Government Investment, Venture Capital, and Innovation

Extended Abstract – Very preliminary and incomplete, not for circulation*

Philippe Aghion† Martin Aragoneses‡ Antonin Bergeaud§ Antonio Ughi¶

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Venture capital (VC) has become a dominant source of external finance for innovation in the United States, supporting the firm growth process from invention through commercialization (Kortum and Lerner, 2000; Lerner and Nanda, 2020). Does private venture finance, when left on its own, fund the full range of socially valuable innovation? We explore how *direct* government investment – grants from the Small Business Innovation Research (SBIR) studied extensively in the microeconomic literature (Howell, 2017; Lerner, 1999) – can complement private VC in financing innovation both empirically and through the lens of a Schumpeterian macroeconomic growth model (Klette and Kortum, 2004). We highlight that this complementarity arises for the most radical of innovations in R&D-intensive projects with high early costs and uncertain returns (Hall and Lerner, 2010).

We develop a novel data infrastructure that links innovation outputs of U.S. firms to their financing histories of SBIR public awards and private VC deals. In doing so, it integrates data from the US Patent and Trademark office, where we build various metrics of overall quality (the patent's technological and economic value, proxied by forward citations, patent family size, generality, and number of claims) and, importantly for our study, radicalness (capturing, respectively, how much a patent draws on prior art from outside its own technology field) following Squicciarini et al. (2013). We build on the work of Aragoneses et al. (2026) who bring together data on venture capital and other private financing sources from PitchBook together with Revelio Labs, which contains firm characteristics including their worker role composition, allowing us to use their proxies for intangible knowledge inputs related to innovation expenditures like the R&D worker pay composition.

Within the setting of SBIR and venture capital, our preliminary analyses uncovers a novel source of complementarity between the public and private venture financing in the innovation process. First, using patent-level and firm-level regressions on the universe of U.S. patenting firms, we find that firms backed purely by VCs are associated with higher impact measuring innovation quality but a lower degree of radicalness. In contrast, purely government-financed firms tend to produce

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†INSEAD.
‡INSEAD.
§HEC Paris.
¶Paris School of Economics.

more radical innovations that are, however, of lower quality and impact. Our main finding is that only firms that receive both private VC and public SBIR financing are associated with innovations that are both high-quality *and* radical – a rare combination in entrepreneurial finance. We further exploit firms a history of patents before the first financing event to show that higher patent portfolio radicalness is associated with first SBIR financing while the opposite holds for first VC backing.

We find suggestive evidence that the SBIR program helps channel venture capital toward firms pursuing more radical, fixed-cost-intensive innovation. SBIR recipients exhibit higher R&D payroll shares and patent-to-trademark ratios early in life, consistent with greater upfront innovation costs, whereas private VC alone appears to favor projects that are quicker and easier to commercialize. These patterns suggest a division of labor in innovation finance: public grants help fund and sustain a broad set of radical projects by relaxing early financing constraints, while private investors provide the selection and scaling capabilities needed to bring the most promising ventures to market.

We are bringing these insights into an innovation-based endogenous growth model where selective private venture finance and unselective government grants can complement each other to generate more impactful *and* radical innovations with higher social return to R&D.

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