

Measures of time-series interdependence: Evidence in US macroeconomic data

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Abstract

Focusing on the stationary vector autoregressive moving average (VARMA) models, the paper provides an approach to investigating vector time-series interdependence; one-way effect measures, reciprocity, and association, which are defined as overall as well as frequency-wise quantities in the frequency domain.

Partial causal measures in the presence of the third series are proposed by Hosoya (2001) and based on the canonical factorization algorithm given by Hosoya and Takimoto (2010) a feasible evaluation procedure of those measures is provided by Hosoya et al. (2017) with some empirical applications. However, it is observed that on rare occasions it fails to evaluate measures of one-way effect numerically, since the success of evaluating measures depends on numerical canonical factorization results. For example, when the information criteria select relatively longer lag-order VARMA models, it is not always an easy task to obtain a proper canonical factor of the derived spectral density where the one-way effect of the third series is eliminated, since it requires to solve higher-order polynomials numerically. The paper classifies the problem involved into two types and presents practical solution methods for each type respectively.

For empirical illustration, the paper examines time-series interdependence of quadruple variate US macroeconomic data which consist of the term spread, GDP, CPI, and M2, comparing the estimation and testing results under a variety of third-series presence as well as with the unconditional simple results.

References

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