

Uncovering Sparse Financial Networks with Information Criteria

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Abstract

Empirical measures of financial connectedness based on Forecast Error Variance Decompositions (FEVDs) often yield dense network structures that obscure true transmission channels and complicate the identification of systemic risk. This paper proposes a novel information-criterion-based approach that selects spillover channels at the level of the decomposition rather than the VAR coefficients. By reformulating FEVD as a regression of forecast errors on structural shocks, we develop a model selection framework that consistently recovers the active set for both orthogonalized and generalized FEVDs. The penalty is calibrated by pseudo-out-of-sample forecast accuracy. In simulations, the criterion recovers the true network accurately at multi-step horizons, including under heavy-tailed errors, and compares favorably with fixed cut-off rules, even ones calibrated to the true network density. Under approximate sparsity, it prunes negligible links at a small cost in explained variance. Applications to market-adjusted S&P 500 sectoral returns, and commodity futures highlight the prevalence of sparse networks in empirical settings.

JEL classification: C32, C38, C52, C58

Keywords: Information criteria; Connectedness; Forecast error variance decomposition; Model selection; Factor adjustment.

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