# Master in Quantitative Economics

## Master 2 Track- Quantitative Economic Analysis

### Compendium of the syllabus

#### Academic Year: 2020-2021

### Summary of the program

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<th>Field</th>
<th>ECTS</th>
<th>Teacher</th>
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<tr>
<td><strong>Master 2 Track Quantitative Economic Analysis</strong></td>
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<tr>
<td>3 specialization fields : Theory THEO / Social and public policies SPP / Macro &amp; Finance MF</td>
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<tr>
<td><strong>Master 2, Semester 1</strong></td>
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<tr>
<td><strong>Quantitative methods, obligatoire min 18 ECTS</strong></td>
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<tr>
<td><strong>Mandatory courses (12 ECTS)</strong></td>
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<tr>
<td>Information Economics</td>
<td>36 h</td>
<td>THEO, SPP, MF</td>
<td>6</td>
<td>Françoise Forges</td>
</tr>
<tr>
<td>Machine Learning (*)</td>
<td>36 h</td>
<td>SPP, MF</td>
<td>6</td>
<td>Fabrice Rossi</td>
</tr>
<tr>
<td><strong>Optional courses (6 ECTS)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advanced Microeconometrics</td>
<td>30 h</td>
<td>THEO, SPP</td>
<td>6</td>
<td>Eric Bonsang</td>
</tr>
<tr>
<td>Advanced Macroeconometrics</td>
<td>24 h</td>
<td>THEO, MF</td>
<td>3</td>
<td>Gauthier Vermandel, Magali Marx, Sylvain Benoit</td>
</tr>
<tr>
<td>Modelling in Decision Aiding and Operational Research</td>
<td>15 h</td>
<td>THEO, SPP</td>
<td>3</td>
<td>Daniel Vanderpooten</td>
</tr>
<tr>
<td>Preference Modelling and Multiple Criteria Decision Making</td>
<td>15 h</td>
<td>THEO, SPP</td>
<td>3</td>
<td>Brice Mayag</td>
</tr>
<tr>
<td>Bayesian techniques in Macroeconomics</td>
<td>15 h</td>
<td>MF</td>
<td>3</td>
<td>Gauthier Vermandel</td>
</tr>
<tr>
<td>Finance in continuous time</td>
<td>24 h</td>
<td>THEO, MF</td>
<td>3</td>
<td>René Aid</td>
</tr>
</tbody>
</table>
(*) Depending on the student's background, it will be asked to follow a refresher course (September)

### Specialization courses, 12 ECTS, 4 courses, mandatory within the field

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Hours</th>
<th>THEO, MF, SPP</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioral economics and bounded rationality</td>
<td></td>
<td>27 h</td>
<td>THEO, MF, SPP</td>
<td>Bertrand Villeneuve</td>
</tr>
<tr>
<td>Empirical Industrial Organization</td>
<td></td>
<td>27 h</td>
<td>THEO, MF, SPP</td>
<td>Daniel Herrera</td>
</tr>
<tr>
<td>Advanced Game Theory: Bayesian games and Information design</td>
<td></td>
<td>21 h</td>
<td>THEO, SPP</td>
<td>Françoise Forges, Sidartha Gordon</td>
</tr>
<tr>
<td>Health Economics</td>
<td></td>
<td>27 h</td>
<td>THEO, SPP</td>
<td>Florence Jusot</td>
</tr>
<tr>
<td>Development microeconomics</td>
<td></td>
<td>21 h</td>
<td>SPP</td>
<td>Phillippe de Vreyer</td>
</tr>
<tr>
<td>The Economics of Energy and the Environment</td>
<td></td>
<td>27 h</td>
<td>SPP</td>
<td>Jan-Horst Keppler</td>
</tr>
<tr>
<td>International Trade &amp; International Macroeconomics</td>
<td></td>
<td>27 h</td>
<td>MF</td>
<td>Gianluca Orefice / Lise Patureau</td>
</tr>
<tr>
<td>Business Cycles and Stabilization policies</td>
<td></td>
<td>27 h</td>
<td>MF</td>
<td>Gauthier Vermandel / Anne Epaulard</td>
</tr>
<tr>
<td>Asset pricing</td>
<td></td>
<td>27 h</td>
<td>MF, THEO</td>
<td>Jérôme Dugast</td>
</tr>
</tbody>
</table>

### Semester 2

#### Specialization courses, 3 to choose within the chosen field, 9 ECTS

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Hours</th>
<th>THEO, SPP</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport and variational problems in economics</td>
<td></td>
<td>15 h</td>
<td>THEO</td>
<td>Guillaume Carlier</td>
</tr>
<tr>
<td>Individual and collective decisions</td>
<td></td>
<td>24 h</td>
<td>THEO, SPP</td>
<td>Jean-Philippe Lefort / Remzi Sanver / Sidartha Gordon</td>
</tr>
<tr>
<td>Advanced Health economics</td>
<td></td>
<td>18 h</td>
<td>THEO, SPP</td>
<td>Brigitte Dormont</td>
</tr>
<tr>
<td>Policies in developing countries</td>
<td></td>
<td>21 h</td>
<td>SPP</td>
<td>Véronique Gilles / Olivia Bertelli</td>
</tr>
<tr>
<td>Labor Economics</td>
<td></td>
<td>18 h</td>
<td>SPP</td>
<td>Eve Caroli</td>
</tr>
<tr>
<td>Research Methods in Monetary Economics</td>
<td></td>
<td>18 h</td>
<td>MF</td>
<td>Richard Dutu / Mariana Rojas-Breu</td>
</tr>
<tr>
<td>Advanced Macroeconomics: Frictions &amp; Policies</td>
<td></td>
<td>18 h</td>
<td>MF</td>
<td>Gauthier Vermandel/ Lise Patureau</td>
</tr>
<tr>
<td>Banking economics</td>
<td></td>
<td>18 h</td>
<td>MF</td>
<td>Mariana Rojas-Breu</td>
</tr>
</tbody>
</table>

#### Research seminar, choose 1 (within the chosen field), 3 ECTS

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Hours</th>
<th>THEO, MF, SPP</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topics in Health and Ageing</td>
<td></td>
<td>18 h</td>
<td>SPP</td>
<td>Brigitte Dormont / Eric Bonsang</td>
</tr>
<tr>
<td>Research Seminar: Market regulation</td>
<td></td>
<td>18 h</td>
<td>THEO, MF, SPP</td>
<td>Sven Heim / Bertrand Villeneuve</td>
</tr>
<tr>
<td>Topics in Macroeconomics &amp; Finance</td>
<td></td>
<td>18 h</td>
<td>MF</td>
<td>Anne Epaulard / Richard Dutu</td>
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Please pay attention to the specialization fields and their corresponding courses.

There are three specialization fields:
- Theory (THEO)
- Social and Public Policies (SPP)
- Macroeconomics & Finance (MF)

Except for the two mandatory courses (Information Economics & Machine Learning, Semester 1), the chosen specialization field conditions the courses to be followed.
Details of the courses

Semester 1

**Advanced Game Theory: Bayesian games and Information Design (THEO, SPP)**

**Teacher:**
Françoise FORGES, University Paris-Dauphine, LEDa & PSL Research University
Sidartha GORDON, University Paris-Dauphine, LEDa & PSL Research University

Contact Information :
francoise.forges@dauphine.psl.eu
sidartha.gordon@dauphine.psl.eu

**Information on the course**
Semester 1
Course load: 21 h (7 sessions of 3h)
ECTS: 3

**Overview:**
The course is divided into two parts.
The first part is devoted to so-called “noncooperative games” and concentrates on multistage games with incomplete information played by Bayesian players. The agents’ rationality is analyzed through various solution concepts, capturing backward and/or forward induction. These solution concepts are applied to strategic information transmission and communication.
In the second part, we will introduce a recent literature on the choice of an information structure by a designer (or principal) for an agent or a set of agents who interact strategically in an asymmetric information setting.

**Prerequisites :**
Master 1 Courses : Mathematics and optimization, Game theory

**Course Objectives:**
The objective of the course is to give a deep background in interactive decision-making and its applications. We will notably present the recent developments in the field of microeconomics that address the issue of how information should be designed under informational asymmetries across agents.

After having attended the classes, the students will be able to read recent academic papers applying game theory to various area of economics and to make use of game theory in their future research work.

**Mode of Assessment**
Regular home work, final written exam, with the following weights:
- Final exam 90%
- In-class participation 10%.

**Course Schedule**

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<td>1</td>
<td>Multistage games with incomplete information played by Bayesian players, equilibrium concepts capturing backward induction (variants of sequential equilibrium).</td>
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<tr>
<td>2</td>
<td>Equilibrium concepts capturing forward induction. Reputation models.</td>
</tr>
<tr>
<td>3</td>
<td>Multistage games with partially verifiable information, “unraveling” reasoning.</td>
</tr>
<tr>
<td>4</td>
<td>Correlated equilibrium and communication equilibrium. Strategic information transmission.</td>
</tr>
<tr>
<td>5</td>
<td>Information design: The case of one sender and one receiver</td>
</tr>
<tr>
<td>6</td>
<td>Information design: Extensions to multiple senders, receivers and dynamic settings</td>
</tr>
<tr>
<td>7</td>
<td>Information design: Bayes Correlated Equilibrium</td>
</tr>
</tbody>
</table>

**Readings**

**Basic readings**
- M. Osborne “An introduction to game theory”, Oxford University Press, 2003 (elementary version of the previous one).

List of selected articles for Sessions 5 to 7

**Advanced Macroeconometrics (THEO, MF)**

**Teacher:**
Sylvain BENOIT (Université Paris Dauphine, LEDa & PSL Research University)
Magali Marx (Banque de France)
Gauthier Vermandel (Université Paris Dauphine, LEDa & PSL Research University)
Informations on the course:
Semester 1
Course load: 24 hours, 9 sessions of 3 hours
ECTS: 3

Overview:
This course provides advanced econometrics tools for applied macroeconomics. Emphasis is on hands-on implementation of the methods covered in the course. Topics include macroeconomic data, linear and nonlinear time series models, practical issues with likelihood-based inference for these models, computational approaches to hypothesis testing and model comparison, forecast evaluation, and structural identification.

Prerequisites
Master 1 courses: Macroeconometrics, Statistical & Mathematical tools

Course Objectives:
The course provides a deep knowledge of the advanced time series techniques and their application to macroeconomics. A technical presentation of these models will be given, before studying applications of these models to macroeconomics.
The course will equip students with the necessary knowledge to be able to undertake econometric analysis of the type commonly associated with modern macroeconomic research. Substantial emphasis will be placed on the development of programming skills in MATLAB.

Mode of Assessment
Course grades for will be based on a course paper (50%) and a homework assignment in group of two students (50%).

Planning / Course Schedule

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<tbody>
<tr>
<td>1</td>
<td>VAR with several methods for identifying shocks (Cholesky, Blanchard-Quah, sign restrictions…)</td>
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<tr>
<td>2</td>
<td>Structural VAR model, HP filter, Kalman Filter, FAVAR and PCH-VAR</td>
</tr>
<tr>
<td>3</td>
<td>Simulated method of moments</td>
</tr>
<tr>
<td>4</td>
<td>Nonlinear model (Markov-switching, STAR…)</td>
</tr>
<tr>
<td>5</td>
<td>Intertemporal optimization and the GMM method</td>
</tr>
<tr>
<td>6</td>
<td>Estimating rational expectations models with GMM</td>
</tr>
<tr>
<td>7</td>
<td>Univariate and Multivariate volatility models</td>
</tr>
<tr>
<td>8</td>
<td>Contagion models (direct and indirect effects decomposition)</td>
</tr>
</tbody>
</table>
**Readings**

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**Advanced Microeconometrics (THEO, SPP)**

**Teacher:**
Eric Bonsang (Université Paris Dauphine & PSL Research University, LEDa)

Contact information: eric.bonsang@dauphine.psl.eu

**Informations on the course :**
Semester 1
Course load: 30h, 10 sessions (3 hours per session)
ECTS: 6

**Overview:**
This course explores different topics in applied microeconometrics. It focuses on causal inference and how econometrics can help identify causality in a credible way. It discusses the advantages and limitations of particular types of approaches/tools that are used in econometrics. It covers the following topics: Causal inference and identification, Randomized experiment, Regression and causality, Instrumental variables approach, Difference-in-differences estimation and Regression discontinuity designs. The course will review the theory underlying those different techniques and will discuss the recent studies that have applied those different methods to make causal inference.

**Prerequisites**
M1 Courses: Microeconometrics, Database & Stata programming
Course Objectives:
The objective of the course is to provide students the econometric methods aiming at identifying causal relationships. These methods are widely applied in economics to assess the effects of policy interventions and other treatment on interest. After attending the classes, the students will be able to have a deep understanding and a critical view on studies aiming at identifying causal effects and to apply those methods for their own research.

Mode of Assessment
Short paper + exam and active participation in class

Planning / Course Schedule

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<table>
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<tbody>
<tr>
<td>1</td>
<td>Causal inference and identification/ Randomized experiment</td>
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<tr>
<td>2</td>
<td>Regression and causality</td>
</tr>
<tr>
<td>3</td>
<td>Instrumental variables approach with heterogeneous effects: part 1</td>
</tr>
<tr>
<td>4</td>
<td>Instrumental variables approach with heterogeneous effects: part 2</td>
</tr>
<tr>
<td>5</td>
<td>Instrumental variables approach for nonlinear models</td>
</tr>
<tr>
<td>6</td>
<td>Difference-in-differences estimation</td>
</tr>
<tr>
<td>7</td>
<td>Regression discontinuity designs</td>
</tr>
<tr>
<td>8</td>
<td>Applications with Stata 1</td>
</tr>
<tr>
<td>9</td>
<td>Applications with Stata 2</td>
</tr>
<tr>
<td>10</td>
<td>Presentation of the short empirical papers by the students</td>
</tr>
</tbody>
</table>

Readings
Mostly Harmless Econometrics, Joshua Angrist and Jörn-Steffen Pischke
Econometric Analysis of Cross-section and Panel Data, Jeffrey Wooldridge
Microeconometrics. Methods and Applications, A. Colin Cameron and Pravin K. Trivedi

Asset pricing (MF)

Teacher:
Jérôme Dugast (Université Paris-Dauphine, DRM-Finance & PSL)

Contact information
Jerome.dugast@dauphine.psl.eu
Information on the course:
Semester 1
Course load: 27h (9 sessions of 3h)
ECTS: 3

Overview:
The course will cover the following topics: Decision Making under Uncertainty; Mean-Variance Analysis and the CAPM; Arbitrage Pricing Theory and Factor Models; Equilibrium Consumption-based Asset Pricing; Dynamic Equilibrium Asset Pricing Models; Estimation and Evaluation of Asset Pricing Models; Asymmetric Information and Asset Prices; Illiquidity and Asset Prices; Behavioral Asset Pricing; Limits to Arbitrage.

Prerequisites
Master 1 courses: Mathematics and optimization, Microeconomics 2
Master 2: Finance in continuous time,

Course Objectives
In this course, we will discuss a wide range of topics ranging from no arbitrage, state prices, consumption-based asset pricing, and factor models to more special topics including asymmetric information and behavioral finance.

After attending the class, the students will be able to address issues related to the behaviors of agents and prices on financial markets on theoretical and empirical grounds.

Mode of assessment
Final exam: 60%. Paper presentation/refereeing: 40%.

Course schedule
1. Decision Making under Uncertainty
2. Mean-Variance Analysis and the CAPM
3. Arbitrage Pricing Theory and Factor Models
4. Equilibrium Consumption-based Asset Pricing
5. Dynamic Equilibrium Asset Pricing Models
7. Asymmetric Information and Asset Prices
8. Illiquidity and Asset Prices
9. Behavioral Asset Pricing
10. Limits to Arbitrage

Readings
Textbooks
• Back, Kerry E., Asset Pricing and Portfolio Choice Theory, Oxford University Press, revised ed., 2017
Bayesian techniques in Macroeconomics (MF)

Teacher:
Gauthier Vermandel (Université Paris-Dauphine, LEDa & PSL Research University, France Stratégie)

Contact Information
Gauthier VERMANDEL: gauthier.vermandel@dauphine.psl.eu

Information on the course:
Semester 1
Course load: 15h, 5 sessions with 3 hours per session
ECTS: 3

Overview:
The lectures provide a self-contained introduction to the building, simulation and estimation of the Dynamic Stochastic General Equilibrium models that constitute the main workhouse of today’s financial macroeconomics. These models, which incorporate micro-foundations, dynamic relations and rational expectations in a macroeconomic framework, have now became a powerful tool used in central banks for policy projections. The course will present the recent developments in Bayesian econometrics that are commonly used to estimate these models. After recalling the standard VAR (Vector Autoregressive) model à la Sims (1980), the course will present the Bayesian VAR model à la Sims & Zha (1998). These class of atheoretical models is then compared to theoretical DSGE models à la Smets & Wouters (2003, 2007).

Prerequisites
A solid background in both microeconomics and macroeconomics is a prerequisite. A background in Econometrics (time series + VAR models) and MATLAB programming are a plus but not compulsory.

Course Objectives:
The objective of the course is to equip the students with the more advanced estimation techniques of macroeconomic models. It will provide the most up-to-date tools to allow the students to get a deep knowledge of these models and to be able to read and understand policy and research papers using these approaches.

After having attended the classes, the students will master the up-to-date estimation techniques of the macroeconomic models which are now employed in policy institutions such as the ECB, the Banque de France or the IMF. Using the estimated models, students will be able to perform business cycles analysis (variance decomposition, inspecting propagation mechanisms, variance forecast error decomposition), as well as forecasting exercises using both VAR, B-VAR and DSGE
models. These types of skills are typically required in a growing number of policy-making institutions.

**Mode of Assessment**
Attendance, active participation, and assignments preparation prior to the lecture are strongly appreciated. In addition, the main assessment of this course is based on a 30-page project that is devoted to the estimation of a macroeconomic model based on DBnomics. Students are expected to select a country on DBnomics and a set of macroeconomic time series that will be used to the estimation of a DSGE model using Bayesian methods.

**Planning / Course Schedule**

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<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AR, VAR and B-VAR Models. Constructing a likelihood function to estimate a state-space model. Use priors to penalize the likelihood function.</td>
</tr>
<tr>
<td>2</td>
<td>Solution methods and simulations for DSGE models. Linearization and Perturbation methods.</td>
</tr>
<tr>
<td>4</td>
<td>Real Extensions: Consumption habits, Investment adjustment costs and fixed cost in the production function, Capital (Smets &amp; Wouters, 2003). Nominal extension: sticky wages.</td>
</tr>
<tr>
<td>5</td>
<td>Trends in macroeconomics: stationarity vs deterministic/stochastic trends (Smets &amp; Wouters, 2007).</td>
</tr>
</tbody>
</table>

**Readings**

**Articles:**

**Textbooks:**

**Behavioral economics and bounded rationality (THEO, MF, SPP)**

**Teacher:**
Bertrand Villeneuve (Université Paris-Dauphine, LEDa & PSL Research University)

**Contact Information**
Bertrand Villeneuve : bertrand.villeneuve@dauphine.psl.eu

**Information on the course**:
Semester 1
Course load: 27 hours, 9 sessions of 3 hours
ECTS : 3

**Overview:**
The course will study the main features motivating behavioural economics: Nonstandard preferences; nonstandard beliefs; nonstandard decision making. Emphasis will be set on presenting this expanding research field that incorporates elements of bounded rationality and behavioural economics in models that maintain the game theoretic tradition of high logical standards. By choice, the course will not be about experimental protocols, but rather on main ideas and debates.

**Prerequisites**
Standard microeconomic choice (static and intertemporal). Basic game theory (Nash perfect, Bayesian perfect).

**Course Objectives:**
The objective of the course is to present the most important themes in behavioral economics. The motivation of this dynamic research program is deeply empirical and sometimes anecdotal. Accordingly, many papers start by pointing at behaviors that standard models relying on the rationality assumption cannot explain. The course itself will focus in the ways the authors have modelled these puzzling features of human behaviors. We will study how, in turn, these models enable new predictions and fine tuning.

The topic has reached a certain degree of maturity. The course will examine the new standards to see where the research is going to. After studying the classes, the students will be able to read the cutting-edge research on the topic. Given the variety of ways by which standard models can be tweaked, the course is not intended to promote a particular view, but to help aspiring modelers to think about their choices.
Mode of Assessment
20% participation + 30% short prepared presentation during course + 50% written exam.

Planning / Course Schedule

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<tbody>
<tr>
<td>1</td>
<td>Introduction. What classical models don’t explain and why it matters.</td>
</tr>
<tr>
<td>2</td>
<td>Nonstandard preferences 1. Time inconsistency.</td>
</tr>
<tr>
<td>3</td>
<td>Nonstandard preferences 2. Reference dependence.</td>
</tr>
<tr>
<td>6</td>
<td>Nonstandard decision making. Framing and menu effects. Limited attention. Persuasion and social pressure.</td>
</tr>
<tr>
<td>8</td>
<td>Applications 2. Behavioral business applications (IO, marketing).</td>
</tr>
</tbody>
</table>

Readings (short list)


Business Cycles and stabilization policies (MF)

Teacher:
Anne Epaulard (Université Paris-Dauphine, LEDa & PSL, France Stratégie)
Gauthier Vermandel (Université Paris-Dauphine, LEDa & PSL, France Stratégie)

Contact Information:
Anne Epaulard: anne.epaulard@dauphine.psl.eu
Gauthier Vermandel: gauthier.vermandel@dauphine.psl.eu

Information on the course :
Semester 1
Course load: 27 hours, 9 sessions and of 3 hours per session
ECTS : 3
Overview:
The lectures provide insight into how to craft an optimal policy to stabilize an economy. Policymakers have several sets of policy instruments available to stabilize the business cycles of an economy and thus reduce the welfare cost of business cycles. These instruments are referred to as fiscal policy, monetary policy and macroprudential policies and can be employed to the stabilization of output, inflation and the financial system. The lecture aims at introducing how these instruments can be implemented optimally, and how these policy tools may have spillovers effects on one another.
The lectures offer an introduction to the derivation of a welfare criterion into a linear-quadratic framework to determine the optimal policy. These policy regimes can thus be ranked by comparing the utility level of each policy regime provided. Regarding fiscal policy, the lecture offer a discussion on the fiscal multipliers in DSGE models.

Prerequisites
Master 1 courses: Macroeconomics 1, Macroeconometrics 1 (semester 1); Macroeconomics 2
Master 2 courses: Bayesian techniques in macroeconomics (semester 1)

Course Objectives:
The objective of the course is to provide theoretical foundations of the design of optimal policies and discuss the effectiveness of stabilization policies (monetary policies, fiscal policies and macroprudential policies) in up to date New Keynesian Models. After having attended the classes, the students should be able to technically employ rational expectation model to determine an optimal policy, rank them using a welfare criterion, and discuss what are the determinants that make the policy (in)effective.

Mode of Assessment
Attendance, active participation, and assignments preparation prior to the lecture are strongly appreciated.

Planning / Course Schedule

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<tbody>
<tr>
<td>1</td>
<td>An introduction to a linear quadratic framework in macroeconomics: derivation of a welfare criterion up to second order, the welfare cost of business cycles;</td>
</tr>
<tr>
<td>2</td>
<td>Monetary policy analysis: efficient frontier, stabilization trade-offs, sacrifice ratio between inflation and output stabilization</td>
</tr>
<tr>
<td>3</td>
<td>Monetary policy at the zero lower bound: occasionally binding constraint on the monetary policy rate. From a deterministic to a stochastic setup.</td>
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<tr>
<td>4</td>
<td>Macroprudential policy analysis and its interaction with monetary policy.</td>
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<tr>
<td>5</td>
<td>Macroprudential policies</td>
</tr>
<tr>
<td>6</td>
<td>Identification of fiscal policies shocks (Structural VAR and Narratives approaches) and the size of spending and tax multipliers</td>
</tr>
<tr>
<td>7</td>
<td>Fiscal Policies in RBC and standard DSGE models</td>
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<tr>
<td>8</td>
<td>Fiscal Policies in DSGE models: the role of preferences</td>
</tr>
<tr>
<td>9</td>
<td>Fiscal Policies in DSGE models at the Zero-Lower Bound</td>
</tr>
</tbody>
</table>
Readings

RBC and DSGE models and Policies:

Monetary Policy:

Fiscal Policy

Textbooks:
Information Economics (THEO, SPP, MF)

Teacher:
Françoise Forges (Université Paris-Dauphine, LEDa & PSL Research University)

Contact Information: francoise.forges@dauphine.psl.eu

Information on the course:
Semester 1
Course load: 36 hours, 12 sessions of 3 hours
ECTS: 6

Overview:
The course studies contractual relationships and resource allocation mechanisms among agents who have (i) different information on the basic economic situation at hand and (ii) different commitment power. Applications to auctions and regulation are considered.

Prerequisites
Standard microeconomic theory. Basic game theory.

Course Objectives:
After attending the classes, the students will master the modeling of informational asymmetries in various economic contexts. They will be able to rely on these models to address a number of questions dealing with allocation and regulation issues.

Mode of Assessment
10% participation + 90% written exam.

Planning / Course Schedule

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<tbody>
<tr>
<td>1</td>
<td>Models of economic interaction under asymmetric information.</td>
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<tr>
<td>2</td>
<td>Signaling: game theoretic approach</td>
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<tr>
<td>3</td>
<td>Signaling: economic applications</td>
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<tr>
<td>4</td>
<td>Auctions: private values, revenue equivalence theorem</td>
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<tr>
<td>5</td>
<td>Auctions: common values (winner’s curse)</td>
</tr>
<tr>
<td>6</td>
<td>Mechanism design: general framework, revelation principle</td>
</tr>
<tr>
<td>7</td>
<td>Efficient mechanisms (Holmström-Myerson, Vickrey-Clarke-Groves, Myerson-Satterthwaite, etc.)</td>
</tr>
<tr>
<td>8</td>
<td>Implementation</td>
</tr>
<tr>
<td>9</td>
<td>Contract theory in the light of mechanism design, application to optimal auction design</td>
</tr>
<tr>
<td>10</td>
<td>Contract theory: special topics, economic applications</td>
</tr>
<tr>
<td>11</td>
<td>Multi-agent, multi-principal problems</td>
</tr>
<tr>
<td>12</td>
<td>Multi-agent, multi-principal problems (continued)</td>
</tr>
</tbody>
</table>
Readings (short list)


**Development Microeconomics (SPP)**

**Teacher:**
Philippe De Vreyer (University Paris-Dauphine, LEDa & PSL Research University)

Contact Information
philippe.devreyer@dauphine.psl.eu

**Information on the course :**

Semester 1
Course load: 21 hours, in 7 sessions of 3 hours each. Teaching will be complemented with the readings of a short selection of research papers on which students may be tested.
ECTS : 3

**Overview:**
Beyond the obvious differences in standard of living, what distinguishes developing countries (DCs) from developed countries is the functioning of markets, which are more frequently failing in developing. Taking this into account is of primary importance to understand the behavior of households in developing countries and to design policies able to successfully fight against poverty. The course studies these issues both theoretically and empirically by addressing several topics in which they are relevant: Agricultural production and rural households; credit and insurance markets; intrahousehold decision making and inequality; fertility, demography and education; migration and transfers.

**Prerequisites**
Microeconomics, Microeconometrics

**Course Objectives:**
After attending the classes, the students will have a solid understanding of the main market failures in developing countries and how they shape the households’ behaviors. A careful reading of
academic papers on these subjects will give them the most up-to-date research on these issues, and the appropriate tools to understand the policy implications.

**Mode of Assessment**
Classroom examination

**Course Schedule**

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<tr>
<td>1</td>
<td>Introduction: what is development microeconomics about?</td>
</tr>
<tr>
<td>2</td>
<td>Market failures in developing countries: first insights using the agricultural household model as an example</td>
</tr>
<tr>
<td>3</td>
<td>Credit and insurance markets failures: implications on household behaviour, inequalities and adoption of innovations</td>
</tr>
<tr>
<td>4</td>
<td>Intrahousehold decision making and inequalities</td>
</tr>
<tr>
<td>5</td>
<td>Fertility, education, poverty and child labour</td>
</tr>
<tr>
<td>6</td>
<td>Migration and remittances</td>
</tr>
</tbody>
</table>

**Readings**

The papers that will be studied in class will be chosen in the list of main references that follows:

Duflo and Udry (2004), Intrahousehold resource allocation in Cote d'Ivoire - Social norms, separate accounts and consumption choices, NBER WP 10498

**The Economics of Energy and the Environment (SPP)**

**Teacher:**
Jan Horst Keppler (Université Paris-Dauphine, LEDa & PSL)

**Contact Information**
Email : jan-horst.keppler@dauphine.psl.eu

**Information on the course**
Semester 1
Course load: 36h, 12 sessions, 3h per session
ECTS: 3

**Overview:**
The course will study the following topics: Externalities, Fixed Costs and Information; The Static Model of Optimal Internalization of Externalities (the Pigouvian approach); The Measurement of Externalities (abatement cost, loss of option value, the Coasean critique); Energy and Sustainable Development; Electricity Markets and the interaction of Carbon and Electricity Markets.

**Prerequisites**
Microeconomics, Industrial organization

**Course Objectives:**
The class will provide students with an overview of key concepts in both environmental economics and energy economics with a special focus on the performance of European electricity markets. The class will develop those notions in a framework alternating between private and social utility maximisation.
The class should enable students to apply the most important notions of environmental and energy economics to basic policy analysis.

**Mode of Assessment**
Written exam

**Course Schedule**

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</table>
| 1 | Externalities, Fixed Costs and Information  
Private and public goods  
Externalities  
Informational complexity and transaction costs  
The role of governments |
| 2 | The Static Model of Optimal Internalisation of Externalities I  
The Pigouvian approach  
Instruments for Internalisation  
The Working of Emissions Markets |
| 3 | The Static Model of Optimal Internalisation of Externalities III  
The distributional implications of the static model  
Grandfathering versus auctioning  
Risk, uncertainty and option value |
| 4 | The Measurement of Externalities I  
Measuring Abatement Cost  
Measuring Social Costs (including loss of option value) |
| 5 | The Measurement of Externalities II  
Distributional implications of environmental policies  
The Coasean critique (Coase against Coase)  
The Rebound Effect |
| 6 | Energy and Sustainable Development  
Sustainable development in the energy sector  
Energy efficiency and the rebound effect  
World energy perspectives |
| 7 | Electricity Markets  
The functioning of electricity markets and price formation  
The investment challenge and the capacity issue |
| 8 | Topics in electricity markets  
   a. Projected costs of generating electricity  
   b. Carbon pricing  
   c. System effects |
| 9 | The Interaction of Carbon and Electricity Markets  
   a. Theories of price formation in the carbon market  
   b. Causality between CO2 prices and energy variables  
   c. Rents of electricity producers due to carbon pricing |
Bibliography:


http://www.ecosystemvaluation.org/dollar_based.htm


Empirical Industrial Organization (THEO, SPP, MF)

Teacher:
Daniel Herrera (University Paris-Dauphine, LEDa & PSL)

Contact Information
Daniel Herrera: daniel.herrera@dauphine.psl.eu

Informations on the course:
Semester 1
Course load: 27h, 9 sessions; 3 hours per session
ECTS: 3

Overview:
In this course we will cover mainstream empirical industrial organization methods. The main goal is to provide a set of tools necessary to undertake empirical analyses typically performed in Empirical Industrial Organization. Most methods that will be reviewed in this course are not limited to empirical IO, but can be used in a variety of different fields (such as health, finance, and environmental economics).

The course will consider reduced-form estimation papers, seeking to provide insights from data to understand how markets work. The course will also deal with structural estimation of supply and demand models taking the theoretical models to the data with the objective of generating policy-relevant counterfactuals.

Reduced and structural econometrics methods requires the use of programs such as Stata or Matlab. Practical tutorials will ensure the implementation of the materials provided in the course.

**Prerequisites**
Master 1 courses: Industrial Organization; Advanced Industrial Organization; Microeconometrics
Basic knowledge of Stata and Matlab programming

**Course Objectives:**

The objective of the course is to provide the students with an appropriate understanding of key empirical industrial organization models.
After having attended the classes, the students will:
- have an overview of seminal and recent papers in empirical IO
- understand core empirical methods
- understand the data requirements for each method to be implemented
- have a working knowledge on Stata and Matlab

**Mode of Assessment**
There are 2 problem sets and 2 take homework assignments accounting for 70% of the mark. Presenting papers will account for the remaining 30%. By the end of each topic, students will be asked to read some of the remaining material (not covered in the course). Randomly selected students will make a one-hour presentation about the assigned paper. Also, during the course, two practical problem sets will be assigned. Randomly selected students will be asked to discuss their problem sets’ solutions (codes and results).
There is no final exam.

**Course topics**

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<thead>
<tr>
<th></th>
<th>Introduction to empirical industrial organization</th>
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<tr>
<td></td>
<td>- Meeting #1: assignment of problem set 1</td>
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<td>2</td>
<td>Estimation of entry models and fixed costs</td>
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<td>- Meeting #2</td>
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<td>- Meeting #3</td>
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</table>
| 3 | Estimation of demand and marginal costs  
   - Meeting #4  
   - Meeting #5  
     - Assignment of take-home exam 1  
   - Meeting #6  
     - Students present topic 3 papers  
     - Students discuss solution of problem set 2 |
| 4 | Consumer search and switching costs  
   - Meeting #7  
   - Meeting #8  
     - Students present topic 4 papers  
     - Deadline for take-home exam 1 |
| 5 | Estimation of bargaining models (if time allows)  
   - Meeting #9  
     - Assignment of take-home exam 2 |
|   | Deadline for take-home exam 2: 3 weeks after the end of the course |

Readings

Introduction to empirical industrial organization


**Entry models and market structure: estimation of fixed costs**


**Estimation of demand and marginal costs**


**Estimation of bargaining models**


- Dube Hitsch, Rossi (2009). Do switching costs make markets less competitive.


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**Health economics (THEO, SPP)**

**Teacher:**
Florence Jusot, Université Paris Dauphine, LEDa & PSL University

Contact Information
florence.jusot@dauphine.psl.eu

**Informations on the course:**

- Semester 1
- Course load: 27h, 9 sessions of 3 hours per session
- ECTS: 3

**Overview:**
This course aims at addressing the main issues in health economics in order to develop students’ awareness to understand current debates in the organization, the financing and the equity of health systems. We will first present the specificities of the demand for health and for preventive and curative health, the economics determinants of health and in particular the complex relationships existing between income, labor and health, and the determinants of health-related behaviors. Most attention will be paid on the relevance of incentives and on behavioral determinants. The second part of the course will address economics tools for the regulation of health system organization. We will present various concepts and tools used in order to assess equity in health, health care use and health system finance, in order to judge the efficiency of health strategy, and in order to evaluate health policies.

**Prerequisites**
Master 1 courses: Microeconomics 1, Microeconomics 2, Industrial organization

**Course Objectives:**
The objective of the course is to present the state of the art as concerns the treatment of the main current issues in health economics.
After having attended the classes, the students should be able to take up the reading of most research papers in health economics. They will be able to know how to gather sensible literature to write a comprehensive international survey on any policy question in health economics.

**Mode of Assessment**
One written final exam.

**Planning / Course Schedule**

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<td>1</td>
<td>Demand for health and for health care</td>
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<td>2</td>
<td>Economic determinants of health: labor, income, health</td>
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<td>3</td>
<td>Economics analysis of health-related behaviors</td>
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<td>4</td>
<td>Equity in health, health care use and health care finance</td>
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<td>5</td>
<td>Economic evaluation of health technologies: cost benefit analysis</td>
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<td>6 – 7</td>
<td>Economic evaluation of health policies</td>
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</table>

**International Trade, International Macroeconomics (MF)**

**Professor:**
Gianluca Orefice, Professor, University Paris-Dauphine, LEDa & PSL Research University
Lise Patureau, Professor, University Paris-Dauphine, LEDa & PSL Research University

Contact Information
Gianluca Orefice: gianluca.orefice@dauphine.psl.eu
Lise Patureau: lise.patureau@dauphine.psl.eu

**Information on the course:**
Semester 1
Course load: 27h, 9 sessions of 3 hours each
ECTS: 3

**Overview:**
The course is a topics course on international trade and macroeconomics, which covers the recent advances in international trade and macroeconomics with an emphasis on the role of firm heterogeneity. Starting from recent models of international trade with heterogeneous firms (Melitz 2003; Chaney 2008) and its effects on the labor market, the course will rely on the theoretical modelling of the New Open Economy Macroeconomy framework (Obstfeld & Rogoff, 1995), which embeds explicit microfoundations in a dynamic general equilibrium perspective. The first part of the course will provide students with the essential tools to study the optimal international strategy of firms with different levels of productivity. The second part of the course studies the recent advances in international macroeconomics that incorporate these elements from the
international trade literature, by modeling the role of the extensive margin of trade à la Melitz (2003) in an international macroeconomic setting.

**Prerequisites**
Master 1 : International Trade, Macroeconomics, macroeconometrics

**Course Objectives:**
The objective of the course is to introduce some key topics of interest in the field of international trade and international macroeconomics, and to provide students with the modelling framework to address them. In complement with the standard textbook, the students will be trained to read leading research articles on these issues.
After attending the classes, the students will have a decent understanding of the optimal international strategy of firm, and the intertemporal approach of the current account, and how to use it to address some key issues in international trade and macroeconomics. They will also master the cutting-edge research at the frontier between international macroeconomics and international trade, and how to think about economic policy in this global framework.

**Mode of Assessment**
Students will first be required to participate actively in class discussions (10% of the final grading). They will have to take a written exam at the end of the course (90%).

**Course Schedule**

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<th>Part 2 – International Macroeconomics</th>
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**Readings**
Even though there is no textbook for this course, here are a few useful references:
• *Foundations of International Macroeconomics*, by Maurice Obstfeld and Kenneth Rogoff, MIT Press, October 1996
• *Exchange Rate Dynamics*, Martin Evans, Princeton University Press, 2011

Articles: A list of readings will be provided for each topic – among them, a set of required readings, and a set of selected papers to be picked up for group presentation

**Machine Learning (THEO, SPP, MF)**

Teacher:
Fabrice Rossi (Université Paris-Dauphine & PSL Research University, CEREMADE)

Contact Information :
fabrice.rossi@dauphine.psl.eu

**Information on the course**
Semester 1
Course Load: 36h, 12 sessions of 3 h each
ECTS: 6

**Overview**
This course provides a thorough introduction to machine learning covering both supervised and unsupervised learning. The first part of the course is dedicated to an introduction to supervised learning, i.e., situations in which a predictive model has to be constructed from a data set. This part introduces simple machine learning algorithms (k nearest neighbors and decision trees) and contrasts them with the standard linear model (used in e.g. econometrics). The key concepts of generalization and overfitting are presented, together with the resampling techniques used to properly tune complex models. The second part of the course focuses on advanced supervised learning methods including ensemble methods (random forests and boosting), kernel methods (support vector machines) and artificial neural networks (deep learning). The complex setting of unbalanced data is also covered in this part. Finally, the third part of the course is dedicated to unsupervised methods, with a particular focus on clustering techniques and on dimensionality reduction methods. Other aspects of unsupervised learning, such as frequent pattern mining and outlier detections are also discussed.

**Course Objectives**
The objective of the course is to introduce the methods of multidimensional descriptive data analysis for the processing of large datasets. The course is an applied one: all the methods are illustrated on real world data sets using python and its machine learning libraries. After attending the class, the students will know the main innovative techniques for the processing of large datasets and how to implement supervised machine learning, in view of applying these techniques to several economic issues.

**Prerequisites:**
Master 1 courses: Mathematical and statistical tools; Data management and programming. Practice of the Python language programming at basic level.

### Preference Modelling and Multiple Criteria Decision Making (THEO, SPP)

**Teacher:**
Brice Mayag (Université Paris-Dauphine, LAMSADE & PSL Research University)
Contact information: brice.mayag@dauphine.psl.eu

**Information on the course**
Semester 1
Course Load: 15h
ECTS: 3

**Overview**
This course is an introduction to the main tools and techniques of preference modelling and multiple criteria decision making. The course will cover the following topics: Introduction to modelling for decision aiding and to Preference modelling; Social choice: introduction to social theory, voting rules and their properties; Multi-attribute Value Theory; ELECTRE methods: introduction to the ELECTRE methods.

**Prerequisites**
Mathematics and optimization, Statistics and probability at Master 1 level

**Objectives:**
After attending the classes, the students will have acquired a good knowledge of the concepts of preference modelling and elicitation techniques.

**Course Schedule**

| 1 | Introduction to modelling for decision aiding: decision making process and decision aiding process |
| 2 | Preference modelling: main structure for preference modelling, numerical representations and classical problems |
| 3 | Social choice: introduction to social theory, voting rules and their properties |
Multi-attribute Value Theory: even swap technique, additive value functions (mains results and elicitation)

ELECTRE methods: introduction to the ELECTRE methods.

Bibliography:

Modelling in Decision Aiding and Operational Research (THEO, SPP)

Teacher:
Daniel Vanderpooten (Université Paris-Dauphine, LAMSADE & PSL)

Contact information: daniel.vanderpooten@dauphine.psl.eu

Information on the course
Semester 1
Course load: 15h, 5 sessions, 3h per session
ECTS: 3

Overview
The course will introduce the students to the main models in decision aiding and operational research. After presenting the definition and roles of models in Decision Aiding/Operational Research, we will study the solution and preference models. We will then describe the modelling process and its different phases. The course will then introduce to non-trivial models using various modelling frameworks and the use of binary variables in linear programming. We will finish by studying the modelling and solving tools (modelers and solvers).

Prerequisites
Mathematics and optimization, Statistics and probability at Master 1 level

Objectives:
The course aims at presenting the modelling process in Decision Aiding/Operational Research as well as original models for various decision problems.
After attending the classes, the students will have a solid knowledge of some important points and techniques to undertake a decision support study.

**Course schedule**

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<tbody>
<tr>
<td>1</td>
<td>Definition and roles of models in Decision Aiding/Operational Research. Solution and preference models.</td>
</tr>
<tr>
<td>2</td>
<td>Description of the modelling process and its different phases.</td>
</tr>
<tr>
<td>3</td>
<td>Presentation of non trivial models using various modelling frameworks (graphs, linear programming, multiobjective,...).</td>
</tr>
<tr>
<td>4</td>
<td>The use of 0-1 variables in linear programming</td>
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<tr>
<td>5</td>
<td>Presentation of modelling and solving tools (modellers and solvers).</td>
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</tbody>
</table>

**Bibliography:**


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**Finance in continuous time (THEO, MF)**

**Professor:**
René Aïd (Paris Dauphine University, LEDa & PSL Research University)

Contact Information
renе.aid@dauphine.psl.eu

**Informations on the course:**

Semester 1  
Course load: 24 h (8 sessions, 3 hours each)  
ECTS : 3

**Overview:**

Continuous-time modeling has taken a significant place in financial economics both from theoretical analysis of market equilibria and for management sciences. These lectures introduce stochastic calculus for two main applications, namely the pricing of contingent claims and the maximisation of intertemporal utility.

**Prerequisites**

Background in probability theory, differential calculus, ordinary differential equations, optimization.
Course Objectives:
The objective of the course is to make the students familiar with the fundamental techniques of stochastic calculus. After attending the classes, the students will master the tools of stochastic calculus which are required to address issues in financial economics and management science applications.

Mode of Assessment
Written exam.

Planning / Course Schedule

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<tbody>
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<td>Basic notion of probability theory</td>
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<td>2</td>
<td>The Brownian motion</td>
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<td>3</td>
<td>Stochastic integral and Itô's lemma (1/2)</td>
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<tr>
<td>4</td>
<td>Stochastic integral and Itô's lemma (2/2)</td>
</tr>
<tr>
<td>5</td>
<td>Black &amp; Scholes model (1/2)</td>
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<tr>
<td>6</td>
<td>Black &amp; Scholes model (2/2)</td>
</tr>
<tr>
<td>7</td>
<td>Intertemporel maximation of utility (1/2)</td>
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<td>8</td>
<td>Intertemporel maximation of utility (2/2)</td>
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Readings
Semester 2

Advanced Health economics (THEO, SPP)

Professor:
Brigitte Dormont, Université Paris Dauphine, LEDa & PSL University

Contact Information
brigitte.dormont@dauphine.psl.eu

Informations on the course:
Semester 2
Course load: 18h, 6 sessions of 3 hours per session
ECTS : 3

Overview:
The course addresses the main issues in Health Economics at an advanced level: Design and regulation of health insurance (efficiency and coverage), Managed competition systems; The impact of health insurance on medical prices (coverage of demand, medical networks), Physician agency, Hospital competition under fixed prices and quality of care, Equity in Cost-Benefit Analysis.

These subjects are all linked to current policy questions in most countries: is it important for efficiency to put copayments in place, i.e. to limit coverage for an efficient use of healthcare? Are managed competition systems effective in promoting price competition between insurers, or do they encourage patient selection? Does supplementary health insurance encourage balance billing in France? Do medical networks implemented by some insurers contribute to limit prices? Is there a risk that hospital payment systems that are based on lump-sum payments per stay encourage a decrease in the quality of hospital care? How to introduce equity in cost-benefit Analysis? (Currently medical evaluation to decide on the reimbursements of medical innovations and pharmaceutical products are based on the cost per Qaly, which raises ethical concerns because individual preferences and impacts on redistribution are not taken into account.)

Prerequisites
Course of M2 semester 1: Health economics
Courses in Master 1 : Microeconomics 1 & 2, Industrial organization

Course Objectives:
The objective of the course is to present the state of the art as concerns the treatment of the main current issues in health economics.

After having attended the classes, the students should be able to take up the reading of most research papers in health economics. They will be able to know how to gather sensible literature to write a comprehensive international survey on any policy question in health economics.
**Mode of Assessment**
One written exam.

**Course Schedule**

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<tr>
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<th>Design and regulation of health insurance</th>
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<td>2</td>
<td>Managed competition systems</td>
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<td>3</td>
<td>The impact of health insurance on medical prices</td>
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<td>4</td>
<td>Physician agency</td>
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<td>5</td>
<td>Hospital competition and quality of care</td>
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<td>6</td>
<td>Equity in Cost-Benefit Analysis</td>
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**Readings**
- Does health insurance encourage the rise in medical prices?, A test on balance billing in France, Brigitte Dormont and Mathilde Peron Health Economics, Volume 25, Issue 9, September 2016, pp. 1073-1089

**Advanced Macroeconomics: Frictions and policies (MF)**

**Teacher:**
Lise Patureau (Université Paris-Dauphine, LEDa & PSL Research University)
Gauthier Vermandel (Université Paris-Dauphine, LEDa & PSL Research University, France Stratégie)

**Contact Information**
Lise Patureau : lise.patureau@dauphine.psl.eu>
Gauthier Vermandel: gauthier.vermandel@dauphine.psl.eu>

**Information on the course :**
Semester 2
Course load: 18 hours, 6 sessions, 3 hours per session
ECTS : 3
Overview:
The standard real business cycles model features a reduced form for both financial and labor markets. The main of these lectures is to present the recent set of frictions on the labor and financial markets that extend the benchmark RBC model, and thus allowing the latter to reproduce the dynamics of loans, employment rate, asset prices into a rational expectations model.

The lectures are thus split in two parts:

Part I. Topics in Monetary policy: this first part aims at introducing frictions into the monetary system. The starting point of the lecture is cash-in-advance constraints, and then are continued to more elaborate financial frictions models from collateral constraints to the financial accelerator model.

Part II: Macroeconomics of the labour market. In the second part of the course, we will study the recent development in the macroeconomics of the labour market that includes search and matching labour market frictions in a dynamic general equilibrium setting. In complement with the presentation made in the reference textbook, we will study some leading research articles that embed search and matching frictions in the DSGE approach, and how to think about labor market policies in this setting.

Prerequisite
A solid background in both micro and macro is a prerequisite.
The course in Business Cycles Stabilization and Policies (Master 2, Semester 1) is a prerequisite, as this lecture is a direct extension to macroeconomic stabilization.

Course Objectives:
The objective of the course is to provide a presentation of the role of frictions on financial and labor markets on the cyclical behaviors of the main macroeconomic variables, and the induced consequence for the stabilization policy.

After having attended the classes, students will know how to include financial frictions to determine the dynamics of loans and asset prices of the economy. On both issues, a careful reading of academic papers will give them the most up-to-date research on the topic, and the appropriate tools to understand the relevant policy implications.

Mode of Assessment
Attendance, active participation, and assignments preparation prior to the lectures are strongly appreciated. In addition, the main assessment of this course is based on a 30-page project.

Course Schedule
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<tr>
<td>1</td>
<td>Money in macroeconomic models, seigniorage and the use of monetary base as a macroeconomic tool (‘helicopter money’).</td>
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<tr>
<td>2</td>
<td>Borrowing constraints on collateral for housing and the industrial loans markets. Occasionally binding constraints with non-linear methods.</td>
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<td>3</td>
<td>Costly state verification and the financial accelerator: endogenous default, external finance premium and risk shocks.</td>
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<td>4</td>
<td>Labour market search and matching frictions and unemployment rate fluctuations</td>
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<tr>
<td>5</td>
<td>Labour market policies and employment fluctuations</td>
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<tr>
<td>6</td>
<td>International trade and labor market frictions</td>
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**Readings**

Articles: Here is a non-exhaustive list of papers that we will cover

**Part I: Topics on Monetary policy**


**Part II: Macroeconomics of the labour market**


**Textbooks:**


Banking Economics (MF)

Professor:
Mariana ROJAS-BREU (Université Paris Dauphine, LEDa & PSL)

Contact Information
Mariana ROJAS-BREU, mariana.rojas-breu@dauphine.psl.eu

Informations on the course:
Semester 2
Course load: 18 hours, 6 sessions, 3 hours per session
ECTS : 3

Overview:
The course develops the theory of banking and financial intermediation. It starts by reviewing basic concepts in financial and banking economics. What are financial intermediaries and what is their role in the economy? Why are banks special? The course then presents formal frameworks for the analysis of the banking system, financial fragility and the occurrence of financial crises, as well as the policy responses to financial fragility (suspension of convertibility, deposit insurance, narrow banking, bailouts). The course provides the tools to examine important aspects of the design and implementation of banking regulation. Topics that will be reviewed include the role of asymmetric information, the types of banking regulation, the role of deposit insurance and capital requirements, the lender-of-last-resort function of the central bank, the role of market discipline.

Prerequisites
Basic microeconomic knowledge (calculus and basic notions of optimization theory).

Course Objectives:
The course will allow students to get familiar with formal tools for the analysis of the economics of banking and financial regulation. Students will be confronted with real-world examples of banking regulation and will gain understanding on important issues that have been at the center of the policy debate over the last years, such as the on- and off-balance sheet activities of financial institutions, the separation of banking and other financial industries, and contagion across financial institutions.

Mode of Assessment
Class presentation (50%)
Referee report (50%)

Planning / Course Schedule

| 1 | Basic concepts in banking economics. A model of liquidity insurance: the Diamond-Dybvig model. The market solution vs. the banking arrangement. Optimal allocation under the fractional reserve banking system (FRBS). Bank runs and bank panics. |
2 Solutions to the instability of the FRBS. Narrow banking, suspension of convertibility, deposit insurance, lender of last resort. The role of the interbank market. The Bhattacharya-Gale model.


5 Banking crises and bubbles. Optimal monetary policy. Financial contagion.

6 Bank deregulation. Shadow banking.

Readings
The course follows specific chapters of:

Selected articles
The contents of the course are enriched with a number of academic articles that we will discuss in class:
Rochet, J.C. and X. Vives, 2004. “Coordination failures and the lender of last resort: was Bagehot right after all?” *Journal of the European Economic Association* 2, 1116-1147.

**Individual and collective decisions (THEO, SPP)**

**Professor:**
Jean-Philippe Lefort (Université Paris-Dauphine, LEDa & PSL)
Remzi Sanver (University Paris-Dauphine, LAMSADE & PSL)
Sidartha Gordon (Université Paris-Dauphine, LEDa & PSL)

Contact Information
Jean-Philippe Lefort: jean-philippe.lefort@dauphine.psl.eu
Remzi Sanver: remzi.sanver@dauphine.psl.eu
Sidartha Gordon: sidartha.gordon@dauphine.psl.eu

**Information on the course :**
Semester 2
Course load: 24 hours (8 sessions of 3 hours)
ECTS: 3

**Overview:**
The course investigates the process of decision making, both at an individual and collective level. It is organised in three parts. It starts with the analysis of individual decision making. The analysis of collective decision making comes as a natural extension: What if there are several individuals with conflicting preferences who, nevertheless, have to choose an option which will be common to all of them? This raises the problem of aggregating individual preferences into a collective one. This drives us to introduce fundamental concepts and results on preference aggregation, with particular emphasis on the majority rule and Arrow’s Impossibility Theorem. The third part covers recent developments on the allocation of resources on markets not necessarily governed by prices, with an emphasis on the allocation of human organs to patients and the allocation of public-school places to children through centralized mechanisms.

**Prerequisites**
Game Theory, Microeconomics

**Course Objectives:**
The objective of the course is to present the fundamentals of decision making both at an individual and collective level. The students will have a good understanding of
- standard models of individual decision making;
- how to analyse an individual decision-making problem within a given model;
- standard models of collective decision making;
- axiomatic approach to collective decision making;
- how to allocate resources when markets be designed when they are not governed by prices

After having attended the classes, the students should be able to address theoretical and applied problems in those fields and to come up with their own research questions in these areas.

**Mode of assessment**
Final exam 95%
In-class participation 5%.

**Planning / Course Schedule**

| 1 | What is a rational economic agent? Utility paradigm, Debreu gap lemma. |
| 2 | Revealed preference theorem: Afriat theorem, and recent extensions. Risk and uncertainty framework |
| 3 | Behavioral approach, expected utility and subjective expected utility. Non-expected utility approaches |
| 4 | We present the preference aggregation problem. For the particular case of two alternatives, we state and prove the characterization of the majority rule by May (1952). For the general case with at least three alternatives, we make a complete statement of Arrow’s (1963) impossibility theorem. |
| 5 | We present one of the proofs of Arrow’s impossibility theorem (Mas Colell et al. (1995)). We also discuss ways to escape this negative result via weakening the conditions which lead to the impossibility. |
| 6 | Cooperative bargaining (nontransferable utility): Nash bargaining, Kalai and Smorodinsky solution. Games in characteristic function form (possibly with nontransferable utility), core, Shapley value. |
| 7 | House Allocation and Housing Markets: deterministic mechanisms |
| 8 | Introduction to two-sided matching |

**References**
• *The Handbook of Market Design*. Oxford University Press. 2013

List of selected articles
For the topic *House Allocation and Housing Markets: deterministic mechanisms*
• Roth and Postlewaite (1977) Weak versus strong domination in a market with indivisible goods. *Journal of Mathematical Economics*.

For the topic: *Introduction to two-sided matching*

Policies in developing countries (SPP)

Professor:
Olivia Bertelli (Université Paris-Dauphine, LEDa & PSL )
Véronique Gille (IRD, Université Paris-Dauphine, LEDa & PSL)
Information on the course:
Semester 2
Course load: 21h, 7 sessions and of 3 hours per session
ECTS: 3

Overview:
The very large efforts carried out by countries and international organizations to increase income and fight poverty have been unequally successful. While some countries have seen impressive growth in the last 30 years, 736 million people were still leaving in extreme poverty as of 2015. This observation raises questions about policies that we discuss in this course. It is divided in two parts. The first part of the course analyses impact evaluations of public policies tackling the constraints to human and economic development tied to education, health, gender and agriculture in developing countries. The second part provides insights into social policies in developing countries, with a focus on the instruments and the political economy of the implementation of policies.

Prerequisites
The class will sometimes get technical regarding the econometric methods adopted in the papers. We will discuss key methods along with the papers applying them. We expect the students to be familiar with panel estimation methods and IV methods, which can be read up in the following references:

Course Objectives:
The overall objectives of this course are to provide students with an overview of policies in developing countries, with a focus on the different types of instruments and the political economy of policy implementation. It will also discuss the impacts of education, health, gender and agricultural policies in developing countries.
The course is based on contemporary research, that the students will be required to read and that we will discuss in class. After having attended the classes, the students will therefore understand the main challenges related to policies in developing countries and know what the most recent evolutions in this literature are. They will also be able to critically assess research work.

Mode of Assessment
10% Participation, 90% Written exam

Planning / Course Schedule
The course will cover the following topics
1. Health economics: how to improve the health conditions of people in developing countries?
2. Education economics: how to increase human capital?
3. Gender economics: how to improve gender equity?
4. Agriculture economics: how to boost agricultural production?
5. Conditional cash transfers and microfinance as development tools: what works?
6. The political economy of policies: clientelism and corruption; leaders identity and preferences

Readings (not exhaustive list)
All readings will be available on MyCourse. This is a not exhaustive list of the papers that will be discussed in class.

- Buckley, Graeme. "Microfinance in Africa: Is it either the problem or the solution?" *World Development* 25, no. 7 (1997): 1081-1093.
- Duflo, Esther (2012) “Women empowerment and economic development”, *Journal of Economic Literature*, vol.50 n.4: 1051-1079

**Research Methods in Monetary Economics (MF)**

**Teacher:**
Richard DUTU (Université Paris Dauphine, LEDa & PSL Research University) & Mariana ROJAS-BREU (Université Paris Dauphine, LEDa & PSL Research University)

**Contact Information**
Richard DUTU, richard.dutu@dauphine.psl.eu
Mariana ROJAS-BREU, mariana.rojas-breu@dauphine.psl.eu

**Information on the course :**
Semester 2
Course load: 18 hours, 6 sessions and 3 hours per session
ECTS : 3

**Overview:**
The goal of this course is to train students to modern research methods in monetary economics and policy. The course starts with a review of the main macroeconomic models of money (MIU, CIA, NK-DSGE). The rest of the course is then dedicated to a hands-on presentation of the New Monetarist framework where the frictions that give rise to money and credit are explicitly modeled, thereby creating a natural environment to understand the role of money, credit and intermediation. The course presents the main financial and trade frictions (private information, limited commitment, search) that are key to the concepts of money and liquidity. The formal framework is then applied to a range of important topics, such as the relationships among liquidity, asset prices, monetary policy, the dynamics of over-the-counter markets, crypto-currencies and cashless economies.

**Prerequisites**
Master 1 courses: Mathematical and statistical tools, Macroeconomics 1, Macroeconomics 2

**Course Objectives:**
The course will allow students to get familiar with state-of-the-art monetary theory and acquire key research tools and models in monetary and financial economics.
After attending the classes, the students will have a solid knowledge of a wide range of classic and timely issues in monetary theory and policy, such as the interplay between money and credit, optimal monetary policies, monetary unions, over-the-counter markets, and crypto-currencies.

**Mode of Assessment**
Class presentation (50%)
Referee report (50%)

**Planning / Course Schedule**

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<td>1</td>
<td>Introduction to 1) the economics of money, liquidity and payments.; 2) existing ad-hoc models of money (MIU, CIA); 3) dynamic programming.</td>
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<tr>
<td>2</td>
<td>Search and matching monetary models of first and second generation. Types of monetary equilibria and non-monetary equilibria.</td>
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<tr>
<td>3</td>
<td>The Lagos-Wright model for monetary theory and policy. Pricing mechanisms (competitive pricing, bargaining). Calibration and policy experiments in monetary search models.</td>
</tr>
<tr>
<td>4</td>
<td>Monetary models with bank credit, default and asset markets.</td>
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**Readings**
- Aleksander Berentsen & Gabriele Camera & Christopher Waller, 2007. “Money, Credit and Banking”. JET 135, 171-195

Further readings given depending on the topic being covered.

**Transport and variational problems in economics (THEO)**

**Teacher:**
Guillaume Carlier (University Paris-Dauphine, CEREMADE & PSL Research University)

**Contact:**
Guillaume Carlier: guillaume.carlier@dauphine.psl.eu
Information on the course
Semester 2
Course Load: 15h
ECTS: 3

Overview
In this course after introducing tools from convex duality and optimal transport we will see how they can be used in various problems in economics such as matching, congestion games and congested transport, principal-agent problems, urban economics, …

Objectives of the course
The course is a topics course at the frontier of mathematics and microeconomics. It aims at presenting the basics of the mathematical theory of optimal transportation and how it can be applied in various economic contexts.
After attending the classes, the students will be able to address the mathematical theory of optimal transport and make use of it to have an in-depth analysis of related applied economic issues.

Research seminars (Semester 2)

Research seminar: Topics in Health and Ageing (SPP)

Professor:
Eric Bonsang (Université Paris-Dauphine, LEDa & PSL University) and Brigitte Dormont (Université Paris-Dauphine, LEDa & PSL University)

Contact Information
Eric Bonsang: eric.bonsang@dauphine.psl.eu
Brigitte Dormont: brigitte.dormont@dauphine.psl.eu

Informations on the course :
Semester 2
Course load: 18h, 6 sessions and 3 of hours per session
ECTS : 3

Overview:
This seminar is aimed to provide students with key skills in terms of research paper writing, while at the same time build their knowledge of the most important issues in Health and Ageing. The seminar is divided in 6 three-hour sessions.

During the first session, after a brief presentation of the various themes that will be treated during the seminar, the remaining time will be devoted to an explanation of what is expected from
researchers when they conduct empirical research in economics. The following questions will be examined: how to provide credible empirical evidence in economics, write a paper, how to structure a presentation using powerpoint or an equivalent software.

The remaining sessions will be devoted to the critical assessment of articles recently published in top journals in the fields of Health and Ageing economics. Each paper will be presented by one student and up to three students will act as “referees”, who will have to discuss the presentation and the paper itself.

**Prerequisites**
Good knowledge of econometrics on micro data.

**Course Objectives:**
The objective of the course is to get students familiar with the main issues in Health Economics, and the main challenges of population ageing. The course will cover the recent empirical studies that approach these topics by using advanced econometric methods.

Possible topics are the following:
- The effects of retirement on health
- Causes and consequences of cognitive ageing
- Long-term care and long-term care insurance
- Health insurance: Impact of on medical prices and access to care
- Competition in health insurance and supplementary health insurance
- Hospital heterogeneity in hospital payment systems

**Mode of Assessment**
The grade is based on oral participation and the writing of your analysis of the selected article and the reports on other presentations. No final exam is organized.

**Planning / Course Schedule**
1. Introduction
2. Topics in Ageing (Sessions 2-3)
3. Topics in Health (Sessions 4-6)

**Readings**
Readings will be based on recent publications in top journals in Health Economics and in the Economics of Ageing

**Research seminar : Topics in Macroeconomics and Finance (MF)**

**Professor:**
Anne Epaulard (Université Paris-Dauphine, LEDa & PSL University, France Stratégie) and Richard Dutu (Université Paris-Dauphine, LEDa & PSL University)
Informations on the course:
Semester 2
Course load: 18h, 6 sessions and 3 of hours per session
ECTS : 3

Overview:
This seminar is aimed to provide students with key skills in terms of research paper writing, while at the same time build their knowledge of the most important issues in Macroeconomics and Finance. The seminar is divided in 6 three-hour sessions.

During the first session, after a brief presentation of the various themes that will be treated during the seminar, the remaining time will be devoted to an explanation of what is expected from researchers when they conduct empirical research in economics. The following questions will be examined: how to provide credible empirical evidence in economics, write a paper, how to structure a presentation using powerpoint or an equivalent software.

The remaining sessions will be devoted to the critical assessment of articles recently published in top journals in the fields of Macroeconomics, Monetary Economics and Macrofinance. Each paper will be presented by one student and up to three students will act as “referees”, who will have to discuss the presentation and the paper itself.

Prerequisites
Advanced macroeconomics, macroeconometrics, monetary economics

Course Objectives:
The objective of the course is to get students familiar with the main issues in macroeconomics, in special connexion with monetary and banking economics, and the financial area. The course will cover the recent empirical studies that approach these topics by using advanced econometric methods.

Mode of Assessment
The grade is based on oral participation and the writing of your analysis of the selected article and the reports on other presentations. No final exam is organized.

Readings
The final list of papers will be finalized a few weeks before the start of the seminar. It could include the following articles


**Financial accelerator**

**Household debt and the business cycle**
• Mathias Drehmann, Mikael Juselius, and Anton Korinek. 2017. Accounting for debt service: the painful legacy of credit booms. BIS Working Papers No 645

**Bank lending channel**
• Michael Greenstone, Alexandre Mas, and Hoai-Luu Nguyen. 2014. “Do credit market shocks affect the real economy? Quasi-experimental evidence from the Great Recession and ‘nor- mal’ economic times”. NBER working paper 20704

**Research seminar : Market regulation (THEO, MF, SPP)**

**Professor:**
Sven Heim ( Mines ParisTech, CERNA & PSL)
Bertrand Villeneuve (Université Paris-Dauphine, LEDa & PSL)
**Contact Information**
Sven Heim: sven.heim@mines-paristech.fr
Bertrand Villeneuve: bertrand.villeneuve@dauphine.psl.eu

**Information on the course:**
Semester 2
Course load: 18 h, 6 sessions of 3 hours each
ECTS: 3

**Overview:**
This research aims at presenting and discussing the state-of-the-art research papers in the different fields of economics that involve thinking about market regulation. The seminar is organized in six sessions.

After an introductory class, sessions will be devoted to the critical assessment of articles recently published in top or top field journals. Each paper will be presented by one student and up to three students acting as “referees”, who will have to discuss the presentation and the paper itself.

**Prerequisites**
Familiarity with economics models (individual choice, equilibrium). Proficiency in the economics of information (game theory, asymmetric information, contracts).

**Course Objectives:**
The objective of the course is to get students familiar with the main issues in market regulation, with a particular emphasis on environmental and energy markets regulations, and on competition policy in world of massive data (barriers to entry, collusion, privacy).

Depending on the topic, the course will cover the recent empirical studies that approach these topics by using advanced econometric methods, or will show how theoretical models help explain and interpret facts or scenarios.

Work in this seminar is aimed to provide students with key skills in terms of research paper writing, research oral presentation, while at the same time build their knowledge of the most important issues in market regulation.

**Mode of Assessment**
The grade is based on oral participation and the writing of your analysis of the selected article and the reports on other presentations. No final exam is organized.

**Readings (short list)**
Here is provided a non-exhaustive list of papers that will be studied.