

# Estimation and Applications of Some Risk Measures in Finance

## Abstract

A major concern for the regulators and owners of financial institutions is the market risk of a portfolio and the adequacy of capital to meet such risk. Market risk is the risk of losses in positions arising from the movements in market prices. A risk measure is used to determine the amount of capital to be kept in reserve. Some of the well known measures of market risk are: Value-at-Risk (VaR), Median Shortfall (MS) and Expected Shortfall (ES). VaR is an extreme quantile of the marginal loss distribution. Its use was recommended by the Basel Committee on Banking Supervision in 1996. MS is the median loss when the loss in the investment exceeds the VaR level. ES is the mean of the conditional loss distribution, given the event that the loss exceeds the VaR. We study the problems of estimation of these risk measures based on asset or portfolio return data, and their applications in comparing the market risk of a wide variety of Indian mutual funds. For each fund, the data on the daily and monthly net asset value (or closing price for an exchange traded fund) from 1 April 2007 to 31 March 2015 is considered, during which the Indian equity market experienced extreme volatility due to global recession and subsequent recovery.

Our future work consists of two more risk measures, viz. the Entropic Value-at-Risk (EVaR) and Spectral Risk Measures (SRMs). EVaR is a coherent risk measure proposed by Ahmedi-Javid in 2012. Ahmedi-Javid showed that EVaR is more risk-averse as compared to the ES at the same confidence level. SRMs proposed by Acerbi in 2002 is the most promising development in the financial risk area. It belongs to the family of coherent risk measures and hence inherit the properties of such measures. Our aim is to study the problems of estimation of these risk measures based on asset or portfolio return data, and their applications.