Abstract

Examining the nature of extreme values plays an important role in financial risk management. This thesis investigates tail behaviour of distribution of returns using the framework of univariate Extreme Value Theory. The empirical research was conducted on the S&P 500 index and its seven constituents. The goal of this thesis was to use the Hill method to estimate the tail index of the series which characterizes the tail behaviour, especially the speed of the tail decay. To select the tail threshold several graphical methods were performed as they represent empirical measures of model stability. Classical Hill plots as well as alternative Hill plots and smoothing procedure were presented. The threshold choice based on stable regions in the graphs was found to be highly subjective. Hill method modified by Huisman was used instead and the results confirmed that the classical Hill method yields estimates which overestimate the tail thickness. All the examined series were found to have heavy tails with polynomial tail decay. This thesis stressed the need to model the left and the right tail separately as both extreme losses and profits are important depending on whether an investor takes a long or a short position on portfolio. Finally, the tail index was used to demonstrate the need to compute the expected losses for certain quantiles instead of simply the minimum losses as expressed by Value at Risk.