Cameron Fen

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Education:

University of Michigan, Ann Arbor, MI — Aug 2018-Present
Fields: Macroeconomics and Finance — Advisor (tentative): Florian Gunsilius and Matthew Shapiro
Classes Macro I, Macro II, Macro III (year 2), Macro IV (year 2), Finance I, Finance II

Brandeis University, Waltham, MA — Sep 2012-May 2015
Economics and Mathematics, Magna Cum Laude

Research Interests:

Bayesian Econometrics, Time Series Forecasting, Deep Learning, Structural Estimation

Research Experience:

Summer Research Assistant, University of Michigan 2019, 2020
Research Assistant, Philadelphia Federal Reserve 2016-2018

Teaching Experience:

Teaching Assistant, Intermediate Macroeconomics, Brandeis Spring 2014
Teaching Assistant, Economics of Europe, Michigan Fall 2019, 2020, 2021
Teaching Assistant, Introductory Microeconomics, Michigan Spring 2020
Teaching Assistant, Capitalisms, Michigan Spring 2021

Working Papers:

Simulation-based Bayesian Inference of Structural Models
Working Paper

This paper proposes a simulation-based deep learning Bayesian procedure for the estimation of macroeconomic models. This approach can derive posteriors even when the likelihood function is not tractable. Because the likelihood is not needed for Bayesian estimation, filtering is also not needed. This allows Bayesian estimation of HANK models with upwards of 800 latent states as well as estimation of representative agent models that are solved with methods that don't yield a likelihood--for example, projection and value function iteration approaches. I demonstrate the validity of the approach by estimating a 10 parameter HANK model solved via Reiter's method that generates 812 covariates per time step, where 810 are latent variables, showing this can handle a large latent space without model reduction. I also estimate the algorithm with an 11-parameter model solved via value function iteration, which cannot be estimated with Metropolis-Hastings or even conventional maximum likelihood estimators. In addition, I show the posteriors estimated on Smets-Wouters 2007 are higher quality and faster using simulation-based inference compared to Metropolis-Hastings. This approach helps address the computational expense of Metropolis-Hastings and allows solution methods which don't yield a tractable likelihood to be estimated.

Forecasting GDP with Recurrent Neural Networks with Samir Undavia
Ready for Submission

We show that adding countries as a panel dimension to macroeconomic data can statistically significantly improve the generalization ability of structural and reduced form models, as well as allow machine learning methods to outperform these and other macroeconomic forecasting models. Using GDP forecasts evaluated on a out-of-sample test set, this procedure reduces root mean squared error (RMSE) by 12% across horizons and models for certain reduced form models and by 24% across horizons for structural DSGE models. Removing US data from the training set and forecasting out-of-sample country-wise, we show that both reduced form and structural models become more policy invariant and outperform a baseline model that uses US data only. Finally, given the comparative advantage of

"nonparametric" machine learning forecasting models in a data rich regime, we demonstrate that our recurrent neural network (RNN) model and automated machine learning (AutoML) approach outperforms all baseline economic models in this regime. Robustness checks indicate that machine learning outperformance is reproducible, numerically stable, and generalizes across models.

Works in Progress:

"Variational Inference and Bayesian DSGE Estimation"
"An Optimal Transport Algorithm for Arbitrary Distributions and Cost Functions" with Asef Ahmed
"Data Imputation with Transformers" with Zhengyuan Cui

Relevant Job Experience:

Head of Research - AI Capital Management Sep 2019-Present

I am head of research and co-founder at a quantitative investment firm that specializes in the use of deep learning in trading. Our firm has been featured at TED, NVIDIA, SPARKTank, and NexCubed. We specialize in reinforcement learning and computer vision techniques. We also provide consulting work at the intersection of machine learning and finance.

Skills:

- Python: Scrapy/Beautiful Soup(Web Scraping), Tensorflow/PyTorch(Deep Learning); Matlab; SQL;Java: Hadoop (Distributed Computing); C++; Stata

Presentations:

2020: European Winter Meeting of the Econometric Society, Umich Political Science I3SM
2021: Midwest Economics Association Annual Conference, EcoMod, EconWorld (2 presentations)
2022: ASSA (Poster)

Memberships:

Econometric Society, Midwest Economic Association

Referee:

2021: Journal of Econometrics

Media:

Financial Markets:
https://www.thearmchairtrader.com/palantir-technologies-stock-price-forecast-pltr/
Deep Learning:
https://beta.informationweek.com/ai-or-machine-learning/machine-learning-basics-everyone-should-know
https://searchenterpriseai.techtarget.com/feature/10-AI-tech-trends-data-scientists-should-know