February 23, 2020

National Bureau of Economic Research

1050 Massachusetts Avenue

Cambridge MA 02138-5398

Dear Professor Bloom and Professor Lerner:

I am a fourth-year finance PhD from the Wharton School, and I am thrilled to be applying for the 2020 NBER Entrepreneurship Research Boot Camp.

The application package includes my CV, a list of all completed PhD courses, a research statement. My recommendation letter will be sent separately by Professor Luke Taylor of the Wharton School. His detailed information is as follows:

Lucian A. Taylor
Associate Professor of Finance
The Wharton School
University of Pennsylvania
Tel: (215) 898-4802
Email: luket@wharton.upenn.edu

My research interests mainly lie in Entrepreneurial finance, healthcare finance, corporate finance, and industrial organization. I believe attending the boot camp could be a great chance to deepen my knowledge about the field and to further develop my research agenda.

Thank you very much for considering my application. Look forward to seeing you in Boston.

Sincerely,

Tong Liu
Ph.D. Candidate in Finance
The Wharton School, University of Pennsylvania
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Tong Liu

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EDUCATION

The Wharton School, University of Pennsylvania 2016 - Present

Ph.D. in Business Administration - Finance

China Center for Economic Research, Peking University 2013 - 2016

M.A. in Economics

Central University of Finance and Economics 2009 - 2013

B.A. in Mathematical Economics and Finance

RESEARCH INTERESTS

Entrepreneurial Finance, Healthcare Finance, Corporate Finance, Industrial Organization

PUBLICATION

[1] **Investment without Q**, (with Joao Gomes and Vito Gala), 2019, *Journal of Monetary Economics*, Forthcoming

WORKING PAPERS

[2] **Financing Experimentation**, 2019

- 2019 European Finance Association (EFA) Best Doctoral Student Conference Paper Prize
- 2019 China International Conference in Finance (CICF) Yihong Xia Best Paper Award

[3] **Do Venture Capitalists Stifle Competition?** (with Luke Taylor and Xuelin Li), 2019

[4] **An Invisible Oncologist: Implications of Financing for Cancer Patients**, (with Alexandr Kopytov and Haotian Xiang), 2019

WORK IN PROGRESS

[5] **Startup Compensation and Team Stability** (with Mauricio Medeiros Jr.)

AWARDS, GRANTS, and FELLOWSHIPS

Outstanding Discussant Award at Wharton Innovation Doctoral Symposium 2019

AFA Student Travel Grant 2019

CICF Yihong Xia Best Paper Award 2019

EFA Best Doctoral Student Conference Paper Prize	2019
John Hodges PhD Prize in Finance, University of Pennsylvania	2019
George James Travel Award, University of Pennsylvania	2019
Kleinman Center for Energy Policy Research Fund, University of Pennsylvania	2017-2018
Miller, Anderson & Sherrerd Graduate Fellowship in Finance, Wharton School	2017-2018
Mack Institute Research Grant, Wharton School	2017, 2019
University of Pennsylvania Dean's Fellowship for Distinguished Merit	2016-2021

PRESENTATIONS

*Conferences and Invited Seminars (including scheduled, * = by coauthor)*

2019/2020: 2020 Fifth Annual Young Scholars Finance Consortium*, 2020 MFA (Chicago)*, 2020 IPC Spring Research Symposium, Corporate Policies and Asset Prices (COAP) 3rd Annual Conference, 2019 EFA (Carcavelos), 2019 CICF (Guangzhou), Smith School of Business (Queen's University)*

Before 2019: 2018 AFA (Philadelphia)*, 2018 MIDAS Workshop, 2016 EFA (Oslo)*, 2016 SFS Cavalcade (Toronto)*, 2016 CICF (Xiamen)*

Discussions: 2019 Wharton Innovation Doctoral Symposium, 2017 CICF (Hangzhou), 2017 FMA Annual Meeting (Boston)

PROFESSIONAL SERVICE

Referee: Economics Letters

Program Committee: Wharton Innovation Doctoral Symposium (2017, 2018, 2019)

Co-organizer: Wharton Finance PhD Lunch Seminar (2017)

Board Member: Mack Innovation Doctoral Association (2017, 2019)

TEACHING ASSISTANCE

FNCE912, Corporate Finance & Financial Institution (PhD), Professor Itay Goldstein	Spring 2020
Guest Speaker to WH150 Evaluating Evidence (UG), Professor Iwan Barankay	Spring 2020
WH299/399, Wharton Honors Thesis (UG), Professor Catherine Schrand	Fall 2019
FNCE613, Macroeconomics and the Global Economic Environment (EMBA)	Fall 2018
FNCE726, Advanced Corporate Finance (EMBA), Professor Itay Goldstein	Spring 2018, Summer 2018, 2019
FNCE203/726, Advanced Corporate Finance (UG, MBA), Professor Christian Opp	Spring 2018, 2019
FNCE611, Corporate Finance (EMBA), Professor Itay Goldstein	Spring 2019, 2020

OTHER ACTIVITIES

Finance Theory Group Summer School (WUSTL and Wharton) 2017, 2019

Mitsui Summer School on Structural Estimation in Corporate Finance (U. Michigan) 2017

INDUSTRY EXPERIENCE

China Central Depository and Clearing Company, Beijing, China Dec.2012 - Mar.2013

A list of Completed PhD Courses

Fall 2016	ECON-701-001	Microeconomic Theory I
Fall 2016	ECON-705-001	Econometrics I: Fundamental
Fall 2016	FNCE-911-001	Financial Economics
Fall 2016	FNCE-928-001	Methods in Finance Theory
Spring 2017	FNCE-912-001	Corporate Finance and Financial Institutions
Spring 2017	FNCE-921-001	Introduction to Empirical Methods in Finance
Spring 2017	FNCE-924-001	Intertemporal Macro Finance
Spring 2017	STAT-521-001	Applied Econometrics II
Fall 2017	BEPP-931-001	Numerical Methods in Economics
Fall 2017	ECON-703-001	Microeconomic Theory II
Fall 2017	ECON-712-001	Macroeconomics and Financial Markets
Fall 2017	ECON-712-007	Empirical Industrial Organization
Fall 2017	ECON-714-001	Quantitative Macroeconomic Theory
Spring 2018	ACCT-930-301	Empirical Design in Accounting Research
Spring 2018	FNCE-810-001	Structural Estimation in Corporate Finance
Spring 2018	FNCE-922-001	Continuous-Time Financial Economics
Spring 2018	FNCE-932-001	Topics in Corporate Finance
Fall 2018	FNCE-926-001	Empirical Methods in Corporate Finance
Fall 2018	FNCE-937-001	Applied Quantitative Methods
Fall 2018	FNCE-950-001	Macro Research Seminar
Fall 2018	FNCE-950-002	Research Seminar in Fin: Micro Research Seminar
Spring 2019	ECON-712-001	Topics in Empirical IO
Spring 2019	ECON-712-008	Nonparametric & Machine Learning: Nonparametric & Machine Learning Methods For Structural Estimation Problems

Personal Statement

My research interests mainly lie in Entrepreneurial finance, healthcare finance, corporate finance, and industrial organization. One of my projects empirically investigates how information frictions between entrepreneurs and investors affect their financing strategy, and how large the losses are associated with it. Specifically, it quantifies the effect of information frictions on firm value by structurally estimating a dynamic model that features volatile market valuation, strategic experimentation, and dynamic adverse selection. Entrepreneurs make decisions to access public financing by weighing market-timing incentives against the costly delay to signal by conducting additional experimentation. Leveraging the unique setting of biotech startups with drug development, I employ data variations in leading drug stages at IPOs, durations of staying private, and IPO valuations to estimate the model. I find that adverse selection is prevalent between early-stage startups and investors. My baseline estimates suggest that information frictions cause about 24% loss of ex-ante firm value, which is due to the direct effect of market belief distortions and the indirect effect of firms remaining private longer and hence burdened with higher financing costs by approximately 15%. I also document substantial variations in magnitude of the effect across VC-backed startups and firms with more effective "patent fences." These results show that information frictions have a large impact on the financing behavior of startups and firm values.

In another paper coauthored with Luke Taylor from the Wharton School, and Xuelin Li from the Carlson School of Management, we study whether venture capitalists stifle competition. We find that common ownership leads venture capital (VC) firms to stifle competition among startups, but only in limited circumstances. Our evidence is from pharmaceutical startups, where common ownership is widespread: 39% of startups share a VC with a close competitor. After a startup sees a close competitor make progress on a new drug project, the startup is less likely to

advance its own project, and less likely to obtain VC funding, if the two startups share a common VC. These anticompetitive effects, however, are concentrated in markets with few competitors, VCs with larger equity stakes, and projects with similar technologies.

In an ongoing project collaborated with my colleague, we study the compensation structure within startups and how it affects the stability of their teams. By exploiting Brazilian data on private firms and exogenous changes of exchange rate between Brazil and its main exporting destinations as a quasi-natural experiment, we observe that during downturns founders reduce their own wages while compensation of employees does not change. This pattern is associated with a lower probability of worker leaving or being fired. Our evidence uncovers a new channel through which startups adjust labor compensation structure to provide insurance to their workers guaranteeing team stability.

Given my research interests, I believe attending the boot camp could be an excellent opportunity to deepen my knowledge about the research field and to further develop my research agenda. It's also a precious chance to meet and interact with the most prominent researchers of entrepreneurship research, as well as fellow students who share similar research interests. It enables me to get more exposures on the frontier of current research topics and to bounce new ideas off other participants.

Thanks again for considering my application. I really hope to have the opportunity to attend the boot camp and meet everyone in Boston this summer!

Finance Department

The Wharton School
University of Pennsylvania

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luket@wharton.upenn.edu
Luke Taylor
Associate Professor of Finance

February 26, 2020

Dear Committee:

It is my pleasure to recommend **Tong Liu** for the NBER Entrepreneurship Research Boot Camp. I am one of Tong's main advisors at Wharton. Tong is one of the best PhD students I have ever advised. I recommend him without any reservations.

Tong's research is a very good match for the boot camp. Tong, Xuelin Li, and I have coauthored a paper called "Do Venture Capitalists Stifle Competition." This paper shows that common ownership leads VCs to stifle competition among pharmaceutical startups, but only in limited circumstances. This topic is very relevant to the boot camp. Tong has started presenting our paper in conferences, including the 2020 IPC Spring Research Symposium at UNC. Tong's dissertation is also about entrepreneurship. It is still in its early phases, so I prefer not to reveal many details about it.

Tong has several strengths. He comes up with great questions to study. He has an uncanny ability to get his hands on amazing datasets. He works incredibly hard. He is a clear and creative thinker. Despite speaking English as a second language, he is a fairly good presenter. I would coauthor with Tong again without thinking twice.

Please don't hesitate to contact me if you have questions about Tong.

Sincerely,
Luke Taylor