

A Meditation on

**An Interpretable Machine Learning Workflow  
With an Application to Economic Forecasting**

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## Context

- Many researchers and central bank analysts do ML econ forecasting. Should decision makers (DM) care?
- We sometimes see that ML models outperforms **Workhorse econometric methods (WOKEM)**
- WOKEM's predictions are quite straightforward to interpret
- ML predictions, not quite
- Arguably, the DM care more about the interpretation than the prediction itself. (Think: inflation)

# What the paper does

- Introduce a workflow, i.e., how to make all that ML stuff we've been doing for a while useful to people that (hopefully) make useful decisions
- The steps:
  1. Compare the performance of many methods
  2. Evaluate the importance of each feature
  3. Do statistical inference on those importance measures

## **Also, there are some empirical findings:**

- Boosting beats other models. There can be important non-linearities that ridge or other linear methods fails to capture.
- Amongst other nonlinear things: SP500, UR(lag), Business Loans.

## Of Course

- It is extremely well executed and thorough
- The empirical evidence is interesting

## Less Obvious Things

- The workflow is less compelling when considering the whole data set, with basic models doing as well as ML
- **Interpretability is weakened.** Nothing new here, because the heart of the interpretability problem in macro is likely not inhuman nonlinearities, but rather that we have often 100+ extremely cross-correlated, whereas economic rationale certainly has less than 100 shocks

## Which apple to pick in the tree

- PC3 does basically as well as Boosting, so what do we do?
- **So, pick your poison:**
  1. A linear model with ~100 regressors summarized in 3 mostly incomprehensible factors
  2. A nonlinear model with no betas to look at but only 9 regressors picked semi-arbitrarily to represent economic concepts in a likely imperfect fashion (think: are industrial production and unemployment aptly capturing economic slack?)

Factors make economic sense: few sources of latent economic shocks.

But tangible variables are cool too. Since any modelling involve choices, option 2 appears more promising. **BUT**

**Broader question:** in such knife-edge case, it appears the interpretation – which is of utmost important for policy making – is... a choice.

## A Larger Debate, and a Crossroad

- What should analysts do?
  - a) Interpret black box models
  - b) Build inherently interpretable models grounded in minimal economic theory, like *Yours Truly* (2020), and *Yours Truly* (2022).
- Like in anything, both have their merits. (b) appears desirable when possible, but it is not always possible.
- (b) will fail if generic economic theory does.
- But hardly anyone will believe (a) if they cannot economically rationalize it.

**Conclusion:** this paper provides a solid cookbook on how to successfully walk down road (a).