Research Proposal for NBER Research Grants in Innovation Policy

I am Yifei Mao, an Assistant Professor of Finance in Cornell University. I would like to apply for the NBER grant in the area of Innovation Policy. My research mainly focuses on innovation and entrepreneurial finance. Specifically, I have been working on a broad range of topics including collateral shocks and corporate innovation policies, inventor patenting activities, banking competition and firm innovation, and venture capital (VC) staging and entrepreneurial innovation. I believe the grant would substantially benefit my research.

First, I am currently working on a research project titled "Internal versus external innovation: How do corporations react to financing shocks?" In this project, I examine how corporations react to real estate collateral shocks by adjusting their innovation policy. I find that when corporations receive windfalls of money through real estate collateral value appreciation, they disproportionately increase investment on external innovation relative to internal innovation. In particular, they allocate more resources not only on internal research and development (R&D), but also on external acquisitions of innovative targets and corporation venture capital (CVC) investment—equity investment in start-ups by incumbent firms. As a result, the trajectory of innovation moves away from more incremental innovation to experimental and radical innovation. Overall, the empirical results do not support a pure "pipeline model" which suggests that innovation can simply be achieved by more spending on basic research. The empirical evidence is more consistent with a blend of the "pipeline model" and the "great man" theory, with the "great man" theory predicting that breakthroughs come from talented minds rather than monetary input.

Second, I have also been working on a project that investigates the relative importance of individual inventors' human capital and firms' organizational capital in promoting a firm's innovation output. This paper is titled "Do individuals or firms matter more? The case of patent generation" (coauthored with Tong Liu and Xuan Tian). We decompose the variation in innovation output into inventor- and firm-specific components. Inventors' human capital is about 13 times as important as firms' organizational capital in explaining a firm's innovation performance in terms of patent counts and citations, while inventors' human capital is only about the same as important when explaining the firm's innovation styles in terms of patent exploratory and exploitive scores. In the cross section, inventors contribute more to innovation output when

they are better networked, in firms with higher inventor mobility, in industries in which innovation is more difficult to achieve, and in publicly traded firms. Additional tests suggest that our main findings continue to hold after accounting for inventors' endogenous moving. This research highlights the importance of individual inventors in enhancing firm innovation and sheds new light on the theory of the firm.

Third, I have been investigating how entrepreneurial innovation gets affected by a special type of financing -venture capital staging - in a paper titled "Unleashing Innovation" co-authored with Xuan Tian and Xiaoyun Yu. Using a sample of venture capital (VC)-backed initial public offering (IPO) firms, we study the effect of financial intermediaries' tight leash on entrepreneurs' innovation productivity. We find that financial intermediaries' tight leash impedes innovation: IPO firms are significantly less innovative when VCs interfere with their development more frequently through staging—as measured by a larger number of VC financing rounds. To establish causality, we exploit plausibly exogenous variation in the frequency of direct flights between VC domiciles and IPO firm headquarters that are due to airline restructuring. Our identification tests suggest a negative, causal effect of VC staging on firm innovation. By documenting a previously under-recognized adverse consequence of VC stage financing, our evidence suggests that short-termist incentives can be cultivated even in a private equity market populated with long-term, sophisticated investors.

Finally, I have worked on a paper that documents the differential effect of credit financing on entrepreneurial and mature firms. The paper is titled "Does Banking Competition Affect Innovation?" (coauthored with Jess Cornaggia, Brian Wolfe, and Xuan Tian) and is forthcoming in the Journal of Financial Economics. In this paper, we construct tests using U.S. bank branching deregulatory events as plausibly exogenous shocks to banking competition. We find evidence that banking competition enables small, innovative firms to secure financing instead of being acquired by public corporations. Therefore, the supply of innovative targets declines, which reduces the portion of state-level innovation attributable to public corporations.

I find that there are so many fascinating topics to explore in the area of innovation. In the future, I plan to delve deeper into the area, and address questions such as innovation incentive provisions, the organizational structures of innovation, the impact of innovation on the economy, and others. I believe that the NBER research grant in the area of Innovation policy would greatly help me advance this line of research.

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WORK EXPERIENCE

- Assistant Professor of Finance, Cornell University, 2015-present

EDUCATION

- Ph.D. in Finance, Indiana University, 2015
- M.A. in Economics, University of Pennsylvania, 2010
- B.A. in Economics, Tsinghua University, China, 2008

PUBLICATIONS

- "Does Banking Competition Affect Innovation?" (with Jess Cornaggia, Xuan Tian, and Brian Wolfe), ***Journal of Financial Economics***, 2014.
  - On the 2014 Association of Financial Economics (AFE) program
  - On the 2013 Western Finance Association (WFA) program

WORKING PAPERS

- "Do Individuals or Firms Matter More? The Case of Patent Generation," with Tong Liu and Xuan Tian
  - On the 2016 SFS Cavalcade program
  - On the 2016 China International Conference in Finance (CICF) program
  - On the 2016 European Finance Association (EFA) program
- "Internal versus external innovation: How do corporations react to financing shocks?"
  - On the 2015 China International Conference in Finance (CICF) program
  - On the 2014 SIFR Conference on Innovation and Entrepreneurship program
- "Unleashing Innovation," with Xuan Tian and Xiaoyun Yu, ***Reject and Resubmit, Journal of Financial Economics***
  - On the 2016 American Finance Association (AFA) program
  - On the 2015 China International Conference in Finance (CICF) program
  - On the 2013 CEPR Workshop on Entrepreneurship Economics program
  - On the 2013 Indiana Finance Symposium program
- "Price Discovery in the Stock and Corporate Bond Markets," with Craig Holden
  - On the 2013 Financial Management Association (FMA) program

INVITED CONFERENCE PRESENTATIONS

(* indicates presentations by co-author)

- 2016 European Finance Association (EFA) conference (Oslo, Norway)

- 2016 China International Conference in Finance (CICF) conference (Shanghai, China)
- 2016 SFS Cavalcade Conference (Toronto, Canada)
- 2016 Association of Finance (AFA) Annual Meetings (San Francisco)
- 2015 China International Conference in Finance (CICF) annual meetings (Shenzhen, China)
- 2014 SIFR Conference on Innovation and Entrepreneurship program (Stockholm, Sweden)
- 2014 Association of Financial Economics (AFE) Annual Meetings (Philadelphia)
- 2013 Western Finance Association (WFA) Annual Meetings (Lake Tahoe)*
- 2013 CEPR Workshop on Entrepreneurship Economics program (Amsterdam, Netherlands)*
- 2013 Financial Management Association (FMA) Annual Meetings (Chicago)
- 2013 Indiana Finance Symposium program (Bloomington)*

INVITED CONFERENCE DISCUSSIONS

- 2015 Financial Economics and Accounting (CFEA) Annual Meetings (New Jersey)
- 2015 Financial Management Association (FMA) Annual Meetings (Orlando)
- 2015 Entrepreneurial Finance and Innovation around the World Conference (Beijing, China)
- 2014 Financial Intermediation Research Society (FIRS) Annual Meetings (Quebec, Canada)
- 2013 Financial Management Association (FMA) Annual Meetings (Chicago)
- 2013 China International Conference in Finance (CICF) Annual Meetings (Shanghai, 3 papers)

RESEARCH AND TEACHING EXPERIENCE

- Instructor, Cornell University
  - HADM 2220 Introduction to Finance (Undergraduate), Spring 2016
  - HADM 2250 Introduction to Finance (Undergraduate), Spring 2016
- Instructor, Indiana University
  - F305 Intermediate Corporate Finance (undergraduate), Summer 2013, 2014
  - F303 Intermediate Investments (undergraduate), Summer 2013, 2014
- Research Assistant, Indiana University, 2010-2012
- Research Assistant, Dr. Marshall Blume and Dr. Donald Keim, the Rodney L. White Center for Financial Research, Wharton School, 2009-2010

HONORS AND AWARDS

- NBER Entrepreneurship Research Boot Camp Participant, NBER, 2014
- American Finance Association (AFA) Doctoral Student Travel Grant, 2013
- Graduate Student Fellowship, Finance Department, Indiana University, 2010-present
- University Fellowship, Tsinghua University, 2007

- Asia Institute for Political Economy Fellowship from the Fund of American Studies, Georgetown University, and the University of Hong Kong, 2007

REFEREE SERVICES

- Review of Financial Studies, Management Science, Asia-Pacific Journal of Financial Studies, Journal of Financial Research Services

INDUSTRY EXPERIENCE

- Internship at Bank of China International, Hong Kong, China, August 2007
- Internship at ING Bank N.V., Beijing, China, January-February 2007

ADDITIONAL INFORMATION

- Citizenship: P.R. China
- Immigration status: U.S. permanent resident