Accepted Manuscript

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Please cite this article as: Kiatsupaibul, S., et al., Confidence sets and confidence bands for a beta distribution with applications to credit risk management. *Insurance: Mathematics and Economics* (2017), http://dx.doi.org/10.1016/j.insmatheco.2017.05.006

Confidence Sets and Confidence Bands for a Beta Distribution with Applications to Credit Risk Management

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Abstract

Incorporating statistical multiple comparisons techniques with credit risk measurement, a new methodology is proposed to construct exact confidence sets and exact confidence bands for a beta distribution. This involves simultaneous inference on the two parameters of the beta distribution, based upon the inversion of Kolmogorov tests. Some monotonicity properties of the distribution function of the beta distribution are established which enable the derivation of an efficient algorithm for the implementation of the procedure. The methodology has important applications to financial risk management. Specifically, the analysis of loss given default (LGD) data are often modeled with a beta distribution. This new approach properly addresses model risk caused by inadequate sample sizes of LGD data, and can be used in conjunction with the standard recommendations provided by regulators to provide enhanced and more informative analyses.

Keywords: Credit risk, loss given default, beta distribution, multiple comparison, confidence band.

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