

STK 3505: Problems and methods in Actuarial science

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Preliminary curriculum

- Note that this is a preliminary curriculum.
- Written material for the course:
From *Erik Bølviken (2014): Computation and Modelling in Insurance and Finance. Cambridge University Press.:*
 1. Chapter 1 Introduction: Sections 1-5
 2. Chapter 2 Getting started the Monte Carlo Way: Sections 1-5, except 2.3.3 and 2.3.4
 3. Chapter 3 Evaluating risk: A primer: Sections 1-7
 4. Chapter 5 Modelling I: Linear dependence: Sections 1,3-6
 5. Chapter 6 Modelling II: Conditional and non-linear: Sections 1-3,5

CH 1: Introduction

- Introduce the main concepts.
- Introduce some notation.
- Give some examples.

CH 2: Getting started the Monte Carlo Way

- Examples of use of Monte Carlo methods.
- A simple method for sampling from various probability distributions.
- Some characteristics of distributions that are frequently used in this course.

CH 3: Evaluating risk: A primer

- Introduction to general insurance.
- Introduction to life insurance.
- A brief introduction to financial risk and derivatives.
- How to evaluate risk in general insurance over several years.

CH 5: Modelling I: Linear dependence

- What is linear/non-linear dependence?
- Markowitz theory for optimal selection of a portfolio of financial assets.
- Some characteristics of the multivariate normal distribution.
- Properties and use of some simple time-series models:
 - Random walk
 - Autoregression.

CH 6: Modelling II: Conditional and non-linear

- Conditional modelling with examples of use.
- Use of conditional modelling for studying risk.
- Dependence (not necessarily linear).

From *Aftenposten*, August 6

Forsikringsselskap nedringt

Vannet flommet ned over Østlandet - Oslo, Asker og Bærum spesielt - fra tidlig lørdag morgen. Det har ført til stengte butikker, veier og våte kjellere.

Vi har fått hundrevis av henvendelser fra Asker- og Bærumsområdet.

[...]

Når kraftige nedbørsmengder rammer tettbygde områder, rammer det så mange samtidig at kapasiteten til beredskapsstatene - som politi, brannvesen, saneringsselskap - blir sprengt. Det ser vi nå sier han, og forteller om lang ventetid.

Vi har vannlekkasjer over hele Oslo. Kapasiteten er sprengt. Ring forsikringsselskapet deres, skrev Brann- og redningsetaten på Twitter lørdag formiddag.

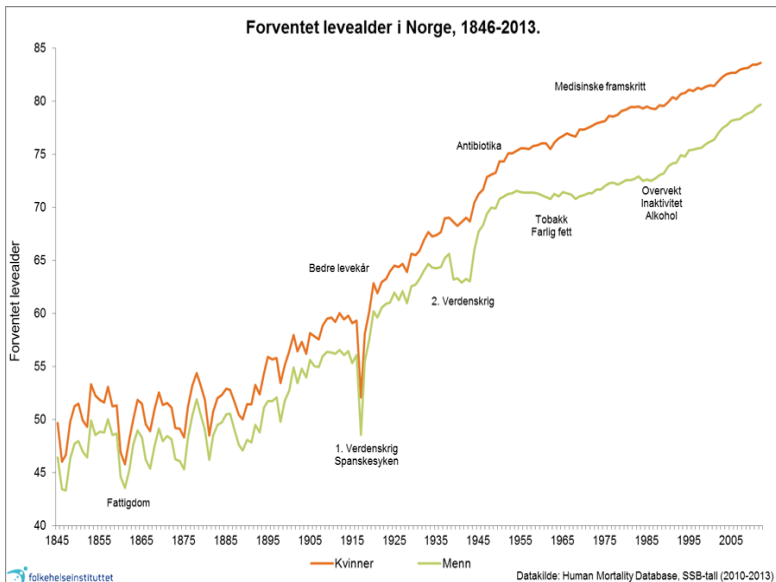
Insurance and climate change



Foto: Geir Tilje



Insurance and increased life expectancy



Insurance and increased life expectancy

Forventet gjenstående levealder fra 35 år etter utdanningsnivå, Norge 1960-2009



From *The Wall Street Journal*, May 6 2015

Low Interest Rates Pressuring European Insurers

[...]

Insurers are particularly sensitive to low rates. One of the main ways they make money is by collecting payments made by policyholders and investing them in the market for higher returns, mostly in bonds because they are seen as lower risk than equities. When interest rates fall, insurers margins get squeezed. Low market yields also force insurers to put aside more cash because they cant rely on high market returns to generate enough cash to fulfill their obligations to policyholders.

Small exercise

- Do you have any insurance? In that case what types?
- To which category (general or life) do they belong?
- Why does insurance work?