Tianshu Lyu
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January 18, 2022

Dear Committee,

I am writing to apply for the NBER Entrepreneurship Research Boot Camp in July 2022. I am currently a second-year Ph.D. student in financial economics at the Yale School of Management.

With ongoing research at the intersection of venture capital, sustainability, and behavioral finance, the boot camp is a great opportunity for me to gain broader exposure to entrepreneurship as a field and form new research ideas at the intersection of these topics. I describe my research interest and motivation for the boot camp in detail in the essay attached.

I enclose in this application the following materials:

1. A current CV
2. A list of current and completed PhD courses
3. An essay describing my research and reasons for wanting to attend the boot camp

Moreover, you should be receiving a recommendation letter for me directly from Jessica Jeffers, Assistant Professor at the University of Chicago Booth School of Business (jessica.jeffers@chicagobooth.edu).

Thank you for your consideration.

Sincerely,
Tianshu Lyu

TIANSHU LYU
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EDUCATION

YALE SCHOOL OF MANAGEMENT New Haven, CT
Ph.D. in Financial Economics 2020 – Present

- **Research Interests**: Entrepreneurship, Sustainability, and Behavioral Finance
- **Coursework:** see a list of PhD courses attached below the CV

THE UNIVERSITY OF CHICAGO Chicago, IL
Graduate Student-At-Large 2018 – 2020

- **PhD Coursework**: Theory of Income I (Fernando Alvarez; B+), Corporate Finance II (Amir Sufi; Audit)
- **Other Coursework:** Analysis in Rn I (Real Analysis, Topology; A)

MIT SLOAN SCHOOL OF MANAGEMENT Cambridge, MA
Master of Finance, June 2018 2017 – 2018

- **GPA**: 5.0/5.0; Financial Engineering Concentration; 2018 MFin Excellence Award
- **PhD Coursework:** Econometrics (Victor Chernozhukov; A+)
- **Master Coursework:** Financial Theory, Financial Engineering, Corporate Finance, Options & Futures Markets, Asset Management, Advanced Analytics of Finance, International Capital Markets, Fixed Income Securities & Derivatives

NEW YORK UNIVERSITY Shanghai, China
Bachelor of Science in Computer Science and Business & Finance Double Major, magna cum laude 2013 – 2017

- Business & Finance, GPA: 3.95/4.0; Computer Science, GPA: 3.89/4.0; **Cumulative GPA**: 3.86/4.0
- **Honor Thesis** in Business & Finance: On Performance and Persistence of Mutual Funds in China
- **Thesis** in Computer Science: Scalable Data Structure for the Discovery of Frequent Itemsets
- **Honors:** Honors in Business Major (4 out of more than 100 students), Business Honor Program, Founders' Day Award, NYU Shanghai Excellent Graduate, 2015/16 Recognition Award, Dean's Undergraduate Research Fund

WORK IN PROGRESS

SHORT-RUN UNDERREACTION WITH DELAYED OVERREACTION IN CORPORATE EARNINGS GROWTH 2021

- I document both short-run underreaction and long-run overreaction to earnings growth in the cross-section of stock returns. In contrast, earnings level only exhibits short-run underreaction, consistent with the literature. I jointly explain under- and over-reaction to growth with overextrapolation with noisy, dispersed information.

WORKING PAPER

THE RISK AND RETURN OF IMPACT INVESTING FUNDS 2021
(with Jessica Jeffers, and Kelly Posenau)

- **Abstract:** We provide the first analysis of the risk exposure and consequent risk-adjusted performance of impact investing funds, private market funds with dual financial and social goals. We introduce a new dataset of impact fund cash flows constructed from financial statements. When accounting for market risk exposure, impact funds underperform the market, though not more so that comparable private market strategies. We exploit known distortions in measures of VC performance to characterize the risk profile of impact funds. Impact funds have substantially lower market beta than VC funds, contradicting the idea of sustainability as a "luxury good." We find that impact fund cash flows do not exhibit positive correlation with a public market sustainability factor, consistent with the idea that private and public market sustainability strategies capture distinct exposures.
- **Presentations:** (* indicates presentation by co-author): (2021) NBER Entrepreneurship*, Chicago Booth*, Columbia*, Toronto*, U. Washington*, PERC Symposium*, UN PRI Academic Network Conference, Early Career Women in Finance Conference*, Oklahoma*, SoCal PE Conference*, Workshop on Entrepreneurial Finance and Innovation* (2020) Chicago-Area Entrepreneurship Workshop*

TEACHING EXPERIENCE

YALE SCHOOL OF MANAGEMENT New Haven, CT

Teaching Assistant

Behavioral Finance Spring 2022
(MBA and Master, by Professor Nicholas Barberis)

Financial Markets and Macroeconomic Policy Fall 2021
(MBA and Master, by Professor Alp Simsek)

PROFESSIONAL EXPERIENCE

UNIVERSITY OF CHICAGO BOOTH SCHOOL OF BUSINESS Chicago, IL

Research Professional, Fama-Miller Center for Research in Finance June 2018 – July 2020

Stefan Nagel

- Verified proposition proofs related to characteristics-based stochastic discount factor
- Calculated pricing errors of SDF on equity portfolios and ran bootstrap samples with *MATLAB*
- Performed ridge regressions with different model selection schemes on past equity returns to predict future equity return for working paper, *Market Efficiency in the Age of Big Data*
- Collected and cleaned GCF tri-party repo data for *Treasury Inconvenience Yields during the COVID-19 Crisis*
- Collected GC repo, CD and Treasury note/bill data series for extension of QJE paper, *The Liquidity Premium of Near-Money Assets*

Zhiguo He

- Conducted instrumental variable and difference-in-differences analysis on working paper, *Pledgeability and Asset Prices: Evidence from the Chinese Corporate Bond Markets*
- Collected and organized data on Chinese bond market and produced all the tables and graphs in *Chinese Bond Market and Interbank Market,* chapter for *the Handbook of China's Financial System*
- Plotted Chinese corporate bond maturity shortening effects over years
- Performed web scraping on blockchain websites using *Python* and *Selenium*; Conducted regression analysis on working paper, *Decentralized Mining in Centralized Pools*
- Conducted empirical analysis on working paper, *Margin Trading and Leverage Management*

George M. Constantinides

- Verified calculation for an asset pricing model on the utility cost of household income shocks correlated with the business cycle on working paper, *Welfare Costs of Idiosyncratic and Aggregate Consumption Shocks*
- Calculated model results with variations in parameter estimates using *R*

Jessica S. Jeffers

- Investigated the cross section of expected equity premium on firms' carbon emissions
- Quantified and cleaned impact private equity & venture capital fund contract data with limited partners and portfolio companies using *Python*
- Produced analysis on working paper, *Contracts with Benefits: The Implementation of Impact Investing*
- Helped Wharton Social Impact Initiative with data organization on impact fund contracts and financial statements
- Performed fuzzy match between firm sample from LinkedIn and Compustat with *Python*

Elisabeth Kempf

- Cleaned corporate credit rating data from Mergent FISD, Moody's DRD and S&P Capital IQ and credit analyst personal information from web scraping for working paper, *Partisan Professionals: Evidence from Credit Rating Analysts*

MIT SLOAN - MSCI Boston, MA

Joint Finance Research Practicum January 2018 – April 2018

- Implemented four metrics to evaluate factor crowding in systematic trading strategies and examined the predictive power of factor crowding on market total and idiosyncratic returns
- Applied K-means clustering on common stock characteristics, calculated average crowding measure in each cluster and found this definition of crowding is statistically significant in predicting market idiosyncratic returns

MIT SLOAN - ACCENTURE Cambridge, MA
Joint Analytics Lab (Natural Language Processing) September 2017 – December 2017

- Performed sentiment analysis on earnings call transcripts during Q&A sessions using financial lexicons
- Analyzed the effect of CEO and CFO sentiment on explaining "surprises" in stock returns

NEW YORK UNIVERSITY Shanghai, China
Research Assistant, "Textual Analysis on Corporate Financial Constraints" October 2016 – May 2017

- Assisted Professor Yiqing Lü in textual analysis on firms' 10-K filings to measure levels of corporate financial constraints with *Perl*

SHANGHAI SECURITIES LLC. Shanghai, China
Mutual Fund Evaluation Center Research Intern June 2016 – August 2016

- Improved performance of asset allocation model by building an ordered logistic model in *Stata* to predict Shanghai Composite Index return based on daily stock price

ADDITIONAL INFORMATION

- **Certificate:** Passed CFA Level I in July 2017; Machine Learning at Stanford University on Coursera; Deep Learning Specification at deeplearning.ai on Coursera
- **Programming**: Stata, MATLAB, Python, R, SAS, Java, Perl, C; HTML, CSS, JavaScript, PHP
- **Database**: CRSP, Compustat, I/B/E/S, Mergent FISD, CSMAR, Moody's Default and Recovery Database, MSCI KLD, Bloomberg Terminal, Wind Database, Thomson Reuters, S&P Capital IQ

Current PhD Courses

YALE UNIVERSITY

Ph.D. in Financial Economics, expected May 2026

- Household Finance (James Choi)
- Financial Crisis (Gary Gorton)
- Applied Empirical Methods (Paul Goldsmith-Pinkham)
- General Economic Theory: Macroeconomics II (Giuseppe Moscarini)
- Continuous Time Finance (Jonathan Ingersoll)

Completed PhD Courses — Grade

YALE UNIVERSITY[1]

Ph.D. in Financial Economics, expected May 2026

- Behavioral Finance (Nicholas Barberis) — H
- Financial Econometrics (Bryan Kelly) — H
- Financial Economics I (Jonathan Ingersoll & Stefano Giglio) — H
- Advanced Macro I (George-Marios Angeletos, Zhen Huo) — H
- General Economic Theory: Macroeconomics I (Zhen Huo, Michael Peters) — H
- Econometrics II (Timothy Armstrong) — H
- Econometrics I (Donald Andrews) — H
- General Economic Theory: Microeconomics II (Johannes Horner, Ryota Iijima) — HP
- General Economic Theory: Microeconomics I (Larry Samuelson, Johannes Horner) — HP
- International Finance (Costas Arkolakis, Ana Cecilia Fieler) — Audit
- Natural Language Processing (Dragomir Radev) — Audit

THE UNIVERSITY OF CHICAGO

- Theory of Income I (Fernando Alvarez) — B+
- Corporate Finance II (Amir Sufi) — Audit

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Master of Finance, June 2018

- Econometrics (Victor Chernozhukov) — A+

[1] Yale graduate school uses the following grading policy: H – Honors, HP – High Pass, P – Pass, F – Fail

Dear Committee,

I am a second-year Ph.D. student in Financial Economics at Yale School of Management. My research interests lie in sustainability, venture capital, and behavioral finance. I am applying to the NBER Entrepreneurship Boot Camp because I am eager to develop a solid foundation in entrepreneurship research. I am actively doing research in venture capital and social impact, and would greatly benefit from participating in the program. Entrepreneurship is an exciting field with a rapidly growing body of cutting-edge research, and I believe the NBER boot camp is the best place to master this body of work. I would like to develop a research agenda connecting questions in innovation with social impact and behavioral science, both of which, I think, can expand our understanding of entrepreneurship.

My first exposure to the field occurred when I was a full-time research assistant in the Fama-Miller Center at Chicago Booth from 2018 to 2020. I worked as a research assistant for Professor Jessica Jeffers. I assisted on her paper about the contract design of impact investing funds, which has since been published in the Journal of Financial Economics (Geczy, Jeffers, Musto, and Tucker (2021)). Impact funds are private equity funds investing in projects with the dual mandate of financial and social performance. This dual objective introduces a new dimension to the contracting problem for funds, investors, and portfolio companies, and I enjoyed learning about the intersection of contract theory and venture capital. Working on this project also convinced me that venture capital is an interesting place to explore how finance can help address sustainability issues, because in early stages, capital providers exert more influence on both deal sourcing and governance.

Therefore, after the research assistantship, I began working on a joint project with Jessica and Kelly Posenau (Booth PhD student) again on impact investing funds. In this paper, we are interested in the risk-adjusted performance of the impact funds. We study the risk exposure and risk-adjusted performance of these funds and conclude that impact funds are significantly less exposed to systematic risk than traditional venture capital. We also find that on a risk-adjusted basis, impact funds perform on par with VC funds. Backing out risk exposure on private funds is hard because the cash flows are infrequent and skewed. We extend the Korteweg and Nagel (2016) framework and use a new moment (difference between PME and GPME) to infer beta. The paper has been presented at many conferences, including the NBER Entrepreneurship Working Group, SoCal PE Conference, and WEFI. I enjoy working on this project because, using new methodology, it provides novel and important understanding about risk and returns, which could attract new capital to impact funds and help address sustainability issues.

For my future research plan, I am interested in working on entrepreneurship in two main directions. First, I want to continue exploring how entrepreneurship could promote social impact. One way is

through venture capital investments. Impact investing funds, similar to VC funds, screen in and choose projects that suit their goals. Therefore, impact funds are more likely to invest in projects with positive impact, compared to public markets. Understanding more how well they perform screening is helpful in studying more directly how social and financial performance interact.

Innovation is another way that finance can facilitate solutions to social and environmental issues. The emergence of green patents, for example, is one way to incentivize the development of sustainable ideas. However, Cohen, Gurun, and Nguyen (2020) find that firms with low ESG scores are key innovators in green patents. This raises many interesting questions for future research. What incentivizes these companies to invest in green innovation? Are they producing true impact or is this more of a marketing endeavor, in other words, "greenwashing"? Also, this paper focuses on public companies. How do private firms conduct green innovations, especially start-up and growth companies? These questions are interesting and essential in understanding the optimal way to finance green innovations.

Finally, another research direction I am interested in is the intersection of entrepreneurship with behavioral finance. This is a relatively new field but understanding behavioral biases of entrepreneurs and/or investors is essential to figure out how to incentivize innovation, which in turn stimulates economic growth. Existing literature mainly explains why entrepreneurship is popular despite low returns, because of overconfidence (Camerer and Lovallo (1999)), non-pecuniary benefits, or preference for skewness (Moskowitz and Vissing-Jørgensen (2002)). However, there are many new questions to be explored. Are entrepreneurs always overconfident? Hebert (2021) finds some entrepreneurs are pessimistic and they learn from errors over time. Then what are the different implications of optimistic and pessimistic entrepreneurs? On the other hand, what behavioral biases do private investors have? Hu and Ma (2021) show that they screen not only on content but also on delivery of the pitch, which leads to subsequent under-performance. Are there other biases and how are they different from public investors? How large are the welfare costs of inefficient funding decisions? These are just examples of many questions I want to explore in this exciting intersection.

Given my research plan, the NBER Entrepreneurship Boot Camp is an excellent opportunity to dive into the novel and exciting literature in entrepreneurship. I also want to get involved in the entrepreneurship research community. I was honored to join the NBER working group meeting in Fall 2021 and find the group really friendly and supportive. Finally, the boot camp would be an invaluable experience to interact with peers who have similar research interests and seek potential collaborations. I sincerely hope that I can be a participant in the workshop and get the chance to learn about the field and interact with the active researchers in entrepreneurship.

References

Camerer, C. and D. Lovallo (1999). Overconfidence and Excess Entry: An Experimental Approach. *American Economic Review 89*(1), 306–318.

Cohen, L., U. G. Gurun, and Q. H. Nguyen (2020). The ESG-Innovation Disconnect: Evidence from Green Patenting. Technical report, National Bureau of Economic Research.

Geczy, C., J. S. Jeffers, D. K. Musto, and A. M. Tucker (2021). Contracts with (Social) benefits: The implementation of impact investing. *Journal of Financial Economics 142*(2), 697–718.

Hebert, C. (2021). Learning from Errors in Entrepreneurship. Available at SSRN: https://ssrn.com/abstract=3947926.

Hu, A. and S. Ma (2021). Persuading Investors: A Video-Based Study. Available at SSRN: https://ssrn.com/abstract=3583898.

Korteweg, A. and S. Nagel (2016). Risk-Adjusting the Returns to Venture Capital. *Journal of Finance 71*(3), 1437–1470.

Moskowitz, T. J. and A. Vissing-Jørgensen (2002). The Returns to Entrepreneurial Investment: A Private Equity Premium Puzzle? *American Economic Review 92*(4), 745–778.