# Bayesian Stochastic Frontier Models under the Skew-Normal Settings

Zheng Wei[1*], S.T. Boris Choy[2], Tonghui Wang[3], Xiaonan Zhu[4], Ziwei Ma[5]

[1]Department of Mathematics and Statistics, Texas A&M University -
[2]Discipline of Business Analytics, The University of Sydney, Australia
[3]Department of Mathematical Sciences, New Mexico State University,
[4]Department of Mathematics, University of North Alabama, Florence,
[5]Department of Mathematics, University of Tennessee at Chattanooga,

*Corresponding author(s). E-mail(s): zheng.wei@tamucc.edu;

**Abstract**

Recently, a skew-normal-based stochastic frontier model was proposed for efficiency analysis. In this paper, a Bayesian method for statistical inference is developed. The performance of the Bayesian approach is examined using simulation data and real data from a manufacturing productivity study, and is compared with the maximum likelihood approach. Both the simulation and empirical studies demonstrate that the Bayesian approach outperforms the maximum likelihood approach, using the Nelder-Mead simplex algorithm and the expectation-conditional-maximization algorithm, respectively.

**Keywords:** Bayesian Statistics, Efficiency, Markov chain Monte Carlo,Skew-normal Distribution, Stochastic Frontier Model.