Can Venture Capitalists Better Allocate Government Subsidy to Start-ups? New Evidence from China

Motivations

Entrepreneurship and innovations are the twin engines for economic growth and employment. However, innovation-oriented entrepreneurs face the problems of technology non-appropriability as well as information frictions when seeking external financing (Arrow, 1962). As a result, investments in technological entrepreneurship tend to be socially suboptimal. In response, many countries implement policies to subsidize technological start-ups with an aim to reduce the costs of innovations to start-up firms and remedy the information friction issues (Hall and Lerner, 2010).

There is a growing literature on the effects of government R&D funding to new ventures (Acemoglu et al., 2017; Howell, 2017; Lerner, 2009; Wallsten, 2000) Despite the institutional heterogeneity, government subsidy programs examined by existing literature share many common features. One of those is the evaluations of entrepreneurial projects are conducted by technical experts or/and government officials. The concern, though, is that those reviewers may not have adequate knowledge or skills needed to pick right innovations to receive a government subsidy. First, bureaucratic officials are notoriously known for lacking incentives or knowledge to effectively evaluate entrepreneurial projects. Such problem could be even more serious in emerging markets where governments usually present strong influences in allocations of resources. Second, though technical experts contribute to identifying technology strengths and feasibilities, depending solely on technical experts' opinions may cause subsidy programs to overlook market potentials of a project and gravitate to pure basic research that has no immediate commercial applications.[1] Thus, a more effective evaluation mechanism should balance a start-up's technological aspects with its market potentials. So can governments do a better job evaluating entrepreneurial projects by replacing government official reviewers with experts that have market insights, say, professional venture capitalists (VCs)? Such policy innovation is recently implemented in China, where historically evidence of bureaucratic intervention was found in R&D grant allocation and there were mixed effects of R&D subsidy on firms' performances and innovations (Wang et al., 2017; Guo et al., 2016). This newly introduced evaluation method does not necessarily indicate the subsidy would just go to the privately profitable projects that would have been likely to succeed even without the government subsidy. In fact, if projects under review are at very nascent stage, high uncertainty would deter any external financers from investing, including VCs themselves. However, this new policy allows VCs to share their insights about which nascent stage projects present market potentials and are likely to be good candidates for receiving the subsidy. That being said, the effectiveness of this creative policy change remains unclear. Fortunately, we obtain novel proprietary data that enable us to evaluate this policy and shed lights on effective evaluation mechanism for government subsidy programs. In a broader perspective, we seek to add knowledge to building a vibrant ecosystem of entrepreneurship and innovations through creative policy-making.

Data and Research Plan

Our data come from an entrepreneurship competition organized by the Chinese government. Since 2012, the Ministry of Science and Technology (MOST) in China have been organizing China Innovation and Entrepreneurship Competition. As the largest of its kind in scale nationwide, the competition consists of multiple levels of tournaments that are divided by geographic regions, going up from district level to national level. The detailed rules of competition vary by administrative levels as well as by regions. Our data come from the district-level competition in Pudong New District, Shanghai, which includes famous the Zhangjiang High-Tech Industrial Park—the largest host home of its kind of multinational R&D centers and technological start-ups in China. The final score of each contestant venture is a weighted average score based on two sets of raw scores: 60% comes

[1] The general consensus is it is more efficient to delegate basic research to universities or research institutions.

from a panel of three judges who are professional investors from private venture capital or angel funds, and 40% comes from two technical experts who focus on the technology potentials and feasibility of the project. About one-third of the contestant ventures successfully received a grant of 200,000 RMB in the Pudong District competition each year. The competition has separate tournaments for ventures of different development stages. We focus on the competition for small/micro ventures. A small/micro venture is typically at early stage of development before achieving break-even point.

Our dataset includes 1,633 competing ventures registered in Pudong with information of founder demographics, industries, winning status, as well as main accounting and financial records for the past three years leading to the competition. In addition, we obtained the administrative records of each venture's evaluation received from both the VCs and the technical expert judges. In recognition of potential investment opportunities provided by investor judges, we surveyed all the venture capitalist judges regarding their interests in investing in the contestant firms they evaluated. In the future, we will also supplement with data on the performance outcomes and subsequent financing records of the contestant ventures.

We examine if an evaluation mechanism including technical experts and VCs can efficiently allocate subsidy funding, promoting innovations and growth of technological start-ups. Our research questions and plans are as following. First, what features of technological ventures are related to receiving a favorable assessment from professional VCs, and how do their picks differ from the ones made by technical experts? We will use detailed scores from VC judges and technical experts to examine if these two types of judges present systematic difference in their evaluations. Second, do winner firms in the competition achieve greater performances and growth after receiving the subsidy? Following the literature, we will perform regression discontinuity analysis to evaluate the effects of receiving a grant on the development of a venture. The outcome variables we are considering include venture survival, patenting, and likelihoods of receiving VC funding afterward. Third, as competitions provide venues for start-ups to present their work and connect with future stakeholders including prospective investors, are there external effects from such an arrangement? We will examine if contestant firms receive follow-up funding or inquiries from the funds of VC judges and its implications for social welfare.

References

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Arrow, K., 1962. Economic welfare and the allocation of resources for invention. In: The Rate and Direction of Inventive Activity: Economic and Social Factors. Princeton University Press, Princeton, pp. 609–626.

Guo, D., Guo, Y., Jiang, K., 2016. Government-subsidized R & D and firm innovation: evidence from China. Research Policy 45 (6), 1129–1144.

Hall, B., Lerner, J., 2010. The financing of R&D and innovation, In: Hall, Handbook of the Economics of Innovation, pp. 609-639.

Howell, S., 2017. Financing Innovation: Evidence from R&D Grants, American Economic Review 107 (4), 1136-1164.

Howell, S., 2018. Learning from Feedback: Evidence from New Ventures. NBER Working Paper (No. w23874).

Lerner, J., 2000. The government as venture capitalist: the long-run impact of the SBIR program. Journal of Private Equity 3 (2), 55–78.

Wallsten, S.J., 2000. The effects of government-industry R&D programs on private R&D: the case of the small business innovation research program. RAND Journal of Economics 31 (1), 82–100.

Wang, Y., Li, J., Furman, J. L., 2017. Firm performance and state innovation funding: evidence from China's Innofund program. Research Policy 46 (6), 1142–1161.

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Budget Estimate

Suting Hong, Guangwei Li

ShanghaiTech University

Survey Staffing: $10,000

- Hire people (or Subcontract to Survey Company) to physically check 1633 start-ups registered addresses (most of them are in Shanghai area) in our dataset to see if they are still operating (survival rate)

Operating Expense: $6,000

- Data acquisition: 1,000
- Conference expenses for Suting Hong and Guangwei Li to disseminate the work: $5,000

Capital Equipment: $3,000

- One computer to store and analyze the confidential data: about $3,000

Miscellaneous: $1,000

Grand total: $20,000

Guangwei Li

CONTACT INFORMATION

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EMPLOYMENT

ShanghaiTech University, **School of Entrepreneurship and Management**, Shanghai, China
Assistant Professor, PI, 2017-present
Group Head, Minor in Innovation and Entrepreneurship, 2018-present

EDUCATION

Ph.D., Public Policy and Management (Strategy, Entrepreneurship and Technological Change), Carnegie Mellon University, 2017
M.P.M., Carnegie Mellon University, 2007
B.A., Economics, University of International Business and Economics, China, 2002

RESEARCH INTERESTS

Economics and Management of Technological Innovation, Technology Entrepreneurship, Science and Technology Policy

ACADEMIC PUBLICATIONS

Branstetter, Lee, **Guangwei Li**, and Francisco Veloso. 2015. "The Rise of International Coinvention." In *The Changing Frontier: Rethinking Science and Innovation Policy*, edited by Adam Jaffe and Benjamin Jones. Chicago and London: University of Chicago Press.

OTHER PUBLICATIONS

Branstetter, Lee, **Guangwei Li**, and Francisco Veloso. 2013. "The Polyglot Patent Boom." *Scientific American Magazine*, 309 (4), 62–63.

WORKING PAPERS

"The Role of R&D Offshoring in Knowledge Diffusion: New Evidence from China"

"Bridge to Excellence? The Impacts of International Coinvention on Multinational R&D in China," with Lee Branstetter and Francisco Veloso.

"The Globalization of R&D: China, India, and the Rise of International Coinvention," with Lee Branstetter and Francisco Veloso.

"New Development in Idea Sharing: Intrafirm Knowledge Flow across Borders through Coinvention," with Francisco Veloso.

"What can the Chinese Domestic Patent Explosion Tell Us about Real Innovation in China?" (Report to the World Bank), with Lee Branstetter.

GRANTS & AWARDS

The William W. Cooper Doctoral Dissertation Award	2017
Awarded research funding from the Carnegie Bosch Institute ($35,000)	2015
Carnegie Mellon Graduate Student Small Project Help funds ($750)	2013

CONFERENCE PRESENTATIONS

"New Development in Idea Sharing: Intrafirm Knowledge Flow across Borders through Coinvention," presented at

- *Academy of Management 2014 Inter-firm Networks and Diversity Session*, Philadelphia, PA, August 5, 2014

"The Globalization of R&D: China, India, and the Rise of International Coinvention," presented at

- *Seventh Annual USPTO-Searle Center Conference on Innovation Economics*, Northwestern University, Chicago, IL, June 19–20, 2014

- *The 5th Biennial Atlanta Conference on Science and Innovation Policy*, Georgia Tech, Atlanta, GA, September 26–28, 2013
- *NBER The Changing Frontier: Rethinking Science and Innovation Policy Conference*, Chicago, IL, August 2–3, 2013
- *NBER The Changing Frontier: Rethinking Science and Innovation Policy Pre-Conference*, NBER, October 26–27, 2012

INVITED PRESENTATIONS

"The Globalization of R&D: China, India, and the Rise of International Coinvention," presented at

- *Academy of Management 2014 Patent PDW*, Philadelphia, PA, August 2, 2014
- *G2 at GW 2013: Conference on China's Economic Development and U.S.-China Economic Relationship*, George Washington University, Washington, D.C., November 8, 2013

"Bridge to Excellence? The Impacts of International Coinvention on Multinational R&D in China," presented at (with Lee Branstetter)

- *AIEA-NBER Conference on Innovation and Entrepreneurship 2016*, Tsinghua University, Beijing, China, August 24–26, 2016

PROFESSIONAL EXPERIENCE

Hangzhou Customs, Department of Tariff Affairs — Hangzhou, China
Customs Inspector (First Grade) — 2002 – 2006

PROFESSIONAL AFFILIATIONS

American Economic Association
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Academic Positions
Assistant Professor, Shanghai Tech University (tenure-track), since August 2016
Visiting Scholar, Payment Cards Center, Federal Reserve Bank of Philadelphia, May 2014-Dec 2016.
BKT Assistant Professor of Economics (tenure-track), Wabash College, August 2014 to June 2016.

Education
Ph.D. in Economics, LeBow College of Business, Drexel University, June 2014.
Bachelor of Economics (with Honors), Major: Finance, Nanjing University, China, June 2006.

Fields of Specialization
Industrial Organization, Applied Econometrics, Entrepreneurial Finance

Other Positions
Visiting Industry Analyst, Payment Cards Center, Federal Reserve Bank of Philadelphia, July 2013 to April 2014.
Teaching/Research Assistant, School of Economics, Drexel University, 2008 to 2013.

Working Papers
The Market for Venture Capital: Entry, Competition, and the Survival of Start-up Companies (with Konstantinos Serfes and Veikko Thiele)

Dynamic Pricing of Credit Cards and the Effects of Regulation (with Robert M. Hunt and Konstantinos Serfes)

Work in Progress
Effects of Entry of Governmental Venture Capital Firms on Start-up Success (with Massimo Colombo and Massimiliano Guerini)

Does Wisdom of the Crowd Improve Innovation? Evidence from Crowdfunding (with Vincenzo Buttice)

Academic Awards
Best Paper Award, 2016 FMA Conference on Finance and Investment in Creative Ventures
Outstanding Economics Stream Research Paper Award, LeBow College of Business, 2012.
The 5th NBER Entrepreneurship Research Boot Camp, NBER, July 2012.
Graduate Assistantship, Drexel University, 2008 to 2013.
People Scholarship, Nanjing University, 2002 to 2006.

Teaching

ShanghaiTech Univeristy

- New Technology Ventures, Summer 2017.
- Principles of Economics, Fall 2017, Spring 2018.

Politecnico Di Milano

- Workshop on Competition Policies, June 2016, June 2017, May 2018.

Wabash College

- Principles of Economics, Fall 2014, Fall/Spring 2015, Spring 2016.
- Intermediate Microeconomics, Fall 2014, Fall/Spring 2015.
- Industrial Organization, Fall 2014, Fall 2015.
- Special Topic: Entrepreneurship, Spring 2015/2016.
- Econometrics, Spring 2016.

Drexel University

- Principles of Microeconomics, Winter 2011
- Intermediate Microeconomics, Summer 2011, Winter 2012

Presentations

11th Annual Searle Center/USPTO conference on Innovation Economics, June 2018
East China Normal University, November 2017
Chinese Finance Annual Meeting, Shanghai, October 2017
Asian-Pacific Industrial Organization Conference, December 2016
FMA Conference on Finance and Investment in Creative Ventures, September 2016
Politecnico Di Milano, June 2016.
American Economic Association Conference, January 2015. (Presented by coauthor)
Wabash College, February 2014.
Federal Reserve Bank of Philadelphia, December 2013.
Drexel University, November 2013.
International Industrial Organization Conference, Boston, May 2013.
Southern Economic Association Conference, New Orleans, November 2012.
Southern Economic Association Conference, Washington D.C., November 2011.

Computer Skills

Stata, SAS, Matlab.

Languages

Chinese (native), English (fluent).