
**The Swedish House of Finance (SHoF) offers within its Doctoral
Course Program in Finance a course in**

Topics in Asset Pricing

Schedule: Classes will be held at the premises of SHoF, Drottninggatan 98, 111 60 Stockholm on the following days:

- January 17: Equity return predictability (Riccardo Sabbatucci)
- January 21: Intermediary asset pricing in continuous time (Adrien d’Avernas)
- January 28: Household finance (Paolo Sodini)
- February 4: No lecture [midterm break]
- February 11: Time inconsistent preferences (Tomas Bjork)
- February 18: Limits to arbitrage and bubbles (Jungsuk Han)
- February 25: Asset liquidity, collateral and crises (Vincent Maurin)
- March 4: Higher-order moments of equity returns (Michael Halling)

Requirements: To pass the course, students are supposed to attend all lectures, complete required readings, and submit assignments. Given 100% attendance, it is necessary and sufficient to submit any 3 out of 7 assignments. Every missed class is equivalent to an additional assignment to be completed.

Evaluation: Pass with Distinction, Pass or Fail. To Pass with Distinction, more than 50% of your assignments (for example, two out of required 3 assignments) should receive Distinction.

Deadline for submitting assignments: March 24, 2019

Registration

Please register in advance with the course secretary Jenny Wahlberg Andersson, Department of Finance, Stockholm School of Economics, Drottninggatan 98, 111 60 Stockholm,
e-mail: jenny.wahlberg.andersson@hhs.se
Registration deadline: December 20, 2018

Travel Stipends

SHoF offers travel stipends to PhD students from Swedish universities. To apply, please send a brief motivation letter/mail by the supervisor and a budget to jenny.wahlberg.andersson@hhs.se. The Nordic Finance Network (NFN) offers travel stipends to PhD students from other Nordic countries who come from one of the NFN member institutions. Information on how to apply for NFN travel stipends is on <http://nfn.aalto.fi/courses.htm>.

Syllabus

January 14: Equity return predictability

Time Series Predictability

Theory: what does “returns are predictable” mean? (e.g., time-varying returns, market inefficiency, slow diffusion of information)

In-sample predictability vs. Out-of-sample predictability

Statistical vs. Economic Significance of Predictability

Intro to Statistical Learning: model selection

Cross-sectional return predictability

Factor models

Cross-sectional anomalies: A list

Spurious factors – data mining considerations

Required readings:

Cochrane notes on predictability:

(http://faculty.chicagobooth.edu/john.cochrane/teaching/35150_advanced_investments/week_1_notes.pdf)

Goyal, Amit, and Ivo Welch, 2008, A comprehensive look at the empirical performance of equity premium prediction, *The Review of Financial Studies* 21(4), 1455-1508.

Chapter 1-2-3-5-6 of *An Introduction to Statistical Learning* by James, Witten, Hastie, Tibshirani (Springer, 2015)

Ang, A., Hodrick, R. J., Xing, Y. and Zhang, X. 2006, The Cross-Section of Volatility and Expected Returns, *The Journal of Finance*, 61: 259–299.

Campbell R Harvey, Yan Liu, Heqing Zhu 2016, ... and the Cross-Section of Expected Returns, *Review of Financial Studies*, 29(1): 5-68.

January 21: Intermediary asset pricing in continuous time

Many recent papers in macro-finance use continuous-time general equilibrium models with heterogeneous agents to study the dynamics of risk premia during crises in asset markets where the marginal investor is a financial intermediary. The objective of this course is to provide enough knowledge of these methods that one could begin to use them in nontrivial ways in his or her research.

The course begins with the mathematical preliminaries about continuous-time stochastic processes. Then we will learn how to solve He and Krishnamurthy (2013) and Brunnermeier and Sannikov (2014). The class concludes with a review of the most recent empirical and theoretical papers in the field.

Required Readings:

Brunnermeier, Markus K., and Yuliy Sannikov. "A macroeconomic model with a financial sector." *American Economic Review* 104.2 (2014): 379-421.

Brunnermeier, Markus K., and Yuliy Sannikov. "Macro, money, and finance: A continuous-time approach." *Handbook of Macroeconomics*. Vol. 2. Elsevier, 2016. 1497-1545.
 He, Zhiguo, and Arvind Krishnamurthy. "Intermediary asset pricing." *American Economic Review* 103.2 (2013): 732-70.

Recommended Readings:

Basak, Suleyman, and Domenico Cuoco. "An equilibrium model with restricted stock market participation." *The Review of Financial Studies* 11.2 (1998): 309-341.
 Di Tella, Sebastian. "Uncertainty shocks and balance sheet recessions." *Journal of Political Economy* 125.6 (2017): 2038-2081.
 Di Tella, Sebastian, and Pablo Kurlat. "Why are Bank Balance Sheets Exposed to Monetary Policy?" Working paper, 2016.
 Drechsler, Itamar, Alexi Savov, and Philipp Schnabl. "A model of monetary policy and risk premia." *The Journal of Finance* 73.1 (2018): 317-373.
 Merton, Robert C. "An intertemporal capital asset pricing model." *Econometrica: Journal of the Econometric Society* (1973): 867-887.
 Moreira, Alan, and Alexi Savov. "The macroeconomics of shadow banking." *The Journal of Finance* 72.6 (2017): 2381-2432.

January 28: Household finance

Household finance studies how households should use financial markets to achieve their goals and how do they actually do it.

The course will review theoretically and empirically various financial decisions relevant to household finances. Financial risk taking and the heterogeneity of household risk preferences. Rebalancing over time and over the life cycle. Diversification and hedging.

Recommended readings:

Guiso L., and P. Sodini, Household Finance: an Emerging Field, *Handbook of the Economics of Finance*, edited by Constandinides, G., M. Harris and R. Stulz, Elsevier, 2013
 Calvet, L., and P. Sodini Twin Picks: Disentangling The Determinants of Risk Taking in Household Portfolios, *Journal of Finance*, Vol. 69, No. 2 pp. 867-906, April 2014
 Calvet L., and J. Campbell, P. Sodini, Down or Out: Assessing The Welfare Costs of Household Investment Mistakes, *Journal of Political Economy*, Vol. 115 No. 5 pp. 707-747, October 2007
 Betermier, S. and L. Calvet, and P. Sodini, Who are the Value and Growth Investors?, with *Journal of Finance*, forthcoming
 Calvet L., and J. Campbell, P. Sodini, Fight or Flight? Portfolio Rebalancing by Individual Investors, *Quarterly Journal of Economics*, Vol. 124 No. 1 pp. 301-348, February 2009

February 11: Time Inconsistent Preferences

In recent years there has been an increased interest in studying individual preferences which are “time inconsistent”, in the sense that the associated decision problem for the agent does not admit a Bellman optimality principle. One way of attacking such problems is by viewing them within a game theoretic framework, and to look for Nash subgame perfect equilibrium points. This lecture is an introduction to - and an overview of – some parts of this theory.

For a general controlled Markov process and a fairly general objective functional we derive an extension of the standard Hamilton-Jacobi-Bellman equation, in the form of a system of non-linear equations, for the determination for the equilibrium strategy as well as the equilibrium value function. Most known examples of time inconsistency in the literature are easily seen to be special cases of the present theory. We also study some concrete examples, and in particular we study a general equilibrium production model with time inconsistent preferences.

Required readings:

Björk, T. Slides on time inconsistent control. (pdf-files).
Björk, T., Khapko, M. and Murgoci, A: (2017). Time inconsistent Control Theory (lecture notes. pdf file).

Recommended readings:

Barro, R. (1999). Ramsey meets Laibson in the neoclassical growth model. *The Quarterly Journal of Economics*, 114:1125–1152.

Basak, S. and Chabakauri, G. (2010). Dynamic mean-variance asset allocation. *Review of Financial Studies*, 23:2970–3016.

Björk, T. and Murgoci, A. (2014). A theory of Markovian time inconsistent stochastic control in discrete time. *Finance and Stochastics*, 18:545–592

Björk, T., Murgoci, A., and Khapko, M. (2016). On time inconsistent stochastic control in continuous time. *Finance and Stochastics* 21 (2), 331-36

Björk, T., Murgoci, A., and Zhou, X. Y. (2014). Mean-variance portfolio optimization with state dependent risk aversion. *Mathematical Finance*, 24:1–24.

Ekeland, I. and Lazrak, A. (2010). The golden rule when preferences are time inconsistent. *Math. Financ. Econ.s*, 4:29–55.

Ekeland, I., Mbodji, O., and Pirvu, T. (2010). Time consistent portfolio management. *SIAM J. Financ. Math.*, 3:1–32.

Ekeland, I. and Pirvu, T. (2008). Investment and consumption without commitment. *Mathematics and Financial Economics*, 2(1):57–86.

Harris, C. and Laibson, D. (2012a). Dynamic choices of hyperbolic consumers. *Econometrica*, 69(4):935–957.

Harris, C. and Laibson, D. (2012b). Instantaneous gratification. *The Quarterly Journal of Economics*.

Krusell, P. and Smith, A. (2003). Consumption and savings decisions with quasi-geometric discounting. *Econometrica*, 71:366–375.

Luttmer, E. and Mariotti, T. (2003). Subjective discounting in an exchange economy. *Journal of Political Economy*, 111:959–989.

Strotz, R. (1955). Myopia and inconsistency in dynamic utility maximization. *Review of Economic Studies*, 23:165–180. Vieille, N. and Weibull, J. (2009). Multiple solutions under quasi-exponential discounting. *Economic Theory*, 39:513–526.

February 18 Limits to arbitrage and bubbles

This session has a general theme of inefficient markets and the violations of the law of one price. The first part will cover theories related to limits to arbitrage. The second part will cover theories related to bubbles and asset overvaluations. We will study some classical works in the field, and also try to connect them with more modern approaches.

Required readings:

Lecture note

Recommended readings:

De Long, J. B., A. Shleifer, L. H. Summers, and R. J. Waldmann, 1990, "Noise Trader Risk in Financial Markets," *Journal of Political Economy*, 98(4), 703–738.
 Shleifer, A., and R. W. Vishny, 1997, "The Limits of Arbitrage," *Journal of Finance*, 52(1), 35–55.
 Gromb, D., and D. Vayanos, 2002, "Equilibrium and welfare in markets with financially constrained arbitrageurs," *Journal of Financial Economics*, 66(2-3), 361–407.
 Loewenstein, M., and G. A. Willard, 2006, "The Limits of Investor Behavior," *Journal of Finance*, 61(1), 231–258
 Harrison, J. M., and D. M. Kreps, 1978, "Speculative Investor Behavior in a Stock Market with Heterogeneous Expectations," *Quarterly Journal of Economics*, 92(2), 323–336.
 Blanchard, O. J., and M. W. Watson, 1982, "Bubbles, Rational Expectations and Financial Markets," in *Crises in the Economic and Financial Structure*, ed. by P. Wachtel. Lexington Books, Lexington, Mass.
 Tirole, J., 1985, "Asset Bubbles and Overlapping Generations," *Econometrica*, 53(6), 1499–1528.
 Santos, M. S., and M. Woodford, 1997, "Rational asset pricing bubbles," *Econometrica*, 65(1), 19–57.
 Allen, F., and D. Gale, 2000, "Bubbles and Crises," *Economic Journal*, 110(460), 236–255.

February 25: Asset liquidity, collateral and crises

There is a vast empirical literature showing that liquidity factor(s) can help to price the cross-section of stocks. We will briefly review the main findings and explicit the potential underlying mechanism. Recent papers also found evidence of a premium for certain categories of debt, such as government bond. This premium is often related to safety or liquidity attributes.

The course will first try to answer some fundamental questions about asset liquidity: what does it mean for an asset to be liquid? What are the potential sources of liquidity premia? We will then focus on models where assets play the role of collateral. Finally, we will study the implications for the financial system of the demand for collateral and the role of collateralized debt in financial crisis.

Recommended readings:

- Yakov Amihud, (2002). "Illiquidity and stock returns: cross-section and time-series effects," *Journal of Financial Markets*.
- Albert S. Kyle, (1989). "Informed Speculation with Imperfect Competition." *The Review of Economic Studies*.
- Krishnamurthy, Arvind, and Annette Vissing-Jorgensen, (2012). "The Aggregate Demand for Treasury Debt." *Journal of Political Economy*.
- Lagos, Ricardo, Guillaume Rocheteau, and Randall Wright, (2017). "Liquidity: A New Monetarist Perspective." *Journal of Economic Literature*.
- John Geanakoplos, (1996). "*Promises Promises*." Cowles Foundation Discussion Papers.
- Gorton, Gary, and Guillermo Ordoñez (2014) "*Collateral Crises*." *American Economic Review*.
- Brunnermeier, Markus Konrad and Pedersen, Lasse Heje, (2009). "*Market Liquidity and Funding Liquidity*". *The Review of Financial Studies*.

March 4: Higher order moments of equity returns

In standard/traditional asset pricing, only averages, standard deviations and covariances of return distributions are taken into consideration. In recent years, however, higher moments and co-moments of return distributions have also been shown to matter from a theoretical and, mostly, empirical point of view. Those higher moments and co-moments include skewness, kurtosis, co-skewness and co-kurtosis. The discussion of higher-order moments is also related to the notion of crash or jump risk. In this session, we will review some of the basic concepts and economic questions related to higher-order moments of (equity) returns. For example, we will discuss whether higher-order moments matter for cross-sectional differences in expected rates of return. Of course, we will also briefly review some theoretical literature on why higher-order moments could or should potentially matter for asset pricing.

Required readings:

- Harvey, C. R. and Siddique, A. (2000). Conditional Skewness in Asset Pricing Tests, *Journal of Finance* 55 (3): 1263–1295.
- Kraus, A. and Litzenberger, R. H. (1976). Skewness Preference and the Valuation of Risky Assets, *Journal of Finance* 31(4): 1085–1100.
- Conrad, J., Dittmar, R. F. and Ghysels, E. (2013). Ex Ante Skewness and Expected Stock Returns, *Journal of Finance* 68 (1): 85–124.

Recommended readings:

- Bakshi, G., Kapadia, N. and Madan, D. (2003). Stock Return Characteristics, Skew Laws, and the Differential Pricing of Individual Equity Options, *Review of Financial Studies* 16(1): 101 – 143.
- Boyer, B., Mitton, T. and Vorkink, K. (2010). Expected Idiosyncratic Skewness, *Review of Financial Studies* 23(1): 169–202.
- Brunnermeier, M. K., Gollier, C. and Parker, J. A. (2007). Optimal Beliefs, Asset Prices, and the Preference for Skewed Returns, *American Economic Review* 97(2): 159–165.

Dittmar, R. F. (2002). Nonlinear Pricing Kernels, Kurtosis Preference, and Evidence from the Cross Section of Equity Returns, *Journal of Finance* 57(1): 369–403.