Efficiency in Linear Model with AR (1) and Correlated Error-Regressor

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In this study, we conduct several Monte-Carlo experiments to examine the sensitivity of the efficiency of FGLS estimators relative to OLS using the Variance and RMSE criteria, in the presence of first order autocorrelated error terms which are also correlated with geometric regressor. We examine the sensitivity of the efficiency to ($\rho$) as well as, its asymptotic behaviour, N, when the above two assumptions are violated. We observe that CORC and HILU give similar result, same for ML and MLGRID. OLS is more efficient than CORC and HILU while ML and MLGRID dominate OLS. In the scenarios, efficiency does not increase with increase in autocorrelation level, only ML and MLGRID at $\alpha = 0.05$ show that efficiency increases with increase in autocorrelation level. All estimators show that efficiency reduces as significant level increases only when the autocorrelation value and sample size are small ($\rho = 0.4$, $N = 20$). There is more efficiency gain when $N$ and $\rho$ are large at all significant correlation levels. Asymptotically, the efficiency of FGLS estimators increase with increasing autocorrelation but it is indifferent to the correlation levels. The asymptotic ranking is CORC and HILU followed by MLGRID and ML.

Keywords: Efficiency, Monte-Carlo Experiment, Feasible Generalized Least Squares, Ordinary Least Squares, Autocorrelation, Significant Correlation.