

# A case study on using generalized additive models to fit credit rating scores

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In credit rating, the finally fitted rating score is not only intended to provide the optimal classification result but also to serve as a modular component of a (typically complex) rating system. This means in particular that a rating score should be given by a linearly weighted sum of so-called rating factors, a procedure which can be easily interpreted and understood by non-statisticians. An important issue is also the possibility to run stress-tests on the final model in order to study the effects of extreme inputs.

All of this leads to the fact that the logit model or logistic regression approach is one of the most popular models for estimating credit rating scores. A possible nonlinear (more precisely nonparametric) dependence of the rating score on the original raw data variables is typically separated within an initial transformation step. From a point of view of optimizing the model fit and thus the potential to identify possible credit defaults more precisely, generalized additive models (GAM) would allow for a simultaneous estimation of the initial transformation together with the final logit fit.

Meanwhile R comprises a number of different packages to fit generalized additive models. In this study we compare GAM estimating approaches with a focus on the specific structure of credit data: small default rates, mixed discrete and continuous explanatory variables, possibly nonlinear dependencies between the regressors.

## References

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