

Non-Linear Causality Inference Using BAMLSS and Bi-CAM in Finance

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Abstract : Inferring causality from observational data is one of the fundamental subjects, especially in quantitative finance. So far most of the papers analyze additive noise models with either linearity, nonlinearity or Gaussian noise. We fill in the gap by providing a nonlinear and non-gaussian causal multiplicative noise model that aims to distinguish the cause from the effect using a two steps method based on Bayesian additive models for location, scale and shape (BAMLSS) and on causal additive models (CAM). We have tested our method on simulated and real data and we reached an accuracy of 0.86 on average. As real data, we considered the causality between financial indices such as S&P 500, Nasdaq, CAC 40 and Nikkei, and companies' log-returns. Our results can be useful in inferring causality when the data is heteroskedastic or non-injective.

Keywords : causal inference, DAGs, BAMLSS, financial index

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