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**Fields of Concentration:**

Primary fields: Urban Economics, International Trade  
Secondary field: Industrial Organization

**Desired Teaching:**

Macroeconomics  
International Economics  
Applied Econometrics

**Comprehensive Examinations Completed:**

2018 (Oral): International Trade (with distinction), Macroeconomics (with distinction)  
2017 (Written): Macroeconomics, Microeconomics

**Dissertation Title:** *Essays in Urban and Spatial Economics*

**Committee:**

Professor Costas Arkolakis (Chair)  
Professor Samuel Kortum  
Professor Katja Seim

**Degrees:**

Ph.D., Economics, Yale University, 2023 (expected)  
M.Phil., Economics, Yale University, 2019  
M.A., Economics, Yale University, 2018  
M.A., Economics, Tsinghua University, 2017  
B.A., Economics (with distinction), Tsinghua University, 2014

**Fellowships, Honors, and Awards:**

University Dissertation Fellowship, 2022  
Nathan Hale Associates Scholarship, Yale University, 2021  
Carl Arvid Anderson Prize, Yale University, 2020  
Cowles Foundation Fellowship, Yale University, 2017-2021  
Doctoral Fellowship, Yale University, 2017-2021  
Academic Excellence Scholarship, Tsinghua University, 2013,2015  
Mitsubishi International Scholarship, Tsinghua University, 2012  
Freshmen Scholarship, Tsinghua University, 2010-2013  
Gold Medal of China Physics Olympiad, 2009

**Teaching Experience:**

Spring 2020, 2022 Teaching Assistant to Prof. Aleh Tsyvinski and Dr. William Hawkins,  
Introductory Macroeconomics (Undergraduate), Yale University  
Fall 2021, Teaching Assistant to Prof. Ana Cecilia Fieler,  
Growth and Macroeconomics (Graduate), Yale University  
Summer 2021, Teaching Assistant to Prof. Zvika Neeman,  
Introduction to Game Theory (Graduate), Yale University  
Spring 2021, Teaching Assistant to Prof. Ana Cecilia Fieler,  
International Finance (Undergraduate), Yale University  
Fall 2019, Teaching Assistant to Prof. Fabrizio Zilibotti,  
Growth and Macroeconomics (Graduate), Yale University

**Research and Work Experience:**

Research Assistant to Prof. Costas Arkolakis, 2018-2020  
Research Assistant to Prof. Fabrizio Zilibotti, 2017-2018

**Working Papers:**

"Measuring Welfare Gains from Online Stores: Theory and Evidence from the Supreme Court's Wayfair Decision" with Yang Su, (November 2022), *Job Market Paper*

**Work In Progress:**

"The Economics of Traveling: A Study of High-Speed-Railway Expansion," (June 2021)  
"E-commerce and the Retail Apocalypse," (October 2021).

**Seminar and Conference Presentations:**

North American Meeting of the Urban Economics Association, October 2022.  
Asian Meeting of the Econometrics Society, June 2017.

**Languages:**

Mandarin (native), English (fluent)

## References:

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## Dissertation Abstract

### **Measuring Welfare Gains from Online Stores: Theory and Evidence from the Supreme Court's Wayfair Decision** (with Yang Su) *Job Market Paper*

We study how the rise of e-commerce has reshaped consumer welfare and its distributional implications in the presence of retail oligopoly. Specifically, we ask how online shopping benefits consumers by providing additional shopping options, saving travel costs, and fostering price competition. We also ask how the rise of e-commerce differentially impacts households differ in geographic areas and incomes. To answer those questions, we face two empirical challenges: (1) limited micro-data on omnichannel shopping behaviors to learn consumer heterogeneity and (2) credible estimates of online-offline substitution elasticities to evaluate consumer welfare. We make progress on both fronts by combining brand-new micro-data on consumer omnichannel shopping receipts with an exogenous tax shock, the Supreme Court's Wayfair Decision, to estimate the substitutability of online stores.

Based on new receipts data from Numerator, we document considerable consumer heterogeneity in the online retail market: Households living in rural areas rely more on online shopping; Conditional on the same zip code, rich households are 30% more likely to shop online than the poor.

We then leverage an exogenous tax shock from the Supreme Court's Wayfair Decision, decided on June 2018, to learn about consumer online demand and firm pricing responses. The Wayfair Decision allows states to charge sales tax for out-of-state sellers even if the seller does not have a physical presence in the taxing state. Additionally, each state enacted the Wayfair Decision following a state-specific timeline. The rich variation in level and timing of sales tax rate changes helps us learn about online store substitutability. In the descriptive analysis, we deploy an event study design to visualize the effects of the Wayfair Decision on the sales and firm pricing responses. We find that: (1) the Wayfair Decision decreased pre-tax sales by 5%; (2) online retailers set uniform pricing and don't respond to local shocks; and (3) offline retailers increased their local prices by 2%. We also estimate the reduced-form substitution elasticities using the sales tax changes as price instruments. We find that stores belonging to the online channel and the same retailer are more substitutable.

Motivated by these findings, we develop and estimate a structural demand and supply model focusing on the pet food retail market. On the demand side, consumers choose shopping stores based on prices, distance, and quality, allowing for flexible substitution patterns. On the supply side, firms incur different logistical costs to fulfill online and offline orders.

We estimate the model exploiting variation in tax shocks and spatial variation in consumers' choice sets and firms' fulfillment centers. Our estimation yields two findings. First, low-income households are more price-sensitive and distance-averse than the rich. But main differences in online expenditure between the rich and the poor come from their perception of store quality. Second, our estimates suggest that the logistical cost to fulfill an online order is 40% higher than that of an offline order.

We use the model to evaluate overall and distributional welfare effects. The average consumer welfare gains from online shopping are 17% of their shopping budget, which can be decomposed into gain from variety (9%), gain from convenience (5%), and gain from price competition (3%). We further characterize the distributional effects of the rise of e-commerce and find it has reduced consumption inequality between rural and urban areas but increased consumption inequality between the rich and the poor.

### **The Economics of Traveling: A Study of High-Speed-Railway Expansion**

Travel flows across cities are large, and infrastructure facilitating human mobility over longer distances has recently raised policymakers' attention. However, how human mobility affects regional development and welfare remains underexplored due to limited measurement of travel flows and their mixed purposes. In this paper, I use high-frequency GPS data of mobile maps app users in China to measure travel flows across cities and their business or leisure activities. I find that spatial frictions in the form of travel time significantly shape travel flows, and travelers' business and leisure activities are associated with the industrial composition of the business service and tourism sectors in the cities. To study how infrastructure improvement affects regional development and welfare through human mobility, I examine China's recent expansion of the High-Speed-Railway system (HSR) since HSR only reduces people's travel costs, not goods' trade costs. I develop and estimate a new spatial model with worker and consumer mobility to study how HSR (1) boosts business and leisure travel, (2) reshapes the industrial structure of cities, and (3) brings unequal welfare gains across cities. Ignoring the human mobility aspect of infrastructural improvement could underestimate the welfare gains by 0.3 percent.

### **E-commerce and the Retail Apocalypse**

I study the long-run effect of the rise of e-commerce on retail branch closures. I first develop a tractable framework to study the equilibrium effect of online penetration on retail firms' branching decisions. To gauge the causal impact of rising e-commerce on the retail apocalypse, I use a shift-share design exploiting cross-retailer variations in online exposure stemming from the initial sectoral composition of the retailers and instrumenting local online market share using online penetrations in other geographically separating markets. The rise of e-commerce caused retail branch closures, but the effects are minor.