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Optimal Parametric and Pseudo-Gaussian Tests for Joint Detection of Random Coefficient Variability and ARCH Effects

Communication Info

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(3) Random coefficient regression

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(5) Pseudo-Gaussian test

Abstract

We propose parametric and pseudo-Gaussian tests to jointly detect random coefficient regression and ARCH-type conditional heteroskedasticity in linear regression models. The methodology is based on the Uniform Local Asymptotic Normality (ULAN) framework, which allows the construction of locally optimal test statistics in both parametric and semi-parametric settings.

The pseudo-Gaussian test is a robust modification that remains valid under a wide class of error distributions while maintaining good efficiency under Gaussian errors. Unlike conventional approaches that test random coefficient variation and ARCH effects separately, our procedure provides a unified testing framework. Monte Carlo simulations show that the joint test performs better than separate tests, especially when both effects occur simultaneously.

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