

Intelligence MEMOS



From: Sabrina T. Howell

To: Canadian Innovation Policymakers

Date: January 16, 2023

Re: **EVIDENCE ON SME FINANCING FROM THE CUTTING EDGE OF ECONOMIC RESEARCH**

Governments around the world have numerous programs to provide funding for small and medium-sized enterprises. There are some important lessons they can draw from recent US economic research.

The US Small Business Innovation Research (SBIR) program, which was established in 1982, is Washington's main vehicle to directly support innovation at small firms and encourages them to enter the federal contracting pipeline. It is available at 11 federal agencies and always has two stages. Firms first apply to a subsector- or topic-specific Phase 1 competition for awards, usually about \$150,000. Phase 1 winners may then apply nine months later for \$1 million Phase 2 awards. The SBIR program has been imitated around the world, so policymakers in Canada that oversee similar program designs should be interested in the results.

In my large-sample review of Phase 1 awards at the Department of Energy, I [found](#) strong effects: they dramatically increased citation-weighted patenting, the chance of raising venture capital (VC) investment, revenue, and survival. On average, the early-stage grants did not crowd out private capital and instead enabled new technologies to go forward.

The picture was not so rosy for Phase 2. This larger grant had no measurable effect, except for a small positive effect on citation-weighted patents. Almost 40 percent of Phase 1 winners did not apply to Phase 2, and these were disproportionately VC recipients.

Phase 2 eligibility criteria, which include requirements that the firm not change its business strategy and not be more than 50-percent investor owned, apparently generated this adverse selection. This finding underscores the general theme that who decides to apply – i.e., selection – is a powerful force determining the effectiveness of a program.

Effective programs target financially constrained firms. The strong positive effects of the SBIR programs stem from awards to small, young firms that are new to SBIR and to government contracting. The small firms that benefit from SBIR awards use the funds in part to pay employees, especially those with long tenure at the firm, J. David Brown and I [found](#). These financially constrained firms appear to finance themselves in part by engaging in back-loaded wage contracts with their workers. By alleviating constraints, an effective program paves the way for future investment and growth.

Another key decision in government procurements is between centralized approaches – the procurer tightly specifies the desired innovation – or decentralized, where applicants are given leeway to suggest solutions. John Van Reenen, Jason Rathje, Jun Wong and I [found](#) that the open approach seems to work in part because it provides firms with an avenue to identify technological opportunities of which the government is not yet fully aware, and it enables firms to pursue their private and government commercialization pathways simultaneously.

Openness has benefits in a different setting: university research.

Tania Babina, Alex He, Elisabeth Perlman, Joseph Staudt and I [asked](#) whether declines in federal R&D funding affected the innovation outputs of academic research. We found that a reduction in federal funding nearly halved a researcher's chance of founding a high-tech startup and reduced the number of academic publications. And it also doubled their chance of being an inventor on a patent.

What could explain these seemingly puzzling findings?

Part of the answer is a shift from federal to private funders, we found. While federal awards typically assert no property rights to research outcomes, private firms have incentives to appropriate research outputs for themselves, and employ complex legal contracts with researchers. That means outputs are more often commercialized by the private funder, and more rarely published in journals or taken to a startup by the researcher.

Meanwhile, more than 14 countries and most US states offer angel investor tax credits to foster innovation.

These increase the number of angel investments by approximately 18 percent and the number of individual angel investors by 32 percent, I found in a [study](#) with Matthew Denes, Filippo Mezzanotti, Xinxin Wang, and Ting Xu. Surprisingly, however, we found that angel tax credits do not appear to generate high-tech firm entry or job creation.

One reason appears to be selection: additional investment flows to relatively low-growth firms. The angel investments appear to crowd out investment that would have happened otherwise, as common informal equity stakes – often made by insiders in the firm or family members of the entrepreneur – are labeled as “angel.”

Another reason emerges from the theory of investment in early stage, high-growth firms. These investments have fat-tailed returns. We find that as the chance of an extraordinary outcome – say, a Google seed investment – rises at the expense of a lower chance of a simply good outcome (in other words, the right tail grows fatter), professional investors become less sensitive to the tax credits. This limits the ability of the policy to reach its intended targets – potentially high-growth startups. In the words of one survey respondent explaining why angel tax credits do not affect decision-making: “I’m more focused on the big win than offsetting a loss.”

In summary, policymakers should consider three key takeaways.

First, program design can be more important than the amount of funding.

Second, effectiveness depends on which firms decide to apply for support.

Third, government funding plays an important role in our innovation ecosystem and is not always substitutable with private alternatives.

Sabrina T. Howell is Associate Professor of Finance at New York University Stern School of Business.

To send a comment or leave feedback, email us at blog@cdhowe.org.

The views expressed here are those of the author. The C.D. Howe Institute does not take corporate positions on policy matters.

This Memo is based on [Mechanisms and Impacts of Innovation Policy](#) in the National Bureau of Economic Research Reporter.