

Nonparametric additive regression models for binary time series

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I consider models for binary time series, starting with autoregression models and then developing generalizations of them which allow nonparametric additive covariates. I show that several apparently different binary AR(1) models are equivalent. Three possible nonparametric additive regression models which allow for autocorrelation are considered; one is a generalization of an ARX model, the other two are generalizations of a regression model with AR errors. One of the models is applied to two data sets: IBM stock transactions and Melbourne's rainfall. The fitted models show that stock transaction occurrences are more likely if there have been large transactions in the previous time period. They also show that the Southern Oscillation Index does not provide a strong predictor of rainfall occurrence in Melbourne, contrary to current meteorological practice.

Key words: ARX models, autocorrelated errors; autocorrelation; binary time series; generalized additive model; generalized linear model; logistic regression; non-Gaussian time series, smoothing with correlated errors; time series regression.

JEL Classification: C14, C22, C25.

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