# Monte Carlo Estimation of Heteroscedasticity and Periodicity Effects in a Panel Data Regression Model

**Authors :** Nureni O. Adeboye, Dawud A. Agunbiade

**Abstract :** This research attempts to investigate the effects of heteroscedasticity and periodicity in a Panel Data Regression Model (PDRM) by extending previous works on balanced panel data estimation within the context of fitting PDRM for Banks audit fee. The estimation of such model was achieved through the derivation of Joint Lagrange Multiplier (LM) test for homoscedasticity and zero-serial correlation, a conditional LM test for zero serial correlation given heteroscedasticity of varying degrees as well as conditional LM test for homoscedasticity given first order positive serial correlation via a two-way error component model. Monte Carlo simulations were carried out for 81 different variations, of which its design assumed a uniform distribution under a linear heteroscedasticity function. Each of the variation was iterated 1000 times and the assessment of the three estimators considered are based on Variance, Absolute bias (ABIAS), Mean square error (MSE) and the Root Mean Square (RMSE) of parameters estimates. Eighteen different models at different specified conditions were fitted, and the best-fitted model is that of within estimator when heteroscedasticity is severe at either zero or positive serial correlation value. LM test results showed that the tests have good size and power as all the three tests are significant at 5% for the specified linear form of heteroscedasticity function which established the facts that Banks operations are severely heteroscedastic in nature with little or no periodicity effects.

**Keywords :** audit fee lagrange multiplier test, heteroscedasticity, lagrange multiplier test, Monte-Carlo scheme, periodicity

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