

Abstract

To Statisticians, the structure of the extreme levels which exist in the tails of the ordinary distributions is very important in analyzing, predicting and forecasting the likelihood of an occurrence of extreme event. Extreme events are defined as values of the event below or above a certain value called threshold. A well chosen threshold helps to identify the extreme levels. Several methods have been used to determine threshold so as to analyze and model extreme events. One of the most successful methods is the maximum product of spacing (MPS). However, there is a problem encountered while modeling data through this method in that the method breaks down when there is a tie in the exceedances. This study offers a solution to model data even when it contains ties. In the study, a method that improved MPS method for determining an optimal threshold for extreme values in a data set containing ties was derived. The Generalized Pareto Distribution (GPD) parameters for the optimal threshold were derived and compared to GPD parameters determined through the standard MPS model. The study improved the standard MPS methodology by introducing the concept of frequency and used Generalized Pareto Distribution (GPD) and Peak over threshold (POT) methods as the basis of identifying extreme values. The improved MPS models and the standard models were applied to Nairobi Securities Exchange (NSE) trading volume data to determine the GPD parameters for different sectors registered in NSE market and their performance compared. It was realized that the improved MPS model performed better than the standard models. This study will help the Statisticians in different sectors of our economy to model extreme events involving ties.