Off to the Races:
A Comparison of Machine Learning and
Alternative Data for Predicting Economic Indicators
by
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Econometrics / Statistics Perspectives

Cross-section:
Econometrics: \( \hat{\beta} \) (“causal estimation”)

ML: \( \hat{y}(= x'\hat{\beta}) \) (“prediction”)

Time-series:
Econometrics: \( \hat{y} \) (“prediction”)
(Time series econometrics ↔ predictive dynamic econometric modeling)

ML: \( \hat{y} \) (“prediction”) (???)

So what’s new in ML?
Time Series Econometrics (TSE) vs. ML

**Significant TSE / ML overlap:**
- Acknowledge misspecification throughout
- Seek good out-of-sample predictive approximations
  - Use the relevant loss function
    - Shrinkage
    - Selection
  - Forecast combination (“ensemble averaging”)

**ML goes farther in some important directions:**
- High dimensionality
  - Nonlinearity
- Interesting new procedures
But TSE Goes Much Farther in Important Macroeconometric Directions...

- Trend
- Seasonality
- Serial correlation & cycles
- Workhorse linear models (VAR, ...)
- Summarizing voluminous results (Impulse-response fns, variance decomps, Granger causality, ...)
- Customized reduced-rank linear models (DFM, FAVAR, ECM, ...)
- Customized nonlinear models (regime-switching, volatility)
  - Structural evolution and breaks
  - Quantifying forecast uncertainty
In the Trenches, Down and Dirty...

\[ GDP \supset CE \supset PCE \supset PCES \supset PCES_i \]

This paper is interested in \( PCES \).

\( PCES \) is partly based on the Quarterly Survey of Services (QSS). (The \( PCES_i \) are informed by the \( QSS_j \) only from release 3 onward.)

One would like to make the QSS more timely, by nowcasting.

Do ML nowcasting "regressions" of QSS components on timely \( x \)'s:

\[ QSS_{it} \rightarrow x_{1t}, \ldots x_{Kt}, \quad i = 1, \ldots, 188 \]

\( x \)'s include both BLS data (from CES and CPI) and private data (First Data credit cards and Google Trends)
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Issues / Comments / Questions

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3. I worry about use of private x’s in constructing public data
4. “Cherry picking” of x’s is odd in an ML exploration (and performs poorly)
5. Include lags of x’s, as well as lags of *all* QSS
6. Factor structure? Principal-component regression?
7. What about trend?
8. What about seasonality? Seasonal autoregressive lags? Seasonal differencing?
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