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## Who should fund science?

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According to the latest annual survey conducted by the National Science Foundation (NSF), the federal government funded less than half of all basic research in the country for the first time since World War II.

As for whether this is a good thing, it depends on who you ask. Francis Bacon some 400 years ago claimed that science is a public good and must be funded by governments for discovery to proceed. Today, scientific research as a public good is a societal value few question.

Perhaps we should start questioning. As my Cato colleague Terence Kealey notes, objective indicators show that scientific progress is actually slowed by public funding, as it crowds out support from philanthropic sources and industry.

Basic research is often called "knowledge for knowledge's sake," with no immediate practical application in mind. Prior to the war most funding for basic research in the United States came from foundations, philanthropists, university endowments, and industry.

Other countries, like France and Germany, had publicly funded science for over a hundred years, yet in the United States science was not federalized until World War II, via the Manhattan Project. Even before its explosive success, Franklin Roosevelt wrote to its director, Vannevar Bush, asking him to design a national science enterprise to replace the bomb project after the war. In a few months, Bush produced a booklet called "Science: The Endless Frontier." By the 1970s, over 70 percent of basic research was federally funded.

It appears we are now gradually moving back toward the way basic science was funded prior to its nationalization. Kealey's research predicts that this will be associated with greater economic growth.

With government's withdrawal, we will have an opportunity to test Kealey's hypothesis.

As the federal share declines, corporate support for science is dramatically increasing. According to the NSF, in 2005, the federal outlay was some \$37 billion, while the corporate contribution was a bit under \$10 billion. Ten years later, taxpayers contributed about \$38 billion, a 2.7 percent increase, while corporations chipped in around \$24 billion, an increase of a whopping 240 percent. The share and the amount contributed by philanthropy and university endowments also rose in the last decade, much more than the government's portion and much less than the corporate sector.

These cuts comes at the expense of universities as, in Bush's plan, scientists were not to be paid directly by government. Instead, universities would apply for government funding, with research proposals written by their faculty. For this administration, schools may charge overhead, a 50 percent vigorish the feds allow to be tacked on to research proposals. Research universities became dependent upon this large stream of funds.

Universities support this because money is fungible - within some broad limits. The government wasn't happy that some of its overhead paid for paneling on Stanford University's yacht. But it hasn't the same moral qualms when that money buys, say, computers for the Germanic Language department. In fact, it's a general rule that the massive overhead generated by the science and engineering departments of a Tier-1 research university (think Stanford, Berkeley, Wisconsin) is what helps the many other departments that simply cannot support themselves with tuition revenue. By comparison, almost all corporate funding for basic research is spent in-house rather than being farmed out, which means that overhead revenues should decline.

This is probably good news for science. As it stands now, many students of science, such as University of Virginia's Brian Nosek, note that the current incentive structure, wherein university faculty are under intense pressure to publish research that maintains the flow of federal dollars, is causing demonstrable harm to science.

This structure has also led to a skewing of the canon of scientific knowledge away from objective truth. If one's research does not support a funded hypothesis, it puts the funding in jeopardy, and it is therefore dangerous to publish such "negative" results. This has led to a massive increase in the percent of positive results. Often these hypotheses are being supported by public funding. In an extremely influential 2012 paper, Stanford's Daniele Fanelli showed that an increase of nearly 20 percent in such findings from 1990 to 2007.

While some are not liking the gradual withdrawal of the government from funding basic science, the rest of us should be singing praise. This may be the best way to right the ship of science, currently wallowing in an ocean of shoddy research, where the incentives for professional advancement are impeding the search for truth, and slowing prosperity for all.

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