

## ENTREPRENEURSHIP AND INNOVATION POLICY AND THE ECONOMY:

### INTRODUCTION TO VOLUME 5

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This fifth volume of the *Entrepreneurship and Innovation Policy and the Economy* series appears at a moment when the status quo of innovation policy faces unusual pressures. Innovation has long been seen as an engine for increasing economic prosperity, health, and national security. As nations increasingly compete to dominate emerging technology areas, including artificial intelligence, innovation policy appears more important than ever. But with U.S. federal debt at near-historic highs, academic institutions under scrutiny, and globalization in retreat, difficult questions have been raised about how scientific and technological advance should be designed and funded. The chapters in this volume bring rigorous new economic research to bear on these challenges, illuminating both the immense potential and the critical tradeoffs inherent in today's innovation policy debates.

This year's conference was held in Washington, DC in April 2025. The seven contributions collected in this volume address major topics in entrepreneurship, science, and innovation policy.

The first group of chapters considers the macroeconomic and budgetary impacts of innovation policy. Andrew Fieldhouse and Karel Mertens quantify the social returns to public R&D, finding that federal investments have yielded extraordinarily high productivity payoffs. They argue that cuts to non-defense R&D in the name of fiscal consolidation risk long-run damage to economic growth. Douglas Elmendorf, Glenn Hubbard, and Zachary Liscow then examine how innovation-friendly growth-oriented policies can interact with deficit reduction. They conclude that while such policies cannot by themselves stabilize federal debt, they can meaningfully ease fiscal pressures, reducing the need for painful tax increases or spending cuts.

The second set of contributions provide deep dives into several instruments of innovation policy. Timothy Simcoe and Nirupama Rao survey evidence on R&D tax credits, a widespread approach for encouraging private sector innovation. The authors document the effectiveness of these credits but also highlight design challenges: for example, how to ensure that credits stimulate additional research rather than subsidize activity that firms would undertake anyway. Kyle Myers, Lauren Lanahan, and Evan Johnson analyze the Small Business Innovation Research (SBIR) program, showing how small firms supported through SBIR pursue distinctive strategies compared to venture-backed startups, and how the program serves to address national technology needs. Pierre Azoulay, Daniel Gross, and Bhaven Sampat turns to research universities, a central engine of scientific advance, and analyze indirect cost recovery, the

system by which universities are reimbursed for overhead. Their analysis introduces key facts into the policy discussion, highlighting both the importance of indirect costs for sustaining the research enterprise and the tensions surrounding possible reforms.

The final group of papers turns to global competition and innovation policy. Fiona Paine, Richard Townsend, and Ting Xu assess restrictions on foreign investment in startups, weighing national security concerns against the costs to innovation ecosystems. They examine the potential benefits of more nuanced approaches. Finally, Aaron Chatterji and Fiona Murray argue that geopolitics is fundamentally reshaping the economics of innovation: where the old model emphasized efficiency and spillovers across borders, nations are now prioritizing sovereignty and control over critical technologies. This paper helps set conceptual foundations, and a research agenda, for innovation policy amidst the shifting geopolitical landscape. Collectively, the chapters in this volume provide a set of conceptual and empirical syntheses for innovation policy, engaging key dimensions and facts that are extremely relevant to contemporary policy issues.

In “The Social Returns to Public R&D,” Fieldhouse and Mertens present the most comprehensive estimates to date of the causal impact of federal R&D spending on productivity growth. Using modern econometric techniques and a novel set of exogenous budget shocks, they show that non-defense public R&D generates gross social returns in the range of between 140 and 210 percent. This implies that every dollar of federal R&D outlays produces economy-wide gains that are many times larger than the costs. The authors further find that these effects come from non-defense R&D areas such as health, energy, and basic science, whereas federally-funded defense R&D shows little measurable impact on aggregate productivity. Their estimates suggest that U.S. productivity growth, the ultimate driver of living standards, is highly sensitive to public science investments.

The authors then apply these results to ongoing policy debates. They quantify the potential returns to the R&D provisions of the CHIPS and Science Act of 2022, showing that, if fully appropriated, the law’s funding could boost productivity growth by between 0.2 and 0.4 percent after seven years, with annual output gains (i.e., the gains in just one year) exceeding the decade-long costs of the program. Conversely, they warn that fiscal consolidations that cut non-defense R&D could be especially harmful. Historical episodes show that R&D budgets have often been a prime target in deficit-reduction efforts, perhaps because the benefits of research are delayed and less directly visible to constituents. The authors argue that such cuts would likely slow productivity growth and thereby worsen long-run fiscal sustainability. Taken together, the evidence points to extraordinary social returns from federal R&D, highlighting both the potential benefits of greater funding and, by the same token, substantial risks from funding cuts.

In “Policies to Reduce Federal Budget Deficits by Increasing Economic Growth,” Elmendorf, Hubbard, and Liscow ask a pressing question: can growth-oriented policies reduce federal deficits in a meaningful way? Their answer is nuanced. They show that growth alone cannot stabilize the debt-to-GDP ratio, given the magnitude of projected deficits. But they also demonstrate that growth-enhancing policies—especially in areas like high-skilled immigration, infrastructure permitting, and public R&D—can reduce the scale of explicit tax hikes or spending cuts otherwise required. In short, innovation policy cannot substitute for fiscal discipline, but it can complement it.

The chapter assesses seven domains of policy: immigration, housing regulation, safety net design, electricity transmission, R&D support, business investment taxation, and infrastructure permitting. In each case, the authors consider both the growth potential and the budgetary cost. For example, while expanding R&D has a direct fiscal cost, the long-run productivity effects can significantly offset it. Conversely, some pro-growth policies may carry large near-term costs that outweigh their fiscal benefits. The authors conclude with a call for more empirical research: despite the centrality of these questions, policymakers have surprisingly little rigorous evidence on the budgetary impact of growth-enhancing reforms. By placing innovation policy squarely in the context of fiscal sustainability, this chapter reframes debates often treated separately, highlighting that innovation policy is not only about standards of living but also a key component of fiscal strategy.

“Tax Incentives for Research and Development: Policy Design and Evidence,” by Simcoe and Rao, provides a thorough review of R&D tax incentives, one of the largest single instruments of innovation policy. They document that in 2024, U.S. businesses spent \$824 billion on R&D—roughly three-quarters of all U.S. R&D, and 16 percent of private fixed investment. Yet theory and evidence alike show that firms underinvest relative to the social optimum because they cannot fully capture knowledge spillovers from the innovations they pursue. Tax incentives are designed to close this gap by lowering the cost of R&D.

The chapter evaluates the effectiveness of these tax credits, highlights design tradeoffs, and discusses potential reforms. Across decades of research, the consensus is that R&D tax credits do increase R&D spending, with an elasticity near one: that is, a 10 percent increase in the credit rate raises R&D spending by about 10 percent. But there is substantial variation depending on policy design, data, and firm characteristics. Larger firms claim the vast majority of credits, yet smaller firms appear more responsive when credits are refundable or targeted. The authors also note challenges: some credits may subsidize research that firms would have conducted anyway, lowering cost effectiveness. Moreover, complex rules create compliance costs and uncertainty. Simcoe and Rao argue that design choices—such as whether credits are incremental, whether they are refundable, and how they interact with broader corporate tax

structures—determine much of their effectiveness. They conclude by analyzing potential reforms to simplify credit design, improve targeting, and ensure that incentives are effective in light of other tax mechanisms.

Myers, Lanahan and Johnson, in “Small Business Innovation Applied to National Needs,” focus on what is arguably the most important U.S. program to use small businesses to meet national innovative challenges, the Small Business Innovation Research (SBIR) program. The authors highlight that SBIR awardees occupy a distinctive niche compared to traditional government agencies or venture-capital-backed firms (though there is some overlap). While each group is well suited to different innovative challenges, the strong suit of the typical SBIR awardee is solving technical problems that are simultaneously modest in scale and technically highly uncertain.

The paper also highlights the potential of adapting some features of other successful government initiatives, as well as some steps that have been seemingly forgotten over time. For instance, they highlight efforts on the part of the Defense Innovation Unit (DIU) to not only fund firms, but also facilitate the commercialization of awardee products within the government. They suggest adopting some of DIU’s key elements could facilitate the successful deployment of SBIR-funded technologies. Similarly, they point to the intensive involvement of venture investors in the review process of the original SBIR program introduced at the National Science Foundation in 1977 as another feature that could well be revived. With efforts to more effectively merge government, venture, and entrepreneurial perspectives, the authors argue, this program can deliver outsized benefits to the nation.

“Indirect Cost Recovery in U.S. Innovation Policy: History, Evidence, and Avenues for Reform” by Azoulay, Gross, and Sampat, turns to an often-overlooked but potentially critical element of innovation policy: indirect cost recovery (ICR). This is the system through which universities and other research institutions are reimbursed for overhead expenses, such as costs for facilities and administration.

Azoulay, Gross, and Sampat trace the history of ICR from its origins in the mid-20th century to today, showing how it has become central to the functioning of the U.S. research enterprise. They emphasize that although negotiated indirect cost rates average 58% percent, the effective reimbursement rate is far lower—averaging 42% percent—because of caps and exclusions. They also show that ICR rates tend to be comparable across universities, regardless of total funding or university rank.

The authors then evaluate potential ICR reforms, such as imposing a flat 15 percent rate as has recently been proposed. The analysis shows that such a shift is likely to impose the largest declines in funding on the most research-intensive universities. These universities have larger

infrastructure costs but also generate more technology transfer and biomedical advances for society. The authors further evaluate alternative reform approaches, such as a flat rate above 15%, eliminating ICR entirely to make all grant costs direct, and shifting from ICR to institutional grants that support research infrastructure. The author weigh how such alternatives align with policymakers' goals, highlighting tensions between the desire for simple, transparent policies and the practical need to sustain the institutional base that makes research possible. In doing so, the authors bring much-needed clarity to a complex but critical policy issue that shapes the productivity and sustainability of the U.S. research system.

In "Should Governments Restrict Foreign Investments in Startups?," Paine, Townsend, and Xu explore the challenging issues associated with cross-border venture capital. On the one hand, venture capital investments across international boundaries have greatly accelerated the commercialization of transformative technologies. On the other hand, nations around the world have become increasingly concerned about the security implications, seeing these investments as leading to flows of critical defense-related and dual use knowledge. In the U.S., these concerns manifested themselves in the 2018 Foreign Investment Risk Review Modernization Act (FIRRMA), which significantly expanded the government's ability to review such deals.

The authors seek to understand these tradeoffs, focusing on the evidence around the U.S. experience. Their message is two-fold. First, it seems that, consistent with the critics' fears, there are real costs associated with the knowledge flows from cross-border venture deals. Second, the consequences of steps to curb such transactions are not trivial: these may affect not just the firms in the problematic venture deals themselves, but also the broader availability of capital and the success of firms. While an easy or simple answer to these trade-offs is elusive, the paper provides a framework for policymakers seeking to think through these issues.

Finally, in "How Geopolitics is Changing the Economics of Innovation," Chatterji and Murray situate innovation policy in the context of shifting global geopolitics. They argue that the traditional model—built around efficiency, specialization, and global diffusion of technology—is giving way to a new paradigm centered on sovereignty, security, and control. This shift is driven above all by the rise of China as both an economic and military competitor, prompting the U.S. and its allies to rethink innovation through the lens of "economic security."

The authors trace how this new paradigm is altering innovation across the value chain. Nations are seeking "full-stack" control—from basic research through scaled production—and abandoning the old assumption that comparative advantage would distribute tasks globally. They illustrate this with case studies of quantum computing, semiconductors, and fusion energy, technologies where control over supply chains and production appears to be becoming as important as discovery itself. They also highlight the institutional changes underway, including new government programs, export controls, and investment restrictions designed to secure

domestic innovation capacity. For innovation policy, the implication is clear: the economics of innovation can no longer treat geopolitics as a minor or secondary issue. Instead, national security concerns now shape the direction, pace, and geography of innovation. The chapter closes by urging researchers to develop new frameworks to analyze innovation in this era of economic statecraft, where prosperity and security are seen as deeply intertwined.

The seven contributions in this volume all engage major, contemporary issues in innovation and entrepreneurship policy. The chapters examine innovation policy with regard to economic growth, fiscal sustainability, and national security. They also provide deep and cutting-edge assessments of several key levers within the innovation policy toolkit, highlighting what is known and also helping set the agenda for further research. This volume, its conference, and the broader EIPe series stand at the nexus between research and policy, highlighting policy opportunities and new research questions, and building a community of researchers and policymakers who seek to better understand and advance the U.S. innovation and entrepreneurship system and meet core national priorities.

We thank the authors for their excellent contributions.