

Chad Brown

PhD Candidate CU Boulder

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EDUCATION

Ph.D., Economics, University of Colorado Boulder	December 2024 (Expected)
Advisor: Dr. Carlos Martins-Filho	
M.A., Economics, University of Colorado Boulder	2021
B.G.S., Economics, University of Kansas	2017

RESEARCH INTERESTS

Econometrics: Nonparametric Estimation, Time-Series, Neural Networks, Inference after Machine Learning

Law and Economics: Corporate Bankruptcy, Legal Sector Labor Markets

WORKING PAPERS

[Statistical Properties of Deep Neural Networks with Dependent Data \(2024\)](#)

Job Market Paper

Best Paper Presentation Award at the International Conference on Statistics Econometrics and Mathematics 2024: XVIII

Abstract: This paper establishes statistical properties of deep neural network (DNN) estimators under dependent data. Two general results for nonparametric sieve estimators directly applicable to DNN estimators are given. The first establishes rates for convergence in probability under nonstationary data. The second provides non-asymptotic probability bounds under stationary α -mixing data. I apply these results to DNN estimators in both regression and classification contexts imposing only a standard Hölder smoothness assumption. The DNN architectures considered are common in applications, featuring fully connected feedforward networks with any continuous piecewise linear activation function, unbounded weights, and a width and depth that grows with sample size. The framework provided also offers potential for research into other DNN architectures and time-series applications.

Inference in Partially Linear Models under Dependent Data with Deep Neural Networks (2024)

Abstract: I consider inference in a partially linear regression model under stationary α -mixing data after first stage deep neural network (DNN) estimation. Using the results from Brown (2024) 'Statistical Properties of Deep Neural Networks with Dependent Data', I show that the estimator for the finite dimensional parameter, constructed using DNN-estimated nuisance components, achieves \sqrt{n} -consistency and asymptotic normality. By avoiding sample splitting, I address one of the key challenges in applying machine learning techniques to

WORKS IN PROGRESS

Uniform Convergence of Deep Neural Network Sieve Estimators

Semiparametric Inference with Deep Neural Networks and Dependent Data

AWARDS AND FELLOWSHIPS

Reuben A. Zubrow Graduate Fellowship for the Research and Teaching of Economics 2022-2023

Reuben A. Zubrow Graduate Fellowship for the Research and Teaching of Economics 2021-2022

Stanford Calderwood Student Teaching Award 2020-2021

SEMINAR AND CONFERENCE PRESENTATIONS

Midwest Econometrics Group Conference 2024

International Conference on Statistics Econometrics and Mathematics: XVIII 2024
[Best Paper Presentation Award](#)

Bernoulli-IMS 11th World Congress in Probability and Statistics 2024
(Poster Presentation)

28th Finance Forum, the Annual Meeting of the Spanish Finance Association (AEFIN) 2021

Brownbag Seminars:

CU Boulder Econometrics (2023, 2024)

CU Boulder Macroeconomics (2024)

CU Boulder Leeds School of Business (2021)

CU Boulder Trade Economics (2021)

TEACHING EXPERIENCE

Instructor of Record CU Boulder

Principles of Macroeconomics- Spring 2022

Principles of Microeconomics- Fall 2021

Teaching Assistant CU Boulder

Principles of Microeconomics- Fall 2018, Fall 2019, Spring 2020, Fall 2022, Fall 2023, Spring 2024

Principles of Macroeconomics- Spring 2019, Spring 2021

Intermediate Microeconomics- Fall 2020,

Math Tools for Economists II- Spring 2023

Natural Resource Economics- Spring 2023

PROGRAMMING EXPERIENCE

STATA

Considerable experience with data cleaning, data analysis, and creating graphics.

- For instance, see the replication package for Forum Shopping and Legal Labor Markets: Evidence from the Court Competition Era (2024) available at <https://www.journals.uchicago.edu/doi/suppl/10.1086/728370>

Pro cient with complex data manipulation and developing statistical packages.

- Coauthored the publicly available STATA package SSCI, for the paper “Short and Simple Con dence Intervals when the Directions of Some Effects are Known” (2023) by Adam McCloskey and Philipp Ketz. Available at <https://ideas.repec.org/c/boc/bocode/s458986.html>

PYTHON

Extensive experience web scraping and parsing data.

- Wrote a web scraper to collect and parse publicly available corporate bankruptcy data from 1990-2009 from SEC EDGAR, and PACER Case Locator. See Section OF of the supplementary pdf for Forum Shopping and Legal Labor Markets: Evidence from the Court Competition Era (2024) available at <https://www.journals.uchicago.edu/doi/suppl/10.1086/728370>

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Pro cient in data cleaning and data analysis.

CITIZENSHIP

United States of America