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No Windfall for U.S. Science

WITH SEQUESTRATION, 2013 WAS NOT A BANNER YEAR FOR U.S. SCIENCE. THE FEDERAL RESEARCH and development (R&D) budget, at an estimated \$132.8B (billion), was 6.9% below 2012 levels and the lowest it had been since 2002, adjusted for inflation. With October came the government-wide shutdown, when the political parties failed to reach agreement on the 2014 appropriation. After 2 weeks of critical experiments being abandoned, time series suffering gaps, research grants not being funded, and overall loss in the credibility of the U.S. government as a reliable science partner, a temporary budget deal was struck in the form of a continuing resolution that reopened government, but only until January 15 of 2014.

The modicum of good news for 2014 is that a budget deal has been reached by a bipartisan group chaired by Congressman Paul Ryan (R-Wisconsin) and Senator Patty Murray (D-Washington State) that splits the difference exactly down the middle between the House budget mark of \$967B and Senate mark of \$1,058B. Overall, this agreement restores \$63B to the total federal budget over what would have been expected under the sequestration budget limits. Furthermore, the parties agreed to distribute the \$63B equally between non-defense and defense spending across 2014 and 2015. One might ask why it has taken so many months to craft what appears to be the obvious compromise. But given the recent congressional gridlock that led to sequestration and the shutdown, the fact that there is bipartisan agreement on anything seems nothing short of a miracle. While details still need to be worked out as to how the \$63B will be apportioned to various agencies, it is possible to make some fairly good guesses as to how much will go to R&D using past appropriations history. Absent this deal, requirements under sequestration (primarily on the defense side of the R&D budget) would have likely reduced the 2014 R&D budget to about \$130.1B. With the budget deal, R&D will likely increase to about \$136B instead, a positive boost of 4.5%.

The 2014 budget will continue what has been a decades-long slide in the ratio of the federal R&D budget to the GDP (gross domestic product). This ratio is often used as a measure of how much a nation values basic research; it has fallen 25% in the last decade alone.

In the meantime, elsewhere internationally, investment in science is rising as nations throughout the world connect investment in R&D to the development of their human capital and to their future prosperity. For example, the European Union's flagship research program, Horizon 2020, is set to receive a nearly 30% boost in 2014. The Chinese government's investment in R&D has been increasing by percentages in the double digits for the last several years and is poised to become the world leader.

One can already see the cascading consequences as federal R&D budgets shrink. The best and the brightest students trained at world-class U.S. universities grow disillusioned and seek other careers or better opportunities overseas for pursuing their research. Research programs are narrowing their scope as budgets decline to maintain reasonable funding success levels, and gaps appear between programs such that some areas of fundamental investigation fall between the cracks. Ultimately, the flow of discoveries from basic research, primarily supported by the federal government, will slow down, as will the pace of innovation.

This erosion of the U.S. scientific enterprise is not in the best interest of the global scientific enterprise, and certainly not in the best interests of the United States. Professional societies can only do so much in terms of advocacy. Congress needs to hear from every U.S. scientist, engineer, technologist, and anyone whose job depends on the innovation pipeline. It is far easier to keep U.S. science world class than to rebuild it.

– Marcia McNutt

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