This thesis' topic is stochastic programming, in particular with regard to portfolio optimization and heavy tailed data. The first part of the thesis mentions the most common types of problems associated with stochastic programming. The second part focuses on solving the stochastic programming problems via the SAA method, especially on the condition of data with heavy tailed distributions. In the final part, the theory is applied to the portfolio optimization problem and the thesis concludes with a numerical study programmed in R based on data collected from Google Finance.