

# Inference about the slope in linear regression: an empirical likelihood approach

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**Abstract** We present a new, efficient maximum empirical likelihood estimator for the slope in linear regression with independent errors and covariates. The estimator does not require estimation of the influence function, in contrast to other approaches, and is easy to obtain numerically. Our approach can also be used in the model with responses missing at random, for which we recommend a complete case analysis. This suffices thanks to results by Müller and Schick (Bernoulli 23:2693–2719, 2017), which demonstrate that efficiency is preserved. We provide confidence intervals and tests for the slope, based on the limiting Chi-square distribution of the empirical likelihood, and a uniform expansion for the empirical likelihood ratio. The article concludes with a small simulation study.

**Keywords** Efficiency · Estimated constraint functions · Infinitely many constraints · Maximum empirical likelihood estimator · Missing responses · Missing at random

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