

# On finite mixtures of linear quantile regression models for clustered data

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## Abstract

Individual specific effects are often included in regression models when considering clustered data, with the purpose of accounting for dependence within first-level (sometimes referred to higher-level) units while considering potential unobserved covariates at that nesting level. In a random effect approach, the estimates for parameters in the linear regression model are derived by the marginal likelihood. This is defined integrating out the effects, assumed to be an iid sample drawn from a specific parametric distribution. However, dependence between the unobserved (individual-specific effects) and the observed covariates should be appropriately considered here. If such a dependence is not properly accounted for, in fact, the resulting estimator may be inconsistent. Some solutions have been proposed in the linear regression context and its extensions, leading to the class of correlated random effect estimators. Their properties are based on the geometric properties of the (generalized) least-squares method. We argue that similar properties hold even in the case of linear quantile regression, and propose a general solution by exploiting a finite mixture specification for the marginal likelihood.