrief also examines the effect on NSF's R&D-to-GDP ratio. For current national, regional, and industry GDP statistics, see <http://www.bea.gov/index.htm>.

[3] Similar to the treatment of purchased R&D, R&D grants made by the business and federal sectors are also treated as investment by the sector making the grant because the grantor is assumed to receive the primary economic benefit (BEA 2013 and communication with BEA staff).

[4] Working papers and publications on R&D satellite accounts are available at <http://www.bea.gov/national/rd.htm>.

[5] Upon the release of the 2013 NIPAs, BEA is no longer producing R&D satellite accounts.

[6] As another example, NSF and BEA both include depreciation of physical capital and intangibles (such as software) used for R&D purposes in their underlying R&D cost measures for the business sector. NSF directly collects depreciation as a separate item under current costs in the Business R&D and Innovation Survey (BRDIS), which in turn is included in total R&D expenditures. BRDIS-reported depreciation is based on industry-wide tax and regulatory accounting rules. However, BEA bases its estimates of depreciation of physical and intangible fixed investment used in business R&D on a

separate BRDIS question that asks about the amount of physical and intangible capital expenditures used in R&D operations.

**[7]** R&D depreciation rates are critical to calculating rates of return to R&D investments, which in turn are important for estimating the service costs of R&D assets used in production (Lee and Schmidt 2010). See BEA working paper on R&D depreciation rates and services lives at <http://www.bea.gov/national/pdf/WendyLiDepreciationBusinessR&DCapital20130314BEAwebversion.pdf>

**[8]** A description of the regional and state impacts can be found in BEA's publications (Lee and Schmidt 2010; Broda and Tate 2014).

**[9]** As an example of the magnitude of software R&D expenditures, for the business sector, software R&D reached \$60.3 billion, or 20.5% of \$294.1 billion in total business R&D, based on 2011 BRDIS statistics.

**[10]** In particular, the current R&D costs collected by NSF do not include charges for profits on purchased R&D; the R&D purchases component of BEA estimates of R&D investment totals include profits as noted earlier.

---

Francisco Moris ([fmoris@nsf.gov](mailto:fmoris@nsf.gov))  
Project Officer  
Research and Development Statistics Program  
National Center for Science and Engineering Statistics

---

Can't find what you're looking for? [Search NCSES](#) or [Browse the Publication Index](#)

Last Updated: March 30, 2015