EXPLICIT FORMULAS TO DETERMINE THE EFFICIENCY OF OLS IN THE PRESENCE OF FIRST ORDER AUTOREGRESSIVE DISTURBANCES

Samir Khaled Safi

Department of Mathematics and Statistics, Faculty of Science and Mathematics

James Madison University, Harrisonburg, VA 22807

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Abstract:

In problems concerning time series, it is often the case that the disturbances are, in fact, correlated. It is known that the ordinary least squares (OLS) may not be optimal in this context. We have proved that the relative Efficiency of the variance of the generalized least squares (GLS) to that of OLS is invariant to scaling and shifting of the design vectors. We have derived explicit formulas for the relative Efficiencies of the GLS estimator to that of OLS estimator in some important special cases. We consider both linear and quadratic design vectors in the presence of AR(1) disturbances with and without an intercept term included in the design and use these formulas to show some asymptotic properties of the estimators.

Keywords: Autocorrelation; Autoregressive; Ordinary Least Squares; Generalized Least Squares; Efficiency.