

# Risk Management Part II for MSc

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## 1 Course Description

This course deals with the ways in which risks are quantified and managed by financial institutions.

### 1.1 Class Schedule

I will have 4 weeks of 3 hour lectures, starting in October.

## 2 Course Textbook

The main course textbook is:

Christoffersen, P.F. Elements of Financial Risk Management. (Academic Press, London, 2003).(PC)

However, the lecture slides will generally be a complete description of the course unless stated in the lectures.

## 3 Assessments

There will be a final exam (80%) and a group assignment (20%).

### 3.1 Practical Work

A group practical assignment to be done on excel which will require students to integrate theoretical and practical knowledge of the course.

## 4 Syllabus

1. Value-at-risk (Chapter 1)
2. Historical Simulation, Value-at-Risk and Expected Shortfall (Chapter 2)

3. Volatility Modeling (Chapter 4 and 5)
4. Backtesting and Stress Testing (Chapter 13)
5. Value-at-Risk and Banking Regulation (Slides)

#### 4.1 Value-at-Risk

It starts by defining value at risk (VaR). It compares VaR to expected shortfall and shows that the latter has better theoretical properties. (To use the technical term, it is more “coherent.”) It discusses the choice of parameters for VaR, and the impact of autocorrelation on VaR estimates.

#### 4.2 Historical simulation

The advantage of the historical simulation approach is that it requires no assumptions about probability distributions and correlations. It assumes that percentage changes in all market variables over the next day are a random sample from the last  $N$  days. We study how to calculate a standard error when VaR is estimated from historical simulation.

#### 4.3 Volatility Modeling

This topic provides a formal definition of volatility and then moves on to discuss how the volatility of a variable can be monitored by risk managers. One issue is whether volatility should be considered to be a trading-day or calendar-day phenomenon. Whatever the reason, volatility is much greater when markets are open than when they are closed. It therefore makes sense to measure volatility using trading days rather than calendar days. This is what traders and risk managers do.

#### 4.4 Backtesting and Stresstesting

This section covers the model-building approach, which is the main alternative to historical simulation. We study the relationship of VaR to the Markowitz results and also show how covariance matrices can be used. The section first explains how the model building approach can be used for the situation where the value of the portfolio is linearly dependent on the values of the underlying market variables.

#### 4.5 VaR and Banking Regulation

This section looks at prudential regulation of banks’ capital and conduct of business. We stress the reasons for regulating banks, notably in the light of the interrelation between prudential regulation and the safety net, as well as looking at some additional forms of regulation such as reserve requirements, and discussing the various Basel Agreements for international banking regulation.