

A Meditation on

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

Philippe Goulet Coulombe, PhD
goulet_coulombe.philippe@uqam.ca

ESG UQÀM

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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 **m**ethods (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).