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Government Expenditures on Defense Research and Development by the United States and Other OECD Countries: Fact Sheet

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Background

Research and development (R&D) has played a central role in the national security of the United States and its allies. R&D creates the foundation for new and improved technologies that underpin a wide range of applications. These applications include advanced weapons and systems that provide intelligence, medical treatments, and troop support.

For more than 70 years, U.S. defense-related R&D has delivered breakthroughs in computing, communications, networks, satellites, fighter and bomber aircraft, aircraft carriers, submarines, tanks, tactical and strategic missiles, nuclear weapons, drones, advanced materials, autonomy, and many other weapons and technologies. Military and policy analysts broadly agree that investments in R&D can provide substantial technological advantages against potential adversaries.

This fact sheet provides data on government defense R&D funding of the United States and other countries of the Organisation for Economic Co-operation and Development (OECD).[1]

Government Defense R&D Funding of OECD Members

In 2016, the United States spent $78.1 billion on defense R&D, more than seven times as much on defense R&D than the rest of the OECD countries combined. **Table 1** shows government-funded defense R&D for OECD countries in 2016. The United States spent 25 times the amount spent by the next-highest funder, South Korea; 33 times the amount spent by the United Kingdom; 70 times the amount spent by France; 73 times the amount spent by Japan; and 80 times the amount spent by Germany.

OECD defense R&D is highly concentrated among a handful of countries. Since at least 2009, the United States has accounted for more than 85% of total OECD government defense R&D funding. In 2016, the U.S. share was 87.8% (see **Figure 1**); the top seven countries account for 98.5%.

Table 1. Top Ten OECD Countries by Government Defense R&D Funding, 2016

(in millions of purchasing power parity dollars)

Country	R&D
United States	$78,094.0
South Korea	3,067.7
United Kingdom	2,325.3
France	1,117.5
Japan	1,063.4
Germany	973.9
Turkey	916.9
Australia	311.8
Canada	204.5[a]
Poland	177.4
Other OECD Countries	630.8
Total, OECD	**$88,883.1**

[1] The OECD is an organization of 36 countries formed after World War II to promote economic cooperation and reconstruction. Among its activities, the OECD collects, analyzes, and publishes data on each of its member countries.

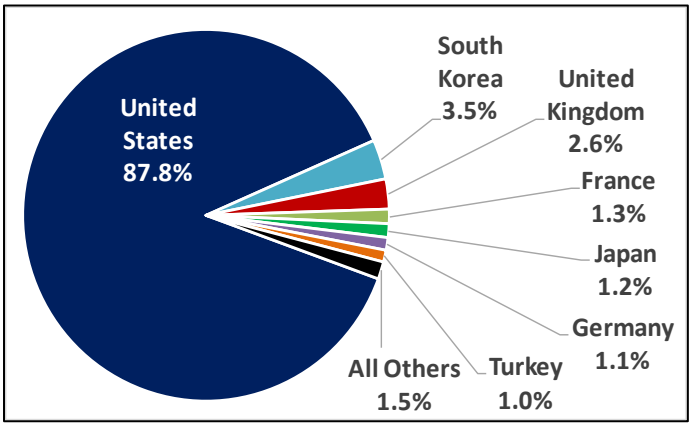
Source: Organisation for Economic Co-operation and Development (OECD), Research and Development Statistics (RDS) Database, https://stats.oecd.org/Index.aspx?DataSetCode=GBARD_NABS2007.

Notes: Purchasing power parity is a method of adjusting foreign currencies to a single common currency (in this case U.S. dollars) to allow for direct comparison between countries. It is intended to reflect the spending power of each local currency, rather than international exchange rates. The latest government defense R&D data for Canada, Chile, and Switzerland available from the OECD are for 2015. OECD government defense R&D data not available for Israel, Lithuania, and Portugal.

a. 2015 data are the most recent available for Canada, Chile, and Switzerland.

Figure 1. Share of Total OECD Government Defense R&D Funding, by Country, 2016

(in purchasing power parity terms)



Source: OECD, RDS Database.

Notes: Purchasing power parity is a method of adjusting foreign currencies to a single common currency (in this case U.S. dollars) to allow for direct comparison between countries. It is intended to reflect the spending power of each local currency, rather than international exchange rates. Includes 2015 data for Canada, Chile, and Switzerland, as 2016 data were not available. OECD government defense R&D data not available for Israel, Lithuania, and Portugal.

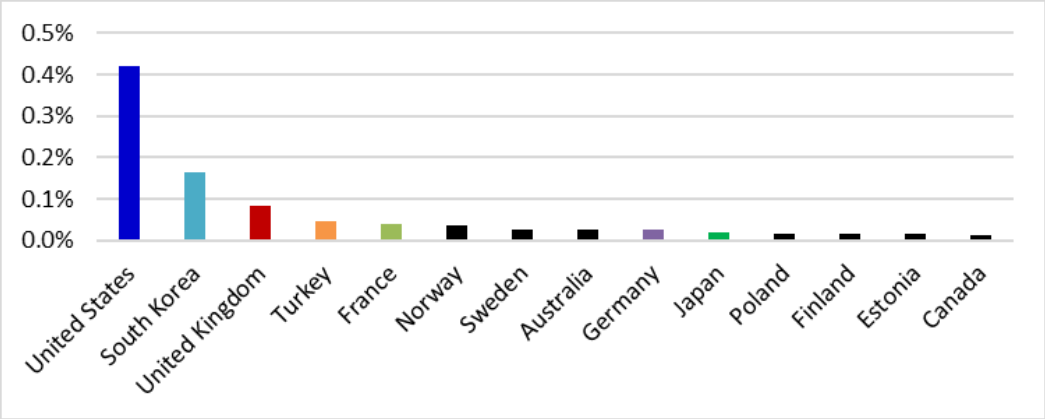
Government Defense R&D Funding as a Share of GDP

In general, countries with larger economies are able to make larger investments in R&D and defense.[2] In 2016, the United States had the largest GDP among OECD countries at $18.6 trillion, followed by Japan ($5.4 trillion), Germany ($4.0 trillion), the United Kingdom ($2.8 trillion), and France ($2.8 trillion).

One approach used to facilitate comparison of government defense R&D spending among countries with different size economies is to divide each government's defense R&D spending by that country's gross domestic product (GDP). **Figure 2** illustrates this metric, government defense R&D funding as a percentage of GDP, for the OECD countries ranked highest by this metric in 2016. The United States spent 0.419% of its GDP on defense R&D in 2016. The United States led in this metric, spending more than 2.5 times the share spent by South Korea (0.164%), the OECD country ranked second in this metric. Compared to the other largest OECD economies, the United States spent a much greater share of GDP on defense R&D: more than 21 times the share spent by Japan, more than 17 times the share spent by Germany (0.024%), more than 5 times the share spent by the United Kingdom (0.083%), and more than 10 times the share spent by France (0.040%).

[2] For additional information on overall national spending on research and development, see CRS Report R44283, *Global Research and Development Expenditures: Fact Sheet*, by (name redacted)

Figure 2. OECD Countries with the Highest Levels of Government Defense R&D Funding as a Share of GDP, 2016



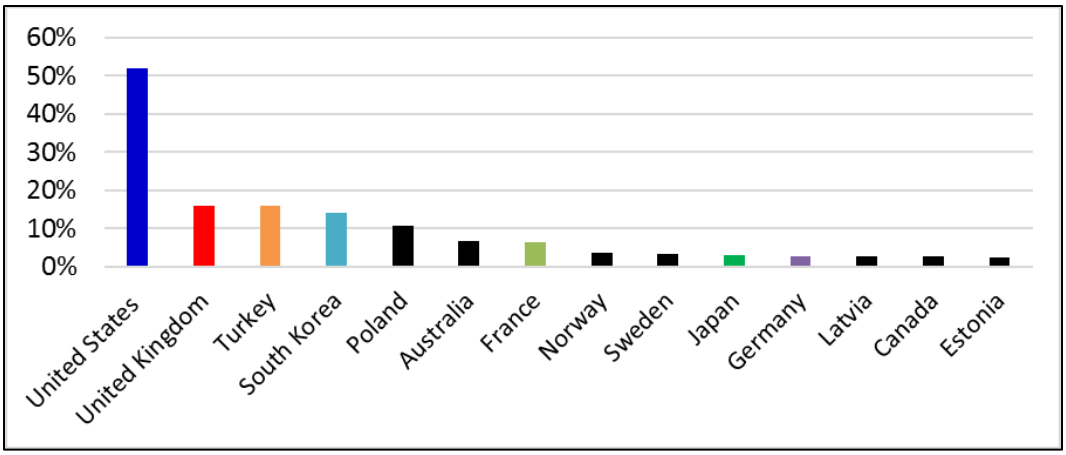
Source: CRS analysis of OECD RDS Database data.

Notes: Does not include countries with less than 0.01% government defense R&D as a share of GDP. OECD data not available for Israel, Lithuania, and Portugal. Colors assigned to countries are the same as assigned in **Figure 1**.

Share of Government R&D Funding Spent on Defense R&D

Government defense R&D spending as a share of total government R&D spending is a metric that provides an indication of the relative importance of defense R&D within each nation's R&D portfolio. **Figure 3** illustrates this metric for each OECD country. In FY2016, the United States devoted 51.9% of government R&D expenditures to defense. The United Kingdom and Turkey tied for second in this metric among OECD countries at 15.9%. Among other large OECD economies, France ranked 7th (6.4%); Japan ranked 10th (3.1%); and Germany ranked 11th (2.8%).

Figure 3. OECD Countries with the Highest Levels of Government Defense R&D Funding as a Percentage of Total Government R&D Funding, 2016



Source: CRS analysis of OECD RDS Database data.

Notes: Does not include countries that spent less than 2.0% of total government R&D spent on defense R&D. OECD data not available for Israel, Lithuania, and Portugal. Colors assigned to countries are the same as assigned in **Figure 1**.

Statistical Notes

The data, table, and figures in this fact sheet are based on CRS analysis of 2016 OECD data on government budget allocations for R&D (GBARD), government budget allocations for defense-related R&D, and gross domestic product (GDP), on a purchasing power parity basis.[3]

Some caveats:

- The 2016 OECD data are the most recent nearly complete set of government defense R&D funding figures for OECD countries. Data for Canada, Chile, and Switzerland are based on each country's 2015 GBARD, government budget allocations for defense-related R&D, and GDP levels.
- In July 2016, the U.S. Office of Management and Budget adopted a refinement to the categories of R&D used by the federal government in data collection, replacing "development" with "experimental development." This new definition more narrowly defines the set of activities to be included in R&D reporting. This change resulted in lower reported R&D funding for some agencies, including the Department of Defense. Data reported to OECD for 2016 reflected funding based on the previous definition; according to the National Science Foundation, U.S. reporting of government defense R&D funding to the OECD is expected to be based on the new definition beginning with 2018 GBARD data. According to the Office of Management and Budget, for FY2017, $26.95 billion in non-experimental development funding at the Department of Defense, which would have been reported as R&D under the previous definition, will not be reported under the new definition. This would reduce reported U.S. defense R&D funding by about one-third.[4]

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[3] Organisation for Economic Co-operation and Development (OECD), Research and Development Statistics (RDS) Database, https://stats.oecd.org/Index.aspx?DataSetCode=GBARD_NABS2007.

[4] Email communication from the Office of Management and Budget to CRS, February 4, 2018.