Orapan Tantrakul 2012: A Comparison of Robust Regression Coefficient Estimation Methods for Multiple Linear Regression with Outliers. Master of Science (Statistics), Major Field: Statistics, Department of Statistics. Thesis Advisor: Associate Professor Prasit Payakkapong, M.S. 111 pages.

The purpose of this research was to compare the methods of regression coefficient estimation in the multiple linear regression models for the three methods, composed of Ordinary Least Squares method (OLS), Least Trimmed Squares estimator method (LTS) and Generalized M-estimator method (GM), when the data has outlier. Simulated data by Monte Carlo technique, repeated 1,000 times for each situation with R programming version 2.14.0 were used in this study. For simulated data, two independent variables with β_0, β_1 and β_2 equal to one , two types of error distribution: student's t and lognormal, two level of outlier: mild and extreme with the outlier proportions of independent variables equal to 0.10, 0.15 and 0.20, and four levels of sample size: 20, 50, 100 and 200 were generated. The criterion of comparison was mean square error (MSE) which the smaller value indicates the better method.

The results of this research showed that in case of no outliers in independent and dependent variables, OLS provided the lowest of MSE in all situations. In case of outliers in dependent variable and in case of outliers in independent and dependent variables, it is found that if error is student's t-distribution, GM gave mostly the lowest of MSE when degree of freedom is 1 and 4 but OLS showed the lowest of MSE when degree of freedom is 8. If error is lognormal distribution, LTS provided generally the lowest of MSE. In addition, it showed that MSE has the reciprocal of the sample size, outlier proportion of independent variables, outlier level of independent variables, degree of freedom of error and standard deviation of error for 100 and 200 sample sizes of LTS and GM. Meanwhile the MSE varies the same direction with standard deviation of error.

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