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ECO 529 Financial and Monetary Economics
Fall 2022
TTh 2:40PM – 4:10PM (ET)
In-person JRRB298 or JRRB102 and online

Preceptor: Andrey Alexandrov
Email: alexandrov@princeton.edu

Econ529: Modern Macro, Money and (International) Finance: A Heterogeneous Agents Continuous Time Approach

Course Description:

The first 6 weeks of this course will expose students to modern continuous time modeling techniques at the intersection between macroeconomics, monetary economics and (international) finance. The aim of this course is to develop and teach advanced tools and includes a step-by-step solution procedure that students can apply to a variety of economic problems. The step-by-step approach includes both the analytical approach and numerical methods.

In models with financial frictions, a setting with heterogeneous agents is paramount. In addition to the consumption choice, the portfolio choice of the various agents is the focus of this course. The risk itself is endogenous and so is the price of risk leading to a time-varying risk premia. Agents save for precautionary reasons in the safe asset, which consists of money and government bonds – possibly priced as a bubble. The course draws a link to leading monetary theories. As idiosyncratic risk rises, flight-to-safety flows kick in leading to endogenous consumption demand shocks. Monetary policy is necessary to avoid deflationary and liquidity spirals. The safe asset perspective sheds new light on debt sustainability analysis, currency competition, international capital flows, also in the light of emergence of new digital forms of money. New concepts like Digital Currency Areas and digital dollarization will be discussed.

Zoom Link

for lectures: https://princeton.zoom.us/my/economicus
for precepts: https://princeton.zoom.us/j/6150265984

Lecture Notes:

See link: https://www.dropbox.com/s/c2nj1fe6bu3cx8d/ModernMacroMoneyFinance.pdf?dl=0
(The lectures notes will be constantly updated.)

Additional Course Material:

Lecture slides and additional course material will be made available on jointly shared Google Drive.

Teaching Assistant and Precepts:

Name:	Andrey Alexandrov
Office:	JRRB
E-mail:	alexandrov@princeton.edu

- Review sessions (precepts) will be held in person and in xx
- The preceptors' job is to act as a catalytic in that process. Please **ask** him when something is not clear – if you did not understand something, the odds are that somebody else did not either.
- Problem Sets can be solved in groups of 3 to 5 students, will be submitted to head TA Andrey Alexandrov. His email is alexandrov@princeton.edu.

Hybrid Format:
The lecture will be in person and on ZOOM.us. It will be made available online and students can watch it live or at their convenient time. Students should form groups to watch the lectures simultaneously using interactive chat features.

Structure of the Course:
[x] refers to the chapter in the lecture notes

1. Intro: Run-up, Amplifications, Externalities, Recovery	*Princeton Initiative*
Part I: Real Macro-Finance Models with Heterogenous Agents	
2. Optimization: Portfolio and Consumption Choice [2]	*Sept 6, 2022*
3. A Simple Heterogenous Agents Model [2]	*Sept 8*
Princeton Initiative: https://initiative.princeton.edu/programs/2022-program/ Only parts by Yuliy, Sebastian and Markus: Heterogenous Agents Macro-Finance and Monetary Models	*Sept 10-12*
4. Endogenous Risk (and Price of Risk) Dynamics [3] Numerical Methods: Precept/TA sessions/ Yuliy	*Sept 13, 15* *Sept*
5. Introducing CRRA/Epstein-Zinn preferences [3]	*Sept 20*
6. A Model with Endogenous Jumps due to Runs [4]	*Sept 22*
Part II: Monetary Models with Aggregate and Idiosyncratic Risk	
7. A Simple One-Sector Money Model with Idiosyncratic Risk [5]	*Sept 27*
8. Link to Monetary Theories [5]	*Sept 29*
9. Cash vs. Cashless Economy and Inflation Risk as Hedge [6]	*Oct 4*
10. The I Theory of Money Safe Assets and Flight to Safety [6]	*Oct 6*
11. Welfare: Monetary Policy and Macro-Prudential Policy Interaction [7]	*Oct 11*
12. International Monetary System: A Risk Perspective [9]	*Oct 13*
13. Digital Money, Digital Currency Areas, Digital Dollarization	

Optional Topics:
Machine Learning and Macro-Models
Reversal Interest Rate – Effective Lower Bound of Monetary Policy

Additional Readings:

1. Run-up, Crisis-Amplification, Recovery

Brunnermeier, Markus K., Thomas Eisenbach and Yuliy Sannikov, 2013, "Macroeconomics with Financial Frictions: A Survey"

Brunnermeier, Markus K, 2015, Baffi Lecture: "Financial Dominance".

Brunnermeier, Markus K, and Lasse Heje Pedersen, 2009, "Market Liquidity and Funding Liquidity". Review of Financial Studies 22, 2201-2238.

Shleifer, Andrei and Robert W. Vishny, "The Limits of Arbitrage", Journal of Finance, 52(1), 35-55.

2. A Simple Heterogenous Agents Model

See also website: http://scholar.princeton.edu/markus/MacroMoneyFinance

Caballero, Ricardo J. and Alp Simsek, 2018, "A Risk-centric View of Demand Recessions and Macro-prudential Regulation"
https://www.dropbox.com/s/ud0jejruqxsc852/DRSR_37_public.pdf?dl=0

3. Endogenous Risk (and Price of Risk) Dynamics

*Brunnermeier, Markus K. and Yuliy Sannikov, 2014, "A Macroeconomic Model with a Financial Sector", American Economic Review 104(2), pp. 379-421.

Di Tella, Sebastian, 2017, "Uncertainty Shocks and Balance Sheet Recessions", Journal of Political Economy 125 No. 6, 2038-2081

He, Zhiguo, and Arvind Krishnamurthy, 2013, "Intermediary Asset Pricing", American Economic Review 103(2): pp. 732-70.

He, Zhiguo, and Arvind Krishnamurthy, 2012, "A Model of Capital and Crises", Review of Economic Studies 79(2): pp. 735-777.

Kaplan, Greg, Ben Moll, and Gianluca Violante, 2018, "Monetary Policy According to HANK", American Economic Review 108 No. 3, 697-743

Moreira, Alan, and Alexi Savov. "The macroeconomics of shadow banking." The Journal of Finance 72.6 (2017): 2381-2432.

4. A Model with Endogenous Jumps due to Runs

Fernando Mendo, 2020, “Risky low-volatility environments and the stability paradox”, https://drive.google.com/file/d/1NIuz0cJKzVssFgazRKsxbo9m-W6SNRUi/view

5. A Simple One Sector Money Model

*Brunnermeier, Markus K. and Yuliy Sannikov, 2016, “On the Optimal Rate of Inflation”, American Economic Review 106(5), pp. 484-489.

*Brunnermeier, Markus K., Sebastian Merkel, and Yuliy Sannikov, 2019, “The Fiscal Theory of the Price Level with a Bubble”, Working Paper.

*Brunnermeier, Markus K., Sebastian Merkel, and Yuliy Sannikov, 2020, “Debt as Safe Asset”, Working Paper.

6. Cash versus Cashless Economy and The I Theory of Money

*Brunnermeier, Markus K. and Yuliy Sannikov, 2015, “The I Theory of Money”.(see website)

Drechsler, Itamar, Alexi Savov and Philipp Schnabl, 2015, “A Model of Monetary Policy and Risk Premia”, Journal of Finance.

7. Welfare

Lecture Notes: https://www.dropbox.com/s/r7ek4cy59nda2fp/ECO529_Notes.pdf?dl=0

8. Real International Models with Pecuniary Externalities and Sudden Stops

*Brunnermeier, Markus K. and Yuliy Sannikov, 2015, “International Credit Flows and Pecuniary Externalities”, American Economic Journal: Macro. 7(1): pp. 297-338.

Dávila, Eduardo, and Anton Korinek, 2017, "Pecuniary Externalities in Economies with Financial Frictions.", The Review of Economic Studies, 85 (1): pp. 352-395.

Lorenzoni, Guido, 2008, "Inefficient Credit Booms", The Review of Economic Studies, 75 (3): pp. 809-833.

Bianchi, Javier, 2011, "Overborrowing and systemic externalities in the business cycle." American Economic Review, 101 (7): pp. 3400-3426.

Bianchi, Javier, and Enrique G. Mendoza, 2018, "Optimal time-consistent macroprudential policy”, Journal of Political Economy, 26(2): pp. 588-634.

9. International Monetary System and Safe Assets

**Brunnermeier, Markus K. and Yuliy Sannikov, 2019, "International Monetary Theory: A Risk Perspective". (see website).

Brunnermeier, Markus K. et al., 2018, "The Sovereign-Banking Diabolic Loop and ESBies", American Economic Review Papers and Proceedings 106.5, *106*, 5, pp. 508-512

Brunnermeier, Markus K. and Lunyang Huang, 2018, "A Global Safe Asset for and from Emerging Market Economies", working paper, see my website.

Acharya, Viral, Itamar Drechsler, and Philipp Schnabl, 2014, "A pyrrhic victory? Bank bailouts and sovereign credit risk." The Journal of Finance 69(6), pp. 2689-2739.

Caballero, Ricardo J., Emmanuel Farhi, and Pierre-Olivier Gourinchas, 2017, "The Safe Asset Shortage Conundrum", Journal of Economic Perspectives 31(3), pp. 29-46.

Caballero, Ricardo J., and Arvind Krishnamurthy, 2008, "Collective risk management in a flight to quality episode." The Journal of Finance 63(5), pp. 2195-2230.

Farhi, Emmanuel, and Matteo Maggiori, 2017, "A Model of the International Monetary System", The Quarterly Journal of Economics 133(1), pp. 295-355.

Farhi, Emmanuel, and Jean Tirole, 2017, "Deadly embrace: Sovereign and financial balance sheets doom loops." The Review of Economic Studies 85 (3), pp. 1781-1823.

Gennaioli, Nicola, Alberto Martin, and Stefano Rossi, 2014, "Sovereign default, domestic banks, and financial institutions." The Journal of Finance 69(2), pp. 819-866.

Dang, Trivi, Gary Gorton, and Bengt Holmström, 2015, "The Information Sensitivity of a Security". Working Paper.

Maggiori, Matteo, 2017, Financial Intermediation, International Risk Sharing, and Reserve Currencies, American Economic Review 107(1), pp. 3038-3071.

Brunnermeier, Markus K., Pierre-Olivier Gourinchas, and Oleg Istkoki, "Consumption-Led Growth", working paper.

10. Digital Money

Brunnermeier, Markus K., Harold James and Jean-Pierre Landau, 2019, "The Digitalization of Money", (see also "Digital Currency Areas" https://voxeu.org/article/digital-currency-areas).

Joseph Abadi and Markus Brunnermeier, 2021, "Blockchain Economics", working paper.

Brunnermeier, Markus K. and Jonathan Payne, 2020, "Platforms, Tokens, and Interoperability", working paper.

11. Machine Learning and Macromodels (optional guest lecture)

Fernandez-Villaverde, Jesus, Samuel Hurtado and Galo Nuno, 2019, "Financial Frictions and the Wealth Distribution", working paper.

Duarte, Victor, 2018, "Machine Learning for Continuous Time Economics", working paper

Goutham Gopalakrishna, 2021, "A Macro-Finance model with Realistic Crisis Dynamics", working paper (SSRN)

Video Recording Links from Fall 2021

- Lecture 01: Introduction
  - 2021-09-01
  - https://princeton.zoom.us/rec/share/2Egftud34ucLfrfN_zg-FzHQ9FGqZCpouTWGYGsgmHOiUdeqtYF-nJZGN9ELHNH3.dK5eY5orl5td2N8I?startTime=1630517029000
- Lecture 02: Why continuous time?
  - 2021-09-07
  - https://princeton.zoom.us/rec/share/LgseX3uPLtMAAwHzqiTcWL6QRVKx3NbBGHbxzPB6YplSp8QtSM-ZvcwbdQWvMhuk.MOYkAkZPP0n5uDvL?startTime=1631040524000
- Lecture 03a: Cts Time Stochastic Optimization
  - 2021-09-07
  - https://princeton.zoom.us/rec/share/LgseX3uPLtMAAwHzqiTcWL6QRVKx3NbBGHbxzPB6YplSp8QtSM-ZvcwbdQWvMhuk.MOYkAkZPP0n5uDvL?startTime=1631042864000
- Lecture 03b: Cts. Time Stochastic Optimization (Consumption + Portfolio)
  - 2021-09-09
  - https://princeton.zoom.us/rec/play/MqMFoMe7NA8blJhSvMAr-avVuCjmBuTlZ6e3LzrEZZ2rCT0pwbij-ayzajgwpzq8tImwWzhFfgCsvqsN.LMwLXuKyNajpCvxn?autoplay=true&startTime=1631213238000
- Lecture 04: Simple Heterogeneous Agent MacroFinance Model (Basak-Cuoco)
  - 2021-09-09
  - https://princeton.zoom.us/rec/play/24TDjyR66OuWzBzJUKey_RGPm6-E6PkSi9YSaMZhuMHnlohV09yKovQov9uPLCie2AxCfRrIidBI6_WG.cQy8_Jtu11ffOUSH?autoplay=true&startTime=1631217066000
- Lecture 05a: Endogenous Risk Dynamics
- Lecture 05b: Endogenous Risk Dynamics with **log-utility**
  - https://princeton.zoom.us/rec/play/dIyoDS0m5yE-RHjA2YrVAn6fA5GMcvlFQcJTO6V3V5y1RUZ3G625BdxHTCZKrj7_W5aJeAma_UhgqhjD.Y-dTQL5_fh5xVkZQ?continueMode=true

- Lecture 06: Endogenous Risk Dynamics with **CRRA** and Epstein-Zin utility
  - https://princeton.zoom.us/rec/play/IBbT0GRo-32T12vii3C37soiL5T2Mxf2OeerzdoZNQ_GMIKVqtC7hkLDvCpWe_DOKANaywEXTgfitA3G.FgNPttfqyYj403gA?autoplay=true&startTime=1632855115000
- Lecture 07: Numerical Flipped Classroom 01 (Yuliy)
  - https://princeton.zoom.us/rec/play/JneioTO9wG0dcy5EOSwqxj3HqxLa-1dQh_u91kp4y0YqkBTjtgpuvaMcWryfFqw_DcjO7ncULBWt4OE4._SJrxSx6Qm9Cs0n8?continueMode=true
- Lecture 08: Numerical Flipped Classroom 02 (Yuliy)
  - https://princeton.zoom.us/rec/play/jad09ZY5TgJcBRwUy1gDybip5wmTeifaqy4nWttzgPFj4RTM8Jk6PsNcdMCRprZSb-jfIANVhtI9QOW9.oVwCM30JQvaB3b6L?continueMode=true
- Lecture 09: Endogenous Risk Dynamics with **Jumps**
  - https://princeton.zoom.us/rec/play/t6nuwD013W_18J-hZu_PnO9gsgJ3pBJxk5NbaCWyhX36P2TEesEOFnQkfnnExurKs47sWMgrYXi_FmZq.GaUxEXwQuci9Xro9?autoplay=true&startTime=1633027394000
- Lecture 10a: Monetary Model with One Sector
  - https://princeton.zoom.us/rec/share/LdTAChJoD5AMs7yNt4mrBq6utDkBtIY-k6rIuIYIGxYq8YdYx_AmDVjshkEOL_4G.MhPjdIeQyhbponhV?startTime=1633459506000
- Lecture 10b: Monetary Model with One Sector
  - https://princeton.zoom.us/rec/share/jRQYuI1uNK7ftU1LSMDnL9z_ddrYm4nquHOox7Lgw9lO3w1AUlCZKyQOQU3Zi90.Zr8hT_f1Nu7fzRjd?startTime=1633632362000
- Lecture 11: Cash vs. Cashless
  - https://princeton.zoom.us/rec/share/qEunA_7vQrxOeuLhdtuliaBusG8vY6AwJeKgkALez1Jmtna_qP2SlvdY-Jv65avj.4HCbbhcUnFeXrfIT?startTime=1634064358000
- Lecture 11b: Cash vs. Cashless + I Theory of Money
  - https://princeton.zoom.us/rec/share/YNfhBcV2x9s3g9RF2Q8Bown0fUpZxaL2k_YaUbJ7tz2DmaGpCX-ZInKffEqWyg-I.PnddBcMA3_Uz-I1d?startTime=1634237071000
- Lecture 12: Welfare – Optimal Policy
  - https://princeton.zoom.us/rec/share/YNfhBcV2x9s3g9RF2Q8Bown0fUpZxaL2k_YaUbJ7tz2DmaGpCX-ZInKffEqWyg-I.PnddBcMA3_Uz-I1d?startTime=1634241236000
- Lecture 13a: International Real Model with Sudden Stops
  - https://princeton.zoom.us/rec/share/Y4jfN6araFkzF73hNR0LdjZPuUsS-ALc7M53pgT5VyTL2nFrhBx7IkB-DN3HbbPI.EaE8o_oJxKcJkN_R?startTime=1635346168000
- Lecture 13b: International Real Model with Sudden Stops
  - https://princeton.zoom.us/rec/share/HyskfijARH1DYLZQdqkZr56JN9U_h6F1Ld8V6ZlRFb3diS3xCkftT8FVdhqXhrQK.SAFWNPBkKTGFjoG5?startTime=1635777843000
- Lecture 14: International Monetary Model
  - https://princeton.zoom.us/rec/share/-F8b3qTPbDO0WgMsdTEGuMPFdI1A3K2ZwGQ7QDDZ-6DNuI_PeQMEIroFS0ungQ3p.3CQjV_Y-snF0eMWx
- Lecture 15: Uncovered Interest Rate Parity
  - https://princeton.zoom.us/rec/share/LcjEGy7NcbARcPqgrGR6Ys4gl3tROKqLB_MLGMjh_MBno4_ZuygeruAYgolcXMTN.ChP9uhj30tF6FWss?startTime=1635173078000

Precept Recordings 2021

- Precept 1: https://1drv.ms/v/s!AgfWdkP2JvZPg4hyhZcsGxQudbXmxA
- Precept 2: https://1drv.ms/v/s!AgfWdkP2JvZPg4h3eKJyKDifPWXK8A
- Precept 3: https://1drv.ms/v/s!AgfWdkP2JvZPg4xdcloSSGKkXa9Bcw
- Precept 4: https://1drv.ms/v/s!AgfWdkP2JvZPg49eJjaovf1_cQ_THQ
- Precept 5: https://1drv.ms/v/s!AgfWdkP2JvZPg8F4MDh6LSQ5asrJuw