

Introduction to:
Strategic Asset Allocation

Ken Nyholm

Outline

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My contact information

Ken Nyholm

Risk Management Division

European Central Bank

+49 69 1344 7926

Ken.nyholm@ecb.int

Ken.nyholm@gmail.com

www.KenNyholm.com

- The strategy unit is responsible for:
 - Quantative model development and implementation
 - Strategic benchmarks for ECB's investment portfolios
 - Currency allocation
 - Investment framework design
 - Asset allocation analysis for the ECB retirement plan
- My motivation for giving the course?

What is this course about

COURSE DESCRIPTION: This course will treat "strategic asset allocation" from a practical point of view. It will show how financial and econometric tools can be used to help designing investment strategies for longer time-horizons. We will see how econometric techniques such as vector autoregressive models and regime switching models can be used to generate return projections for financial instruments, how business cycle dynamics can be integrated into the investment framework and how financial models such as the Capital Asset Pricing Model (CAPM) can be used to derive optimal asset allocations.

During the course we will see many hands-on examples and practical model implementations, however, the theoretical foundations for the used modelling frameworks will also be treated to some extent. The course falls in three parts: Section 1 refreshes matrix algebra and describes the econometric building blocks needed. Section 2 outlines the main financial models used and Section 3 completes the course by combining sections 1 and 2 to show how these tools can form the foundation for strategic asset allocation decisions.

What is this course about

COURSE PREREQUISITES: Students are expected to have basic knowledge of econometric techniques and matrix algebra, although the course will offer a refresher of these topics. Also, students are expected to have some familiarity with financial market basics, financial models such as the CAPM and arbitrage pricing theory as well as interest rate models. However, aided by the applied nature of the course, all topics will be introduced from a basic and intuitive level, so the prerequisites are minimal. Prior knowledge of an econometric programming language will be an advantage (e.g. Matlab, Ox, Gauss or the like: Matlab will be used in the teaching).

What should you get out of the course

- Applied knowledge of Matlab
- Better understanding of matrix algebra
- The layers of the investment process
- The interaction between:
 - Asset allocation techniques
 - Yield curve modelling
 - Regime switching models
- Improved productivity in empirical calculations
- Ability to read articles in finance journals
- Produce better thesis work
- Course documentation

Exam and grading

- Course grading:
 - a) For class participation: 30%
 - b) For the take-home exam: 70%
- Class participation:
 - Do the Matlab exercises during class
 - Be alert and ask questions
- Take-home exam:
 - Theoretical and empirical questions
 - 1 week to prepare a "report"

Teaching format

- Focus on the interaction between data and theoretical models by the use of Matlab
- Slide-show and practical exercises
- Be active and ask questions!
- Very intense and demanding course structure

Course Outline

Session	Monday 4/12-06	Tuesday 5/12-06	Wednesday 6/12-06	Thursday 14/12-06	Friday 15/12-06
1	Introduction	Matlab	Risk and Return	Asset Allocation	Econometric Tools
2	Basic principles	Matrix algebra	Risk and Return	Asset Allocation	Econometric Tools
3	Basic principles	Matrix algebra	Risk and Return	Asset Allocation	Econometric Tools
4	Basic principles	Matrix algebra	Asset Allocation	Econometric Tools	Summary, Q&A
5	Matlab		Asset Allocation	Econometric Tools	Distribution of Exam

Literature

- Main texts:
 - User's guide to Empirical Finance, November 2006, K.Nyholm, *Lecture notes*
 - A consistent and accountable framework for strategic asset allocation relevant for risk averse investors, September 2006, M. Koivu and K.Nyholm, *RMA paper*
 - Common factors affecting bond returns, 1991, R.Litterman & J.Scheinkman, *The Journal of Fixed Income*
 - Discretion versus policy rules in practise, 1993, J.B.Taylor, *Carnegie-Rochester Conference Series on Public Policy*
 - Slides, Excel and Matlab examples
- Supplementary texts:
 - Time Series Analysis, 1994, J.D. Hamilton
 - Fixed income securities, 2002, B. Tuckman
 - Investment Science, 1998, D.G. Luenberger
 - State Space Models with Regime Switches, 1999, C.J. Kim & C.R. Nelson
 - Foundations for Financial Economics, 1988, C.F. Huang & R.H. Litzenberger

Literature

- Software:
 - Matlab(tm)
 - Excel
- Supplementary materials:
 - Maxima (<http://maxima.sourceforge.net/>), freeware
 - Scilab (<http://www.scilab.org>), freeware
- Relevant homepages:
 - <http://www.mathtools.net/MATLAB/index.html>
 - <http://www.econphd.net/notes.htm>

What is important?

- Ability to use Matlab to solve empirical problems
- Good understanding of:
 - Econometric techniques
 - Financial theory
 - Yield curve modelling
- Good understanding of the layers of the investment process
- Behaviour:
 - Ask questions
 - Do the exercises during the course