Hansen Pen
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EDUCATION

Ph.D. Economics, Rice University — Expected 2026
B.A. Economics and B.S. Mathematics, University of Texas at Austin — 2020

SKILLS

Programming: Python (Pandas, Scikit-learn, and Matplotlib), SQL, Julia, Matlab, Stata, LaTeX
Econometric Modeling and Causal Inference: Dynamic Demand and Supply Modeling, Structural Model Estimation, Difference-in-differences (DID), Experimentation (A/B Testing), Bayesian Statistics, Time Series Analysis
Machine Learning: Predictive Modeling (XGBoost), Classification, Non-convex Optimization, Neural Networks (GANs)

PROFESSIONAL AND RESEARCH EXPERIENCE

Applied Scientist Intern, LinkedIn — Summer 2025

- Managed and processed large-scale network datasets from ad auction marketplace, using SQL for extraction and Python for preprocessing, feature engineering, and model training.
- Designed and implemented competition metrics (e.g., Herfindahl–Hirschman Index) and integrated them into predictive models, yielding a 10% improvement in overall eCPM forecasting accuracy and 20% at the campaign level.
- Enhanced anomaly detection by incorporating network-based signals and designing a categorization framework, revealing 15% of eCPM anomalies are associated with competitive dynamics, enabling more targeted investigation.

Research Fellow/Teaching Assistant, Rice University — 2020-Present

- Conducted extensive research in Empirical Industrial Organization, utilizing structural and statistical modeling.
- Assisted in teaching 10+ Ph.D. and undergraduate courses, holding regular office hours, leading recitation lectures, and providing feedback on structural estimation codes written in Julia and Matlab.

RESEARCH PROJECTS

"Mergers, Market Structure, and the Rise of E-Cigarettes" (Job Market Paper)

- Analyzed vaping manufacturers' pricing adjustments to market structure shifts by cleaning, visualizing, and modeling millions of consumer purchase and retail sales records.
- Built and estimated a structural discrete choice model capturing state dependence and unobserved heterogeneity in consumer behavior, which provided key insights into the increased market concentration in the vaping industry.
- Merger simulations show higher prices and lower sales for the major e-cigarette and tobacco firms, with a 0.72% decline in consumer surplus and a 1.05% increase in smoking-attributable health costs (SAHC).

"Evaluating the Cost Effectiveness of Subsidies for Solar Panels in New York State"
Best Student Paper Award in 2024 United States Association for Energy Economics North American Conference (USAEE)

- Collected and processed a comprehensive dataset from government sources to analyze the effectiveness of subsidy programs designed to increase residential solar panel adoption in New York State.
- Employed Generalized Method of Moments (GMM) Estimation and solved a non-convex optimization problem using Nelder-Mead and L-BFGS algorithms, demonstrating robust out-of-sample performance.
- Quantified the effects of policy changes, projecting that removal of the federal tax rebate would increase carbon costs by $16.62 million and reduce solar panel adoptions by 21%, providing valuable insights for policy evaluation.

"Horizontal Merger and Complementary Availability in the Video Game Industry"

- Analyzed the impact of Microsoft's acquisition of Activision on market structure and consumer welfare in the video game industry, using a dataset of sales and pricing data collected via web scraping.
- Simulated a hypothetical 20% removal of titles from PlayStation 4 to assess changes in competitive dynamics, revealing a 0.2% price reduction and a 1.43% decrease in consumer surplus.

"Net-Metering Matters More than You Think: Evidence from California"

- Evaluated the impact of California's Net Metering Policy (NEM) on both solar panel adopters and installation companies, using time-series regression and Long Short-Term Memory (LSTM) networks to model adoption trends.

AWARDS AND FELLOWSHIPS

Graduate Fellowship, Rice University — 2020 - Present
Center for Computational Insights on Inequality and Society Grant, Rice University — 2025
Dissertation Research Improvement Grants, Rice University — 2025
Samuel Fain Carter Fellowship in Economics for outstanding academic performance, Rice University — 2024
Undergraduate Research in Economics Fellowship, UT Austin — 2020
Unrestricted Endowed Presidential Scholarship, UT Austin — 2019