NBER Behavioral Macroeconomics Research Boot Camp 2020
National Bureau of Economic Research, Cambridge, MA

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Cover Letter

To Whom It May Concern

I enclose my application for the NBER Behavioral Macroeconomics Research Boot Camp, March 12, 2020.

My recommendation letter writer is my advisor Tarun Ramadorai (Imperial College London).

Please note that I am based in Cambridge during the academic year 2019-2020 and will not require reimbursement for travel or lodging expenses.

I look forward to hearing from you.

Sincerely,
Lu Liu

Cambridge, December 9, 2019

Lu Liu

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Research interests

Behavioral Economics, Household Finance

Education

Massachusetts Institute of Technology
Visiting PhD Student *2019–current*
Visiting Antoinette Schoar

Imperial College London
PhD in Finance *2016–current*
Advisors: Tarun Ramadorai, Marcin Kacperczyk

University of Oxford
MSc in Financial Economics (with distinction) *2014*

Eberhard Karls Universität Tübingen
BSc in International Economics (with highest honors) *2012*

Working papers

Non-Salient Fees in the Mortgage Market* [SSRN]
Winner of the Michael J. Barclay Young Scholar Award (FRA 2018)

This paper studies supply-side product pricing when consumers underreact to non-salient fees. Using comprehensive data on issued and offered mortgages in the UK, I document that lenders differ substantially in the fees they charge, and that borrowers appear less overall cost-sensitive to products with fees. In order to distinguish from demand factors such as unobservable preferences or product characteristics, I show that lenders pass on firm-specific funding cost shocks via fees, but not interest rates, consistent with strategic pricing of fees, and maintaining competitive prices in the salient price dimension, interest rates. I further find heterogeneity in pricing across lenders: those who rely on high fees tend to have higher funding cost, lower return on equity and larger branch networks, in line with a specialization equilibrium in which high-cost lenders are able to match with less cost-sensitive consumers.
**Previous title: Product Proliferation as Price Obfuscation? Evidence from the Mortgage Market*

Reference Dependence in the Housing Market [SSRN]
(joint with S. Andersen, C. Badarinza, J. Marx and T. Ramadorai)

We model listing decisions in the housing market, and structurally estimate household preference and constraint parameters using comprehensive Danish data. Sellers optimize expected utility from property sales, subject to down-payment constraints, and internalize the effect of their choices on final sale prices and time-on-the-market. The data exhibit variation in the listing price-gains relationship with "demand concavity;" bunching in the sales distribution; and a rising listing propensity with gains. A new fact is that gains and down-payment constraints have interactive effects on listing prices. We find reference-dependence around the nominal purchase price and modest loss-aversion, but our canonical model cannot fully explain the new facts.

Coursework

Year 1 Microeconomics, Econometrics, Corporate Finance Theory, Asset Pricing Theory, Empirical Asset Pricing, Empirical Corporate Finance, Macro-Finance

Year 2 Empirical Banking, Topics in Household Finance, Macroeconomics (LSE), Economic Theory (Behavioral section, 1 term, LSE), Economics of Industry (LSE)

Honors and awards

AFA Student Travel Grant *2019*

Michael J. Barclay Award (FRA Annual Meeting) *2018*
– For best solo-authored paper by a young scholar (PhD student or <3 years assistant professor)

FRA Student Travel Grant *2018*

Imperial College President's PhD Scholarship *2017-2021*

Economic and Social Research Council Scholarship (LISS-DTP) *2017-2021*

Dean's List for Academic Excellence, MRes Business, Imperial College Business School *2016*
– Graduated top in class

Dean's Commendation Award & Dean's List, MFE, Saïd Business School, Univ. of Oxford *2014*
– Awarded for academic excellence and contributions to the broader school environment

Haniel Graduate Scholarship (Haniel and German National Academic Foundation) *2013*
– Awarded to 5-6 students each year for graduate economics studies abroad, worth €50,000

German Academic Exchange Service and Chinese Government Joint Scholarship *2010*

Fellow of the German National Academic Foundation (Studienstiftung des dt. Volkes) *2008–2014*

Presentations and workshops

Conference and seminar presentations

2019 BoE Brown Bag, CEPR Household Finance (Lund), King's College Conference on Financial Markets*, FCA/Imperial Conference on Household Decision-Making, FCA Research Seminar, Stanford Institute for Theoretical Economics (SITE, Financial Regulation)*, UC Berkeley*, MIT Finance Student Workshop, CEPR Household Finance (Rhodes)*, Rice*, UMichigan*, UChicago*, Harvard University (Economics/HBS Finance joint seminar)*

2018 RES Symposium of Junior Researchers (USussex), Whitebox Advisors Conference (Yale SOM), Annual Meeting of the Financial Research Association (FRA, Las Vegas), AFFECT Showcasing Women in Finance (Stockholm)

(: presentation by co-author)*

Discussions

2018 CEPR European Workshop on Household Finance (London): S. Johnson, "Are Mortgage Regulations Affecting Entrepreneurship?"

Invited workshops

2019 Yale Summer School in Behavioral Finance (New Haven)

2018 EFA Doctoral Workshop on Household Finance (Warsaw)

Research and teaching experience

Imperial College London

Teaching Assistant, Tarun Ramadorai (Big Data in Finance, MSc) *2019*

Teaching Assistant, José-Luis Peydró (Banks, Regulation and Monetary Policy, MSc) *2018*

Research Assistant, Tarun Ramadorai *2017, 2018*

Eberhard Karls Universität Tübingen

Research Assistant, Claudia Buch (Empirical Banking and Finance) *2011–2012*

Teaching Assistant, Joachim Grammig (Statistics III / Quantitative Methods, BSc) *2011–2012*

Teaching Assistant, Rainer Schöbel (Corporate Finance, BSc) *2011–2012*

Research Assistant, Institute for Applied Economic Analysis, Tübingen *2009-2010*

Work experience

Bank of England

Academic Visitor & Part-time Researcher *2016–current*

PhD Intern, Macroprudential Strategy & Support Division (Financial Stability) *2017*

Economist, Macro Financial Analysis Division (Monetary Analysis) *2014–2016*

International Finance Corporation (World Bank Group)

Internship, infrastructure project finance in West Africa *2012–2013*

Deutscher Bundestag (German Parliament)

Internship, banking regulation and consumer financial protection *2009, 2012*

Other

Software: Matlab, Python, Stata, Latex

Languages: German (native), English and Chinese (fluent), French (intermediate)

Nationality: German

Gender: Female

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Essay

My studies in economics and work experience in financial and monetary policy in the context of the Great Recession have been formative for my research interests in household finance, behavioral economics and the macroeconomy. During my undergraduate studies at Eberhard Karls University Tübingen, I conducted research on consumer financial protection and banking regulation for the former deputy chairman of the financial policy committee in the German Bundestag. The experience kindled my interest in understanding (biased) household financial decision making and its macroeconomic implications, in order to inform market design and policy. As a consequence, I read for an MSc in Financial Economics at the University of Oxford. Upon graduation, I worked for two years as an economist in monetary analysis at the Bank of England where I gained first-hand knowledge of policy tools and transmission channels. Hence as a now fourth-year PhD student in Finance at Imperial College Business School and visiting PhD student at MIT, I'm interested in research on how behavioral biases and financial frictions affect household financial decisions, and how these in turn affect macroeconomic outcomes and aggregate welfare.

More specifically, I have two working papers which look at two different market outcomes when households make biased decisions. In my third-year paper for which I won the Michael J. Barclay Young Scholar award at the FRA Annual Meeting, I study supply-side pricing incentives when fees are not fully salient to consumers in the mortgage market. I use a simple discrete choice framework to show that consumers appear less sensitive to fees than interest rates. In order to rule out a demand-driven explanation based on unobserved preferences, I further show that lenders respond to firm-specific shocks to funding costs by raising existing fees on products, consistent with strategic pricing of fees, and maintaining competitive prices in the salient price dimension, interest rates. I further find heterogeneity in pricing across lenders: those who rely on high fees tend to have higher funding cost, in line with a specialization equilibrium in which high-cost lenders are able to match with less cost-sensitive consumers. I hence provide support for supply-driven incentives behind price dispersion in the mortgage market, given suboptimal consumer search.

In another co-authored paper on reference dependence in the housing market which we have presented at SITE and Harvard/HBS, we study households' listing decisions while

taking into account realistic demand-side responses using a simple structural behavioral model. We find that buyers penalize a listing premium over and above the hedonic or fair value of the house asymmetrically when the premium is positive, which can account for some of the asymmetry in listing premia over gains and losses previously attributed to a nonlinearity in preferences, i.e. loss aversion. We further find that demand-side sensitivity to listing premia varies with the homogeneity of the housing stock, the intuition being that uncertainty over the unobserved value of houses is smaller in more homogeneous markets, decreasing seller market power in an "over-the-counter" market and hence attenuating reference-dependent pricing. We further aim to apply our model of seller-buyer behavior to macroeconomic phenomena such as aggregate housing market liquidity in a follow-on paper, and to assess to what extent procyclicality in housing market liquidity can be explained by reference-dependent pricing.

In future work, I am hoping to further my understanding on household decision-making under behavioral biases and how these behavioral patterns aggregate up to more macroeconomic phenomena. I am particularly interested in to what extent behavioral biases affect households choices when they optimize on an already constrained action space, given financial and other market constraints, and in interaction with firms and financial intermediaries. I am hence keen to learn more about both theoretical and empirical advances in behavioral macroeconomics, given the dual challenge of developing a portable and unifiable framework, while providing sufficiently sharp predictions in order to differentiate between models. Furthermore, these new mechanisms are often driven by "mental objects" and may require additional tools, such as experimental approaches to elicit beliefs and expectations. I am exploring such work together with Johannes Wohlfart (KU/CEBI), for instance on beliefs about interest rates, and I would be particularly interested to learn from leading researchers in this field such as Ulrike Malmendier, Yuriy Gorodnichenko and Andrei Shleifer.

Overall, in attending the NBER Behavioral Macroeconomics Research Boot Camp, I hope to broaden my understanding of the research frontier by learning from world-leading researchers in behavioral macroeconomics, meet like-minded peers and discuss and further develop my own research ideas on household finance and behavioral macroeconomics for the next stages of my PhD and beyond.

Thank you for your time and consideration.

Lu Liu

Cambridge, December 9, 2019

Imperial College Business School

Imperial means Intelligent Business

9 December 2019

Re: Reference Letter for Lu Liu

To Whom It May Concern,

I have known Lu Liu since 2013, when she took the graduate empirical asset pricing course I taught when I was at the University of Oxford's Business School. I also supervised her individual Master's thesis project there, and kept in touch with her during her time working at the Bank of England. I am now her supervisor at Imperial College London, where she is currently enrolled in the PhD. I know Lu and her work very well.

Simply put, Lu is an outstanding student. I have no hesitation in recommending her to the NBER Behavioral Macroeconomics Research Boot Camp. In terms of her standing, she is one of the top two PhD students in her (very strong) cohort at Imperial, and easily in the top 5% of all PhD students that I have supervised during my career.

Lu's research potential is unquestionably high. Her interests lie in the intersection of behavioural economics, housing and mortgage markets, and structural estimation. She is essentially an empiricist, but one with a strong understanding of theory. She especially good at questions of identification, with a knack of coming up with thoughtful and clever strategies for instruments that enable key insights to be extracted from data. Her work is also extremely useful in a broad sense, informing the details of public policy in mortgage markets.

Lu is an unusually intellectually mature student. In her third year in the PhD she had a sole-authored paper on obfuscation in mortgage markets selected for the prestigious Financial Research Association conference. The paper was awarded the Michael Barclay rising scholar award, which she won in a field of all PhD students as well as assistant professors of less than three years standing. The fact that she beat several young professional academics to this award while still being a third-year PhD student is a testament to the quality of her work.

I have had first-hand experience of Lu's capabilities as we are also co-authors. I am currently working on a research project with her and a number of others ("Reference Dependence in the Housing Market") using a large administrative dataset from Denmark, which inspects the reasons for households' reluctance to sell their houses when prices fall, and structurally estimates preference and constraint parameters (including the parameter of loss aversion) from these data. The dataset utilizes information on the entire population of Denmark coupled with data on the entire stock of housing and mortgages in that country, and Lu has been a key contributor to the team in terms of working with the data, formulating ideas, and discussing potential pitfalls and robustness.

Lu met Antoinette Schoar who is a faculty member at MIT, during Antoinette's visit to Imperial last year. As a product of their interactions and as a testament to her strengths, Lu is now visiting MIT this year on the Shass pre-doctoral fellowship. I

Professor Tarun Ramadorai
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expect that her already strong work will benefit from exposure to the intellectual environment at MIT this year.

I would urge you to admit Lu to the Boot Camp. She would greatly benefit from the lectures, and contribute positively to the academic environment. In addition to her outstanding personal and professional qualities, Lu is also very generous with feedback and time, and would be a great contributor of positive externalities. She is universally well-respected by students and faculty alike at Imperial.

Please don't hesitate to contact me if I can help to answer any further questions about her.

Tarun Ramadorai

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Professor of Financial Economics

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