Advanced asset pricing and portfolio management

Number of hours: 15
Second Year

Course objectives

The course is dedicated to the study of dynamic term structure models of the interest rates, including references to new developments in monetary economics, as well as of dynamic asset allocation models.

On top of the theoretical foundations, some relevant issues at the frontier of research are presented, providing students with the tools needed to understand the recent literature and to develop new research ideas.

Excel sheets and MATLAB codes for some applications are provided. An empirical assignment allows students to deepen their understanding of the models and their implementation.

Prerequisites

Financial calculus, linear algebra, probability and statistics.

Course content

1) Dynamics of the term structure of interest rates and no-arbitrage bond pricing

- Vasicek model for the short-term interest rate.
- Yield curve of interest rates.
- Estimation of Vasicek model from historical bond yield data (maximum likelihood estimation).

2) Advanced no-arbitrage term structure models

- Multi-factor term structure models in continuous time
- Multi-factor term structure models in discrete time
- Models with a zero-lower-bound
- Term structure models embedding macroeconomic variables and monetary policy rules.

3) Dynamic asset allocation

- Static vs dynamic asset allocation.
- Dynamic asset allocation in continuous time: Kim and Omberg (1996).
- Other dynamic allocation models.

Evaluation

Students will be tested by means of an empirical assignment.

Recommended material

- **Course slides**
- **Readings**

Brennan, M. J., & Xia, Y. (2002). Dynamic asset allocation under inflation. *The Journal of Finance*, 57(3), 1201-1238.

Cox, J. C., Ingersoll Jr, J. E., & Ross, S. A. (1985). A Theory of the Term Structure of Interest Rates. *Econometrica*, 385-407.

Dai, Q., & Singleton, K. J. (2000). Specification analysis of affine term structure models. *The Journal of Finance*, 55(5), 1943-1978.

Duffee, G. R. (2002). Term premia and interest rate forecasts in affine models. *The Journal of Finance*, 57(1), 405-443.

Duffie, D., & Kan, R. (1996). A yield-factor model of interest rates. *Mathematical finance*, 6(4), 379-406.

Ireland, P. N. (2015). Monetary policy, bond risk premia, and the economy. *Journal of Monetary Economics*, 76, 124-140.

Kim, T. S., & Omberg, E. (1996). Dynamic nonmyopic portfolio behavior. *Review of Financial Studies*, 9(1), 141-161.

Lioui A., & Tarelli, A. (2023). Money illusion and TIPS demand. *Journal of Money, Credit and Banking*, 55(1), 171-214.

Krippner, L. (2013). A tractable framework for zero-lower-bound Gaussian term structure models. Working paper.

Sangvinatsos, A., & Wachter, J. A. (2005). Does the Failure of the Expectations Hypothesis Matter for Long-Term Investors? *The Journal of Finance*, 60(1), 179-230.

Vasicek, O. (1977). An equilibrium characterization of the term structure. *Journal of Financial Economics*, 5(2), 177-188.

Wachter, J. A. (2002). Portfolio and consumption decisions under mean-reverting returns: An exact solution for complete markets. *Journal of Financial and Quantitative Analysis*, 37(01), 63-91.

Wu, J. C., & Xia, F. D. (2016). Measuring the macroeconomic impact of monetary policy at the zero lower bound. *Journal of Money, Credit and Banking*, 48(2-3), 253-291.