Sophia Jing Xue
Robert H. Smith School of Business
3330 Van Munching Hall
University of Maryland
College Park, MD 20742
(585) 532-4273
jxue1@umd.edu

Recommendation Letter Writer: Liu Yang
(301) 405-8794
lyang1@umd.edu

Dear Sir or Madam,

I am a fifth-year PhD candidate in Finance at the University of Maryland and I am writing to apply to attend the NBER Innovation Research Boot Camp.

My great interest to this boot camp stems not only from personal experience of running a tech startup and working with R&D team, which brought me intimate knowledge of how important innovation and human capital are in the real world, but also from my current and potential research projects, which share a particular focus on innovation. Topics that I have studied or want to study include innovation and labor finance, implications of urban economics and innovation policy and entrepreneurship. I believe the materials covered in the boot camp will aid in expanding the scope of my research in many ways.

Additional, the boot camp is more than cutting edge research in innovation. It is also a great opportunity to interact with the leading faculty as well as other PhD students who share research interests. Meeting and connecting with established researchers is a valuable source of knowledge and inspiration for me. I also look forward to bringing in my skills and insights to this fantastic boot camp.

Enclosed are my CV and application essay. Thank you for your time and consideration. If you have any questions, please feel free to reach me at the above email address or telephone number.

Sincerely,

Sophia Jing Xue

Application Essay for NBER Innovation Research Boot Camp

Applicant: Sophia Jing Xue

Conducting state-of-the-art research in innovation is of huge interest to me. My passion originally stems from my own experience as an entrepreneur who successfully founded an information technology startup and worked with a great R&D team, which earned me a real life perspective of business operations and brought me intimate knowledge of how important innovation and human capital are in the real world. More importantly, my training and research work let me go into innovation from a different angle. The rest of this essay will expand upon my cover letter in providing my motivations for attending the NBER Innovation Research Boot Camp and the qualifications that I believe make me a strong candidate to benefit from and contribute to the program.

First, my research can greatly benefit from the boot camp. Two recent projects I have been working on are related to innovation.

In the project I currently focus on, I try to highlight the value of human capital in innovation activities of firms by focusing on the role played by individual inventors, and more importantly, examine the interaction effects of labor market thickness. Using the pre-retirement deaths of inventors as an exogenous negative shock, I find firms suffer a significant and persistent decline in innovation outcomes, compared with their matched counterparties in the absence of such loss. Yet, a thick labor market mitigates the adverse effect. I am also investigating the mechanisms underlying the thick market effects and how labor market thickness shaping firms' innovation strategy. At this stage, I will definitely benefit from an innovation workshop. Having a better sense of the state of literature and learning from the top scholars in the field will help in studying those questions.

Another project I conduct lies in the intersection of innovation and urban economics, in which I try to identify the innovation gains as a result of firm clustering and discover the underlying mechanisms. In this project, I show top innovative firms foster innovation of local participants by exploiting the inter-temporal variation in patenting activities of local inventors in chosen commuting zones that attracted top innovative

firms and in runner-up commuting zones that were finalists of location choice. Further, I find social closeness, isolated from technological proximity, consistently explains the innovation gains, which suggests knowledge diffusion being the important channel for the local innovation productivity spillovers.

One line of research I am also interested in is the economic geography of innovation. Innovative activity is vary significantly across geographies, where regional characteristics such as financial capital accessibility, labor market and innovation policy environment could affect the spatial distribution. One aspect I want to pursue would be mobility of skilled labor, specifically, to study how mobility of skilled labor and knowledge spillovers among them affect spatial clustering of innovation through social connection and workplace colleagueship. By explaining the distribution of skilled workers as a result of mobility across space, I hope to make sense of the geographic distribution of innovation activities. The boot camp will serve to broaden my perspective on the foundational ideas and frontier research on theory and empirical evidence, and thus improve the scope of my investigations.

Moreover, I expect that the boot camp will offer a great platform that would connect me to some of the brightest and knowledgeable people in the field. In addition to the hard information the conference presents and insight attendees pick up in conversation, I anticipate that the interaction of leading faculty and other students will make this environment extremely vibrant and inquisitive. The speakers and other attendees will be a valuable source of insight and inspiration that will fuel my efforts in further research.

Last but not least, I want to address the return on granting me admission. I will bring in my insights of running a tech startup and working with R&D team, based on my real world experience. Also, I tend to be an active participant by giving helpful feedback to others. Additionally, as evidenced in the attached CV, my coursework has given me a strong background in analyzing economic questions both theoretically and econometrically. It is my hope and expectation that these, combined with intellectual rigor and work ethic, allow me to contribute to expanding our field.

I shall greatly appreciate your favorable consideration of my application.

Sophia Jing Xue

CONTACT INFORMATION

Department of Finance
Robert H. Smith School of Business
University of Maryland, College Park

Email: jxue1@umd.edu
Tel: +1 (585) 532-4273

EDUCATION

Ph.D. in Finance
Robert H. Smith School of Business, University of Maryland, 2017 - 2023(Expected)
- Dissertation Committee: Vojislav Maksimovic (Co-Chair), Liu Yang (Co-Chair), Maria Cecilia Bustamante, John Haltiwanger, Alex Xi He

M.S. in Finance
Simon Business School, University of Rochester, 2015 - 2016
B.E. in Quantitative Economics
Shanghai University of Finance and Economics, 2011 - 2015

RESEARCH INTERESTS

Innovation, Entrepreneurship, Labor Finance, Corporate Governance, Merger and Acquisition

WOKING PAPERS

Value of Talent, Innovation and Thick-Market Effects

Human capital is increasingly essential to the growth and success of a firm. In this paper, I highlight the value of human capital in patenting activities of innovative firms and examine the interaction effects of labor market thickness. Using the pre-retirement deaths of inventors as an exogenous negative shock, I find firms suffer a significant and persistent decline in patenting outcomes (6% on average), compared with their matched counterparties in the absence of such loss. Yet, a thick labor market mitigates the adverse effect. In particular, the reduction in innovation would be mostly zeroed out for firms located in an area with a high clustering of talents. I investigate two possible mechanisms underlying the thick market effects: risk-sharing and improved match quality. My results show that firms in a thick labor market do better in recruiting and retaining talents, suggesting an insurance effect to firms against idiosyncratic shocks. Furthermore, I find a greater knowledge overlap and technological fit between on-boarding inventors and the firms in a thick labor market, indicating a higher quality of worker-firm match which might help preserve human capital and recover innovation activities. Taken together, the results emphasize the importance of talent in firms' innovation performance and suggest that labor market thickness can play crucial roles in shaping firms' human capital management.

Mr. Faulkender's Experiment: Social Capital, Banks, and PPP Loans
(with Vojislav Maksimovic and Liu Yang)

We use a natural experiment to analyze the uptake of risk-free forgivable loans by retail stores across different geographies. Using granular data, we find a wide variation in loan uptake, much of it at the census tract and block group level. Store agglomeration and bank proximity have a large and economically significant explanatory power. Bank access is particularly helpful in less educated and higher minority share communities. Both forms of social capital – civic capital, which captures a population's ability to overcome the free-rider problem in pursuit of socially valuable

activities, and social connections, which increase information flows in the community, are significantly related to loan uptake. Increasing the civic capital metric from the 25^{th} percentile to the 75^{th} percentile increases loan uptake by 10 percent of the sample mean. This magnitude is comparable to that of having a bank branch within 200 yards. Virtual connections increase loan uptake, especially connections to more educated and economically dynamic counties. Both social connections and virtual connections help mitigate the information disadvantage in locations with fewer stores. Nearby bank branches and local social capital operate through different channels – banks provide more benefit to smaller businesses, whereas social capital and virtual connections are more important for larger businesses. Nearby banks and social connections are partial substitutes – social connections have a greater effect in areas with no local bank branches. These differential channels are policy-relevant, and their impact may grow if the polarization of economic opportunities in the U.S.continues.

Identifying the Effects of Entry on Local Innovation

I identify the entry effects of top innovative firms on incumbent innovation. I exploit the inter-temporal variation in patenting activities of local inventors in chosen commuting zones that attracted the firm headquarters and in runner-up commuting zones that were finalists of location choice. After the entry of top innovative firms, local inventors achieve better patenting outcomes. They apply 6.7% more patents, gain 16.8% more top patents, and receive 11.6% more citations. In addition, I investigate the potential mechanisms underlying local innovation spillovers. Citations evidence suggests the existence of knowledge diffusion. Entry effects are stronger among local inventors who are technologically or socially closer to the entering firm, after controlling for innovation incentives and labor mobility. Overall, my results indicate that knowledge spillovers help explain the entry effects.

Board Diversity and M&A Strategies

I construct a multidimensional measure of experience diversity in directors to examine the effects of board diversity on M&A strategies. Using the diversity in supply of directors as an instrument, I exploit the exogenous variation in board composition and show that greater board experience diversity leads to more diversifying strategies. Specifically, firms with a more diversified board tend to complete more deals. They are more likely to acquire a target that operates in a different industry, is located at a more distance place, and has lower cash flow correlation and lower level of product similarity. Announcement return and post-merger performance are not better for more diversified acquirers.

PROFESSIONAL ACTIVITIES

WEFI Fellows Program, April 2021 - 2022
NBER Entrepreneurship Research Boot Camp, July 2019

Organizer, Smith Finance Brownbag Seminar, 2022
Co-Organizer, 2nd Student-led workshop on Entrepreneurial Finance and Innovation, October 2021

TEACHING

University of Maryland
Instructor:

- Undergraduate core on International Finance (BMGT446), Fall 2020
- Evaluation: 3.5/4.0

Teaching Assistant:

- Master elective on Corporate Governance and Performace (BUFN714), Spring 2021

PROFESSIONAL EXPERIENCE

Co-Founder & Financial Manager
Enlighten Information Technology Co., Ltd., Shanghai, China, 2013 - 2016

- Founded an Internet-based education company, drafted strategic development and marketing plan; administered external financing and internal cost control.
- Attained 75% profit margin and secured $0.5mil venture investment in 6 months.
- Developed a mature business model and got considerable social platform influence; established R&D team with programmers to develop training systems.

HONORS AND AWARDS

Dean's Fellowship, University of Maryland
Member of Beta Gamma Sigma
Dean's List, University of Rochester
National Baosteel Scholarship, Shanghai University of Finance and Economics(3/20000)

SKILLS

SAS, R, STATA, Python

LANGUAGES

Mandarin (native), English (fluent), Cantonese (fluent)

OTHER

Census Special Sworn Status: 2020 to Present

PHD COURSES

University of Maryland

ECON601 Macroeconomic Analysis I	A
ECON603 Microeconomic Analysis I	A
ECON604 Microeconomic Analysis II	A
ECON623 Econometrics I	A
ECON624 Econometrics II	A+
ECON721 Econometrics III	A+
ECON722 Econometrics IV	A+
ECON626 Empirical Microeconomics	A+
BMGT840 Seminar In Financial Theory	A
BMGT841 Seminar In Corporate Finance	A
BMGT843 Seminar in Portfolio Theory	A
BMGT848A Financial Research Method	A
BMGT848C Topics In Empirical Corporate Finance	A-
BMGT848P Empirical Asset Pricing	A
BMGT848T Topics in Industrial Organization and Financial Economics	AU
BMGT848K Public Policy Perspectives of Finance	A-
BMGT848G Seminar in Hedge Funds	A
BMGT848F Workshop in Finance Research	A+

University of Rochester

FIN505 Theory Of Finance	A-
FIN534 Empirical Methods In Corporate Finance	AU
MSM505 Theory of Probability and Stochastic Process II	AU
AEC505 Mathematical Techniques in Economics	AU
MSM502 Linear Algebra	AU

UNIVERSITY OF MARYLAND
ROBERT H. SMITH SCHOOL OF BUSINESS

Dr. Liu Yang
Associate Professor of Finance
4419 Van Munching Hall
R. H. Smith School of Business
University of Maryland
College Park, MD, 20742
Phone: (301) 405-8794
Email: lyang1@ umd.edu

January 20, 2022

To Whom It May Concern,

I am writing to recommend **Sophia Xue** to the NBER Innovation Boot Camp 2022. Sophia is a fifth-year student in our Ph.D. program. She has successfully passed her dissertation defense in 2021 and plans to defend her thesis in 2023. I have known Sophia since she joined the program, and I am also her main thesis advisor.

Sophia's main research area is empirical corporate finance, focusing on innovation, entrepreneurship, and labor and finance. She has two completed solo-authored research papers at this time. The first paper, titled "Value of Talent, Innovation, and Thick-Market Effects," uses the events of inventor death to study how labor market thickness affects the quality and speed of worker-firm matches. Using hand-collected data of inventor death and research centers at the firm-location level, she shows that firms suffer a significant and persistent decline in patent outcomes from losing an inventor; however, the adverse effect is largely mitigated when a high clustering of similar talents exists nearby. The second paper, titled "Identifying the Effects of Entry on Local Innovation," examines changes in innovative activities after the local area has attracted a leading innovative firm. To control for potential selection biases, Sophia compares the winning and the runner-up commuting zones among the finalists for the location search. She finds that the entry of a leading innovative firm generates considerable spillover and fosters innovation of other local firms.

These two papers showcase Sophia's strength as an empirical corporate finance researcher. She is creative, full of interesting ideas, excellent with discovering and utilizing novel datasets, and equally importantly, capable of carrying out clever and careful empirical strategies.

In addition, Sophia is currently working on a project under my guidance to link R&D spending with innovation output (including productivity gains and patents) using micro

establishment-level data from the U.S. Census Bureau. I have been very impressed by her work.

Since innovation is a central theme in her research, I think this boot campus would be an excellent opportunity for her to further develop her knowledge and skillset to become an expert in this area. I encourage you to consider her for this opportunity.

Please feel free to contact me if I can provide more information.

Best Regards,



Liu Yang