This study examined how six estimation methods of a simultaneous equation model cope with varying degrees of correlation between pairs of random deviates using the Variance and Total Absolute Bias (TAB). A two-equation simultaneous system was considered with assumed covariance matrix. The model was structured to have a mutual correlation between pairs of random deviates which is a violation of the assumption of mutual independence between pairs of such random deviates. The correlation between the pairs of normal deviates were generated using three scenarios of \( \rho = 0.0, 0.3 \) and 0.5. The performances of various estimators considered were examined at various sample sizes, correlation levels and 50 replications. The sample size, each replicated 50 times was considered. OLS is performed best when the variance is used to study the finite sample properties of the estimators in that it produces the least variances in all the cases considered and at all sample sizes. All the estimators revealed an asymptotic pattern under CASE I.

**Keywords:** Monte Carlo, Random Deviates, Mutual Correlation, Total Absolute Bias, Root Mean Square Error.