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Heteroscedastic semiparametric transformation models: estimation and testing for validity.

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Summary: In this paper we consider a heteroscedastic transformation model of the form $\Lambda_{\vartheta}(Y) = m(X) + \sigma(X)\varepsilon$, where Λ_{ϑ} belongs to a parametric family of monotone transformations, $m(\cdot)$ and $\sigma(\cdot)$ are unknown but smooth functions, ε is independent of the d -dimensional vector of covariates X , $E(\varepsilon) = 0$ and $\text{Var}(\varepsilon) = 1$. We consider the estimation of the unknown components of the model, $\vartheta, m(\cdot), \sigma(\cdot)$, and the distribution of ε , and we show the asymptotic normality of the proposed estimators. We propose tests for the validity of the model, and establish the limiting distribution of the test statistics under the null hypothesis. A bootstrap procedure is proposed to approximate the critical values of the tests. We carried out a simulation study to verify the small sample behavior of the proposed estimators and tests, and illustrate our method with a dataset.

MSC:

- 62G08 Nonparametric regression and quantile regression
- 62F12 Asymptotic properties of parametric estimators
- 62G10 Nonparametric hypothesis testing
- 62G09 Nonparametric statistical resampling methods
- 62G20 Asymptotic properties of nonparametric inference

Cited in **1** Review
Cited in **10** Documents

Keywords:

bootstrap; empirical distribution function; empirical independence process; local polynomial estimator; location-scale model; model specification; nonparametric regression; profile likelihood estimator

Full Text: [DOI](#) [arXiv](#)