



Prof. Dr. Yvan Lengwiler  
Prof. Dr. Heinz Zimmermann  
Fall 2022

No. 65938-01

## “Finance” for MFM Students

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### Course Objective

This course provides an in-depth treatment of selected topics at the frontier between macro and financial economics. The course includes a **self-study** part based on audio-animated slides, and **in-class meetings** with in-depth discussions of the topics and selected papers.

The main goals of the lecture are to understand

- the allocation of resources along **the time axis**: How much should an individual save? Is there an optimal amount of saving – an optimal capital stock – for the economy as a whole? Can an economy save too much? How are interest rates related to growth? Can interest rates be “too low”, and what are the consequences? We discuss the role and the determinants of interest rates – for individual households and the economy.
- the role of financial assets in the **allocation of risk**: Risk averse individuals command a premium for holding risky assets. How can the riskiness of an asset (stock, bond, project) be operationalized, and how is it related to the risk premium? How can assets be priced without using risk premiums? The state preference model provides interesting insights to both questions: the pricing of cash-flows using stochastic discount factors (SDF) in general markets, and the no-arbitrage principle in complete markets which can be used to price options and many corporate securities.

## Instructors

- Professor Yvan Lengwiler, [yvan.lengwiler@unibas.ch](mailto:yvan.lengwiler@unibas.ch)
- Professor Heinz Zimmermann, [heinz.zimmermann@unibas.ch](mailto:heinz.zimmermann@unibas.ch)

## Course organization

The course is organized as a combination of in-class meetings and self-study, plus Q&A contact windows with the instructors in zoom.

- In-class meetings are held for the introductory sessions for each topic (ITA, APR), and the discussion of selected (specifically: 4) papers. In-class participation is required. (Occasionally, a specific topic is presented.) → See the Time Schedule below for details.
- Self-study is based on audio-augmented ppt-slides which covers the basic material of the lecture. The slides are uploaded 1-2 weeks in advance. We highly recommend study or discuss the topics in small groups.

First lecture: Tuesday, September 20, 2022, 10:30-12:00

Last lecture: Tuesday, December 6, 2022, 10:30-12:00

Final exam: determined by the Studiendekanat

Location: WWZ, Seminarraum S15, HG.31, Peter Merian Weg 6, Basel

## Assessment/Exams/Credits

The course is worth 6 ECTS credit points. Grading is based on a 90-minutes written exam at the end of the lecture. The exam is open-book (no electronic devices permitted).

## Prerequisites

Basic mathematics and statistics are required, e.g. derivatives, expansions, variances and covariances, linear regression. Additional material includes standard bachelor micro- and macroeconomics, e.g. indifference curves, production functions, substitution and income effect, ...

Special knowledge in financial economics is not required, although advantageous. We assume that a basic course in financial markets or financial management (e.g. investments) has been taken.

## Course Material

There is no official textbook. There are audio-augmented slides for each part of the self-study part of the lecture; they are put on ADAM sequentially one or two weeks in advance.

The four papers which are discussed in the in-class meetings (see Section Papers below) are put on ADAM in advance.

Complimentary reading is encouraged – references to key papers and books can be found in the lecture notes, and more recommended readings are available on request.

## Forum

There is a forum on the ADAM website of the course. We encourage you to work with your fellow students. Maybe build a small study group. If you are stuck somewhere, check if someone has posted a similar problem in the forum. Place your questions there. Try to interact through the forum or in person. Try to explain what you have learned to your fellow students. Explaining is a good test to check if you have understood a problem well yourself.

If your study group is stuck, reach out to us by email. We offer appointments by zoom or in person upon request.

## Topics of the Course

### **TIME • Intertemporal analysis (ITA):**

- The standard one-period optimal consumption-saving problem is analyzed and extended to a multiperiod setting. Key is the understanding of the Euler equation.
- We analyse the implications of a concave utility function for consumption smoothing or intertemporal substitution, introduce an explicit measure (EIS), and analyse the effect of interest rate changes on optimal saving.
- We switch from individual households to aggregate (average) magnitudes and assume population growth. Firms and productive capital stock are added, and equilibrium conditions for the dynamics of consumption and capital are derived (Keynes-Ramsey rule, law of motion of capital).
- Long-run consumption-capital equilibrium is analysed under “steady state” assumptions (Optimal Growth model). Stability of the SS and adjustment effects are analyzed.
- The interest rate in SS equilibrium is discussed. It is contrasted with an alternative model, the “Golden Rule” of accumulation and its implication for capital and interest. The relationship between growth and interest is of particular interest. We discuss the determination of adequate social discount rates for long-run public projects. A final topic is the controversy about excessive accumulation of capital and low (negative) interest rates.
- The Fisher separation theorem highlights the role of capital markets in the funding-lending process.

### **RISK • Asset pricing (APR):**

- Risk premiums: ex and ex ante - an important distinction. We then discuss the determinants of risk premiums based on the CAPM, and its limitations.
- A more general perspective on the economic nature of risk premiums is motivated by the EE and formalized by the stochastic discount factor (SDF). An economic interpretation is given by a state-preference interpretation. A generic asset pricing model is presented. The CAPM is shown as a special case
- The state-preference model is analyzed in more detail (complete market model): it provides insights for optimal risk allocation and the value additivity principle under uncertainty (no-arbitrage).
- An important application of the no-arbitrage principle is discussed, the “risk neutral” valuation approach of contingent claims (e.g. options). An important application is the binomial option pricing model.
- The Black-Scholes model is the workhorse for risk-neutral valuation of options and general contingent claims; its assumptions and formula is discussed. An interesting application is the valuation of corporate securities subject to default risk.

## Time Schedule

Notice that the available time for lectures is only 12 weeks in this term

Date	Week		In-class (each 90')	Self-study topic Preparation <u>before</u> classes
20-09-2022	1	ITA	Introduction (ITA_1)	Work through the questionnaire available on ADAM.
27-09-2022 and 04-10-2022	2, 3	ITA		Consumption-savings decisions/ Euler equation (ITA_2, ITA_3), Intertemporal substitution and optimal saving (ITA_4), Keynes-Ramsey rule (ITA_5); Aggregation, firms, and equilibrium (ITA_6); Steady state and dynamics (ITA_7) with EX; Optimal growth and golden rule; Interest rates and growth, social discount rate (ITA_8)
11-10-2022	4	ITA	Paper 1 Aaron	Study the paper by Aaron
18-10-2022	5	ITA	Paper 2 Arrow et al	Overaccumulation, low interest rates, debt (ITA_8); Study the paper by Arrow et al
25-10-2022	6	ITA	Paper 3 Blanchard	Study the paper by Blanchard
01-11-2022	7	APR	Introduction (APR_1)	Risk aversion (APR_2); Capital Asset Pricing Model (APR_3)
08-11-2022 and 15-11-2022	8, 9	APR	<i>(Equity valuation and market crises)</i>	Euler eq and SDF (state-preference model) (APR_4, APR_5)
22-11-2022	10	APR	Paper 4 Pastor et al	Study the paper by Pastor et al
29-11-2022	11	APR	Paper 4 Pastor et al	Study the paper by Pastor et al again; State pricing and arbitrage (APR_7)
06-12-2022	12	APR		Risk neutral pricing, Black-Scholes model (APR_8)

ITA: Intertemporal Analysis

APR: Asset Pricing

## Papers

- [1] Aaron, H. (1966). "The social insurance paradox." *Canadian Journal of Economics and Political Science*, 32(3), 371-374.
- [2] Arrow, K. J., Cropper, M. L., Gollier, C., Groom, B., Heal, G. M., Newell, R. G., Nordhaus, W.D., Pindyck, R.S., Pizer, W.A., Portney, P.R., Sterner, T., Tol, R.S.J., and Weitzman, M. L. (2014). "Should governments use a declining discount rate in project analysis?" *Review of Environmental Economics and Policy*, 8 (2), 145–163
- [3] Blanchard, O. (2019). "Public debt and low interest rates." *American Economic Review*, 109(4), 1197-1229.
- [4] Pástor, L., Stambaugh, R. F., and Taylor, L. A. (2021). "Sustainable investing in equilibrium." *Journal of Financial Economics*, 142(2), 550-571.

## **General recommended textbooks for interested students**

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### **Intertemporal analysis**

Wälde, K.: Applied Intertemporal Optimization, online book, 2012

Wickens, M.: Macroeconomic Theory, Princeton University Press, 2<sup>nd</sup> Ed., 2011, Chapters 2,3,4

Niepelt, D.: Macroeconomic Analysis, MIT Press, 2020, parts of Chapters 2 and 3

Romer, D.: Advanced Macroeconomics, McGraw-Hill Companies, Inc., 4<sup>th</sup> Ed. 2012, Chapters 2, 8

### **Asset pricing**

Back, K.: Asset Pricing and Portfolio Choice Theory, Academic Press, 2010

Cochrane, J.: Asset Pricing, Princeton University Press, rev. Ed., 2005

Campbell, J.: Financial Decisions and Markets, Princeton University Press, 2018

Danthine, J.-P. and J. Donaldson: Intermediate Financial Theory, Academic Press, 3<sup>rd</sup> Ed., 2014

Sharpe, W. F. (2011): Investors and Markets: Portfolio Choices, Asset Prices, and Investment Advice, Princeton University Press.

*in German:*

Seiler Zimmermann, Y. und H. Zimmermann (2021): Finance compact plus, NZZ Libro, Kapitel 11 (CAPM), 12 (Mehrfaktorbewertung), 19 (Derivate, Arbitrage), 20 (Option Pricing).

*Specifically:* Pricing the capital structure of the firm by CC analysis

Ingersoll, I.: Theory of financial decision making, Roman & Littlefield, 1987, Chapter 19

*in German:*

Seiler Zimmermann, Y. und H. Zimmermann (2021): Finance compact plus, NZZ Libro, Kapitel 22 (Kapitalkosten), 23 (Corporate Finance) insbes. Abschnitte 23.2, 23.4, 23.5