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Forecasting with dynamic panel data models. (English)

Summary: This paper considers the problem of forecasting a collection of short time series using cross-sectional information in panel data. We construct point predictors using Tweedie’s formula for the posterior mean of heterogeneous coefficients under a correlated random effects distribution. This formula utilizes cross-sectional information to transform the unit-specific (quasi) maximum likelihood estimator into an approximation of the posterior mean under a prior distribution that equals the population distribution of the random coefficients. We show that the risk of a predictor based on a nonparametric kernel estimate of the Tweedie correction is asymptotically equivalent to the risk of a predictor that treats the correlated random effects distribution as known (ratio optimality). Our empirical Bayes predictor performs well compared to various competitors in a Monte Carlo study. In an empirical application, we use the predictor to forecast revenues for a large panel of bank holding companies and compare forecasts that condition on actual and severely adverse macroeconomic conditions.

MSC:
62P20 Applications of statistics to economics
62D20 Causal inference from observational studies
62M20 Inference from stochastic processes and prediction

Keywords:
bank stress tests; empirical Bayes; forecasting; panel data; ratio optimality; Tweedie’s formula

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