

TESTING NORMALITY OF DISTURBANCES IN LEAST ABSOLUTE VALUE REGRESSION

Terry Dielman, Neeley School of Business, TCU, Fort Worth, TX 76129, 817-257-7533, t.dielman@tcu.edu

DETAILED ABSTRACT

Several tests have been suggested in the literature for assessing the assumption of normality. Among these methods are: (1) the Shapiro-Wilk [11] W test, (2) the Shapiro-Francia [10] W' test, which is suggested for use in place of W when $n > 50$, (3) the D'Agostino [1] [2] D test, (4) the probability plot correlation coefficient test of normality suggested by Filliben [3], (5) the Jarque and Bera [5] test and (6) the Anderson-Darling test. (For a description of these tests, see, for example, Shapiro, Wilk and Chen [12]). In the case of testing for normality of least squares (LS) regression disturbances, the performance of various tests has been examined by Huang and Bolch [4], Jarque and Bera [5], Pfaffenberger and Dielman [7], Pierce and Gray [8], Pearson, D'Agostino and Bowman [6], Thadewald and Buning [13] and White and MacDonald [14]. No one test dominated in any previously published comparisons. Pierce and Kopecky [9] show that all standard tests of normality computed from simple or multiple regression residuals have the same limiting null distributions as in the identically distributed case with unknown mean and variance. The question remains as to how each test will perform in small samples, however.

The primary objective of this research is to compare the size and power (in finite samples) of various tests for normality as applied to residuals from least absolute value (LAV) regressions. Although LAV provides protection against the effect of outliers on regression estimates, it may still be of interest to know whether or not the normal distribution provides a reasonable model for the regression disturbances. Further, in outlier producing distributions, using LAV rather than LS residuals may provide test results that are more sensitive to deviations from normality.

Tests examined include the Filliben test, Jarque-Bera test, Shapiro-Wilk test, D'Agostino D test and the Anderson-Darling test. When standard critical values are used, the tests applied to LAV residuals have very high empirical levels of significance, except for the Shapiro-Wilk test.

Power is investigated using a number of disturbance distributions: Cauchy, Contaminated Normal, Laplace, t and uniform distributions. The Shapiro Wilk test applied to LAV residuals tends to have power equal to or greater than the test applied to LS residuals, and does not need any correction for high levels of significance. The D'Agostino D test has power similar to the Shapiro Wilk test after correction for its high levels of significance are made.

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