Contribution (1987-2010) and Stocks (1953-2010) of Research and Development (R&D)

Table 1 shows the year-to year contribution to private nonfarm business sector and Table 2 shows the long-term contribution of Research and Development (R&D) to multifactor productivity (MFP) growth. Table 3 shows R&D stocks. The stock of R&D in the private nonfarm business sector is derived by cumulating constant dollar measures of research and development expenditures and by allowing for depreciation. Current dollar expenditures for privately financed research and development for the years 1953-2010 are obtained from annual issues of Research and Development in Industry published by the National Science Foundation. The BLS develops price deflators and estimates of the rate of depreciation.

The Bureau of Labor Statistics (BLS) estimates of R&D spillover stocks are designed to measure the benefits of R&D that spill over from the original investors to other firms.[1] The Bureau of Economic Analysis (BEA) of the Department of Commerce has also prepared estimates of ownership stocks of U.S. R&D, as published in the December 2010 issue of the Survey of Current Business. In contrast to the BLS concept, the BEA measures the value of R&D stocks as an asset to its owners, the private firms, government, or colleges and universities which finance and conduct research; spillover effects are not included. In terms of coverage, BEA includes R&D financed by private firms, government, colleges and universities, and non-profit institutions, whereas the BLS considers only R&D financed by private firms.

Because of these differences in concept and coverage, the BEA and BLS R&D stocks utilize different lags[2] and rates of depreciation, and report different magnitudes for the U.S. national R&D stock. For example, the BEA reported that in 2007 the R&D stock was $1828 billion, of which R&D financed by private firms was $1183 billion.[3] In contrast, in 2007 the BLS R&D stock, limited to the R&D of private firms, was $1774 billion. BLS stocks are larger because spillovers, associated with the diffusion of knowledge, typically take more time to occur, and therefore depreciate more slowly. Section I of the BLS Working Paper 408, at http://www.bls.gov/ore/pdf/ec070070.pdf, contains a further discussion of differences between the BLS and BEA concepts.

Users of R&D data should view the BEA and BLS measures as complementary, since asset and spillover effects both have to be taken into account to describe the total effect of R&D on the economy. The BEA stocks provide information on how much value R&D stocks bring to their owners who hold R&D as an asset. The BLS data show how much R&D spills over to create value for other firms in the economy. Since R&D brings both direct benefits to holders of R&D and indirect benefits to other firms who eventually utilize this same knowledge, both elements have to be included to understand the total impact of R&D.

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[1] U.S. Department of Labor, Bureau of Labor Statistics, Bulletin 2331, The Impact of Research and Development on Productivity Growth, available on request, reports the methodology underlying Bureau of Labor Statistics R&D stocks.

[2] Lags refer to the period of time between an investment in R&D and its ability to contribute to production. R&D stocks often incorporate a lag before R&D is assumed to affect production.

[3] Survey of Current Business, December 2010, Table 2.4, page 36. All stocks mentioned here are in 2005 dollars.

Further description of these data and methods can be found in the BLS Bulletin 2331, *The Impact of Research and Development on Productivity Growth* (September 1989). Copies can be obtained by sending an email or calling:

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Table 1. Contribution of Research and Development to Multifactor Productivity: 1987-2010
(percent per year)

Year	R&D contribution
1987	0.24
1988	0.22
1989	0.19
1990	0.20
1991	0.23
1992	0.25
1993	0.25
1994	0.23
1995	0.19
1996	0.19
1997	0.23
1998	0.25
1999	0.26
2000	0.27
2001	0.30
2002	0.34
2003	0.28
2004	0.21
2005	0.19
2006	0.17
2007	0.18
2008	0.20
2009	0.22
2010	0.22

Data are based on the results discussed in Multifactor Productivity Trends, March 21, 2012, www.bls.gov/news.release/pdf/prod3.pdf.

Table 2. Long-term Contribution of Research and Development to Multifactor Productivity: 1987-2010 (percent)

Period	R&D Contribution
1987-2010	0.23
1987-1990	0.21
1990-1995	0.23
1995-2000	0.24
2000-2007	0.24
2007-2010	0.21
2009-2010	0.22

Data are based on the results discussed in Multifactor Productivity Trends, March 21, 2012, www.bls.gov/news.release/pdf/prod3.pdf.

Table 3. Research and Development Stocks: 1953-2010
(in billions of 2005 dollars)
((1) plus (2) equals (3))

Year	Basic Research	Applied Research	Total R&D Stocks
	(1)	(2)	(3)
1953	7.2	52.4	59.6
1955	8.3	64.0	72.4
1960	12.8	105.0	117.8
1965	20.8	162.3	183.0
1970	31.9	238.0	269.8
1973	39.3	285.7	325.0
1975	43.9	316.1	360.0
1979	52.7	372.3	425.0
1980	54.8	388.6	443.4
1985	67.0	505.2	572.2
1987	73.4	576.6	650.0
1988	77.2	610.7	687.9
1989	81.6	641.5	723.0
1990	86.4	674.6	761.0
1991	93.1	711.5	804.6
1992	99.8	752.6	852.4
1993	106.4	794.8	901.2
1994	113.3	835.2	948.5
1995	120.1	869.3	989.3
1996	129.9	901.1	1031.1
1997	139.2	943.9	1083.1
1998	148.6	994.3	1142.9
1999	158.1	1050.6	1208.7
2000	166.6	1115.8	1282.4
2001	177.1	1189.4	1366.5
2002	190.0	1272.1	1462.1
2003	198.0	1343.3	1541.2
2004	206.8	1396.7	1603.5
2005	216.0	1445.0	1661.0
2006	226.5	1489.4	1715.9
2007	236.0	1538.4	1774.3
2008	245.5	1595.6	1841.0
2009	254.6	1657.8	1912.4
2010	264.4	1716.2	1980.6

Multifactor Productivity
Bureau of Labor Statistics
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