Skewness is a Friend and not an Enemy!

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Abstract

In most cases, the performance of significance tests is based on an assumption that the sample data the researcher obtains derives from a normally distributed population. This assumption often is false and, if the sample size is sufficiently small, the Central Limit Theorem may not mitigate the effects of skewness on significance tests to the degree that the researcher desires. Consequently, researchers in this position use a variety of procedures for performing data transformations to reduce skewness. Thus, from the point of view of performing significance tests, skewness is an enemy and skewness reduction via data transformations is desirable. For the skewed data, it is natural to consider an extended family of distributions called skew normal from the usual normal family. Under the skew normal setting, we show that required sampling size decreases as skewness increases if the perspective switches from a focus on significance tests to obtaining data with the best possible sampling precision. In order to check the goodness of fit for our results, Monte Carlo simulations are used to estimate the coverage probabilities.

Keywords: skewness, sampling precision, skew-normal distribution, normal distribution