Zhewei Xie

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Education

University of Texas at Austin, M.A. in Economics — Jul. 2024 – Present

Real Analysis; Causal Inference; Game Theory; Industrial Organization; Structural Econometrics

South China University of Technology, B.E. in Software Engineering — Sep. 2016 – Jun. 2020

Mathematical Analysis; Linear Algebra & Analytic Geometry; Probability & Mathematical Statistics; Discrete Mathematics; Algorithms; Data Structure; Database System

Research Interests

Applied Microeconomics · Industrial Organization · Urban Economics · Environmental and Energy Economics

Research Experience

Research Assistant, University of Texas at Austin - Austin, TX — Jul. 2025 – Nov. 2025
Advisor: Dr. Yiming Xu

Mixed-Charging Coordination for Shared Autonomous Electric Vehicles — Sep. 2025 – Nov. 2025

- Generated synthetic travel demand distributions calibrated to real-world trip records to reflect empirically grounded mobility patterns in shared autonomous electric vehicles systems.
- Formulated the mixed charging and routing coordination problem as a Mixed-Integer Linear Programming (MILP) model, capturing infrastructure heterogeneity, demand variability, and battery dynamics.
- Used facility shadow prices derived from MILP duals to evaluate marginal benefits of charging infrastructure expansion and guide hypothetical deployment strategies.
- Evaluated platform performance via large-scale agent-based simulations, modeling individual decision processes.

Spatial–Temporal–SOC (State of Charge) Network Modeling for SAEV Routing — Aug. 2025 – Sep. 2025

- Constructed a unified spatial–temporal–State-of-Charge network to represent idle, repositioning, charging, and service operations in SAEV fleets.
- Pruned the network using dynamic demand and battery feasibility constraints, achieving tractability without sacrificing behavioral fidelity.
- Solved the resulting operational planning problem as a minimum-cost flow optimization, providing a scalable and interpretable routing and charging strategy.

Research Assistant, University of Texas at Austin – Austin, TX — Jun. 2025 – Oct. 2025
Advisor: Dr. Nitya Pandalai-Nayar, Dr. Ha Bui

- Collected large-scale Chinese and English news data from publicly available sources and implemented an automated data acquisition pipeline to support the construction of a structured research database.
- Developed automated scripts to extract key attributes from articles, ensuring accuracy and consistency in data preprocessing.
- Conducted manual classification and semantic interpretation of news content to enhance dataset relevance for empirical economic analysis.
- Utilized programming, data structuring, and text analysis skills to support empirical economic research.

Industry Experience

Game Engine Development Engineer, Gbits – Shenzhen, China — Jul. 2020 – Jul. 2023

- Led promotional campaigns and identified the uneven, long-tail effects of advertising on user conversion, retention, and revenue growth, informing more data-driven marketing optimization.
- Participated in project pre-research and initiation, analyzing how government regulatory constraints shape enterprise performance metrics and raise project approval thresholds, thus translating policy environments into practical strategic considerations.
- Developed an in-depth understanding of how repeated waves of industry-wide technological development (e.g., cloud gaming, metaverse, GAI) reshape product planning and long-term strategic roadmaps, translating technological shocks into actionable business insights.

Working Papers

Economic Disparities in Ride-Sharing Pricing

The study exploits Chicago's 2020 ride-hailing congestion tax as a quasi-experimental shock and implements a Diff-in-RDiT design with a weekday-aligned 2019 placebo window. Trip-level Transportation Network Provider (TNP) data are merged with census-tract socioeconomic indicators, transit and taxi activity, and weather controls. The results show that fare increases were largest in high-income areas and smallest in low-income areas: approximately +$1.97 (high), +$1.83 (middle), and +$1.26 (low) within a ±15-day window under a linear trend. These findings remain stable across bandwidth choices, polynomial trends, and log-price specifications, consistent with proxy-based third-degree price discrimination.

Strategic Bidding and Spite in Combinatorial Clock Auctions

The paper develops a utility framework with interdependent (spiteful) preferences to explain demand expansion and price jumps observed in the FCC's Combinatorial Clock Auctions. Using WARP and GARP revealed-preference tests, the study shows that bidding paths that appear inconsistent with quasilinear utility can be rationalized once bidders derive disutility from rival surplus. In the Auction 107 (2020–21, C-band) clock phase, the study documents 23 WARP and 43 GARP violations, and estimates that a moderate spite parameter (≈ 0.35 for T-Mobile) rationalizes these behaviors. The results suggest that "irrational" demand expansion may reflect strategic rivalry intrinsic to the CCA price discovery process.

Reassessing the Robinson–Patman Act

The study constructs a dynamic Salop circular-city model to examine wholesale price discrimination between chain retailers and independent stores. It shows how moderate upstream cost asymmetries can induce competitive exclusion and deter entry, even when retail prices fall initially and consumers appear to benefit in the short run. The analysis reframes the Robinson–Patman Act as a policy tool aimed at preserving long-run consumer welfare by maintaining market openness and preventing cumulative market concentration.

Joint Optimization of Repositioning and Dual-Mode Energy Replenishment for SAEV Fleets
with Dr. Yiming Xu

The paper develops a MILP-based operational framework for shared autonomous electric vehicle fleets that jointly optimizes routing, repositioning, and dual-mode energy replenishment (fast charging and battery swapping). It shows that fast charging and swapping are not perfect substitutes: each aligns with different spatial-temporal demand patterns, mobility constraints, and infrastructure congestion conditions. The study characterizes the resulting investment–service performance Pareto frontiers, illustrating how fleet operators trade off infrastructure scale, vehicle availability, and wait-time reliability under alternative deployment strategies.

References

Listed in alphabetical order by first name.

Dr. Cody Tuttle
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University of Texas at Austin
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Dr. Ha Bui
Department of Economics
Grinnell College
Email: buithuha@grinnell.edu

Dr. Nitya Pandalai-Nayar
Department of Economics
University of Texas at Austin
Email: npnayar@utexas.edu

Dr. Stephanie Houghton
Department of Economics
University of Texas at Austin
Email: shoughton@utexas.edu

Dr. Svetlana Boyarchenko
Department of Economics
University of Texas at Austin
Email: sboyarch@eco.utexas.edu

Skills

Empirical Methods: Causal inference, Structural modeling, Agent-based simulation
Programming & Tools: Python, R, Stata, LaTeX, GIS, SQL, C++, C#, HLSL, Git
Computational Skills: Big-data processing, Parallel computing, ML pipelines, Web scraping