Sophia Hua
✉ *huaye@wharton.upenn.edu*

Dear
Madam/Sir

December 9, 2019

I am writing to apply for the NBER Behavioral Macroeconomics Research Boot Camp. Currently I am a third-year PhD student in Finance at the Wharton School in the University of Pennsylvania.

My current research interest lies in Bayesian application in finance and modelling beliefs under information frictions. Recent macroeconomics literature makes me aware of the shortfall of rational expectation equilibrium. So far, my research has been focusing on addressing asset pricing puzzles through the channel of learning. To proceed from here, I believe future research should take into account subjective expectation and information processing frictions. As such, I find the workshop an excellent opportunity for me to gain insights from the leading minds in the field of behavioral macroeconomics. The confluence of ideas would be invaluable.

Lastly, you may contact Professor Jessica Wachter (jwachter@wharton.upenn.edu) for reference if needed. I look forward to find inspiration for my future research agenda from the workshop. Thank you for your consideration.

Best Regards,

Sophia Hua

Sophia Hua

University of Pennsylvania
The Wharton School
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Education

The Wharton School, University of Pennsylvania
Ph.D., Finance, 2017 - present.

University of Toronto
B.S., Economics and Statistics (with High Distinction), 2013 - 2017.

Research Interest

Asset Pricing, Financial Econometics

Research

"Do Subjective Expectation Resolve Asset Pricing Puzzles?" (2018)
Abstract: Weitzman (2007) introduces subjective expectations and structural uncertainty into consumption-based asset pricing. The strong force of the prior and the evolution of consumption volatility make learning non-ergodic and effectively flatten the tail of consumption growth distribution. Without pinning down a finite value to the risk-free rate or risk premium, he postulates that the framework has the potential to reverse the long-standing asset pricing puzzles. Nevertheless, Bakshi and Skoulakis (2010) restrain the support of consumption volatility and show that the model requires an implausible level of uncertainty to explain a high risk premium and a low risk-free rate. Moreover, the output is knife-edge sensitive to perturbations in model specification. We extend the model to the class of exponential-power distribution (see Shephard (1994)) to directly incorporate heavy tails in consumption realizations. The extension also fails to explain the puzzles, suggesting that variance, measuring the spread, and kurtosis, controlling the tail, should be on an equal footing in the setup.

"Learning About Crash Risk" (2019) with Jessica Wachter

Abstract: In the United States a lucky survivor? To what extent is the US equity performance biased upward due to rare disasters that never occur in-sample? We introduce a model featuring common priors which uses cross-sectional information to update one's belief about the probability of rare events (market crashes) in the US. Crash belief in the US shows per- sistent and widening divergence from the implied global average. Crash probability in the US increases by 1% after correcting for survivorship bias, but is still 3% below the implied global average. If allow for time-varying disaster probability, a rational agent in the model overweights recent versus remote experiences in inferring disaster probability. The model justifies heightened subjective crash beliefs post-crises and produces an exponential decay in the memory of crises.

Teaching

The Wharton School, Univeristy of Pennsylvenia
Accelerated Corporate Finance, MBA, 2019 & 2018

Department of Mathematics, University of Toronto
Calculus, Undergraduate, 2016

Awards

University of Toronto Excellence Award
2017
First Place in Waterfront Quantathon (Quantitative Finance Hackathon)
2016
University of Toronto Scholar
2015, 2014
Stefan Stykolt Scholarship in Economic Theory
2015
Samuel Beatty In-Course Scholarships
2015
Adel S Sedra Undergraduate Scholarship in Mathematics
2014

Workshops

2019 MIT-FARFE Capital Markets Research Workshop
Organized by Leonid Kogan

2018 Stanford PhD Masterclass Mutual Fund in Equilibrium
Organized by Johnathan Berk and Jules van Binsbergen

2018 SoFiE Summer School on Machine Learning and Finance
Organized by Bryan Kelly and Dacheng Xiu

Conferences

2018 AFA in Philadelphia

Languages and Skills

English, Mandarin
MATLAB, Python, R, Stata and SQL

Personal Statement

Sophia Hua
huaye@wharton.upenn.edu

I am writing to apply for the 2020 NBER Behavioral Macroeconomic Bootcamp. I am currently a third-year PhD student at the Wharton School in the University of Pennsylvania. My primary research interest involves applying Bayesian learning to the financial market and modeling beliefs under information frictions.

Coming from a statistics background, I am very much fascinated with the Bayesian mindset. I find it implausible that, under rational expectation equilibrium, agents know the transition dynamics of the underlying state variables and the exact parameter values that govern the transition. In the past two years, I wrote both of my summer papers modelling the effect of parameter uncertainty and learning on asset prices. Following Weitzman's intuition, I show that in an economy where the representative agent is uncertain about the volatility of the consumption process, the standard Gaussian assumption on the conditional consumption growth distribution breaks down. Learning about the unknown volatility never catches up with the state transition. As a result, the predictive consumption growth become heavy-tailed, with substantial downside. The model has the potential to address major asset pricing puzzles despite mathematical intractability. In a separate attempt, I look at the global equity market over the past century and model the belief formation of an agent who learns about the probability of rare event by aggregating information across countries. The model produces a shrinkage effect on the posterior estimate of disaster probability and corrects for the survivorship bias of the US equity market by borrowing information from the cross section. Moreover, I show that a rational agent in an ever-evolving economy has fading crisis belief. When the transition dynamic is Markov and the agent updates rationally, recent experience weighs more heavily towards forecasting tomorrow and the model implies an exponential decay in one's memory of crises.

To be frank, my experience with behavioral economics has been limited. Nevertheless, since the past summer I have been attending the *Memory, Beliefs and Choice* reading group where we discuss neuropsychological foundations of decision-making. What strikes me the most is that people have limited information processing capacity. I believe this is especially true in the big data world given the high noise-to-signal ratio and the implication that people need to be selective toward what information to consume. In addition, the encoding of information into memory and the subsequent retrieval are both subject to frictions. Combined with heterogeneous preference and belief, I believe models that consider human limitations in decision-making is essential for future macroeconomic and finance research.

All in all, I would appreciate the opportunity to learn more about behavioural macroeconomics from the workshop. Meanwhile, I also look forward to find inspiration for my future research agenda. Thank you for your consideration.

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AT THE GRADUATE LEVEL

* * * * * * * * * * * **ACADEMIC PROGRAM** * * * * * * * * * * *

School: WHARTON
Division: WHARTON PHD
Degree Program: DOCTOR OF PHILOSOPHY
Graduate Group: FINANCE

* * * * * **UNIVERSITY OF PENNSYLVANIA COURSE WORK** * * * * * *

Fall 2017		**WHARTON PHD**				
	ECON	701	MICROEC THEORY I	1.00	CU	A
	ECON	705	ECONOMETRICS I: FUND	1.00	CU	A
	FNCE	911	FINANCIAL ECONOMICS	1.00	CU	A
	FNCE	928	METHODS IN FNCE THEORY	1.00	CU	A
			Term Statistics:	4.00	CU	
			Cumulative:	4.00	CU	
Spring 2018		**WHARTON PHD**				
	ECON	706	ECONOMETRICS II: METHODS	1.00	CU	A-
	FNCE	912	CORP FNCE AND FIN INSTIT	1.00	CU	A-
	FNCE	921	INTRO EMPIR METHODS FIN	1.00	CU	A-
	FNCE	924	INTERTEMPORAL MACRO FIN	1.00	CU	A-
			Term Statistics:	4.00	CU	
			Cumulative:	8.00	CU	
Fall 2018		**WHARTON PHD**				
	FNCE	925	TOPICS IN ASSET PRICING	1.00	CU	A+
	FNCE	926	EMPIRICAL METH CORP FN	(1.00)	CU	I
	FNCE	934	EMPIRICAL METH IN ASSET	1.00	CU	A
	FNCE	937	APPLIED QUANTITATIVE MET	1.00	CU	A+
			Term Statistics:	3.00	CU	
			Cumulative:	11.00	CU	
Spring 2019		**WHARTON PHD**				
	ECON	712	SEARCH THEORY & APP: Search Theory and Applications	(1.00)	CU	AUD
	ECON	712	NONPARA & MACHINE LEARN: Nonparametric & machine learning methods for structural estimation problems	1.00	CU	A
	ECON	722	ECONOMETRICS IV: ADV	0.50	CU	A
	FNCE	922	CONTINUOUS-TIME FIN ECON	1.00	CU	A
	FNCE	923	FIN ECON UNDER IMP INFO	1.00	CU	A
			Term Statistics:	3.50	CU	
			Cumulative:	14.50	CU	
Fall 2019		**WHARTON PHD**				
	ECON	712	INTRO MACRO HOUSEHLD HET	(0.50)	CU	AUD
	ECON	712	LEARNING AND INFORMATION	(0.50)	CU	AUD
	FNCE	950	RESEARCH SEMINAR IN FIN: MICRO RESEARCH SEMINAR	(1.00)	CU	NR
	FNCE	950	MACRO RESEARCH SEMINAR	(1.00)	CU	NR
	STAT	970	MATHEMATICAL STATISTICS	1.00	CU	A
	STAT	991	SEM IN ADV APPL OF STAT: High Dimensional and Nonparametric Bayes	(1.00)	CU	NR
			Term Statistics:	1.00	CU	
			Cumulative:	15.50	CU	

* * * * * * * * * * * * **COMMENTS** * * * * * * * * * * * * *

Passed Doctoral Qualifications Evaluation: 06-14-18

* * * * * * * **NO ENTRIES BEYOND THIS POINT** * * * * * * * *

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Mobile version

Gmail by Google

Elisa Pepe <epepe@nber.org>

Recommendation letter for Sophia (Ye) Hua

Wachter, Jessica A <jwachter@wharton.upenn.edu> Tue, Dec 10, 2019 at 9:56 AM
To: "epepe@nber.org" <epepe@nber.org>

Dear Review Panel:

It is my pleasure to strongly recommend Wharton Ph.D. student Sophia (Ye) Hua for admission to the behavioral macroeconomics boot camp on March 12. Sophia is a strong third-year student in our program. For the last year, she has worked on topics in Bayesian inference on rare events, and has made significant progress on a number of fronts. In her first-year paper, she significantly extends the Weitzman (2007, AER) result to distributions other than the normal one. In her second-year paper, she updates and extends Brown, Goetzmann, and Ross (1995) to quantify how investor's probabilities of rare events change when survival bias is taken into account. The latter paper has potential for publication in a major journal.

In other words, Sophia is very interested and well-trained in the topic of decision-making under uncertainty. She has been an active participant in a joint research group I have run with members of the Penn psychology department, and is interested and committed to extending the Bayesian model to encounter a broader array of facts.

I strongly recommend Sophia for your program. I am also writing for Hongye Guo — if you much choose one, choose Hongye, but I do strongly recommend you take Sophia as well if you possibly can. She would be a great addition to your intellectual community.

Best wishes,

Jessica

Jessica A. Wachter
Richard B. Worley Professor of Financial Management
Professor of Finance
The Wharton School, University of Pennsylvania
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Philadelphia, PA 19104
Homepage: http://finance.wharton.upenn.edu/~jwachter/