



---

# Master thesis in Mathematics-Economics

Nanna Ingemann Ohrt

## Swaptions pricing

Advisor: Rolf Poulsen

Submitted: May 31th 2024

---

## Abstract

## Contents

<b>1</b>	<b>Introduction</b>	<b>4</b>
<b>2</b>	<b>Swaptions as a missing link in asset allocation</b>	<b>5</b>
<b>3</b>	<b>Mathematics of pricing swaptions</b>	<b>5</b>
3.1	Time value of money . . . . .	5
3.2	The yield curve . . . . .	5
3.3	Forward rates . . . . .	5
3.4	Bonds . . . . .	5
3.5	Financial derivatives . . . . .	5
3.6	Interest rate swaps . . . . .	5
3.7	Options . . . . .	5
3.8	Swaptions . . . . .	5
<b>4</b>	<b>SABR Implied Volatility and Option Prices</b>	<b>5</b>
4.1	Process for the forward rate . . . . .	5
4.2	Estimating Parameters . . . . .	5
<b>5</b>	<b>Data and the Volatility Risk Premium</b>	<b>5</b>
5.1	Data . . . . .	5
5.2	The volatility Risk Premium . . . . .	5

# **1 Introduction**

In this thesis we will investigate swaptions pricing.

## References

- [1] Armstrong, M.A. Basic Topology. England: Editorial Board, 2000.

## 2 Swaptions as a missing link in asset allocation

Look at pdf form Noamura

## 3 Mathematics of pricing swaptions

Look at Swaption pricing and isolating volatility exposure

### 3.1 Time value of money

### 3.2 The yield curve

### 3.3 Forward rates

### 3.4 Bonds

### 3.5 Financial derivatives

### 3.6 Interest rate swaps

### 3.7 Options

### 3.8 Swaptions

## 4 SABR Implied Volatility and Option Prices

Look at The SABR model

### 4.1 Process for the forward rate

### 4.2 Estimating Parameters

## 5 Data and the Volatility Risk Premium

Look at Broekmans

### 5.1 Data

### 5.2 The volatility Risk Premium