

Yale SCHOOL OF MANAGEMENT

ALLEN HU
Ph.D. Student in Financial Economics

PO Box 208200
New Haven CT 06520-8200
T 617 755-6260
allen.hu@yale.edu
https://anallenhu.com

courier
165 Whitney Ave
New Haven, CT 06511

March 16, 2020

Professor David Robinson
Fuqua School of Business
Duke University
100 Fuqua Drive
Durham, NC

Dear Professor Robinson and Review Committee,

I am writing to apply to the NBER Entrepreneurship Research Boot Camp 2020. I am a second-year Ph.D. student in financial economics at Yale School of Management.

Through the introduction of Professor Song Ma, who is also my recommendation letter writer, I come to know this amazing summer program. I believe this is a great opportunity for me to get more exposure to the cutting-edge research in entrepreneurial finance, on which I pursue to conduct more work in the future.

Thanks for your consideration. I look forward to hearing from you.

Sincerely,

Allen Hu

REFERENCE
Song Ma
Assistant Professor of Finance
Yale School of Management
+1 (203) 436-4687
song.ma@yale.edu

March 2020

Allen Hu

165 Whitney Ave Ph.D. Suite, New Haven, CT 06511
Tel: +1 (617) 755 6260 *Email*: allen.hu@yale.edu
Web: https://anallenhu.com

EDUCATION

Yale School of Management
Ph.D. in Financial Economics *2018 – Present*

Tsinghua University
B.E. in Industrial Engineering *2013 – 2017*
Minor in Finance

RESEARCH POSITIONS

Harvard Business School & Tsinghua PBC School of Finance
Full-time Research Assistant *2017 – 2018*
Joint research assistantship for Professor Lauren Cohen, Christopher Malloy, and Ning Zhu

RESEARCH INTERESTS

Behavioral Finance, Asset Pricing, Entrepreneurial Finance, and Unstructured Data Analysis

WORKING PAPERS

"Human Interactions and Financial Investment: A Video-based Approach"
(with Song Ma), 2019
Abstract: Economic decisions are often made after human interactions. This paper proposes a flexible and extendable empirical framework to study micro-level human interactions and their connections to financial investment decisions. Using machine learning-based algorithms with videos as data input, we project human interactions to three-V dimensions—visual, vocal, and verbal, and construct easily interpretable metrics along these dimensions. The framework and methodology are applied to pitch videos in which entrepreneurs pitch to investors for funding. We find that startup founder(s)'s behaviors differ significantly in their pitches. Venture investors are more likely to invest in startup teams that show more positivity (i.e., happy, warm, passionate), but startup teams showing such features underperform conditional on investment. These features in human interactions carry more weight when evaluating female entrepreneurs individually, but women are often neglected when presenting together with their male teammates. First impressions formed in the first five seconds are adequate to predict investment behaviors. Overall, we do not find that human interactions allow venture investors to extract valuable information about startups on net. In contrast, these interactions appear to introduce and amplify social cognitive biases.

"Exploited by Complexity"
(with Paul Gao, Peter Kelly, Cameron Peng, and Ning Zhu), 2020
Abstract: Due to their complex features, structured financial products harm the average investor. But, can some investors benefit from this complexity? Using account-level transaction data of retail structured funds, we show that the rich (sophisticated) benefit from complexity at the expense of the poor (naive). The poor-to-rich wealth transfer that results from trading complex financial products is an order of magnitude greater than the wealth transfer from trading non-structured products. In an event study, we further confirm that the wealth transfer can be partially explained by investors' differing responses to complexity. In particular, when a market crash triggers funds into a restructuring process and their prices are expected to shrink by half on a given day, the poor and naive subset of investors fail to respond effectively. As a result of trading in the wrong direction, they suffer substantial losses.

WORK IN PROGRESS

"Self-Selected or Designated: Which SIC Code is True?"

Abstract: Firms deviate from the regulatory provision when self-reporting industry classifications on the public information platform. This leads to a pervasive (more than 20%) discrepancy between firms' SIC codes presented on EDGAR (self-selected by firms) and the SIC codes recorded in Compustat (designated according to the regulatory rule). This information inconsistency is due neither to higher information quality of EDGAR nor to the mismatch of time horizons but rather to opportunistic actions of firms who seek to categorize themselves into industries with higher valuations. This firm-induced friction doubles the equity return comovement between firms and their self-selected industries and generates return predictability at the firm and industry levels. After taking the opportunistic actions, firms are 40% more likely to restate their financial reports and invest aggressively in the following year.

"Real Life Experience and Financial Risk Taking: Evidence from Automobile Traffic Accidents"

(with Yinglu Deng and Ning Zhu)

Abstract: Utilizing records on automobile accident insurance filing and retail investor investment activities, we show that investors trade less, trade less aggressively, hold more diversified and less risky portfolios, and obtain relatively better returns, after experiencing automobile accidents. Such patterns are particularly strong for those suffer personal injury and above-average financial damage from the accidents. Our paper is among the first to provide direct evidence on the causal relationship between real life risk events and investors' risk preference in investment.

TEACHING EXPERIENCES

Yale School of Management

Teaching Assistant

Financial Economics I — *Fall 2019*
(Ph.D. Asset Pricing Theory, by Professor Jon Ingersoll and Stefano Giglio)

Entrepreneurial Finance — *Spring 2020*
(MBA, by Professor Song Ma)

Corporate Finance — *Spring 2020*
(MBA, by Professor Kelly Shue)

AWARDS & FELLOWSHIPS

2020 AFA Travel Grant

2020 Eastern Finance Association Distinguished Student Paper Award

Yale University Fellowship

Tsinghua Scholarship for Excellence in Academics, Social Activities, and Social Practice

SEMINARS & CONFERENCES

2020 Western Finance Association (WFA)*, SFS Cavalcade NA*, Trans-Atlantic Doctoral Conference (TADC), Financial Intermediation Research Society (FIRS)*, Toronto Rotman Gender and Entrepreneurship Workshop*, NBER Corporate Finance Program Meeting*, Eastern Finance Association × 3, Young Scholars Finance Consortium*, Midwest Finance Association (MFA) × 3, RFS/GSU FinTech Conference*, Yale SOM Finance Lunch, AFA Poster Session

2019 Junior Finance Conference at Indiana University*, Washington St. Louis Corporate Finance Conference*, China Financial Research Conference (CFRC)*

2018 NBER Chinese Economy Working Group Meeting*, China Financial Research Conference (CFRC)*, Summer Institute of Finance Conference (SIF)*

(including scheduled, * by coauthors)

INVITED PARTICIPATION

2019 NBER New Developments in Long-Term Asset Management Meeting
2019 Princeton Financial Economics of Insurance Workshop
2015 Tsinghua PBC School of Finance Summer Camp

CURRENT & COMPLETE PHD COURSES

Financial Economics I *Fall 2018*
(Instructor: Jonathan Ingersoll and Stefano Giglio)
Microeconomics I *Fall 2018*
(Instructor: Larry Samuelson, Eduardo Dávila, and John Geanakoplos)
Econometrics I *Fall 2018*
(Instructor: Donald Andrews)
Empirical Asset Pricing *Spring 2019*
(Instructor: Bryan Kelly)
Empirical Corporate Finance *Spring 2019*
(Instructor: Kelly Shue)
Microeconomics II *Spring 2019*
(Instructor: Johannes Hörner)
Econometrics II *Spring 2019*
(Instructor: Xu Cheng)
Macroeconomics I *Fall 2019*
(Instructor: Zhen Huo and Fabrizio Zilibotti)
Industrial Organization *Fall 2019*
(Instructor: Philip Haile and Mitsuru Igami)
Labor Economics *Fall 2019*
(Instructor: Costas Meghir)
Continuous-Time Finance *Fall 2019*
(Instructor: Jonathan Ingersoll)
Behavioral Finance *Spring 2020*
(Instructor: Nicholas Barberis)
Financial Crises *Spring 2020*
(Instructor: Gary Gorton and Andrew Metrick)
Theoretical Corporate Finance *Spring 2020*
(Instructor: Zhiguo He)
Household Finance *Spring 2020*
(Instructor: James Choi)

Yale SCHOOL OF MANAGEMENT

Statement of Interest

ALLEN HU
Ph.D. Student in Financial Economics

PO Box 208200
New Haven CT 06520-8200
T 617 755-6260
allen.hu@yale.edu
https://anallenhu.com

courier
165 Whitney Ave
New Haven, CT 06511

I am a second-year Ph.D. student in Financial Economics at Yale School of Management. I am writing to apply for the NBER Entrepreneurship Research Boot Camp 2020. Entrepreneurial finance is one of my primary research fields, in which I plan to conduct more research in the future.

I came to know the research in entrepreneurial finance during my gap year at Harvard Business School, working as a full-time research assistant. Professor Lauren Cohen, with whom I worked the most closely at HBS, runs an Entrepreneurship and Innovation Seminar. I reconfirmed my interest in entrepreneurial finance after I entered the doctoral program at Yale and had many discussions on these topics with Professor Song Ma. In my opinion, entrepreneurial finance is an emerging and interdisciplinary field, integrating knowledge in corporate finance, innovation, industrial organization, and labor economics.

My main research methodology is to leverage state-of-the-art computer science techniques (e.g., machine learning, textual analysis, and video processing) to explore novel and non-standard datasets. I think entrepreneurial finance is a perfect research field for me. Unlike the information on public firms that is comprehensively available in some professional databases with standard formats, the profiles of small and young firms are, in general, hard to access and often come with unstructured formats. Thus, my research plan in this field is to use cutting-edge data science techniques to explore unstructured data and answer entrepreneurship-related questions.

Following this research plan, I am currently working on a project "Human Interactions and Financial Investment: A Video-based Approach" with Professor Song Ma. In this paper, we study several largest accelerators and incubators in the U.S. and how they make decisions on the investment in very early-stage startups. We focus on micro-level human interactions in startups' online application video pitches and study how social psychology forces shape the cognition and perception and further affect the decision-making of venture investors. We attempt to answer the following questions—In an environment of high information asymmetry and incomplete contracting, are human interactions providing valuable information or introducing and amplifying social cognitive biases in the financing of startups?

We focus our study on a setting where human interactions may be particularly important—startup founder(s) pitching to early-stage incubators, and an unstructured data format which can capture all dimensions of human interactions—videos. Specifically, we collect thousands of highly standardized pitch videos of startup founders at the time of applying to top accelerator programs online. We first propose a flexible and extendable framework to represent human interaction, extract and measure its key features. Using machine learning-based algorithms with videos as data input, we project human interactions to three-V dimensions—visual (e.g., facial expressions), vocal (e.g., tone of voice), and verbal (e.g., the content and sentiment of the communication), and construct easily interpretable metrics along these dimensions. These measures include visual emotions (e.g., positive, negative) and beauty, audio emotions (e.g., positive, negative, valence, arousal), and textual sentiment and psychological features (e.g., warmth, ability-oriented). We then study human interactions' connections to venture investors' investment decisions and startups' long-run performance. We find that venture investors are more likely to invest in startup teams that show more positivity (i.e., happy, warm, passionate), but startup teams showing such features underperform conditional on investment. This suggests that human interactions may introduce and amplify social cognitive biases instead of providing additional valuable information about startups.

The richness of video data also allows us to explore other important theories in social psychology (e.g., gender stereotyping and first impressions) and their roles in the venture investment decisions. We find that positivity features in human interactions carry more weight when evaluating female entrepreneurs individually, but women are often neglected when presenting together with their male teammates. Besides, first impressions formed in the first five seconds are adequate to predict investment behaviors.

I think the NBER Entrepreneurship Research Boot Camp is a perfect opportunity for me to get more exposure to a broader research frontier in entrepreneurial finance. As a second-year Ph.D. student, I am eager to know more about the literature and to conduct my independent research as soon as possible. It would be really inspiring to meet and communicate with the leading scholars and peers who are interested in the same topic. I would really appreciate it if you could offer me the chance to join this amazing summer program.

Yale SCHOOL OF MANAGEMENT

SONG MA
Assistant Professor of Finance

PO Box 208200
New Haven CT 06520-8200
T 203 436-4687
song.ma@yale.edu
som.yale.edu/ma

courier
165 Whitney Avenue, Room 4524
New Haven CT 06511

Re: Recommendation Letter for Allen Hu

Dear David and the Review Committee,

I am writing to recommend Allen Hu for the 2020 NBER Entrepreneurship Research Boot Camp. Allen is a PhD student in finance from Yale School of Management, and I am working closely with him on research and teaching related to entrepreneurship and entrepreneurial finance. My recommendation is based on our regular interactions and coauthor-ship.

To start from the conclusion—Allen gets my strongest possible recommendation. He is the best PhD student I've ever seen at his stage, and I have no doubt that he will be a valuable boot camper for the class of 2020. I recommended Allen to the camp last year, but he was only a first-year student and the review committee correctly pointed out that he might benefit from the program more in future years. This year, I believe Allen is fully prepared and I hope you can admit him to the boot camp.

Let me begin by describing our joint paper, "Human Interactions and Financial Investment: A Video-Based Approach." In this paper, we re-examine a fundamental question in entrepreneurial finance—how do investors, like venture capitalist, make their investment decisions? We approach this question with a new angle: instead of focusing on the hard information or personal traits of investors, we study "human interactions"—that is, the interactions between people during which one party, like the entrepreneurs, pitches to the investors, like the venture capitalist. We care about the verbal content, but more importantly the visual and vocal features like facial expressions, vocal emotion, etc.

Our study uses a setting where human interactions may be particularly important—startup founder(s) pitching to early-stage incubators. We exploit an unstructured data format which can capture comprehensive dimensions of human interactions—videos (imagine the Zoom calls that we are using everyday now for teaching, virtual seminars, or even "virtual coffee break". We collected thousands of highly standardized pitch videos of startup founders at the time of applying to top accelerator programs online. We first propose a flexible and extendable framework to represent human interaction, extract and measure its key features. Using machine learning-based algorithms with videos as data input, we project human interactions to three-V dimensions—visual (e.g., facial expressions), vocal (e.g., tone of voice), and verbal (e.g., the content and sentiment of the

communication), and construct easily interpretable metrics along these dimensions. These measures include visual emotions (e.g., positive, negative) and beauty, audio emotions (e.g., positive, negative, valence, arousal), and textual sentiment and psychological features (e.g., warmth, ability-oriented). We then study human interactions' connections to venture investors' investment decisions and startups' long-run performance.

We show that venture investors are more likely to invest in startup teams that show more positivity (i.e., happy, warm, passionate), but startup teams showing such features underperform conditional on investment. This suggests that human interactions may introduce and amplify social cognitive biases instead of providing additional valuable information about startups.

This working paper, of which Allen is a full contributing coauthor, has attracted a lot of attention during the circulation. To me, this paper is a clear indicator of Allen's sharp and promising research plan (let me not use the word "agenda" for now)—to develop and apply cutting edge empirical methodologies, including machine learning, unstructured data, big and high frequency data, in entrepreneurship-related studies. We have several projects along this line that we are working on together.

Allen is at the stage where the boot camp training can really help him further his research, and that is why I really hope Allen can join the boot camp this year. The boot camp will for sure teach him valuable lessons ranging from the literature, the appreciation of research questions, among other things. I have no doubt (but will personally monitor to ensure) that Allen will read all required papers carefully and actively contribute to the discussion in class. I will also work closely with him and give advice as he explores the literature more broadly.

All told, Allen is an extremely promising PhD student who is eager to learn more about and conduct research in entrepreneurship and entrepreneurial finance. I hope that you give Allen serious consideration for a spot in the boot camp this year. Please do not hesitate to contact me for any further questions.

Sincerely yours,

