DAVID ZHANG
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Academic Appointments

Assistant Professor of Finance, 2022-Present
Jones Graduate School of Business, Rice University, Houston, TX

Education

Ph.D. in Business Economics, Harvard University, 2016-2022
Committee: John Campbell (chair), Adi Sunderam, Edward Glaeser, Ariel Pakes, Robin Lee
Fields: Real Estate Finance, Household Finance, Industrial Organization

B.A. in Economics and Mathematics, Amherst College, 2009-2013, *summa cum laude*

Teaching Experience:

Spring, 2020	Ec 2727 Empirical Methods in Finance, Teaching Fellow for Samuel Hanson and Adi Sunderam
Summer, 2018	APMA S-115 Mathematical Modelling, Teaching Fellow for Zhiming Kuang
Fall, 2018	Ec 2610 Industrial Organization I, Teaching Fellow for Ariel Pakes and Robin Lee
Fall, 2017	Ec 2610 Industrial Organization I, Teaching Fellow for Ariel Pakes and Robin Lee

Research Experience and Other Employment:

2019-2021	Graduate Intern at the Federal Reserve Bank of Boston
2019-2020	Research Assistant to Professors Ariel Pakes, Mark Shepard, and Kate Ho
2017	Research Assistant to Professor Adi Sunderam
2014-2016	Research Assistant at the Federal Reserve Bank of Boston
2013-2014	Junior Economist at Legal Economics

Professional Activities:

Invited presentations:

2022: CityUHK, HKU, Texas A&M, SMU, Boston College, University of Toronto Rotman & Mississauga, Purdue University, Rice University, Federal Reserve Board, University of Minnesota, University of Colorado Boulder, OSU PhD Real Estate Conference, AREUEA National Conference, North America Summer Meeting of the Econometric Society, Asian Meeting of the Econometric Society, NBER Summer Institute Real Estate Conference.
2021: Stanford Institute for Theoretical Economics (SITE), NBER Summer Institute Household Finance Conference, NBER Summer Institute Monetary Policy Conference*, SFS Cavalcade North America, Financial Intermediation Research Society (FIRS), CFPB Research Conference, Society of Labor Economists (SOLE), Southwest Finance Association (SWFA), Royal Economics Society (RES), Swiss Society for Financial Market Research (SGF), Asian Meeting of the Econometric Society, International Association for Applied Econometrics (IAEE), OSU PhD Real Estate Conference, Week-After Conference on Financial Markets and Institution*.
2020: Winter Meeting of the Econometric Society, Atlanta Fed/Princeton Bendheim Conference on Racial Justice and Finance*, System Applied Microeconomics Conference, System Econometrics Conference*, Harvard Finance, IO, Econometrics, Labor, Lunches.
2019: Harvard Finance, IO, Labor* Lunches.
2018: International Industrial Organization Conference, Harvard Finance, IO Lunches.

[*] Indicates presentation by co-author.

Referee Service:	*Journal of Monetary Economics, Journal of Urban Economics, Real Estate Economics, Journal of Housing Economics, Managerial and Decision Economics, International Review of Economics & Finance*

Honors, Scholarships, and Fellowships:

2021	Best Paper Award, OSU PhD Real Estate Conference
2019	Lab for Economic Applications and Policy (LEAP) grant, Harvard University
2018	Certificate of Teaching Excellence, Harvard Bok Center for Teaching and Learning
2018	Wayfair Datathon, 1st place team, $20000 prize
2016-2021	Harvard Business School Doctoral Fellowship
2013	Bernstein Prize in Economics

Research Papers:

"*Closing Costs, Refinancing, and Inefficiencies in the Mortgage Market*"

In the US, borrowers often finance the price of mortgage origination by agreeing to higher mortgage rates for a given principal amount. I show that for standard fixed-rate, prepayable mortgages this contractual feature has two consequences. First, it leads to increased transfers between borrowers who refinance at different speeds. Second, it creates deadweight losses by incentivizing too much refinancing. Using both reduced form analysis and a structural model of mortgage choice, I show that both effects are large. Average transfers between borrowers increase by over 90%. Borrowers who would otherwise not refinance do so only to receive more transfers, an effect that accounts for around one quarter of all refinancing and generates significant deadweight losses due to administrative resource costs. Alternative contract designs that (i) add origination costs to the loan balance or (ii) make mortgages automatically refinancing can simultaneously reduce transfers and increase total welfare.

"*Do Lenders Still Discriminate? A Robust Approach for Assessing Differences in Menus*", with Paul Willen

We use a new methodology to assess mortgage pricing discrimination by race. We make four main contributions. First, we show that existing estimates of mortgage pricing differences by race can be confounded by a "menu problem," which is the problem associated with evaluating equality in opportunity under multi-dimensional pricing. Though under-appreciated, the menu problem is broadly relevant in economic assessments of differences in opportunity given data on outcomes. Second, we provide a general methodology for resolving this menu problem based on relatively weak economic assumptions. More specifically, we use pairwise dominance relationships in mortgage pricing supplemented by restrictions on the range of plausible menus to define (1) a test statistic for equality in menus and (2) a difference in menus (DIM) metric for assessing whether one group of borrowers would prefer to switch to another group's menus. Our metrics are robust to arbitrary heterogeneity in borrower preferences across racial groups over the menu items, are sharp in terms of identification, and can be efficiently computed using methods from Optimal Transport. Third, to conduct statistical inference we devise a new procedure for hypothesis testing in the value of Optimal Transport problems based on directional differentiation. Fourth, we use our methodology to estimate mortgage pricing differentials by race on a new data set linking 2018--2019 Home Mortgage Disclosure Act (HMDA) data to Optimal Blue rate locks. We find robust evidence for mortgage pricing differentials by race, particularly among Conforming mortgage borrowers who are relatively creditworthy.

"*Mortgage Prepayment, Race, and Monetary Policy*", with Kristopher Gerardi and Paul Willen **(R&R at Journal of Financial Economics)**

Over the period 2005 to 2015, Black borrowers paid more than 40 basis points higher mortgage interest rates than Non-Hispanic white borrowers. We show that the main reason is that NonHispanic white borrowers are much more likely to exploit periods of falling interest rates by refinancing their mortgages or moving. Black and Hispanic white borrowers face challenges refinancing because, on average, they have lower credit scores, equity and income. But even holding those factors constant, Blacks and Hispanic white borrowers refinance less suggesting that other social factors are at play. Because they are more likely to exploit lower interest rates, white borrowers benefit more from monetary expansions. Policies that reduce barriers to refinancing for minority borrowers and alternative mortgage contract designs can significantly reduce racial mortgage rate inequality.

"*The Cost of Being Underbanked: Racial Disparities in Access to PPP Loans and its Equilibrium Implications*", with Jeffrey Wang

Many government support programs for small businesses are designed to pass through banks and credit unions. However, this poses barriers for minority communities that are less connected to financial institutions for obtaining this support. Using the latest program for supporting small businesses, the Paycheck Protection Program (PPP), as an example, we show that there was a large disparity in the density of PPP enrolled lenders by racial composition of the neighborhood. This difference is both due to a lower density of lenders in those neighborhoods in general, and by the fact that the banks and credit unions that do operate there are smaller, are less likely to have previous relationships with the Small Business Administration, and are less likely to enroll in the program. More heavily Black neighborhoods have significantly lower take-up of PPP loans particularly in lower population (more rural) areas where this disparity is most salient. Through an instrumental variables analysis, we show that the intensive margin of access to enrolled lenders can explain about 35% of the racial disparity in take up within the relevant areas. Our results suggest that government programs that provide "support through banks" can have undesirable distributional implications.

"*Do Judge-Lawyer Relationships Influence Case Outcomes?*", with Tianwang Liu **(R&R at Journal of Legal Studies)**

We examine whether law school alumni relationships between the lawyers and judges affect case outcomes. We show that in the context of medical malpractice lawsuits in Florida, the plaintiff lawyer sharing the same law school as the judge increases the chances of recovery by 2%. Furthermore, the effect is confined to younger lawyers who see a 4% increase in the likelihood of recovery from having been to the same law school as the judge, and is absent in older lawyers. We interpret our results as evidence that lawyers gain school-specific human capital from their law schools which helps in their interactions with judges that graduated from the same school, and that this school-specific human capital become less important further on in the lawyers' careers.

"*Semi-Parametric Estimation of Counterfactuals in Dynamic Discrete Choice Models*"

I develop a new method for estimating counterfactuals in dynamic discrete choice models, a widely used set of models in economics, without requiring a distributional assumption on utility shocks. Applying my method to the canonical Rust (1987) setting, I find that the typical logit assumption on utility shocks can lead the researcher to conclude that the agent's counterfactual choice probabilities are much more sensitive to policy changes than what a semi-parametric model would suggest. Therefore, my method may be useful to applied researchers in generating policy counterfactuals that are robust to such distributional assumptions.

Publications:

Ishii, Jun, and David Hao Zhang. 2017. "*Options Compensation as a Commitment Mechanism in Oligopoly Competition*". *Managerial and Decision Economics* 38 (4):513–525.

Shy, Oz, Rune Stenbacka, and David Hao Zhang. 2016. "*History-based versus uniform pricing in growing and declining markets*". *International Journal of Industrial Organization* 48:88–117.

Programming Languages:
Python, Matlab, Stata, LaTex

Citizenship Information:
Canadian citizen