Hoang Nguyen

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EDUCATION

Georgetown University — Washington, D.C., USA
Ph.D. Candidate in Economics — 2020–2026 (expected)
Committee: John Rust, Dan Cao, Whitney Newey

National Economics University — Hanoi, Vietnam
B.A. Banking and Finance — 2013–2017

RESEARCH INTERESTS

Econometrics, Machine Learning and Operations Research

WORKS IN PROGRESS

Neural Networks for Efficient Estimation of High-Dimensional Dynamic Discrete Choice Models (Job Market Paper)

I propose the Neural-Network Efficient Estimator (NNES) for structural dynamic discrete choice models with high-dimensional state vectors. NNES replaces grid/sieve policy evaluation with a deep network for the value function and estimates structural parameters by maximizing a penalized likelihood that enforces the Bellman equation. I prove that (i) the policy-iteration map retains a zero Jacobian property, (ii) the resulting likelihood score is Neyman Orthogonal, and therefore (iii) the estimator is $\sqrt{n}$-consistent and semiparametrically efficient while the information matrix remains block-diagonal. Here, n is the sample size. These properties hold under network approximation rates of order $o(n^{-1/4})$, attainable with over-parameterised Neural Nets for certain class of functions. I provide simulation evidence showing that NNES delivers the same precision as full-information maximum likelihood, demonstrating its attractiveness in high-dimensional settings.

Automatic Debiased Machine Learning for Dynamic Discrete Choice

Numerous causal and structural effects rely on regression estimates, such as policy effects and parameter estimation in economic structural models. Such regressions may involve high-dimensional covariates, so machine learning approaches are of interest. However, putting machine learning models together with identifying equations can result in regularization and model selection bias. This paper introduces a method to automatically debias in Dynamic Discrete Choice problems. This debiasing method does not require the analytically form of the bias correction term to be given. It is applicable to all forms of regression learning techniques, including neural networks, random forests, Lasso, and other techniques available for high-dimensional data. The paper also supplies robust standard error estimations to address misspecification, rates of convergence of bias correction, and asymptotic inference conditions for basing the estimation of a range of structural effects.

Corrections to "Locally Robust Semiparametric Estimation" (with Whitney Newey and William Liu)

In this note, we provide clarifications, corrections, and additional details on the dynamic discrete choice example of the "Locally Robust Semiparametric Estimation" paper, especially on its accompanying Monte Carlo simulations. These adjustments do not affect the conclusions of the paper, but do ensure that the results are meaningful and reproducible.

How Well Can Neural Networks Approximate Equilibrium Policy Functions in Macroeconomic Models? (with Dan Cao and Wenlan Luo)

TEACHING EXPERIENCE

Georgetown University — Washington, D.C., USA
Instructor — 2025

- ECON-1357 - Essential Mathematics for Economics

Georgetown University — Washington, D.C., USA
Teaching Assistant — 2021–2025

- ECON-2120 - Introduction to Econometrics
- ECON-122 - Economic Statistics
- ECON-2544 - International Finance
- ECON-122 – Introduction to Econometrics

PROFESSIONAL EXPERIENCE

Georgetown University — Washington, D.C., USA
Research Assistant to Professor Dan Cao — 2022

TECHCOMBANK — Hanoi, Vietnam
Quantitative Risk Analyst — 2017-2019

HONORS AND AWARDS

Summer School in Dynamic Structural Econometrics at University of Lausanne Grant	2023
Summer School in Dynamic Structural Econometrics at MIT Grant	2022
Georgetown University Summer Dissertation Fellowship	2022
Georgetown University Graduate School Fellowship	2020–2021
Vietnam Education Foundation 2.0 Fellowship	2019
National Economics University Dean's List Honor	2017
National Economics University's Merit-based Scholarship for all eligible semesters	2013-2017

SEMINARS AND CONFERENCE PRESENTATIONS

Econometric Seminar (2025, Georgetown); Annual Macro Meeting (2025, Georgetown); GCER Alumni Conference (2025, Georgetown); EconBrew Seminar (2025, Georgetown)

REFERENCES

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