CERGE-EI

Charles University
Center for Economic Research and Graduate Education
and the Economics Institute of the Czech Academy of Sciences

Coursebook for Academic Year 2017–2018

Fall Semester

PhD Study Affairs Office
Prague, September 2017

CONTENTS

1 The structure of Ph.D. studies in economics at CERGE-EI

Study Program

Here we present the courses designed for the preparatory semester and the first and second year of study. (One lecture/exercise unit is 45 minutes long.)

Preparatory semester

Subject	(Lecture hours / exercise hours)
Macroeconomics 0	4/2, Exam
Microeconomics 0	4/2, Exam
Mathematics	4/2, Exam

Notes: *Upon completion of the preparatory semester, the final selection of students is made to enter the doctoral program in the fall semester.*

First year

Subject	Fall	Spring	Summer
Microeconomics I, II, III	4/2, Exam	4/2, Exam	4/2, Exam
Macroeconomics I, II, III	4/2, Exam	4/2, Exam	4/2, Exam
Statistics/Econometrics I, II	4/2, Exam	4/2, Exam	4/2, Exam
Academic Writing I	---	4/0 Credit	---

Notes: *After completing the first year, each student must pass the General examination in the fields of Microeconomics, Macroeconomics and Econometrics.*

Second Year

Subject	Fall	Spring	Summer
Labor Economics I, II	4/2, Exam	4/2, Exam	---
Macro Topics I, II	4/2, Exam	4/2, Exam	---
Micro Topics	4/2, Exam	---	---
Energy&Environmental Economics	---	4/2, Exam	---
Microeconometrics I, II	4/2, Exam	4/2, Exam	---
Time Series Econometrics	4/2, Exam	---	---
Financial Econometrics	---	4/2, Exam	---
Academic Writing II	4/0, Credit	---	---
Research Methodology Seminar	Mandatory	Mandatory	0/2, Credit
Combined Skills I	---	4/0, Credit	---
Research Seminars	0/2, Credit	0/2, Credit	---
Combined Skills II – M.A.	---	---	0/2, Credit

Notes:
* *Second-year students choose at least three (exam-ended) courses per semester. The courses cannot be from the same field. Courses offered may differ slightly from year to year, depending on the faculty in residence.*
* *The credits for English courses, the Research Seminars and Directed Research are mandatory.*
* *The credit for the Research Methodology Seminar will be awarded based on individual consultations with the instructors and individual written work.*
* *After completing the second year, each student must pass General exam in two fields.*
* *Combined Skills II – M.A. is for M.A. students only, a paper or report appropriate for the MA-degree writing requirement.*

Third year

Subject	Fall	Spring	Summer
Combined Skills II – Ph.D.	Credit	---	---

Notes: Normally, students must pass the 2-year MA program first as a pre-requisite for registering in CS II-Ph.D.

2 Syllabi of the fall semester courses

A. *First year courses*

MACROECONOMICS I / part 1

Lecturer:

Marek Kapička

(marek.kapicka@cerge-ei.cz; office 328, phone 236)

Teaching assistant:

Olga Bychkova

(olga.bychkova@cerge-ei.cz)

Office hours:

Monday & Wednesday 10:00-11:00

Course description
This course will be an introduction to the techniques and the applications of dynamic general equilibrium models. In the first part of the course we will cover basic methods of solving dynamic models, including dynamic programming. This course will apply the techniques of dynamic general equilibrium models to study selected economic applications, such as fiscal policy and recursive contracts. Basic knowledge of MATLAB and Julia or Python will be required to solve some of the problem sets.

Course outline
- ✓ Neoclassical growth model (SS chapter 3, papers)
- ✓ Dynamic Programming (SLP chapters 2,4, LS chapter 2, SS chapter 2)
- ✓ Fiscal policy (LS chapters 11,16, SS chapter 5)
- ✓ Recursive contracts (LS chapters 20,21, papers)
- ✓ Labor Search (LS chapter 6, paper 8)

Requirements and grading
Grades will be based on student's performance in midterm exam, final exam, and problem sets.

Final exam	50%
Problem Sets	50%

Readings
(SS) Thomas J. Sargent and John Stachurski. Quantitative Macroeconomics.
https://lectures.quantecon.org
(SLP) Nancy L. Stokey, Robert E. Lucas, Jr., and Edward C. Prescott. Recursive Methods in Economic Dynamics. Cambridge: Harvard University Press, 1989.

(LS) Lars Ljungqvist and Thomas J. Sargent. Recursive Macroeconomic Theory. The MIT Press, Cambridge, Massachusetts, 2nd edition, 2004.

Timothy J. Kehoe and Edward C. Prescott (2002). Great Depressions of the Twentieth Century. Review of Economic Dynamics, 5:1–18.

Prescott, Edward C. and Rajnish Mehra (2002). Recursive Competitive Equilibrium: The Case of Homogeneous Households. Econometrica, 1365-1379.

Hugo A. Hopenhayn and Juan Pablo Nicolini (1997). Optimal unemployment insurance. Journal of Political Economy, 412–438.

Dirk Krueger and Fabrizio Perri (2005). Does income inequality lead to consumption inequality? Evidence and theory. The Review of Economic Studies, 163–193.

V. V. Chari and Patrick J. Kehoe (1999). Optimal fiscal and monetary policy. Handbook of macroeconomics, 1671-1745.

Peter Diamond (1971). A model of price adjustment. Journal of economic theory, 3(2), 156-168.

Richard Rogerson, Robert Shimer, and Randall Wright (2004). Search-theoretic models of the labor market - a survey. National Bureau of Economic Research.

Kenneth Burdett, and Dale T. Mortensen (1998). Wage differentials, employer size, and unemployment. International Economic Review, 257-273.

Robert Shimer (2005). The Cyclical Behavior of Equilibrium Unemployment and Vacancies, American Economic Review, 25-49.

Marcus Hagedorn and Iurii Manovskii (2008). The Cyclical Behavior of Equilibrium Unemployment and Vacancies Revisited. American Economic Review, 1692-1706.

MACROECONOMICS I / part 2

Lecturer:

Veronika Selezneva

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Teaching assistant:

TBD

Office hours:

TBA

Course information

This course continues to study the theoretical foundations of modern macroeconomics. The goal of the course is to develop models that can help us understand the dynamics of key macroeconomic variables and use these models to derive policy implications. Few new tools are introduced; instead the tools from the first part of the course are applied.

Course outline

- ✓ *Deterministic dynamic optimization problems.*
    a. Canonical model.
    b. Efficient Allocations.
        i. Sequence Approach.
        ii. Function Space and Dynamic Programming.
    c. Properties of Solutions.
    d. Numerical Methods.

- ✓ *Equilibrium Concepts.*
    a. No Uncertainty.
        i. Sequence concepts:
            A. Date 0 Arrow-Debreu.
            B. Sequence-of-Markets.
        ii. Recursive Competitive Equilibrium.
    b. Adding Uncertainty.

- ✓ *Application: Growth Theory.*
    a. Exogenous Growth.
    b. Endogenous Growth.
    c. Overlapping Generations.

- ✓ *Asset Pricing and Risk Sharing.*
- ✓ *Introducing Financial Frictions (if time permits).*

Requirements and grading

The grades will be determined as follows: homework 10% final 90%

Readings

The textbooks for the course are:
Stokey, Nancy L., Robert E. Lucas, Jr., and Edward C. Prescott: Recursive Methods in
Economic Dynamics. Cambridge: Harvard University Press, 1989.
Ljungqvist, Lars and Thomas J. Sargent: Recursive Macroeconomic Theory. Second Edition.
MIT Press. 2004.
Additional reading materials and the related readings will be made available later.

MICROECONOMICS I

Lecturer:

Jan Zápal

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Teaching assistants:

Davit Adunts

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Andrei Matveenko

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Office hours:

see the office door

Course information

This is the first course in the microeconomics sequence. The objective of the sequence in general and of the course in particular is to i) provide students with firm knowledge of the basic microeconomic theory, ii) provide students with grasp of relevant (micro)economic concepts on intuitive and formal level and iii) equip students with tools and techniques allowing them to conduct their own independent research.

The course is based on 24 90-minutes lectures and 12 90-minutes classes (exercise sessions). Two lectures and one class take place in any given week.

12 weekly problem sets are integral part of the course. Students are required to complete one problem set per week and hand it in before each class (details to be specified). The classes will be devoted to the discussion of problem set solutions. Team-work on the problem sets is

encouraged. Free-riding on the effort of team-mates is not ... work on the problem sets is essential for grasping the course material and for exam preparation.

Course outline

1. Consumption
   - ✓ Preference & Choice (MWG 1)
   - ✓ Consumer Choice (MWG 2)
   - ✓ Classical Demand Theory (MWG 3)
   - ✓ Choice under Uncertainty (MWG 6)

2. Production
   - ✓ Production (MWG 5)

3. Markets
   - ✓ Competitive Markets (MWG 10)
   - ✓ Externalities and Public Goods (MWG 11)
   - ✓ Market Power (MWG 12)

Requirements and grading

Grades will be based on final exam only. The final exam will take place in week 13 (details to be specified). There will be midterm exam in week 6 or 7 (details to be specified) with structure similar to the final exam and hence indicative of students' standing in the course. In addition, students are required to hand in 12 weekly problem sets.

Readings

Principal textbook:

Mas-Colell, Andreu; Michael D. Whinston and Jerry R. Green. Microeconomic Theory. Oxford: Oxford University Press, 1995.

Reference (not required) books:

Microeconomic:

Jehle, Geoffrey A. and Philip J. Reny. Advanced Microeconomic Theory. Essex: Pearson Education Limited, 2011.

Varian, Hal R. Microeconomic Analysis. London: W. W. Norton & Company, 1992.

Mathematical:

Aliprantis, Charalambos D. and Kim C. Border. Infinite Dimensional Analysis: A Hitchhiker's Guide. Berlin: Springer, 2007.

Border, Kim C. Fixed Point Theorems with Applications to Economics and Game Theory. Cambridge: Cambridge University Press, 1989.

Dixit, Avinash K. Optimization in Economic Theory. Oxford: Oxford University Press, 2002.

Duggan, John. Basic Concepts in Mathematical Analysis.
https://dl.dropboxusercontent.com/u/17516137/RapidWeaverSite/resources/lecturenotes/MathHandbook13.pdf, 2013.
Chiang, Alpha C. Fundamental Methods of Mathematical Economics. London: McGraw-Hill, 1984.
McLennan, Andrew. Advanced Fixed Point Theory for Economics.
http://cupid.economics.uq.edu.au/mclennan/Advanced/advanced_fp.pdf, 2014.
Simon, Carl P. and Lawrence Blume. Mathematics for Economists. London: W. W. Norton & Company, 1994.
Takayama, Akira. Mathematical Economics. Hinsdale, IL: Dryden Press, 1974.Huang, Chi-fu and Robert H. Litzenberger, Foundations for Financial Economics, North-Holland, 1988.

Game theory:
Fudenberg, Drew and Jean Tirole. Game Theory. London: MIT Press, 1991.
Maschler, Michael; Eilon Solan and Shmuel Zamir. Game Theory. Cambridge: Cambridge University Press, 2013.
Myerson, Roger B. Game Theory: Analysis of Conflict. London: Harvard University Press, 1991.
Osborne, Martin J. and Ariel Rubinstein. A Course in Game Theory. London: MIT Press, 1994.

STATISTICS

Lecturer:

Andreas Menzel

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Teaching assistants:

Vladimir Pyrlik

(vladimir.pyrlik@cerge-ei.cz)

Veronika Vraná

(veronika.vrana@cerge-ei.cz)

Office hours:

Tue 17:30-19:00

Course information

This course is the first of a compulsory three-course series on econometric methods for contemporary economic research during the first year of the PhD Program. In this course we will first review statistical concepts on which econometrics builds, such as random distributions, joint distributions, conditional expectations, etc. We will then continue to the OLS and its finite sample properties, and the motivation for its ubiquitous use. We will look at basic GLS and maximum likelihood models, and introduce hypothesis testing. We will close with an introduction to asymptotic theory.

The course follows the textbooks by Golderberger (1991) for the statistics part and Hansen (2017), Chapter 1-6, for the econometrics part. Both books set out a unified approach to explain and teach econometrics; based on joint distributions of variables and their conditional expectation functions in the population, its best linear approximation, and its estimation from a sample of the population. We will largey restrict ourselves to methods and estimators for independently drawn samples (cross-sectional data), relegating methods for non-independently drawn samples, and their application in time-series and panel datasets, to the later courses in the series.

Course outline
- ✓ Random variables, univariate and multivariate random distributions
- ✓ Conditional Expectation Functions and their linear approximation
- ✓ The estimation of the linear approximation from a sample
- ✓ The finite sample properties of the OLS estimator
- ✓ The OLS estimator with normal errors, MLE, and hypothesis testing
- ✓ Introduction to Asymptotic Theory (for independent samples)

Requirements and grading

Grades will be based on student's performance in midterm exam, final exam, oral presentation, and four graded take-home assignments:

Midterm exam	30%
Final exam	50%
Assignments	20%

Readings

Arthur S. Goldberger (1991): A Course in Economertrics, Harvard University Press. Available for borrowing from the CERGE-EI library.

Bruce E. Hansen (2017): Econometrics. Revised 2017 version freely available on his homepage.

B. Second year courses

LABOR ECONOMICS I

Lecturers:

Daniel Münich

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Mariola Pytliková

(mariola.pytlikova@cerge-ei.cz, office 309, phone 149)

Teaching assistant:

TBD

Office hours:

DM: Monday & Friday 14:00-16:00 (+anytime if doors are open)

MP: upon appointment

Course information

The course will provide fundamental understanding of stylized labor supply and demand models in static and dynamic version, and models of wage determination. The course will combine theoretical concepts, empirical evidence and empirical approaches including use of econometrics tools. Critical discussions about implications for public policy designs and policy evaluations will be encouraged.

The course has three major goals **(i)** to guide students through current theoretical and empirical understanding of major issues in the broad field of labor economics, **(ii)** to guide students to own empirical research, **(iii)** to make students familiar with common research resources, standards of practice and approaches in the field. Throughout the topics, references will be provided to empirical approaches (data and techniques econometric / identification strategies) and actual policies.

The prerequisite for the course is familiarity with principles of microeconomic theory and econometrics from the 1st year.

Course outline

LABOR SUPPLY
- ✓ Key terms, framework, resources
- ✓ Static model of labor supply, non-linear price lines, participation, tax-ben schemes
- ✓ Home production, interpersonal transfers, allocation of (non)market time
- ✓ Labor supply over business and life-cycle

MODELS OF WAGE STRUCTURES
- ✓ Human capital and competing model
- ✓ Skills formation and measurement
- ✓ Differentials on labor markets by gender and ethnicity
- ✓ Compensating wage differentials, discrimination
- ✓ Changes in wage structures, income inequality
- ✓ Job turnover, matching and search, unemployment duration

LABOR DEMAND
- ✓ Static and dynamic labor demand
- ✓ Theory of firm (standard, state owned, coops, labor managed)
- ✓ Minimum wages; unions; bargaining

Requirements and grading

Grade will be based on student's performance in the final exam (55%), a term paper i.e. Critical Literature Review = CLR (25%), and an empirical assignment (20%).

The aim of the empirical assignment is to make students familiar with real empirical econometric analysis on a labor econ topic using real empirical data. The CLR is expected to be a carefully crafted academic literature review on a course-related topic of own choice containing student's own critical insight.

Detailed information, announcements and lecture materials (readings, links, lecture notes, etc.) will be made available via course web page at http://home.cerge-ei.cz/munich/labor17/ .

Readings

Numerous selected chapters from:

HBLE (Handbook of Labor Economics, Vol. 1, 2, 3, 4A, 4B, Edited by O. Ashenfelter, R. Layard and D. Card, Elsevier) at http://econpapers.repec.org/bookchap/eeelabhes/.

HBEE (Handbook of Economics of Education, Vol. 1, 2, 3, 4, Edited by E.A. Hanushek, S.Machin, L.Woessmann, Elsevier).

Labor Economics, George Borjas.

Hamermesh, Daniel S. and Albert Rees (1984) "The Economics of Work and Pay".

Hamermesh, Daniel S. (1993), "Labor Demand" (Princeton University Press).

Auxiliary reference texts:

Econometric Analysis of Cross Section and Panel Data, Jeffrey M. Wooldridge, MIT Press, 2002.

Limited-dependent and Qualitative Variables in Econometrics, G.S. Maddala, Cambridge U. Press, 1983.

A Guide to Econometrics, Peter Kennedy.

Additional readings (papers) will be assigned via course web site for mandatory and optional readings before and after particular lectures.

MACRO TOPICS I / part 1

Lecturer:
<u>Michal Kejak</u>
(michal.kejak@cerge-ei.cz, office 329, phone 186)
Teaching assistant:

Office hours:
after class

Course Information

The increasing complexity of the analysis of theoretical and applied dynamic macroeconomic models, mainly the fact that there are no analytic solutions available for most of them and if they exist, they are often trivial simplifications of the original problem, calls for using *efficient numerical methods* in macroeconomics. Thus, an important part of the course is devoted to numerical methods for the solution of the dynamic macromodels.

Further, it introduces several representative methods each of which is applied to an example of dynamic macroeconomic model. In this course we cover several classes of the dynamic stochastic general equilibrium (DSGE) growth models: 1) standard DSGE exogenous growth – RBC models and DSGE models with endogenous growth; 2) monetary DSGE models with perfectly (and possibly with imperfectly) flexible prices and/or with credit; 3) DSGE models of an open economy. The students will be provided with a MATLAB (or GAUSS) program which will demonstrate the application of the numerical method on the model and she/he will have an opportunity to run the simple program on the computer for different model and method configurations. We will also analyze several papers on advanced macro models of growth and business cycles.

During the course, students will be supposed to write their own simple programs and to run the application programs, in MATLAB, and using toolboxes as Uhlig, DYNARE, or NUMLIN. However, any former experience with programming, albeit welcome, is not necessary for the course work.

Course outline

- ✓ Elementary Concepts in Numerical Analysis
- ✓ Basic Classes of Numerical Methods (Linear Equations, Static Optimization, Nonlinear Equations, Approximation Methods, Numerical Integration and Differentiation)
- ✓ Numerical Dynamic Programming (Value Function Iteration - Deterministic Discrete Ramsey Growth Model)
- ✓ Perturbation Methods ((Log)-Linearization - Deterministic Continuous Ramsey Growth Model, Stochastic Discrete RBC Growth Model)

- ✓ Finite-Difference Methods (Reverse Shooting Method - Time Elimination Method - Deterministic Continuous Ramsey Growth Model, Deterministic Continuous Lucas Endogenous Growth Model)
- ✓ Projection Methods (Orthogonal Collocation Method - Deterministic Continuous Ramsey Growth Model, Deterministic Continuous Lucas Endogenous Growth Model, Stochastic Discrete Ramsey Growth Model, Stochastic Discrete RBC Growth Model)

Requirements and grading

There will be regular homeworks assigned every week and one individual project which will be assigned toward the end of the course. Students can either choose a project from the set of given projects or he/she can work on her/his own proposed project if it relates to the dynamic macroeconomic model issues covered in the class and is approved by the lecturer. Students will have 4 weeks to accomplish the project. There will also be a one-hour exam. The contributions to the total grade from this part of the course are as follows: homework (15%), project (25%), and exam (10%).

Readings

- ✓ **Judd Kenneth L. (1998)** *Numerical Methods in Economics.* **MIT Press.**
- ✓ **McCandless, G. (2008)** *ABCs of RBCs: An Introduction to Dynamic Macroeconomic Models.* **Harvard University Press.**
- ✓ Marimon Ramon and Andrew Scott (Eds.) (1999) *Computational Methods for the Study of Dynamic Economies.* Oxford University Press.
- ✓ Ljungquist Lars and Thomas J. Sargent (1999) *Recursive Macroeconomic Theory.* MIT Press.
- ✓ Cooley, Thomas Ed. (1995) *Frontiers of Business Cycle Research.* Princeton University Press.
- ✓ Walsh, Carl. E. (2003) *Monetary Theory and Policy.* MIT Press.
- ✓ Gali, J. (2008) *Monetary Policy, Inflation, and the Business Cycle: An Introduction to the New Keynesian Framework.* Princeton University Press.

MACRO TOPICS I / part 2

Lecturer:

Marek Kapička

(marek.kapicka@cerge-ei.cz, office 328, phone 236)

Teaching assistant:

Office hours:

Monday & Wednesday 10:00-11:00

Course Information

This course will study issues in dynamic social insurance. We will study economies where the underlying information structure is explicitly specified, and all tax instruments arise endogenously.

We will discuss optimal capital and income taxation, optimal estate taxes and other applications.

We will also discuss other topics, such as long run properties of the efficient allocations, efficient allocations with persistent private information and the implications of hidden savings and endogenous insurance markets.

Course outline
- ✓ Ramsey Taxation
- ✓ Production Efficiency
- ✓ Static Mirrlees Taxation
- ✓ Dynamic Mirrlees Taxation
- ✓ Long Run Properties of the Optima
- ✓ Persistent Private Information
- ✓ Hidden Savings

Requirements and grading

Grades will be based on student's performance in final exam, problem sets, and an oral presentation.

Problem sets	20%
Final exam	30%
Oral presentation	50%

The oral presentation will be devoted to a specific paper. Any paper marked by (R) below can be chosen for presentation.

Readings

1. *Ramsey Taxation*

Anthony B. Atkinson and Joseph E. Stiglitz. Lectures on public economics. McGraw Hill, 1980.

Christophe Chamley. Optimal taxation of capital income in general equilibrium with infinite lives. Econometrica, 54(3):607-622, 1986.

Lenneth L. Judd. Redistributive taxation in a simple perfect foresight model. Journal of Public Economics, 28(1):59-83, 1985.

Chari, V. V., & Kehoe, P. J. (1999). Optimal fiscal and monetary policy. Handbook of Macroeconomics, 1, 1671-1745.

Ivan Werning and Ludwig Straub, Ludwig. Positive Long Run Capital Taxation: Chamley-Judd Revisited. Working paper, MIT.

V. V. Chari, V.V., Juan Pablo Nicolini and Peter Teles. More on the Optimal Taxation of Capital. Working paper, University of Minnesota.

(R) Erosa, Andres and Martin Gervais. Optimal taxation in life-cycle economies. Journal of Economic Theory, 105(2):338-369, 2002.

2. *Production Efficiency*

Peter A. Diamond and James A. Mirrlees. Optimal taxation and public production I: Production efficiency. American Economic Review, 61(1): pp. 8-27, 1971.

3. *Static Mirrlees Taxation*

Joseph Stiglitz (1988). Pareto efficient and optimal taxation and the new welfare economics in: A. J. Auerbach & M. Feldstein (ed.), Handbook of Public Economics, edition 1, volume 2, chapter 15, pages 991-1042.

James A. Mirrlees. An exploration in the theory of optimum income taxation. The Review of Economic Studies, 38:175-208, 1971.

Peter A. Diamond. Optimal income taxation: an example with a U-shaped pattern of optimal marginal tax rates. American Economic Review, 88:83-95, 1998.

(R) Emmanuel Saez. Using elasticities to derive optimal income tax rates. The Review of Economic Studies, 68:205-229, 2001.

Gregory N. Mankiw and Matthew Weinzierl. The optimal taxation of height: A case study of utilitarian income redistribution. American Economic Journal: Economic Policy, 2(1):155-76, February 2010.

(R) Florian Scheuer and Casey Rothschild. Redistributive taxation in the Roy model. Working paper, Stanford University, 2012.

Florian Scheuer and Casey Rothschild. Optimal taxation with rent-seeking. Working paper, Stanford University, 2012.

(R) Peter Diamond. Income taxation with fixed hours of work. Journal of Public Economics, 13(1):101-110, 1980.

(R) Emmanuel Saez, Stefanie Stancheva, and Thomas Piketty. Optimal taxation of top labor incomes: A tale of three elasticities. American Economic Journal: Economic Policy, 2013.

Ales, Laurence and Christopher Sleet. Taxing top CEO Incomes. American Economic Review, 2016.

4. *Dynamic Mirrlees Taxation*

Narayana R. Kocherlakota. The New Dynamic Public Finance. Princeton University Press, 2010.

Mikhail Golosov, Aleh Tsyvinski, and Ivan Werning. New dynamic public finance: a user's guide. NBER Macroeconomic Annual, 2006.

Mikhail Golosov, Narayana R. Kocherlakota, and Aleh Tsyvinski. Optimal indirect and capital taxation. The Review of Economic Studies, 70:569-587, 2003.

Narayana R. Kocherlakota. Zero expected wealth taxes: A Mirrless approach to dynamic optimal taxation. Econometrica, 73:1587-1621, 2005.

(R) Emmanuel Farhi and Ivan Werning. Capital taxation: Quantitative explorations of the inverse Euler equation. Working paper, MIT, 2007.

Stefania Albanesi and Christopher Sleet. Dynamic optimal taxation with private information. The Review of Economic Studies, 73(1):1-30, 2006.

(R) Mikhail Golosov and Aleh Tsyvinski. Designing optimal disability insurance: A case for asset testing. Journal of Political Economy, 114:257-279, 2006.

(R) Borys Grochulski and Narayana R. Kocherlakota. Nonseparable preferences and optimal social security systems. Working paper, Federal Reserve Bank of Minneapolis, 2008.

Marek Kapicka. Optimal Mirrleesean Taxation in a Ben-Porath Economy. AEJ: Macroeconomics, 2015.

Borys Grochulski and Thomas Piskorski. Risky human capital and deferred capital income taxation. Journal of Economic Theory, 145(3):908-943, 2010.

(R) Matthew C. Weinzierl. The surprising power of age-dependent taxes. The Review of Economic Studies, 78:1-29, 2011.

Marco Battaglini and Stephen Coate. Pareto efficient income taxation with stochastic abilities. Journal of Public Economics, 92(3-4):844-868, 2008.

(R) Emmanuel Farhi and Ivan Werning. Insurance and taxation over the life cycle. Review of Economic Studies, 80:596-635, 2012.

(R) Mikhail Golosov, Aleh Tsyvinski, and Maxim Troshkin. Optimal dynamic taxes. Working paper, Yale University, 2011.

(R) Fabian Kindermann and Dirk Krueger. High Marginal Tax Rates on the Top 1%? Lessons from a Life Cycle Model with Idiosyncratic Income Risk. Working paper, 2014.

(R) Alejandro Badel and Mark Huggett. Taxing Top Earners: A Human Capital Perspective. Working paper, 2014.

5. Long Run Properties of the Optima

J. Thomas and T. Worrall. Income fluctuations and asymmetric information: An example of the repeated principal agent problem. Journal of Economic Theory, 51:367-390, 1990.

Edward J. Green. Lending and the smoothing of uninsurable income. In E. Prescott and N. Wallace, editors, Contractual Arrangements for Intertemporal Trade. Minneapolis: University of Minnesota Press, 1987.

Andrew Atkeson and Robert E. Lucas, Jr. On efficient distribution with private information. The Review of Economic Studies, 59:427-453, 1992.

(R) Andrew Atkeson and Robert E. Lucas, Jr. Efficiency and equality in a simple model of efficient unemployment insurance. Journal of Economic Theory, 66:64-98, 1995.

(R) Emmanuel Farhi and Ivan Werning. Inequality and social discounting. Journal of Political Economy, 115(1):365-402, 2005.

6. Persistent Private Information

Ana Fernandes and Christopher Phelan. A recursive formulation for repeated agency with history dependence. Journal of Economic Theory, 91(2):223-247, 2000.

(R) Yuzhe Zhang. Dynamic contracting, persistent shocks and optimal taxation. Journal of Economic Theory, 144:635-675, 2009.

Marek Kapicka. Efficient allocations in dynamic private information economies with persistent shocks: A first-order approach. Review of Economic Studies, 2013.

(R) Kenichi Fukushima and Yuichiro Waki. Computing dynamic optimal mechanisms when hidden types are Markov. Working paper, University of Minnesota, 2011.

7. Hidden Savings

Harold L. Cole and Narayana R. Kocherlakota. Efficient allocations with hidden income and hidden storage. The Review of Economic Studies, 68:523-542, 2001.

(R) Alberto Bisin and Adriano Rampini. Markets as beneficial constraints on the government. Journal of Public Economics, 90:601-629, 2006.

Narayana R. Kocherlakota. Figuring out the impact of hidden savings on optimal unemployment insurance. Review of Economic Dynamics, 7(3):541-554, July 2004.

Ivan Werning. Moral hazard with unobserved endowments: A recursive approach. Working paper, University of Chicago, 2001.

(R) Arpad Abraham, Sebastian Koehne, and Nicola Pavoni. On the first order approach in principal-agent models with hidden borrowing and lending. Journal of Economic Theory, 146:1331-1361, 2011.

MICRO TOPICS

Lecturer:

Avner Shaked

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Teaching assistant:

Jan Šedek

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Office hours:

TBA

Course Information
The course covers topics in microeconomic theory students intending to write thesis in (applied) theory should be familiar with.

Course outline
The course will cover the following topics:

Shaked	Zápal
Nash Bargaining Solution	Behavioural/experimental game theory: 1. QRE
Sequential Bargaining	Behavioural/experimental game theory: 2. non-equilibrium beliefs, level-k
Bargaining & Markets	Voting, preference aggregation, Arrow's impossibility theorem
Cournot dynamic model	Cheap talk, persuasion
Learning models	Informal risk sharing, relational contracting
Models of Advertising	
Horizontal & Vertical Differentiation	
Search models	
Bounded Rationality models	

Requirements and grading

The course grade will be based on the performance on both parts of the course. The weight of A. Shaked's part is 7/12. The weight of J. Zápal's part is 5/12. Performance will be based on an exam as well as on problem sets, assignments and projects distributed throughout the course. The course will be accompanied by an exercise sessions.

Readings

<u>Shaked:</u>

Belleflamme, P., and M. Peitz. Industrial Organization—Markets and Strategies, Cambridge University Press, 2010.

Binmore, K. Playing for Real: A Text on Game Theory, Oxford University Press, 2007.

Pissarides, C. Lecture notes on Search Theory, Royal Economic Society, 2008.

Osborne, J. M. and A. Rubinstein. Bargaining and Markets, Academic Press, 1990.

Spiegler, Ran. "The Market for Quacks" The Review of Economic Studies 73, no. 4 (2006): 1113-1131.

Spiegler, Ran. Bounded rationality and industrial organization. Oxford University Press, 2011.

Tirole, Jean. The Theory of Industrial Organization, MIT Press, 1989.

Wolfstetter, G. Elmar Topics in Microeconomics, Cambridge, 2002.

<u>Zapal:</u>

Camerer, Colin F. Behavioral Game Theory: Experiments in Strategic Interaction. Princeton, NJ: Princeton University Press, 2003.

McKelvey, Richard and Thomas R. Palfrey. Quantal Response Equilibria for Extensive Form Games. Experimental Economics, 1998, 1(1), pp. 9-41.

McKelvey, Richard D. and Thomas R. Palfrey. Quantal Response Equilibria for Normal Form Games. Games and Economic Behavior, 1995, 10(1), pp. 6-38.

Crawford, Vincent P. and Nagore Iriberri. Level-K Auctions: Can a Nonequilibrium Model of Strategic Thinking Explain the Winner's Curse and Overbidding in Private-Value Auctions? Econometrica, 2007, 75(6), pp. 1721-1770.

Duggan, John. Formal Models in Political Science. Lecture notes available from http://www.johnduggan.net/.

Barbera, Salvador and Bernardo Moreno. Top Monotonicity: A Common Root for Single Peakedness, Single Crossing and the Median Voter Result. Games and Economic Behavior, 2011, 73(2), pp. 345-359.

Crawford, Vincent P. and Joel Sobel. Strategic Information Transmission. Econometrica, 1982, 50(6), pp. 1431-1451.

Battaglini, Marco. Multiple Referrals and Multidimensional Cheap Talk. Econometrica, 2002, 70(4), pp. 1379-1401.

Milgrom, Paul. What the Seller Won't Tell You: Persuasion and Disclosure in Markets. Journal of Economic Perspectives, 2008, 22(2), pp. 115-132.

Milgrom, Paul and John Roberts. Relying on the Information of Interested Parties. The RAND Journal of Economics, 17(1), pp. 18-32.

Thomas, Jonathan P. and Tim Worrall. Self-Enforcing Wage Contracts. Review of Economic Studies, 1988, 55(4), pp. 541-553.

Ljungqvist, Lars and Thomas J. Sargent. Recursive Macroeconomic Theory. Cambridge, MA: MIT Press, 2004.

Golosov, Mikhail; Aleh Tsyvinski and Nicolas Werquin. Recursive Contracts and Endogenously Incomplete Markets. National Bureau of Economic Research Working Paper Series, 2016, No. 22012.

Levin, Jonathan. Relational Incentive Contracts. American Economic Review, 2003, 93(3), pp. 835-857.

MICROECONOMETRICS I

Lecturer:

Štěpán Jurajda

(stepan.jurajda@cerge-ei.cz, office 326, phone 139)

Teaching assistant:

Magdaléna Raušová

(magdalena.rausova@cerge-ei.cz)

Office hours:

TBA

Course information

The emphasis of the course is twofold: (i) to extend regression models in the context of cross-section and panel data analysis, (ii) to focus on situations where liner regression models are not appropriate and to study alternative methods. The course prepares you to discuss the estimation of causal parameters and program evaluation in the second part of the sequence. Examples of applied work will be used throughout the course.

Course outline

I *Introduction*

1 Causal Parameters and Policy Analysis in Econometrics

2 Reminder

      2.1 Note on Properties of Joint Normal pdf

      2.2 Testing Issues.

3 Deviations from the Basic Linear Regression Model

II *Panel Data Regression Analysis*

Requirements and grading

20%problem sets, 30%midterm, 50%final, both exams are open-book, open-notes.

Readings

The main textbook for the class is *Econometric Analysis of Cross Section and Panel Data*, J.M. Wooldridge, MIT Press, 2002. Additional references will be provided for the various topics.

TIME SERIES ECONOMETRICS

Lecturer:

Stanislav Anatolyev

(stanislav.anatolyev@cerge-ei.cz, office 316, phone 229)

Teaching assistant:

Daniel Husek

(daniel.husek@cerge-ei.cz)

Office hours:

Monday 14:00-15:30

Course information

This course represents the first half of the two-semester sequence *Time series and financial econometrics*, and is devoted to modern time series econometrics. After reviewing of (or getting acquainted with) basic time series notions like stationarity, Wold decomposition, etc., we will discuss principles of non-structural time series modeling and review various model selection procedures. After that we will study popular models of conditional mean dynamics such as linear autoregressions and vector autoregressions as well as nonlinear structures like threshold, smooth transition and regime switching models. We will also explore such issues as stationarity vs. integratedness and unit roots, and get acquainted with the notion of Brownian motion useful in other contexts as well. Then we will turn to modeling conditional variance and, more generally, volatility. We will also review modeling and forecasting other conditional objects such as conditional quantiles, probabilities, and densities. Finally, we will study methods of dealing with structural instability.

Course outline

I. Basics of time series analysis

- ✓ Stationarity and ergodicity. Linear processes. Lag operator.
- ✓ Innovations and Wold decomposition. AR, MA, ARMA, ARIMA. Dickey-Fuller methodology.
- ✓ Trend stationarity and difference stationarity.
- ✓ Processes with time-varying parameters.

II. Modeling methodology and model selection

- ✓ Structural and non-structural time series modeling.

✓ Object of dynamic modeling: conditional mean, conditional variance, conditional quantile, conditional direction, conditional density.
✓ Model selection: diagnostic testing, information criteria and prediction criteria. Model confidence sets.
✓ General-to-specific and specific-to-general methodologies. Data mining.
✓ Predictability and testing for predictability.

III. Modeling conditional mean

✓ Stationary AR models: properties, estimation, inference, forecasting.
✓ Stochastic and deterministic trends, unit root testing. Brownian motion, FCLT.
✓ Nonlinear autoregressions: threshold autoregressions, smooth transition autoregressions, Markov switching models, state-space models.
✓ Stationary VAR models: properties, estimation, analysis and forecasting. Nonlinear VAR.
✓ Spurious regression, cointegrating regression, and their asymptotics. Engle-Granger test.

IV. Modeling conditional variance and volatility

✓ The class of ARCH models: properties, estimation, inference and forecasting.
✓ Extensions: IGARCH, ARCH-t. Time-varying risk and ARCH-in-mean.
✓ Multivariate GARCH: Vech, BEKK, CCC, DCC, DECO. Variance targeting.
✓ Other measures of financial volatility. Realized volatility. MEM models.

V. Other topics on modeling and forecasting

✓ The class of ARCH models: properties, estimation, inference and forecasting.
✓ High frequency data models: ACD, UHF–GARCH.
✓ Modeling and forecasting conditional density. ARCD modeling.
✓ Multivariate dynamic densities. Copula machinery.
✓ Modeling and forecasting direction-of-change. Directional predictability.
✓ Modeling and forecasting conditional quantiles. Value-at-risk. CAViaR model.

VI. Analysis of structural stability

✓ Identification, estimation and testing for structural breaks. Andrews and Bai-Perron tests.
✓ Retrospection and monitoring for structural stability. CUSUM and other sequential tests.

Requirements and grading
✓ The course presumes the use of publications in applied time series and computer work.
✓ There will be weekly home assignments combining the theory and empirics/simulations (20%of the grade).
✓ One will need programming econometric software to do empirical and simulation exercises. MATLAB is recommended, but GAUSS, Python and/or R are also options.

✓ One may do empirical implementation using low-level programming and get up to the exercise's full credit (and master the techniques), or, alternatively, utilize embedded high-level commands and get up to 25% of the exercise's full credit (and most likely not learn relevant techniques).

✓ There will be a presentation/mini-lecture (40 minutes) on a particular topic assigned far in advance (20% of the grade).

✓ The final exam will be responsible for 60% of the final grade.

✓ All the above components are mandatory (two home assignments are excused – for this count but not for the score) for getting a passing grade.

✓ Discussion sections will be devoted to solving problems and discussing relevant (both theoretical and applied) literature.

Readings

Main textbooks:

Franses, Philip and Dick van Dijk (2000). *Nonlinear Time Series Models in Empirical Finance,* Cambridge University Press, chapters 1–4.

Hamilton, James (1994). *Time Series Analysis,* Princeton University Press, selected chapters.

Additional materials:

A number of methodological materials and published journal articles will be assigned for reading.

Academic integrity policy

Cheating, plagiarism, and any other violations of academic ethics at CERGE-EI are not tolerated.

ACADEMIC WRITING II

Lecturer:
<u>Andrea Downing</u>
(andrea.downing@cerge-ei.cz, office 317, phone 254)
<u>Grayson Krueger</u>
(grayson.krueger@cerge-ei.cz; office 318, phone 259
Course Co-ordinator:
<u>Deborah Nováková</u>
(deborah.novakova@cerge-ei.cz)
Teaching assistant:

Office hours:
TBA

Course information

This course supports ongoing development of PhD level English and academic writing skills through explicit study of in-field language and genre. The course also includes specialized workshops on articles (a, and, the), punctuation, and writing abstracts. Students practice and process their writing through continuing revision of draft work from the idea stages to the final version, in response to peer and instructor feedback on draft texts. Instructors provide individual consultations and extended written feedback in student texts, aimed to support each student in developing his/her individual writing skills.

Building upon the work in Academic Writing 1, students will research, plan, and write a Position Paper on a topic chosen by the student. The paper should both analyze the work of others and present the students' own distinct position on the topic.

Requirements and grading

In addition to the marked assignments below, expect a range of smaller writing tasks beginning with production of a professional biography. The peer feedback step applies to all works.

Four Marked Assignments:

First Summary Task	10%	Due *Sunday 24th. Sept.*
Draft Position Paper	15%	Due *Sunday, 12th November, 23.59*
Peer Review of Position Paper	15%	Due *Monday, 4th December*
Final Position Paper	60%	Due *Friday, 8th. December 23.59*

Students are evaluated according to their ability to produce graduate-level written academic texts in English. 100%class and consultation attendance is mandatory, and completing all assigned tasks is a minimum requirement for passing the course.

C. Third year courses

COMBINED SKILLS ll – PhD

Lecturer:

Andrea Downing

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Grayson Krueger

(grayson.krueger@cerge-ei.cz; office 318, phone 259)

Teaching assistant:

Office hours:

TBA

Seminar Information
This is the final required credit course for the Academic Skills Center.

The seminar is designed to support dissertation proposal workshop participants as they develop their written research proposals and presentations via consultation with Academic Skills Center faculty. For DPW candidates, the seminar will work towards the first official DPW draft due November 1st. Consultations will continue through November until DPW week, and afterwards if necessary, prior to the final submission date for the ASC credit course. All students deliver a presentation of their research proposals close to DPW week in November. Students not wishing to participate in DPW can complete the course requirements by participating in all elements of the course without final attendance at DPW.

Attendance is compulsory at an individual round table workshop (announced in September), the presentations prior to DPW week and at least two individual consultations. Dates of compulsory meetings/presentations will be announced by the ASC in advance.

Evaluation
This is an Academic Skills Center graded course, which includes evaluation of the written proposal and presentation. 70% of available marks are allocated to the written research proposal, and 30% to the assessed presentation.

NOTE: Full participation in the seminar, consultations, and completion of all required tasks are the minimum requirements for passing the course.