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université
PARIS-SACLAY

Master of Economics

2024-2025 Syllabus

MoE's General Organization

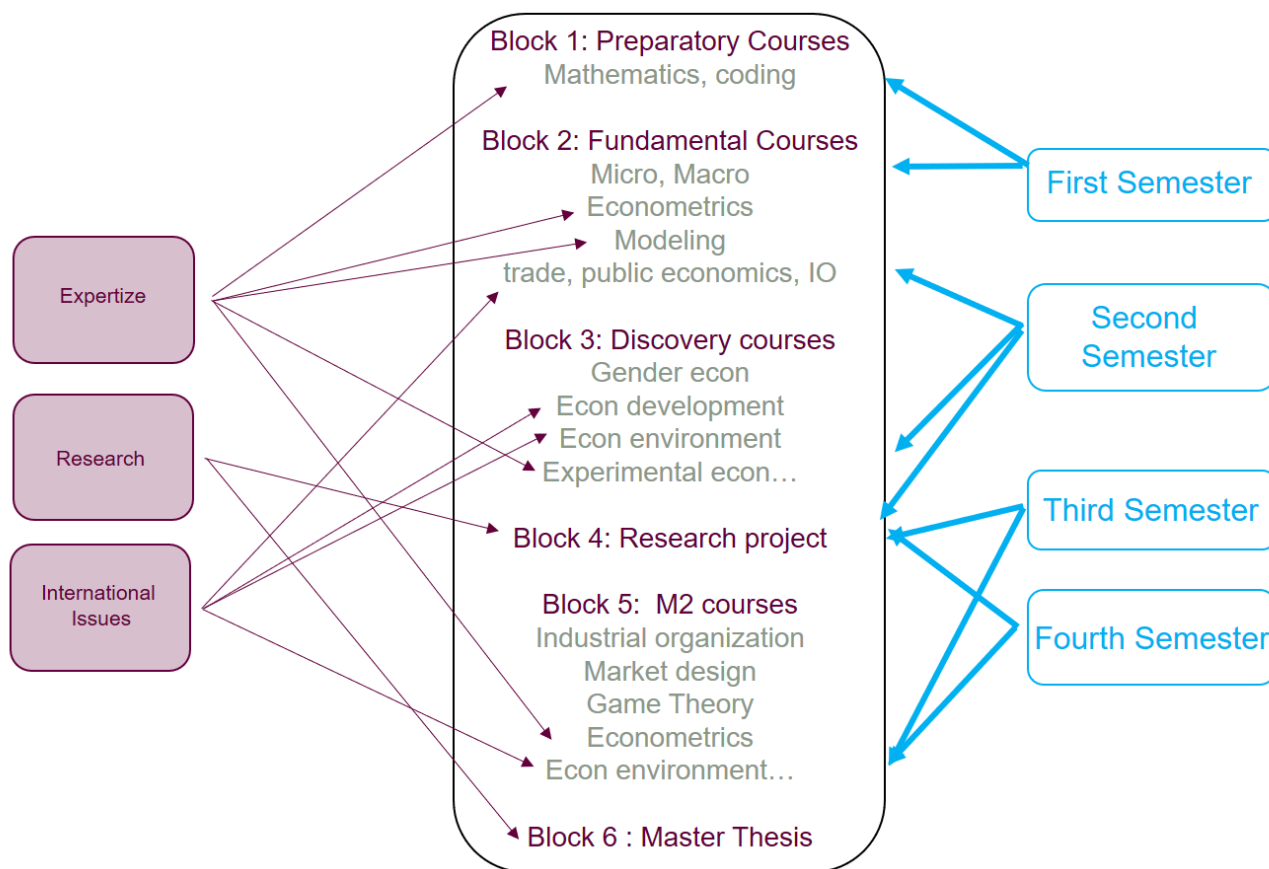


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Public Economics

Number of ECTS: 6

Number of hours: 36

Teachers:

Name: Natacha Raffin/Olivier Baguelin

Affiliation: CEPS

Email: natacha.raffin@ens-paris-saclay.fr

olivier.baguelin@univ-evry.fr

Brief Course Description

The objective of this course is to present an introduction to public economics, with special emphasis on public spending, normative theories of government intervention and redistribution, taxation and transfer policies, social preferences.

Course Outline

1. First Part
 - a. General Equilibrium
 - b. Public goods and externalities
 - c. Social Choice
 - d. Introduction to optimal taxation
 - e. Labor income taxation and redistribution
 - f. Capital taxation
2. Second Part
 - a. Analysis of income and wealth distribution and tax simulation (ex ante evaluation)
 - i. Statistical tools to analyze income distribution
 - ii. Concepts and measures of inequality and poverty
 - iii. Simulation-based analysis of tax-benefit policies and distributional impact
 - b. Policy evaluation (ex post evaluation)
 - i. Problem of evaluating policies & Social Experiments
 - ii. Estimators based on CIA : regression / matching
 - iii. Estimators based on CIA : regression / matching

Core References

Those references below are recommended readings.

Angrist & Pischke (2009), *Mostly Harmless Econometrics*.

Atkinson, A.B. and J. Stiglitz, *Lectures on Public Economics*, New York: McGraw Hill, 1980. [New edition Princeton University Press, 2015]

Auerbach, A. and M. Feldstein, eds., *Handbook of Public Economics*, 4 Volumes, Amsterdam: North Holland, 1985, 1987, 2002, and 2002.

Gruber, J. *Public Finance and Public Policy*, 6th Edition. New York: Worth Publisher, 2019.

Kaplow, L. *The Theory of Taxation and Public Economics*. Princeton University Press, 2008.

Mirrlees, J. *Reforming the Tax System for the 21st Century The Mirrlees Review*, Oxford University Press, (2 volumes) 2009 and 2010

Myles, G. *Public Economics*, Cambridge University Press, 2008.

Neal. *Introduction to Causal Inference*, 2020.

Salanié, B. *The Economics of Taxation*, MIT Press, 2011 [French version *Theorie économique de la fiscalité*, Economica, 2002].

Supplementary Readings

Additional readings will be provided for each chapter.

Evaluation/Assessment

To validate the course, students are required to attend all lectures and actively participate in class and to take the exams: One mid-term exam during tutorials and a final exam.

Development Economics

Number of ECTS: 2

Number of hours: 20

Professor:

Name: Thomas VENDRYES

Affiliation: University/ENS Paris-Saclay, CEPS

Email: thomas.vendryes@ens-paris-saclay.fr

Brief Course Description

The objective of this course is to provide a presentation of the phenomenon of economic development, and an introduction to development economics. After a general depiction of the process of development, the main theories and schools of thought that structured the field are presented. Specific topics are then studied, through classical or contemporary research papers: on the micro side, health and education, and on the macro side, institutions. In all cases, both theoretical approaches and empirical methods will be presented.

Course Outline

1. The Phenomenon of Economic Development
2. Classic Theories and Contemporary Approaches
3. Health and Education
4. Institutions

Core References

- Banerjee & Duflo, *Poor Economics*, Public Affairs, 2011.
- de Janvry & Sadoulet, *Development Economics - Theory and practice*, Routledge, 2016.
- Perkins, Radelet, Lindauer & Block, *Economics of Development* (7th ed.), Norton, 2012.

Supplementary Readings

During lectures, specific papers will be presented and discussed, and supplementary readings provided.

Evaluation/Assessment

- 30%: referee report on a paper in the field of development economics
- 70%: final written exam

Economic Modeling: Dynamics

Number of ECTS: 3

Number of hours: 18 hours (plenary course) + 6 hours (tutorials)

Professor:

Name: Vincent Martinet

Affiliation: INRAE and ENS Paris-Saclay

Email: vincent.martinet@inrae.fr

Brief Course Description

This course aims at introducing the main tools used to model the dynamic aspects of economic problems. It addresses “fundamental methods,” with an emphasize on mathematical aspects and the way to interpret them in economic terms. As such, the course is not about dynamic economics and its results; it will not go deep into a specific topic, e.g., macroeconomic dynamics, but aims at providing the knowledge needed to address any topic from a dynamic perspective. In particular, the course discusses intertemporal equilibria analysis, dynamic programming, and optimal control. It focuses on so-called *mechanistic models*, i.e., models in which the economy evolves according to some explicit rules. As such, we will not consider statistical approaches or dynamic econometrics.

Students are expected to have a sufficient background in economics (microeconomics, macroeconomics - comparative statics, decision theory, social choice theory) and in mathematics (static optimization, advanced calculus).

Course Outline

The course is organized around 6 main classes of 3 hours

1. Introduction to the topic
2. Intertemporal optimization in discrete time
3. Dynamic programming and time-consistency
4. Optimal control in continuous time: basics
5. Optimal control: advanced considerations (constrained problems, infinite horizon, etc.) and particular features (discontinuous controls, bang-bang solutions, etc.)
6. Alternatives to the discounted utility model and a short introduction to viability theory

along with 4 tutorials of 1.5 hours

- a. The cake-eating economy in discrete time
- b. The cake-eating economy in continuous time
- c. Optimal growth in a two-sector economy with a non-renewable asset
- d. Dynamic programming in theory and in practice

Core References

Martinet (2023) *Economic Modeling: Dynamics*. Textbook.

Léonard D. and Long N.V. (1992) *Optimal control theory and static optimization in economics*. Cambridge University Press.

Seierstad A. and Sydsæter K (1987) *Optimal Control Theory with Economic Applications*. North-Holland, Advanced textbooks in economics (Volume 24).

Takayama A. (1974) *Mathematical Economics*. The Dryden Press: Hinsdale, Illinois.

Supplementary Readings

To be displayed during the course.

Evaluation/Assessment

Evaluation is based on a final written exam.

Environmental Economics, innovation and sustainable growth

Number of ECTS: 2

Number of hours: 20

Teachers:

Name: Natacha Raffin/Maria-Eugenia Sanin

Affiliation: CEPS

Email: natacha.raffin@ens-paris-saclay.fr

eugenia.sanin@univ-evry.fr

Brief Course Description

The course provides students with the skills to assess, analyze and recommend economic policies and strategies to tackle environmental issue such as pollution, climate change, the energy transition and biodiversity conservation. The lecture will be divided into 6 slots of 3hours, each of them covering a topic.

Course Outline

1. Health and the environment
2. Climate change
3. Biodiversity
4. Policy instruments to tackle pollution and their interaction with green innovation:
Theory
5. Policy instruments to tackle pollution and their interaction with green innovation:
Practice
6. Climate justice and the energy transition

Core References

The references below are recommended readings.

Brei M., A. Pérez-Barahona and E. Strobl (2016), "Environmental Pollution and Biodiversity: Light Pollution and Sea Turtles in the Caribbean", *Journal of Environmental Economics and Management*, 77, 96-116.

- K. Y. Chay and M. Greenstone (2003). The Impact of Air Pollution on Infant Mortality: Evidence from Geographic Variation in Pollution Shocks Induced by a Recession, *Quarterly Journal of Economics*, 2003
- Dasgupta, P. (2021), *The Economics of Biodiversity: The Dasgupta Review*, London: HM Treasury.
- M.Dell, B. F. Jones, and B. A. Olken, “Temperature Shocks and Economic Growth: Evidence from the Last Half Century”, *American Economic Journal: Macroeconomics* 2012, 4(3): 66-95.
- Mariani F., A. Pérez-Barahona and N. Raffin (2010), “Life expectancy and the environment”, *Journal of Economic Dynamics and Control*, 34 (4), 798-815.
- Perman R., Y. Ma, M. Common, D. Maddison and J. McGilvray (2011), *Natural Resource and Environmental Economics*, Pearson Education Limited, Essex, UK.
- Polasky S., C. Costello and A. Solow (2005), “The Economics of Biodiversity”, in *Handbook of Environmental Economics*, Mäler K. and J. Vincent (Eds.), Elsevier B.V.

For topic 4:

- Bontems, P., & Rotillon, G. (2007). *Economie de l'environnement* (No. 252, pp. 128-p). La Découverte.
- Creti, A., & Sanin, M. E. (2011). Price versus quantities in the coordination of international environmental policy. *International Economics*, 126, 109-130.
- Sanin, M. E., & Zanaj, S. (2011). A note on clean technology adoption and its influence on tradeable emission permits prices. *Environmental and Resource Economics*, 48, 561-567.
- Weitzman, M.L. 1974. Prices vs. quantities, *Revue of Economic Studies* 41, 477-491.
- Weitzman, M. L. (2017). On a world climate assembly and the social cost of carbon. *Economica*, 84(336), 559-586.

For topic 5:

- Creti, A., Jouvet, P. A., & Mignon, V. (2012). Carbon price drivers: Phase I versus Phase II equilibrium?. *Energy Economics*, 34(1), 327-334.
- Planelles, J., & Sanin, M. E. (2023) Carbon taxation in a global production network. EPEE working paper.
- Sanin, M. E., & Sourisseau, S. (2022) Over-allocation profits and competition issues in the steel industry. *Revue Economique*.

Sanin, M. E., Violante, F., & Mansanet-Bataller, M. (2015). Understanding volatility dynamics in the EU-ETS market. *Energy Policy*, 82, 321-331.

Sadighi, M. & Sanin, M.E. (2023). Cost-Benefit Analysis for Green Demonstrators: Application to the introduction of Green Hydrogen in the Container Glass Industry in France. Working paper of the Chair Energy and Prosperity.

For topic 6:

Bousquet, A., & Sanin, M-E. (2023). Car-fuel poverty in France. Working paper of the Chair Energy and Prosperity.

Budolfson, Mark, et al. "Optimal climate policy and the future of world economic development." *The World Bank Economic Review* 33.1 (2019): 21-40.

Douenne, T., & Fabre, A. (2020). French attitudes on climate change, carbon taxation and other climate policies. *Ecological Economics*, 169, 106496.

Ravigné, E., Gherzi, F., & Nadaud, F. (2022). Is a fair energy transition possible? Evidence from the French low-carbon strategy. *Ecological Economics*, 196, 107397.

Xu, Jingyuan, and Yue Zhang. "Has the international climate regime promoted climate justice? Evidence from Clean Development Mechanism projects in China." *Climate Policy* 22.2 (2022): 222-235.

Supplementary Readings

Additional readings will be provided for each chapter/topic.

Evaluation/Assessment

To validate the course, students are required to attend all lectures and actively participate in class. Oral presentation on a topic covered by the lectures will be asked

Advanced Econometrics

Number of ECTS: 6

Number of hours: 36h lectures + 12h tutorials

Professor 1:

Name: Jérôme Héricourt

Affiliation: Université Paris Saclay, Evry

Email: jerome.hericourt@univ-evry.fr

Professor 2:

Name: Jean-Noël Senne

Affiliation: Université Paris Saclay

Email: jean-noel.senne@universite-paris-saclay.fr

Brief Course Description

This course is the natural extension of the Intermediate Econometrics course taught in the first semester. It is divided into two blocks (each block being organized in 6 sessions of 3 hours each).

The first block (18h) studies the basic techniques of non-linear econometrics including:

- Lecture 1: Nonlinear Least Squares and Iterative methods (Newton and Quasi-Newton)
- Lecture 2: Discrete choice models (1): LPM, Probit, Logit, and the MLE estimator.
- Lecture 3: Discrete choice models (2): multinomial and ordinal outcome models
- Lecture 4: Censored and Truncated; Sample Selection Models.
- Lecture 5: Generalized Method of Moments
- Lecture 6: Paper presentations

The second block (18H) presents recent developments in the microeconomic analysis of impact evaluation. This course will explore a wide variety of techniques, focusing not only on the estimators themselves and why they work, but also on the types of data they require and the assumptions that must hold for the estimates to be valid, including:

- Lecture 1: Randomized Controlled Experiments (RCT)
- Lecture 2: Advanced Instrumental Variables (IV)
- Lecture 3: Matching Methods (MM)
- Lecture 4: Regression discontinuity (RDD)
- Lecture 5: Difference-in-Differences (DID)
- Lecture 6: Paper presentations

To complement their theoretical knowledge, students will also attend practical econometrics classes (12H).

References

- Angrist, J. D., & Pischke, J. S. (2009). Mostly harmless econometrics: An empiricist's companion. Princeton university press.
- Cameron, A. C., & Trivedi, P. K. (2005). Microeconometrics: methods and applications. Cambridge university press.
- Davidson, R., & MacKinnon, J. G. (2004). Econometric theory and methods (Vol. 5). New York: Oxford University Press.
- Greene, W. H. (2012). Econometric Analysis 7th ed. Pearson.
- Wooldridge, J. M. (2010). Econometric analysis of cross section and panel data. MIT press.

Evaluation/Assessment

The grade will be based on 3 elements:

- A written exam (50 %)
- A presentation of an academic paper during lectures (20 %)
- Questionnaires during TD sessions (30 %).

Topology and Optimization

Number of ECTS: 2,5

Number of hours: 15

Professor:

Name: Michael Greinecker

Affiliation: ENS Paris-Saclay

Brief Course Description

This course introduces fundamental mathematical methods of use in economics and Econometrics. There will be a focus on basic (point-set) topology (mostly in Euclidean Spaces), basic convex analysis, nonlinear unconstrained and constrained optimization, and an outlook on dynamic optimization methods.

Course Outline

Repetition of the essentials of real analysis on the real line. Extending to Euclidean spaces and basic topology via norms and metrics there, including continuity, compactness, completeness, and related concepts. Then we look at some convex analysis, including separation and support theorems. Abstract formulation of convex optimization problems. Then we relate these methods to multidimensional calculus methods and look in some details at Lagrange and Karush-Kuhn-Tucker methods for constrained optimization methods with equality and inequality constraints, respectively. Versions of the envelope theorem for the behavior of solutions to parametric optimization problems. We then look at the principle of dynamic programming with a bit more metric space theory to understand discrete time infinite horizon recursive optimization. Finally, we survey informally several methods to solve dynamic optimization problems in discrete time.

Core References

Lecture Notes will be made available before each unit.

Supplementary Readings

Sundaram, Rangarajan K. A first course in optimization theory. Cambridge University Press, 1996.

- This book is a good general reference for much of what we do in this course. Sadly, there are a lot of typos.

Dixit, Avinash K. Optimization in economic theory. Oxford University Press on Demand, 1990.

- This book provides a lot of economic intuition for optimization methods but not much formal details.

Stokey, Nancy L., Robert E. Lucas JR., with Edward C. Prescott, Recursive methods in economic dynamics. Harvard University Press, 1989.

- A classic book on discrete-time dynamic optimization methods. The book is fairly technical and for those who want to go deeper into some topics.

Balder, Erik J. "Exact and useful optimization methods for microeconomics." New Insights into the Theory of Giffen Goods. Springer, Berlin, Heidelberg, 2012. 21-38.

- The paper has an appendix showing that even most advanced rigorous textbooks in economics use the Karush-Kuhn-Tucker result incorrectly.

Franklin, Joel N. Methods of mathematical economics: linear and nonlinear programming, fixed-point theorems. Society for Industrial and applied Mathematics, 2002.

- Rigorous and friendly book on many of the mathematical methods introduced in this course.

Carothers, Neal L. Real analysis. Cambridge University Press, 2000.

- A good, slightly advanced, background book for all things real analysis.

Chow, Gregory C. Dynamic economics: optimization by the Lagrange method. Oxford University Press, 1997.

- A lot of examples of how one can use Lagrange multiplier methods for dynamic optimization problems.

Le Van, Cuong, and H. Cagri Saglam. "Optimal growth models and the Lagrange multiplier." Journal of Mathematical Economics 40.3-4 (2004): 393-410.

- An extremely technical and advanced paper on Lagrange multipliers for dynamic optimization problems. For those who would like to know what it takes to make the theory completely rigorous.

Evaluation/Assessment

There will be homework problems counting for 40%, and a final exams counting for 60%.

International Trade

Number of ECTS: 6

Number of hours: 36 (+ 12 tutorials)

Professors:

Name: [LELARGE, Claire](#)

Affiliation: Paris-Saclay University

Email: claire.lelarge@universite-paris-saclay.fr

Name: [CROZET, Matthieu](#)

Affiliation: Paris-Saclay University

Email: matthieu.crozet@universite-paris-saclay.fr

Brief Course Description

This course will provide students with the analytical tools that are essential to understand the process of globalization through the international trade in goods. The lecture focuses on topics that are at the center of the policy debate: why do countries open to trade? What are the gains from trade? What are the distributional impacts of trade between and within countries?

At the end of the course, students are expected to have a good knowledge of the mechanisms and predictions from the traditional models of trade, and from modern trade theories. Students will also be able to read research articles that can be used for the writing of policy notes.

Course Outline (indicative)

[LELARGE, Claire](#)

Sessions 1-2: Monopolistic Competition and Trade

- A refresher on monopolistic competition (Dixit-Stiglitz)
- Monopolistic competition and trade with homogeneous firms
- Monopolistic competition and trade with heterogeneous firms
- The empirics of firm-level trade

Session 3-4: The Law of Gravity

- Do the data obey the law of gravity?
- Micro-foundations for the gravity equation
- Applications

CROZET, Matthieu

Session 5: Trade and economic geography

Session 6: Product quality

Session 7-8: Endogenous markups and pro-competitive effects of trade

- Trade in oligopolistic markets
- Monopolistic competition with endogenous markups
- In search of empirical evidence of pro-competitive effects

Session 9-10: Trade policy

- Impact of tariffs, optimal tariffs and pass-through
- Quantifying the trade gains (and losses)

Session 11-12: Globalization, labor markets and the backlash of globalization

- HOV
- Impact of trade on wages and employment
- Political economy of trade policy
- The backlash of globalization

Required/Essential Readings

Feenstra (2009). *Advanced International Trade: Theory and Evidence*. Princeton University Press.

Handbook of international economics (volume 5, 2022), Elsevier

- Stephen Redding, Chapter 3 - Trade and geography. ([link](#))
- Lorenzo Caliendo and Fernando Parro, Chapter 4 - Trade policy. ([link](#))
- Italo Colantone, Gianmarco Ottaviano, Piero Stanig, Chapter 7 – The Backlash of

Globalization. ([link](#))

Handbook of international economics (volume 4, 2014), Elsevier

- Marc Melitz and Stephen Redding, Chapter 1 – Firm heterogeneity and trade. ([link](#))
- Keith Head and Thierry Mayer, Chapter 3 – Gravity equations: Workhorse, toolkit, and cookbook. ([link](#))

Recommended/Supplementary Readings

Arkolakis, C. (2010), “Market Penetration Costs and the New Consumers Margin in International Trade”, *Journal of Political Economy*, 118:6.

Bernard, A., B. Jensen, S. Redding, and P. Schott (2012), “The Empirics of Firm Heterogeneity and International Trade”, *Annual Review of Economics*, 4.

Blaum, J., C. Lelarge, and M. Peters (2018), "The Gains from Input Trade with Heterogeneous Importers", *American Economic Journal: Macroeconomics*, 10(4).

De Loecker, Jan, and Pinelopi Koujianou Goldberg (2014), “Firm Performance in a Global Market,” *Annual Review of Economics*, 6: 201–27.

Eaton, J., S. Kortum, and F. Kramarz (2011), “An Anatomy of International Trade: Evidence from French Firms,” *Econometrica* 79 (5).

Krugman, P. R. (1979), “Increasing returns, monopolistic competition, and international trade”, *Journal of international Economics*, 9(4): 469-479.

Krugman, P. R. (1980), ”Scale Economies, Product Differentiation and the Pattern of Trade”, *American Economic Review*, 70(5): 950-959.

Melitz, M. J. (2003), “The impact of trade on intra-industry reallocations and aggregate industry productivity”, *Econometrica*, 71(6): 1695-1725.

Evaluation/Assessment

Grades are based on tutorials (25%) and a final exam (75%).

Data Economy

Number of ECTS: 2

Number of hours: 20h

Professor:

Name: Xiangyu QU

Affiliation: CNRS

Email: xiangyu.qu@cnrs.fr

Brief Course Description:

A growing number of companies derive most of their value not from physical assets, but from intangibles ones, like data. Data and new data technologies are changing consumption, production, labor and valuation. Does this transformation from an industrial economy to a data economy bring with it new economics? Is the accumulation of data contributing to big firms getting bigger? Can changes in data technology explain some of the decline in the labor share? How should we measure or value data when it is often traded at zero price, bartered for a user's access to a digital service? Finally, can the accumulation of data be an engine of growth? This course deploys information economics tools to understand the data economy, derives new approaches to measuring data and develops a standard economic framework that can be used for data policy evaluation.

Course Outline

1. The industrialization of Knowledge production: to investigate changes in knowledge production, we consider a parallel approach as in traditional industrialization, replacing capital with data.
2. Data as fuel for growth: to investigate if data accumulation is an engine of growth as well as capital, labor and technology.
3. Data, firm size and investors' changing trading strategies: to understand if data contribute to big firms more.
4. Measuring and Valuing Data in Market Prices: to understand how much data is in the market and what is its value.
5. Data Platforms: Lots of data is collected by intermediaries who create the transaction data, like amazon, alibaba. We will study the platform strategies and competition.

Core References

1. "The Changing Economics of Knowledge Production", Simona Abis and Laura Veldkamp, Working paper.

2. “Impact of Artificial Intelligence on the Labor Market”, Michael Webb, Working paper
3. “A growth model of the data economy”, Maryam Farboodi and Laura Veldkamp, Working paper.
4. “The race between man and machine: Implications of technology for growth, factor shares and employment”, Daron Acemoglu and Pascual Restrepo, *American Economic Review* 108(6): 1488-1542.
5. “Robots and jobs: Evidence from US labor markets, Daron Acemoglu and Pascual Restrepo, *Journal of Political Economy* 128(6): 2188-2244
6. “Where has all the data gone?”, Maryam Farboodi, Adrien Matray, Venky Venkateswaran and Laura Veldkamp, *The Review of Financial Studies*, 2021.
7. “Taking Orders and Taking Notes: Dealer information sharing in Financial markets”, Nina Boyarchenko, David Lucca and Laura Veldkamp, *Journal of Political Economy*, 2022.
8. “The economics of social data”, Dirk Bergemann, Alessandro Bonatti and Tan Gan, *Rand Journal of Economics*, 2022.

Supplementary Readings:

Provided in the class.

Evaluation/Assessment:

Project or written exam

Decision Theory and Game Theory

Number of ECTS: 6

Number of hours: 36 h + 12h (tutorial)

Professor:

Name: Olivier Bos

Affiliation: ENS Paris-Saclay

Email: olivier.bos@ens-paris-saclay.fr

Brief Course Description

This course aims introducing substantial theoretical concepts and tools to be able to formalize and analyze strategic interactions in macro and microeconomics, and beyond to read theoretical and applied scholar articles on decision theory and game theory. Decision theory studies choices that result in either risky or uncertain outcomes, while game theory is the analysis of strategic interactions between rational agents. Both are dynamic fields, with substantial developments and numerous applications in economics (bargaining, taxation, and industrial organization), political sciences (voting, government stability, and climate policy), philosophy (social norms), biology (evolution, cooperative/aggressive behavior), computer science...

Students are expected to have a background knowledge in mathematics (analysis, optimization, probability).

Course Outline

The course is organized around 12 main classes of 3 hours, 8 tutorials of 1.5 hours.

Part I: Decision theory

1. Preferences and choice preference properties — continuity of preferences — existence of utility function — Utility maximization.
2. Demand Theory Walrasian Demand — Hicksian Demand — compensated law of demand — Slutsky equation — Roy's identity
3. Choice under risk preferences over lotteries — Von Neumann-Morgersten's theorem — Allais paradox — rank dependent utility model
4. Increasing risk: comparison and measures risk aversion — measures of risk aversion — stochastic dominance

Part II: Game theory

1. Static games of complete information strategic form — dominance — Nash equilibrium — mixed strategies — equilibrium existence — correlated equilibrium — equilibrium selection and refinements

2. Dynamic games of complete information extensive form, subgame-perfection, backwards induction, repeated games
3. Static games of incomplete information beliefs — Bayesian Nash equilibrium — common knowledge — global games
4. Dynamic games incomplete information incomplete vs. imperfect information — perfect bayesian Nash equilibrium — signaling games

Core References

Gibbons, R. *Game Theory for Applied Economists*. Princeton: Princeton University Press, 1992.

Mas Colell, A., Whinston, M.D. & Green, J.R. *Microeconomic Theory*, Chapters 1 & 6, Oxford University Press, 1995.

Maschler, M., Solan, E. & Zamir, S. *Game theory*, Cambridge University press, 2013.

Osborne, M.J. & Rubinstein, A. *A Course in Game Theory*. Cambridge, Massachusetts: MIT Press, 1994.

Evaluation / Assessment

Grades are based on a midterm (1/3) and a final test (2/3)

Experimental Economics

Number of ECTS: 2

Number of hours: 20h

Professor:

Name: François PANNEQUIN

Affiliation: Université Paris-Saclay, ENS Paris-Saclay, CEPS

Email: francois.pannequin@ens-paris-saclay.fr

Brief Course Description

This course introduces experimental economics. The emphasis will be on the methodology of experimental economics, its relevance to testing economic predictions, and identifying patterns of behaviors. Students will learn how to design experiments and interpret their results. Participation in classroom games will help perfect the understanding of experimental methods. The course is designed in four parts to favor the practice of experimental economics. The first part is dedicated to the understanding of the experimental method. The second focuses on some fundamental experimental methods to provide behavioral measures. The third part explores the field of social preferences (altruism, trust, reciprocity). The last part is devoted to statistical and econometric methods implemented to exploit experimental data.

Course Outline

1. Experimental Economics: Principles and Methodology Introduction: Why an experimental approach? Methodological foundations of experimental economics Rules and procedures in Experimental Design Classroom Experiment: the Voluntary Contributions Game
2. Other-Regarding Preferences Ultimatum Game Dictator Game Trust Game Gift Exchange Game
3. Decision Theory: Risk Aversion, Ambiguity Aversion, Beliefs The Holt & Laury measure Investment Task Measures The Bomb Task Beliefs' Elicitation and Bayesian Learning Probability weighting and Prospect Theory Ambiguity Aversion
4. Auctions Private value auction The Winner's Curse

Core References

- Bardsley N, et al. (2010), *Experimental Economics: Rethinking the rules*, Princeton University Press.
- Dhami S (2016), *The Foundations of Behavioral Economic Analysis*, Oxford.

- Guala F (2005), *The methodology of experimental economics*, Cambridge: Cambridge University Press.
- Holt CA (2019), *Markets, Games, and Strategic Behavior: An Introduction to Experimental Economics*, Princeton University Press.
- Jacquemet N, L'Haridon O, (2018), *Experimental Economics: Method and applications*, Cambridge: Cambridge University Press.
- Kahneman D (2012), *Thinking, Fast and Slow*, Penguin.

Supplementary Readings

During lectures, specific papers will be presented and discussed, and supplementary readings provided.

Evaluation/Assessment

Written report (based on an article and/or an experiment design), possibly in pairs.

Firms and Markets

Number of ECTS: 6

Number of hours: 36h + 12h (tutorials)

Professors:

Name: François Pannequin and Morgan Patty

Affiliation: ENS Paris-Saclay and CEPS

Email: francois.pannequin@ens-paris-saclay.fr & morgan.patty@ens-paris-saclay.fr

Brief Course Description

This course aims at providing the theoretical tools to understand the main issues of industrial organization, competition policy and asymmetric information.

Course Outline

I. Industrial Organization

- a. Perfect Competition (Partial Equilibrium Analysis),
- b. Monopoly (Lerner Index, Price Discrimination, Ramsey's Rule),
- c. Simultaneous Oligopoly (Bertrand, Cournot),
- d. Non-Simultaneous Oligopoly (Stackelberg, Partial Monopoly) e. Product differentiation (Hotelling)
- f. Pricing strategies
- g. Theory of competition policy (tacit collusion, mergers, entry deterrence)

II. Asymmetric information

- a. Hidden information (including the revelation principle)
- b. Case study: insurance markets
- c. Hidden action
- d. Advertising
- e. Warranties
- f. Branding
- g. Bundling

III. Incomplete contracts

- a. From Complete to Incomplete Contracts
- b. Firm Theory
- c. The Hold Up Problem
- d. The Offer Game (Public and Private Contracts)

Core References

Bolton, P., Dewatripont, M., 2005. *Contract Theory*. MIT Press.

Pindyck, R.S., Rubinfeld, D.L., 2013. *Microeconomics* - 8th Edition. Pearson.

Salanié, B., 2005. *The Economics of Contracts, A Primer* - 2nd Edition. MIT Press.

Tirole, J., 1994. *The Theory of Industrial Organization*. MIT Press.

Supplementary Readings

Additional reading will be advised or required during the semester.

Evaluation/Assessment

Grades are based on a midterm (50%) and a final test (50%)

Gender and Discrimination Economics

Number of ECTS: 2

Number of hours: 20h

Professor:

Name: José De Sousa

Affiliation: University Paris-Saclay

Email: jose.de-sousa@universite-paris-saclay.fr

Brief Course Description

This course uses basic microeconomic theory and recent empirical studies to examine the causes and consequences of gender and racial differences in economic outcomes. Topics covered include the labor force participation choices, the gender gap in earnings, occupational choices, fertility decisions, and human capital investment.

Course Outline

1. Definitions, Broad Facts, and Road Map for the Course
2. Divergent Paths
3. Taste-Based Discrimination
4. Orchestrating Impartiality
5. Statistical Discrimination
6. The Gender Earnings Gap in the Economy and the Gig Economy
7. Do Quotas Work?
8. Algorithmic Bias.

Core References

- Blau F.D. & L.M. Kahn. 2017. "The Gender-Wage Gap: Extent, Trends, and Explanations". *Journal of Economic Literature* 55(3), 789–86.
- Cook C., Diamond R., Hall J., List J., and &. Oyer, 2021, *The Gender Pay Gap in the Gig Economy: Evidence from over a Million Uber Drivers*, *Review of Economic Studies*, 88(5), 2210–2238.

- Goldin C. & C. Rouse. 2000. "Orchestrating impartiality: The impact of “blind” auditions on female musicians". *American Economic Review*, 90(4) 715–741.
- Goldin C. *Career & Family: Women's Century-Long Journey toward Equity*. Princeton NJ: Princeton University Press; 2021.

Supplementary Readings

- Bertrand M. & E. Duflo. 2016. "Field Experiments on Discrimination," NBER WP22014.
- Niederle M. 2016. “Gender”. *Handbook of Experimental Economics*, second edition, Eds. John Kagel and Alvin E. Roth, Princeton University Press, 481-553.

Evaluation/Assessment

Grading is based on a research project on gender and discrimination or/and a referee report on suggested papers

INTERMEDIATE ECONOMETRICS

Number of ECTS: 6

Number of hours: 36h + 12h (tutorials)

Professor:

Name: Gregory Verdugo

Affiliation: Université Paris Saclay, Evry

Email: gregory.verdugo@univ-evry.fr

Brief Course Description

The first part of the course presents the basic tools of the econometric analysis of cross-section and panel data. The first chapter presents the linear regression model and the properties of the OLS estimator. The second chapter presents the instrumental variable estimator. The third chapter introduces panel data econometrics. We will also describe static and dynamic panel data analysis techniques that are useful for the analysis of longitudinal datasets.

The second part of the course studies the theory and application of time series methods that are frequently used in macroeconomics and financial econometrics. For each chapter, we will present recent applications of these techniques from the academic literature in economics. A separate list of applied papers will be provided and some of them will be discussed in class.

Course Outline

Part 1 Cross-section and Panel data econometrics

Chapter 1 Introduction to the linear model

Definition

Frisch-Waugh theorem

Variance decomposition

Statistical Properties: bias, variance

Confidence interval

Hypothesis testing

Consistency of the OLS estimator

Generalized least squares estimator

Chapter 2 Instrumental variable estimator

Omitted variable bias analysis

The instrumental variable estimator

Chapter 3 Linear panel models

Notation

Pooled OLS estimation

Between estimator

Fixed effects or within estimator

Consistency of within estimator

Asymptotic distribution of within estimator

Matrix derivation

First differences estimator

Asymptotic distribution of the first-difference operator

Random effect model

Chapter 4 Dynamic panel data

True state dependence and unobserved heterogeneity

Inconsistency of standard panel estimators

Arellano-Bond estimator

Part 2 Time series econometrics

Chapter 1 What is a time series?

White noise

ARMA models Lag operators and polynomials

Manipulating ARMA with lag operators

AR(1) to MA(∞)

AR(p) to MA(∞): factoring lag polynomials Multivariate ARMA models

Chapter 2 Autocovariance and autocorrelation functions

Definitions

Autocovariances and autocorrelations of ARMA processes

Yule-Walker equations

Multivariate auto- and cross-correlations

Partial autocorrelation function

Chapter 3 Prediction and Impulse Response Functions

Predicting ARMA models

Forecasting MA models AR and ARMA models

State space representation

Forecast from AR(1) representation

VARs in vector AR(1) representation

Impulse response function

Chapter 4 Stationarity

Definition: weak and strong stationarity

Conditions for stationarity in ARMA

Chapter 5 Estimating autoregressions

Estimation of an AR(1)

Estimation of an AR(p)

Choice of the lag length

Estimation of VARs

Estimation of ARMA(p,q)

Chapter 6 Seasonality and Structural changes

Seasonality

Structural change

Chow tests

Dummy variables

Chapter 7 Models with trend

Random walk models

Random walk plus drift models

Removing the trend: differencing

Removing the trend: detrending

Dickey-Fuller tests

Core References

Cross-section and Panel data econometrics

Cameron, A. Colin, and Pravin K. Trivedi. Microeconometrics: methods and applications. Cambridge University Press, 2005.

Time series

Cochrane, J. H. (2005). Time series for macroeconomics and finance. Manuscript, University of Chicago, 1-136. Version Spring 1997; Pictures added Jan 2005

<http://econ.lse.ac.uk/staff/wdenhaan/teach/cochrane.pdf>

Enders, Walter, (2015), Applied econometric time series, Fourth edition, Wiley

Software used during tutorials and for the project: R *language*

<https://www.r-project.org/>

Online references on R:

<https://cran.r-project.org/other-docs.html>

Supplementary Readings

Wooldridge, Jeffrey M. Introductory Econometrics, Cengage learning, 2016

Wooldridge, Jeffrey M. Econometric analysis of cross section and panel data. MIT press, 2010.

Greene, William H. Econometric analysis. Pearson Education, 2018.

On causality in Econometrics

Mastering Econometrics, Marginal Revolution University: online videos

<https://mru.org/mastering-econometrics>

Angrist, J. D., & Pischke, J. S. (2008). Mostly harmless econometrics: An empiricist's companion. Princeton university press.

Angrist, J. D., & Pischke, J. S. (2014). Mastering'metrics: The path from cause to effect. Princeton University Press.

Evaluation/Assessment

Final written exam: 80%

Project in econometrics: 20%

Macroeconomics 2: Theory and Policy

Number of ECTS: 3

Number of hours: 18h + 6h (tutorials)

Professor:

Michel GUILLARD

Université d'Évry-Val-d'Essonne & Université Paris-Saclay

michel.guillard@univ-evry.fr

Brief Course Description

The objective of this course is to present to students the theoretical foundations of the workhorse short-term macroeconomic model (the so-called "3-equation New Keynesian model") and its implications for economic policy.

It builds on the methodological background of the course "Macroeconomics 1: Theory and Applications", using a simplified version of the RBC model, without capital accumulation, in order to introduce money, competition imperfections and micro-founded nominal rigidities.

This framework is then used to study the effects and usefulness of monetary and fiscal policies in response to different macroeconomic shocks (financial, energy, climate, etc.).

Course Outline

1. Money and Public Finance

- (a) The household program in a monetary economy
- (b) The Treasury, the central bank and the government budget constraint
- (c) Equilibrium and the Ricardian equivalence

2. The Flexible Price Equilibrium

- (a) The flexible price model
- (b) The real equilibrium
- (c) Monetary equilibria

3. Foundations of the New Keynesian Model

- (a) The household program in a multiple goods economy
- (b) The firms program: Imperfect competition and nominal rigidities

- (c) Equilibrium and properties of the simple “3-equation model”
- 4. Fiscal and Monetary Policy in the NK Model
 - (a) Fiscal Policy in “normal time” and in exceptional time
 - (b) Rules vs discretion: the credibility problem of the central bank
 - (c) Monetary and Fiscal policy in practice

Core References

The main source of material for this course will be the lecture notes (on eCampus)

CHALLES, EDOUARD (2019), *Macroeconomic Fluctuations and Policies*, MIT Press.

CHUGH, SANJAY (2015), *Modern Macroeconomics*, MIT Press.

GALÍ, JORDI (2015). *Monetary Policy, Inflation, and the Business Cycle: An Introduction to the New Keynesian Framework*, Second Edition, Princeton University Press. Main reference.

ROMER, DAVID (2019). *Advanced Macroeconomics*, Fifth Edition, McGraw Hill.

WALSH, CARL (2010). *Monetary Theory and Policy*, The MIT Press Cambridge, Massachusetts, London.

WICKENS, MICHAEL (2012), *Macroeconomic Theory: A Dynamic General Equilibrium Approach*, Second Edition, Princeton University Press.

Supplementary Readings

The list of readings will be updated throughout the course.

Evaluation/Assessment

Tutorials preparation, in-class tests, and class participation (30%)

Final exam (70%)

Mathematics II: Algebra

Number of ECTS: 2,5

Number of hours: 15h + 6h (tutorials)

Professor:

Name: Morgan Patty

Affiliation: ENS Paris-Saclay

Email: morgan.patty@ens-paris-saclay.fr

Brief Course Description

This course introduces students to the basic linear algebra necessary to understand the operations regarding derivatives of functions with more than one variable to investigate maximum and minimum values of those functions with economic applications in mind. Students will also see how to solve linear and non-linear systems and then how to turn them into problems involving matrices. Finally, they will discover stability conditions of linear and non-linear systems.

Course Outline

The course is organized around 5 classes of 3 hours and 4 tutorials of 1.5 hours. 1. Introduction and reminders about matrices 2. Useful properties of matrices 3. Matrix tools for optimization (use of Hessian matrix, etc.) 4. Computing linear and non-linear systems (linear and non-linear equations) 5. Stability conditions (phase diagrams, joint spectral radius, etc.)

Core References

Hoy, M., Livernois, J., McKenna, C., Rees, R., Stengos, T., 2011. *Mathematics for Economics* - 3rd Edition. MIT Press.

Aleskerov, F., Ersel, H., Piontkovski, D., 2011. *Linear Algebra for Economists*. Springer-Verlag Berlin.

Bernstein, D.S., 2018. *Scalar, Vector and Matrix Mathematics: Theory, Facts, and Formulas* - Revised and Expanded Edition. Princeton University Press.

Horn, R.A., Johnson, C.R., 2013. *Matrix Analysis* - 2nd Edition, Cambridge University Press.

Supplementary Readings

Evaluation/Assessment

One final exam