



Policy Brief

Stanford Institute for Economic Policy Research

The Problem with Picking Winners: Evaluating Government Support for Commercial R & D

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Most people understand the economic importance of research and development (R&D). Scientists and engineers make new discoveries and find innovative, unanticipated ways to apply research results leading to economic growth and increases in the standard of living.

Despite R&D's benefits to society, companies are less likely to fund research that does not show commercial promise and may not increase their profits. For example, basic research is tremendously important, but firms underfund it since they cannot appropriate all of its returns. To counter this market failure, government can finance research that is expected to be socially beneficial but not privately profitable.

The federal government historically has supported not only fundamental research, but also more applied R&D that has direct governmental applications, such as weapons systems or computer networks. Much of this R&D generated "spillovers" that proved enormously successful in the commercial market and contributed to economic growth. Recently, the government has also started funding research programs intended to yield commercial products.

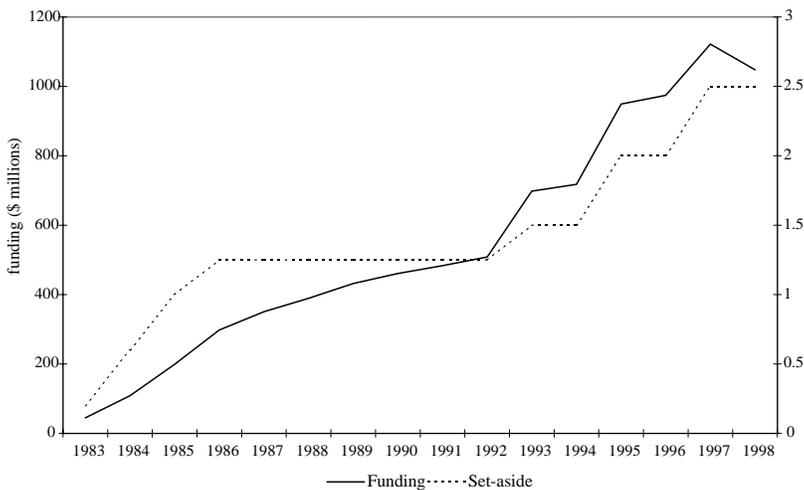
The theoretical justification is sound, but does this federal funding in fact manage to support R&D that would not have been financed privately? An empirical study I conducted of the \$1 billion-a-year Small Business Innovation Research (SBIR) program suggests not; indeed, it indicates that these federal funds have little effect on the amount of R&D the recipient firms conduct. If my analysis is correct, then government needs to significantly alter how SBIR and, perhaps, other commercial R&D-supporting programs operate so the programs truly will work to expand research and development.

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A Closer Look at SBIR

The Small Business Innovation Research program compels all federal agencies with \$100 million or more in R&D grants and contracts to set aside a percentage of that money for SBIR applicants. When the program was first enacted in 1982, that set-aside was just two-tenths of a percent of the agencies' total R&D budgets. But Figure 1 shows that percentage has increased repeatedly over the past eighteen years and now stands at 2.5 percent, equaling more than \$1 billion in annual funding.

Figure 1
SBIR Funding and Set-Aside



SBIR, by statute, seeks to "stimulate technological innovation." An effective government program aimed at stimulating innovation should encourage companies to continue undertaking R&D they would usually pursue out of commercial interest and entice the companies to take on additional projects with a lower probability of commercial promise but that may lead to great gains for society. Such a government program would thus produce a net gain in the amount of R&D undertaken.

Looking at data from 513 firms that applied for SBIR awards between 1990 and 1992, I found that SBIR awards did not significantly increase companies' employment. I also found that the SBIR awards appeared to crowd out private money that the companies previously spent on R&D, such that each dollar the companies received in government subsidies led to a \$1 decrease in the companies' own investment. This analysis strongly suggests that SBIR is not expanding the amount of research

being done; it simply transfers the cost of commercial R&D to the government.

The General Accounting Office (GAO) surveys of companies that receive SBIR money show that many SBIR-supported projects achieve project goals and that the resulting research frequently succeeds in the commercial market. Program supporters interpret these findings as evidence that SBIR stimulates discovery and innovation. However, the fact that a funded project was successful says nothing about whether the project

needed a subsidy. Indeed, an especially high commercial success rate suggests that SBIR is funding R&D that would have been undertaken without government support.

When the commercial success rate slipped, which could have indicated that the agency was funding higher-risk projects, the GAO responded with unfavorable reviews. A 1992 study, for example, found that the Department of Defense (DoD) had a lower SBIR commercialization rate than other agencies. While noting that DoD tried harder than other agencies to use SBIR to achieve mission objectives, GAO concluded that the relatively low market success rate of funded projects "raises the

question of whether DoD should be placing greater emphasis on private-sector commercialization."

Funding the Right Proposals

If government intends to support R&D that would not attract private funding, then government program managers should reject scientifically sound proposals that are likely to yield commercial successes. Instead, government should support proposals that promise great public benefit but would probably not receive private funding.

In a recent article, economist Adam Jaffe suggests that one way to evaluate these programs would be to randomize part of the awards process. Under such a plan, some government-approved proposals would not be funded while some government-rejected proposals would be funded. By not giving government funding

to a group of approved proposals, analysts can determine whether these proposals ultimately attract funding from private sources. Conversely, by funding a group of rejected proposals, analysts can determine whether the proposals truly offered little return when brought to fruition. Such comparisons would answer one of the most important questions of R&D funding: Do programs like SBIR finance projects on the margin, or merely provide funding for projects that companies would have undertaken without federal support?

This evaluation technique may sound radical, but randomization is accepted as essential for analysis in other scientific areas. No drug, for example, can be approved without controlled random testing. A drug's effectiveness cannot be determined by only testing whether drug recipients got better; changes in patients' health must be compared to the health of patients who were similarly sick and did not receive the treatment. Likewise, a subsidy's effectiveness cannot truly be determined by only measuring the returns to government-funded projects. If we are willing to risk human lives for the benefit of future patients, we should be willing to risk a few companies' subsidies for the benefit of future economic growth.

Less radical tests could also be implemented. One such change could require federal agencies to publicly disclose the proposals that did not receive funding. Many programs require proposals to go through rounds of reviews, ultimately leading to "near-winners" and "winners." Evaluators could then compare the outcomes of subsidized and unsubsidized projects that received similar scores in the review process. In particular, SBIR proponents note that the program does not have enough funds to support all of the proposals worthy of funding. If true, this surplus of good projects provides a good vehicle for evaluation: Track the worthy projects that are not funded in addition to those that are. If the unfunded projects are less successful, we might conclude that the program is providing necessary funding. If the unfunded projects are equally successful, we might conclude that the subsidy was unnecessary.

Sadly, politics will probably stand in the way of any legitimate effort to evaluate programs like SBIR. Program proponents do not want rigorous evaluation that could undermine the program's

popularity. Likewise, detractors who disapprove of government funding for R&D may worry that such evaluations would demonstrate that some of these programs are effective. The only way we will ever learn if we are funding the right proposals is by properly evaluating technology programs to discover what works and what does not. Avoiding true evaluation may be politically expedient and please program beneficiaries, but it probably prevents these programs from ever having a real economic impact.

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About the author



Scott Wallsten is a visiting researcher for the Center for Research on Employment and Economic Growth at SIEPR and an acting assistant professor of Public Policy.

Currently on leave from the World Bank, he has studied reforms of public enterprises with a focus on telecommunications. Wallsten also studies government-industry interactions, the economics of research and development, and agglomerations of high-technology firms. He is teaching the Stanford senior seminar in Public Policy.

Prior to receiving his Ph.D from Stanford in 1998, Wallsten worked for the President's Council of Economic Advisers in 1995-1996, focusing his talents on U.S. Science and Technology Policy and regulatory reform.

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