DAANISH PADHA

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CONTACT INFORMATION

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EDUCATION

University of California, Riverside	PhD in Economics	*Expected: June'25*
Delhi School of Economics, University of Delhi	M.A Economics	*2018*
University of Delhi	B.A (Hons) Economics	*2015*

FIELDS OF INTEREST

High-Dimensional Econometrics, Machine Learning, Causal Inference, Forecasting.

FELLOWHIPS, HONORS, AND AWARDS

- Dean's Distinguished Fellowship, University of California Riverside 2019

RESEARCH

WORKING PAPERS

- Forecasting economic time series using supervised factors and idiosyncratic elements (With Tae-Hwy Lee) (Job Market Paper) *[Draft]*

Summary: We extend the paper on "Three-Pass Regression Filter (3PRF)" in two significant dimensions: first, by accommodating weak factors, and second, by allowing for correlations between the target variable and predictors, even after adjusting for common factors. Our primary theoretical contribution establishes the consistency of the 3PRF in estimating target-relevant factors under these broader assumptions. We show that while our estimator is consistent, convergence occurs at a slower rate compared to the case when underlying factors are strong. Methodologically, we introduce a Lasso step to model idiosyncratic dependence, resulting in the 3PRF-Lasso estimator. The augmented 3PRF-Lasso estimator demonstrates strong performance in both simulations and our empirical exercise, forecasting key macroeconomic aggregates.

- Kernel Three Pass Regression Filter
(With Rajveer Jat) (Submitted June'24) *[Draft]*

Summary: When predictors share common underlying dynamics, a latent factor model effectively captures their co-movements, succinctly summarizing the data and aiding in prediction while mitigating the curse of dimensionality. However, using latent common factors for prediction has two drawbacks: (1) not all factors may be relevant, leading to inefficiency when included in forecasts, and (2) typical models assume a linear dependence of the target on the predictors, which limits accuracy. We address these issues with a novel method: the Kernel Three-Pass Regression Filter. This approach extends the Three-Pass Regression Filter to accommodate nonlinear dependencies, while excluding irrelevant information. Our method is computationally efficient and provides robust empirical performance, especially over longer forecast horizons.

- Weak Supervised Factors

Summary: This paper examines the Three-Pass Regression Filter (3PRF) in environments where underlying relevant factor strengths are disparate, a common occurrence in many economic settings. The main finding is that varying factor strengths render the 3PRF estimator inconsistent unless new assumptions about proxy loadings are imposed. We demonstrate that the auto-proxies satisfy these new sufficient conditions under certain mild assumptions, allowing researchers to reliably employ auto-proxy 3PRF in environments with varying factor strengths. Given the similarities between the auto-proxy 3PRF and Partial Least Squares (PLS), our results provide valuable insights into the theoretical properties of PLS under general factor strengths.

WORK IN PROGRESS

- Supervised Instruments in a Data-Rich Environment

Summary: The paper examines the estimation of a causal parameter when dealing with endogenous regressors and many instruments (IVs), which are driven by a set of common underlying factors. A large number of IVs can render the two-stage least squares (2SLS) estimator inconsistent. Instead of using all available instruments in the first stage, we estimate a smaller set of factors that influence both the instruments and the endogenous regressors. These factors are assumed to be orthogonal to the structural error, as in Bai (2010), which facilitates identification. We derive conditions under which inference on the causal parameter can be performed as if the true relevant factors driving the endogenous regressors were observed. Specifically, the estimation error of these factors has an asymptotically negligible impact on the distribution of the causal parameter, with these conditions depending on the strength of the relevant underlying factors.

- Supervised Deep Factor Model

Summary: We use a neural network to forecast a single time series. Inspired by Bai's (2008) "Targeted Predictors" approach, we first select predictors by fitting a non parametric regression of the target on each predictor. Thereafter, an auto-encoder is used to estimate the underlying non-linear factors driving the selected predictors. Unlike traditional factor models that restrict the search to a planar structure, our method explores a non-linear, low-dimensional representation of the predictors that best explains the target.

TEACHING EXPERIENCE

Teaching Assistant, Department of Economics, UC Riverside

Introductory Courses

ECON 002: Introduction to Macroeconomics
Spring 2021, Fall 2021, Winter 2022, Fall 2022, Winter 2023, Spring 2023, Spring 2024

ECON 003: Introduction to Microeconomics
Fall 2023

Intermediate Courses

ECON 101: Statistics for Economics
Fall 2020, Summer 2023

ECON 104B: Intermediate Microeconomics II
Winter 2021, Winter 2022, Spring 2022, Summer 2024

Graduate Course

ECON 205B: Econometric Methods II
Winter 2024

PRESENTATIONS

2024: The 34^{th} Midwest Econometrics Group Conference (Upcoming)	Lexington, KY
2024: The 2024 California Econometric Conference	Davis, CA
2024: Winter 2024 Econometrics Seminar at UC Riverside	Riverside, CA
2023: Spring 2023 Brown Bag Seminar at UC Riverside	Riverside, CA

REFERENCES

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