Application for NBER Entrepreneurship Summer Research Camp

Applicant

Yao Zeng
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Reference

Professor Josh Lerner
Harvard Business School
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Dear Brett,

I am writing regarding three applicants from Harvard to the NBER Entrepreneurship Boot Camp.

Traditionally, we have had a somewhat lower bar for applicants from the Boston area, since they are low (or no) cost to the program, as opposed to those who need travel and lodging. This year we have three applicants from Harvard. Two of them seem quite strong and well over the bar; the third poses a few questions which we can discuss on the call when we confer about the applicants.

Lilei Xu seems like an excellent fit as a candidate. She has been working with Victoria Ivashina and I on a project on private equity co/direct investments, and has also taken our class on Theoretical and Empirical Perspectives on Entrepreneurship. In both these contexts, I have been very impressed with her maturity and analytic abilities. Her interests revolve around venture capital and entrepreneurial finance. I am optimistic that she will prove to be an excellent entrepreneurship finance researcher following the lead of Rick Townsend and Shai Bernstein, two recent very successful graduates of our PhD programs.

Yao Zhen differs from our classic applicant to the boot camp, but is quite intriguing, Yao is in the Harvard Economics Department and is focusing on the topic of theoretical asset pricing, but is very interested in incorporating perspectives entrepreneurship into these models: for instance, how the risks associated with individual actors taking uncertain actions in the real economy will be priced into the returns that investors demand. Yao took Theoretical and Empirical Perspectives on Entrepreneurship this spring and was an extremely active and thoughtful participant. Thus, I am confident that even though this may not reflect the profile of the typical applicant to the boot camp, Yao will be an active participant and benefit considerable from taking part in the seminar series.

The more challenging case is Filippo Mezzanotti. He has been one of my advisees in the Harvard Business Economics program, and seems very interested in entrepreneurship as a research area. He will be working as a research assistant for a project with Shai Bernstein and myself this summer on a project on private equity and the great recession, and has worked previously as a research assistant for Paula Sapienza and Luigi Zingales. But he is a first-year doctoral student at the moment without a well-defined research agenda. I know that the admissions committee has often felt that delaying participation until after oral exams (i.e., second year) is frequently desirable. I will look forward to discussing his case on our call.

I hope these comments are of use.

Best wishes,

Josh

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Pre-doctoral Studies:

MA in Economics, Peking University, highest distinction, 2010
BA in Economics, Peking University, highest distinction, 2007
BS in Electronic Science and Engineering, Beijing Institute of Technology, highest distinction, 2007

Doctoral Studies:

Harvard University, Department of Economics, 2010-present
Expected Completion Date: June 2015

Related PhD-level Courses:

Microeconomics, Macroeconomics, Econometrics, Financial Economics, Asset Pricing, Corporate Finance, Entrepreneurship, Game Theory, Contract Theory, Market Design, Psychology and Economics, Advanced Topics in Macroeconomics (I, II)

Teaching and Research Fields:

Primary fields: Asset Pricing, Corporate Finance, Entrepreneurial Finance
Secondary fields: Theory

Honors, Scholarships, and Fellowships:

2012	Invited participant at the Price Theory Summer Camp, Becker Center, the University of Chicago
2011-2012	Douglas Dillon Fellowship, Harvard University
2011	Invited participant at the Princeton Initiative: Macro, Money and Finance, Bendheim Center for Finance, Princeton University
2010-2012	Harvard University Graduate Fellowship
2007-2010	Guang Hua Fellowship, Peking University
2007	Distinguished Student of the Nation, Ministry of Education, China (The most prestigious merit based award to Chinese university students, 1 out of every 250,000 university students in a given year)
2006-2007	China Economic Research Fellowship, Peking University
2005	First Prize, Chinese National College Mathematical Modeling Competition
2002	First Prize, Chinese National Mathematical Olympiad

Recent Research Papers:

"Security Design with Flexible Information Acquisition," with Ming Yang

We study the design of optimal security when information acquisition is endogenous and flexible. A seller designs a security backed by some fundamental assets and a buyer decides whether to buy it to provide

liquidity. We assume no information asymmetry before bargaining. The buyer has an expertise in acquiring information of the fundamental in the manner of rational inattention. She collects the most relevant information determined by the "shape" of the security, which may endogenously generate adverse selection that is harmful to the seller. However, the seller may also want to induce information acquisition by the buyer to help her screen the assets and provide incentives. Hence, the seller deliberately designs the security in order to induce the buyer to acquire an optimal structure of information in favor of the seller's interest. Issuing securitized debt is uniquely optimal when the aggregate risk is fixed, while when the aggregate risk depends on the consequence of trading or the seller's hidden actions, other forms of contracts such as convertible debts are optimal.

"Endogenous Higher Order Beliefs and Asset Market," with Ho-Mou Wu

Following Keynes'(1936) beauty contest metaphor, we develop a fully rational two-period model of financial market with a previous stage for investors to choose orders of beliefs as trading strategies. Investors have private signals on the future payoff of the asset with different information precisions, regardless of their choices of orders of beliefs. In equilibrium, investors with lower private signal precisions optimally choose higher order beliefs, while those with higher private signal precisions optimally choose first order belief. Moreover, the proportion of investors who choose higher order beliefs increases in the disagreement of the asset's future payoff is less, and decreases in the highest feasible order of belief.

"Communication Learning in Social Networks: Finite Population and the Rates," with Xin Tong

Following the Bayesian communication learning paradigm, we propose a finite population learning concept to capture the level of information aggregation in any given network, where agents are allowed to communicate with neighbors repeatedly before making a single decision. This concept helps determine the occurrence of effective information aggregation in a finite network and reveal explicit interplays among parameters. It also enables meaningful comparative statics regarding the effectiveness of information aggregation in networks. Moreover, it offers a solid foundation to address, with a new perfect learning concept, long run dynamics of learning behavior and the associated learning rates as population diverges. Our conditions for the occurrence of finite population learning and perfect learning in communication networks are very tractable and transparent. As the conditions for finite population learning involve only one key equilibrium outcome, which is computable through a reduced-form game, we can also numerically check the learning status.

Work in Progress:

"Information Cycles"

Conference and Invited Presentations (outside Harvard and Peking University):

2012 (scheduled)	North American Summer Meeting of the Econometric Society
2011	Columbia University; University of Southern California
2010	10th Conference of Society of Advancement of Economic Theory
2009	6th Conference of Logic, Game Theory and Social Choice; 4th China Task Force Meeting, Policy Dialogue, Columbia University
2008	8th Annual Conference of China Economic Association

Personal Statement

My name is Yao Zeng, and I am a second year PhD student in Economics at Harvard. It is my wish to attend the NBER Entrepreneurship Research Summer Camp. This desire comes from my research interests in the interactions among innovations, organization of corporations and financial markets, from my consistent study in finance from a theoretical perspective, and from the great influence I receive now from several scholars specialized in the field of entrepreneurial finance.

I enrolled in two undergraduate programs simultaneously: Electronic Engineering and Economics. My GPA in both disciplines was top, but my most exciting experience was the "innovation" beyond courses. Collaborating with my professor in photoelectric technology, I spent almost the entire senior year, struggling to improve the accuracy of an iris biological information based identity verification system from 97% to 99.99%. The system was further developed in the start-up company owned by my professor's husband who was a clinical professor in Electronic Engineering, and eventually acquired by Huawei, the largest multinational networking and telecommunications equipment and services company in China. Being a first-time innovator, I was happy for that success, but my professor was not satisfied by the "predatory acquisition" in her view. She told me how she would love to continue developing that system within their own start-up company, if further research could have been adequately financed. It is for the first time that I realized and felt the real financial constraint facing early-stage entrepreneurs. After years of study in Economics, although I do not keep working in these real-world technological innovations and also somehow disagree with my professor's view towards innovation, that past experience was rewarding to me. It in fact became my first motivation towards my research interests in financial markets afterwards. More importantly, the rigorous training in applied mathematics, physics as well as the first-hand understanding of innovation and entrepreneurial finance provided me with solid background for my current research and perhaps beyond.

In my study in Economics towards my master's degree, I was not directly working in topics regarding entrepreneurship, but I focused on topics of finance, partly because of my experience as a financial constrained inventor. Since then, I have held the view that finance research should always take the interplay between finance and real economy into account. My master thesis (now a working paper coauthored with my master supervisor, Ho-Mou Wu, a Professor of Economics at Peking University) looks into the role of heterogeneous beliefs in financial market and their implications on dynamics of asset pricing and macro economy. Another working paper (together with Ming Yang, a graduate student at Princeton) investigates problems of security design in an environment where investors acquire information about the fundamental of assets. The efforts towards these projects are rewarding, too. I receive a lot of feedback and encouragements from referees as well as other scholars in conferences, and my independent research capacity was also improved.

I was fortunate to be admitted to the PhD program of Economics at Harvard, and continued my research in finance. The great diversity and strength in frontier research within the economics community at Harvard offers me invaluable opportunities to explore even more. I have taken and audited various advanced courses

in finance, macroeconomics and microeconomic theory. I am also working on two new theoretical projects, one regarding the relation between business cycle in macro economy and behaviors of information acquisition by investors in financial markets, and the other pertaining to learning in social networks and its interplay with financial constraints (coauthored with Xin Tong, another graduate student at Princeton). In my ideas toward these new projects, I still try to keep my early belief that, clear, well-documented mechanism through which the finance markets affect real economy should be address more by researchers. This semester, I am taking the doctoral course "Theoretical and Empirical Perspectives on Entrepreneurships" taught by Professors Josh Lerner, Bill Kerr, and Ramana Nanda. No need to mention, this course reminds me of my early experience as an "entrepreneur", and also offers a perfect match to my view that any research in finance should never be separated from other aspects of real economy. Today, the research territory of entrepreneurial finance naturally spans to other sub-disciplines in traditional Economics, such as industrial organization, labor, as well as macroeconomics, and I indeed have learnt a lot from that course.

Trying preliminary research and taking courses were just a start; it was the more essential questions gradually occurring to me in past years that clarified my study and research plan in future. How can we incorporate the innovation/entrepreneurial risks into traditional risk-based asset pricing models? What factors jointly determine the organization of innovations/entrepreneurial firms and the financing approach they choose? What are the relations between financial innovation and other forms of innovations in the real economy? Do different forms of innovations, for example, marginal innovation that combine existing technologies and radical innovation that break the frontier to a new ground, require different approaches of finance? I am interested in these questions not simply because they are fundamental, but also because understanding the origin and extent of the interplay between innovations in real economy and the evolution of financial markets is highly called for in applied fields such as policy making. By discussing with professors in the Entrepreneurship course, I came to realize the importance of identifying different micro mechanisms through which behaviors of innovations/entrepreneurial firms interact with financial markets in different context. Especially, I find that I should learn to keep a deliberate balance between sticking to all sorts of theoretical models, with looking into data that documents the interested mechanisms from empirical perspectives. Also, burgeoning financial innovations regarding entrepreneurship such as venture capital, angels, micro-equity and various other forms of microfinance all inspire me to revisit the traditional framework on asset pricing and corporate finance went back to Markowitz and Modigliani-Miller. Clearly, I should receive more advanced training in my future graduate study, and I am willing to devote myself in those questions.

As Professor Lerner mentioned to me, the NBER Entrepreneurship Research Summer Camp is a great resource to students who are devoted to research in entrepreneurial finance and topics related to innovation/entrepreneurship. It delivers a really good overview of the literature and what the unanswered questions are, and makes an excellent complement to the more theory-oriented training I have received as of now. I was truly impressed and motivated by his warm suggestions. Sincerely, I hope that the summer camp will be the place where I take the next step toward my academic goals, and where I will be able to ask and perhaps start to address one of my interested fundamental questions.