

Economic Demand Signals

Testing whether macroeconomic variables improve weekly demand forecasts enough to justify production use

STUDY QUESTION

Do economic variables contribute incremental forward-looking demand information after seasonality and recent demand dynamics are modeled?

Executive Summary

Economic variables were considered as candidate demand signals, but the supplied data created two methodological challenges: low effective independent sample size at weekly frequency and uncertainty about whether historical values were available at the forecast origin.

The final decision was not to include economic variables in the frozen forecast. No external variable improved the revised adaptive baseline enough during development to justify the additional complexity, and publication timing created an additional leakage risk.

Why Economic Features Are Difficult in Weekly Forecasting

A weekly customer-demand model can have far more rows than truly independent economic observations. When a monthly economic value is repeated across multiple weekly rows, the dataset can look larger than the effective amount of new information it contains.

A second issue is publication timing. A historical value may exist today, but that does not prove the value was known when a past forecast would actually have been made. Using revised or not-yet-published values would overstate real-world forecasting performance.

Evaluation Standard

- Preserve chronological ordering; do not randomly shuffle time-series observations.
- Test external variables after accounting for the recurring annual cycle.
- Use lagged or rolling forms only when they are available at the forecast origin.
- Compare incremental rolling-origin forecast accuracy against simple adaptive baselines.
- Reject variables that do not produce material forward improvement.

Findings

The methodology concluded that economic features were constrained by repeated monthly values across weekly rows, low effective sample size, and publication-timing uncertainty. More broadly, no external variable improved the revised adaptive baseline enough during development to justify inclusion in the final frozen model.

This is a negative result, but it is analytically useful: model complexity was not increased simply because an economic variable sounded plausible or produced an in-sample relationship.

What Would Be Required to Revisit the Question

- Publication-vintage data showing the value that was actually known at each historical forecast origin.
- A longer history containing more independent economic cycles.
- A clear lag structure motivated by availability and business mechanism rather than retrospective optimization.
- Demonstrated improvement in rolling-origin and out-of-time forecast error after seasonality and adaptive level are already modeled.

Key Takeaways

Core finding

The supplied evidence does not support economic variables as required components of the final weekly forecast.

Data issue

Repeated monthly values reduce the effective weekly sample size.

Validation issue

Publication timing must be respected to prevent leakage.

Decision

Exclude economics until forecast-safe data demonstrate incremental out-of-sample value.

Business Interpretation

The study demonstrates that feature governance is part of business analytics. A model intended for recurring operational use should prioritize signals that are available on time, stable enough to reproduce, and demonstrably useful beyond the information already captured by the baseline.

Portfolio-Ready Summary

SUGGESTED HEADLINE

When a plausible economic signal is not yet production-ready

I evaluated economic variables as candidate demand inputs but rejected them from the final forecast because the effective sample was limited, publication timing was uncertain, and the variables did not improve the adaptive baseline enough in forward testing. The study emphasizes data availability and validation discipline over adding features for complexity's sake.