Quantitative Economic Analysis - 2ème année de Master

Responsable pédagogique : LISE **PATUREAU** - https://dauphine.psl.eu/recherche/cvtheque/patureau-lise

Crédits ECTS : 60

LES OBJECTIFS DE LA FORMATION

Le parcours Quantitative Economic Analysis (QEA) offre une formation d'excellence à la recherche en économie, permettant d'acquérir une connaissance approfondie des problématiques de recherche contemporaines sur leur spécialisation, assise sur une maitrise des concepts économiques fondamentaux. Les étudiantes et les étudiants choisiront un domaine de spécialisation parmi trois possibles : Social and Public Policies, Macroeconomics & Finance, or Economic Theory.

Au fil des différents cours, ils seront amenés à traiter la complexité des questions économiques propres à leur domaine, tout en apprenant à sélectionner et à utiliser les outils statistiques et économétriques appropriés pour répondre aux questions économiques posées. La rédaction du mémoire de Master leur offrira l'occasion d'apporter leur propre contribution sur une thématique donnée.

Cette formation permettra de poursuivre un doctorat en économie ou d'envisager une carrière en tant qu'économiste dans le secteur public, semi-public ou privé, en France ou à l'international.

Les objectifs de la formation :

- Traiter de manière approfondie des enjeux contemporains majeurs dans votre domaine de spécialisation en économie, notamment la santé, les politiques publiques, la macroéconomie, la finance, l'énergie, l'environnement et le développement économique.
- Aborder des problématiques économiques complexes en identifiant et modélisant les spécificités des acteurs publics et privés concernés, ainsi que les défis posés à la conception des politiques économiques.
- Sélectionner les outils statistiques et économétriques adaptés et les appliquer afin de fournir des réponses fiables et robustes à une problématique économique, dans le secteur public ou privé.
- Contribuer à une recherche scientifique innovante dans le domaine de l'économie.
- Communiquer efficacement les résultats d'analyses économiques, statistiques et économétriques à divers publics, à l'oral comme à l'écrit.

MODALITÉS D'ENSEIGNEMENT

Tous les cours du parcours Quantitative Economic Analysis (QEA) sont dispensés en anglais et sous forme de cours magistraux. De par l'accent mis sur la formation à la recherche, les étudiants liront régulièrement des articles de recherche, avec la possibilité d'en présenter certains devant la classe.

Le premier semestre s'étend de début septembre à décembre. Le second semestre va de janvier à mi-mars pour les cours. Ces derniers sont complétés par la rédaction d'un mémoire de Master, qui devra être soutenu entre mai et novembre. En fonction de leurs objectifs professionnels, les étudiants pourront choisir entre la rédaction d'un projet de thèse (PhD) ou la réalisation d'un stage obligatoire.

À l'issue de chaque semestre, les étudiants valident 30 crédits ECTS.

Deux cours fondamentaux sont obligatoires : Python for Data Science et Machine Learning. Les autres cours dépendent de la spécialisation choisie parmi les trois options suivantes : Social & Public Policies, Macroeconomics & Finance, Economic Theory.
Selon la spécialisation, les étudiants suivront des cours quantitatifs et de spécialité de niveau avancé, composés d'enseignements obligatoires et optionnels.

La majorité des cours est concentrée sur le premier semestre, tandis que le second semestre présente une charge d'enseignement allégée. L'essentiel du second semestre est consacré à la rédaction du mémoire et à la réalisation du stage ou du projet doctoral.

ADMISSIONS

Les candidats doivent être titulaires d'un diplôme de niveau Master 1 (équivalent à 60 ECTS), obtenu soit en Master 1 Quantitative Economics, soit dans un autre Master de l'Université Paris Dauphine–PSL, ou encore dans une autre université en France ou à l'étranger ; ou bien être titulaires d'un diplôme équivalent délivré par un Institut d'Études Politiques (IEP), une Grande École de commerce ou d'ingénierie, ou un Grand Établissement reconnu équivalent, en France ou à l'étranger.

Les candidats doivent avoir une formation académique dans les domaines suivants : économie, mathématiques appliquées à l'économie, et informatique appliquée à l'économie.

Une excellente maîtrise de l'anglais est requise.
Pour les étudiants issus d'une université de l'Union européenne, la maitrise de l'anglais doit être attestée par l'un des tests suivants (datant de moins de trois ans) :

- TOEFL iBT (score minimum : 90)
- IELTS (score minimum : 6,5)
- Cambridge Certificate (niveau C1)
- GRE (score minimum de 160 dans les sections verbale et quantitative)

Pour les étudiants ayant effectué la majeure partie de leurs études hors de l'UE, il est nécessaire de fournir à la fois :

- un score GRE (minimum 160 en verbal et en quantitatif)
- un test de langue anglaise : TOEFL iBT (minimum 90), IELTS (minimum 6,5) ou Cambridge Certificate (C1)
- chacun des documents doit dater de moins de trois ans.

Les candidats dont la langue maternelle est l'anglais, ou qui ont effectué au moins une année d'études en anglais dans un pays anglophone au cours des deux dernières années et ont validé les examens correspondants, sont dispensés de ces tests.

POURSUITE D'ÉTUDES

The Quantitative Economic Analysis track offers excellent training in economic research, which also aligns with the real needs of the public and private decision-making world. The curriculum combines cutting-edge specialization courses in economics with advanced quantitative methods, including innovative methods in data science. In addition to fundamental quantitative techniques in economics, the program features courses based on advanced database processing, as well as operational research and decision-making support. These areas are at the leading edge of current economic research and directly relevant to the questions entailed in economic decision-making, in the private and public sectors alike.

In this respect, the Quantitative Economic Analysis track is perfectly suited to students who want to pursue a research specialization by completing a thesis in a PhD program. The excellent instruction provided by the QEA track, entirely in English, enables interested students to apply to prestigious doctoral programs, either as part of PSL Research University, or at other universities in France or abroad. You will also be able to embrace a career as professional economist in public, semi-public institutions, including international organizations, as well as in private businesses in various sectors (banking, insurance, health industry, energy, …)

PROGRAMME DE LA FORMATION

- Semestre 3
  - Research Track - AQME CERTIFICATE - 12 ECTS -
    - Machine Learning
    - Introduction to Matlab programming
    - Python for data science
  - Mandatory courses - 9 ECTS
    - Behavioral economics and bounded rationality
    - Advanced Game Theory
    - Experimental Economics

- Elective specialization course -3 ECTS - choose one

    - [Inequality and redistribution](#)
    - [Environment and sustainability](#)

  - Block 1 - Elective Quantitative courses - 6 ECTS

    - [Advanced Microeconometrics](#)

  - Block 2 - Elective Quantitative courses - 6 ECTS

    - [Advanced Macroeconometrics](#)
    - [Bayesian techniques in macroeconomics](#)

  - Mandatory courses - 15 ECTS

    - [Advanced Microeconometrics](#)
    - [Labor, education and public policies](#)
    - [Inequality and redistribution](#)
    - [Health, welfare and health behavior](#)

  - Elective course - 3 ECTS - choose one

    - [Behavioral economics and bounded rationality](#)
    - [Experimental Economics](#)
    - [Environment and sustainability](#)
    - [Advanced Game Theory](#)

  - Mandatory courses - 12 ECTS

    - [Advanced Macroeconometrics](#)
    - [International Trade & International Macroeconomics](#)
    - [Labor market, inequalities and macroeconomics](#)
    - [Bayesian techniques in macroeconomics](#)

  - Elective Quantitative courses - 6 ECTS - choose 2

    - [Asset pricing theory](#)
    - [Behavioral economics and bounded rationality](#)
    - [Quantitative International Economics](#)
    - [Environment and sustainability](#)

- Semestre 4

  - Data science course - Elective course - 3 ECTS - choose one

    - [NLP for economic decisions](#)
    - [Machine Learning for Economists](#)

  - Mandatory courses - 21 ECTS

    - [Master Thesis Defense](#)
    - [PhD Proposal / Internship](#)

  - Elective courses - 6 ECTS - choose 2

    - [Computational social choice](#)
    - [Empirical Industrial Organization](#)
    - [Economie et finance du marché du gaz (en anglais)](#)

  - Mandatory courses - 27 ECTS

    - [PhD Proposal / Internship](#)
    - [Master Thesis Defense](#)
    - [Advanced Health economics](#)
    - [Policies in developing countries](#)
    - [PhD Proposal / Internship](#)
    - [Master Thesis Defense](#)
    - [Advanced environmental macroeconomics](#)
    - [Financial frictions in macroeconomics](#)
    - [Empirical Industrial Organization](#)

DESCRIPTION DE CHAQUE ENSEIGNEMENT

SEMESTRE 3

Research Track - AQME CERTIFICATE - 12 ECTS -

Machine Learning

ECTS : 6

Enseignant responsable : FABRICE **ROSSI** (https://www.ceremade.dauphine.fr/en/members/detail-cv/profile/fabrice-rossi.html)

Langue du cours : Anglais

Description du contenu de l'enseignement :

The course gives a thorough presentation of the machine learning field and follows this outline:

1. general introduction to machine learning and to its focus on predictive performances (running example: k-nearest neighbours algorithm)
2. machine learning as automated program building from examples (running example: decision trees)
3. machine learning as optimization:
    1. empirical risk minimization
    2. links with maximum likelihood estimation
    3. surrogate losses and extended machine learning settings
    4. regularisation and kernel methods (support vector machines)
4. reliable estimation of performances:
    1. over fitting
    2. split samples
    3. resampling (leave-one-out, cross-validation and bootstrap)
    4. ROC curve, AUC and other advanced measures
5. combining models:
    1. ensemble techniques
    2. bagging and random forests
    3. boosting
6. unsupervised learning:
    1. clustering (hierarchical clustering, k-means and variants, mixture models, density clustering)
    2. outlier and anomaly detection

Compétences à acquérir :

After attending the course the students will

- have a good understanding of the algorithmic and statistical foundations of the main machine learning techniques
- be able to select machine learning techniques adapted to a particular task (exploratory analysis with clustering methods, predictive analysis, etc.)
- be able to design a model selection procedure adapted to a particular task
- report the results of a machine learning project with valid estimation of the performances of their model

Pré-requis obligatoires

- intermediate level in either Python or R. Students are expected to be able to perform standard data management tasks in Python or R, including, but not limited to:
    - loading a data set from a CSV file
    - recoding and cleaning the data set
    - implementing a simple data exploration strategy based on pivot table and on graphical representation
- intermediate level in statistics and probability. Students are expected to be familiar with:
    - descriptive statistics
    - conditional probabilities and conditional expectations
    - core results from statistics: bias and variance concepts, strong law of large numbers, central limit theorem, etc.

Mode de contrôle des connaissances :

- quizzes and tests during the course
- machine learning project

Coefficient : 2

6 (M2 Economie Internationale et Développement)

6 (M2 Diagnostic économique international)

Introduction to Matlab programming

Langue du cours : Anglais

Python for data science

ECTS : 3

Enseignant responsable : MOHAMED KHALIL **EL MAHRSI**

Langue du cours : Anglais

Description du contenu de l'enseignement :

The course is organised as follows.

1 - Introduction to Python Programming

This first part introduces the fundamentals of Python programming. It covers topics such as working with basic built-in types (numbers, strings, booleans, ...), control flow statements, writing reusable code (functions), handling errors and exception that can occur during the execution of Python code, advanced data structures (lists, sets, dictionaries, ...), ...

2 - Scientific Computing With NumPy

This part focuses on using NumPy, a scientific computing package that provides a wide assortment of useful and highly-optimized routines for working with multi-dimensional arrays (matrices, tensors, ...), linear algebra, statistics and random simulation, and much more.

3 - Processing Tabular Data With pandas

The third part of the course is dedicated to pandas, a fundamental Python package when it comes to data science and data analysis. pandas provides functionalities for efficient manipulation of data frames, i.e., tabular data (stored in csv files, Excel sheets, ...). With the help of pandas, you can easily conduct tasks such as data cleaning (filling missing data, replacing outliers, ...), reshaping, merging, ...

4 - Visualizing Data With Matplotlib and seaborn

The last part of the course is a quick introduction to data visualization functionalities in Python using the Matplotlib and seaborn packages. Data visualization is a very powerful tool for making sens of large volumes of data, identifying patterns, and extracting useful insights that can help understand and solve real-world business cases.

Compétences à acquérir :

By the end of this course, you will be able to

- Write and understand entry-level to intermediate-level code in the Python programming language
- Use NumPy for scientific computing and efficient manipulation of multi-dimensional arrays and matrices
- Use pandas to load, manipulate, and analyze tabular data
- Use Matplotlib and seaborn to visualize data

Pré-requis obligatoires

You are expected to be familiar with mathematical tools associated to an economics curriculum (linear algebra, calculus, probability, and statistics) at an undergraduate level

Pré-requis recommandés

The course does not assume any prior knowledge in programming in general and Python in particular. However, familiarity with another programming language can be useful in understanding the discussed concepts and topics.

Mode de contrôle des connaissances :

You will be evaluated based on a team project (conducted in pairs) in which you will apply the knowledge and skills you acquired during the course. The project takes the form of an exploratory data analysis in which you will work on a tabular data set in order to extract valuable insights that can help solve a business problem.

The expected deliverables of the project are:

- A 5–10 pages report;

- The source code (Jupyter notebooks or Python scripts) of your work, either in a Github repository or as a zip file.

You are expected to present your main findings during a 10-minutes presentation, which will be followed by approximatively 5 minutes of questions.

Coefficient : 1

Mandatory courses - 9 ECTS

Behavioral economics and bounded rationality

ECTS : 3

Enseignant responsable : BERTRAND **VILLENEUVE** (https://www.linkedin.com/in/bertrand-villeneuve-0a5a152b/?originalSubdomain=fr)

Langue du cours : Anglais

Description du contenu de l'enseignement :

The objective of the course is to present the most important themes in behavioral economics.

- Reference-dependent utility, with and without risk
- Probabilistic judgement and the treatment of information
- Time preferences
- Attention and inattention
- Social preferences

The course itself will focus on models and their empirical validity.
By choice, the course will not be principally about experimental protocols - yet protocols are explained occasionally - but rather on main ideas, results, and debates.
The diverse applications will be treated all along.

Compétences à acquérir :

Maybe you have heard about it but never received any formal training on it.

Behavioral economics has reached a certain degree of maturity and**it is part of an aspiring economist culture**

After attending the classes, the students will be able to read the cutting-edge research on the topic.

Given the variety of ways by which standard (non behavioral) models can be tweaked, the course is not intended to promote a particular view, but to help would-be modelers to better motivate their choices.

Pré-requis obligatoires

Expected utility. Basic game theory. Basic probability theory, in particular Bayesian calculus.

Mode de contrôle des connaissances :

- MCQs all along the classes (50%).
- Final written exam (50%).

Coefficient : 2

Bibliographie, lectures recommandées :

Highly recommended for the fascinating and lively excursion across almost all topics: Daniel Kahneman's 2011 book, *Thinking Fast and Slow.*
The main reference is the *Handbook of Behavioral Economics*, Elsevier, 2018 and 2019. All chapters are dense. Some of them are heavily used for the lectures.

Advanced Game Theory

ECTS : 3

Enseignant responsable : SIDARTHA **GORDON** (https://dauphine.psl.eu/recherche/cvtheque/gordon-sidartha)

Langue du cours : Anglais

Description du contenu de l'enseignement :

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 first focus on a particular class of games of strategic information transmission, the class of unidimensional cheap talk sender receiver-games, and then introduce recent models 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.

Compétences à acquérir :

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.

Coefficient : 2

Experimental Economics

ECTS : 3

Enseignant responsable : CLAIRE **RIMBAUD** (https://sites.google.com/view/claire-rimbaud/home)

Langue du cours : Anglais

Description du contenu de l'enseignement :

The module will cover both methodology - why and how experiments in economics are conducted - and specific topics from the experimental literature via recent research articles.

Compétences à acquérir :

The aim of the module is to introduce students to the use of experimental methods in economics.

Coefficient : 2 pour le M2 296 et 0,5 pour le M2 346

Bibliographie, lectures recommandées :

Charness, G., & Pingle, M. (Eds.). (2021). *The art of experimental economics: twenty top papers reviewed.* Routledge.

Friedman, D., & Sunder, S. (1994). *Experimental methods: A primer for economists.* Cambridge university press.

Moffatt, P., Starmer, C., Sugden, R., Bardsley, N., Cubitt, R., & Loomes, G. (2009). *Experimental economics: Rethinking the rules.* Princeton University Press.

+ articles cited in class.

Elective specialization course -3 ECTS - choose one

Inequality and redistribution

ECTS : 3

Enseignant responsable : LAURA **KHOURY** (https://dauphine.psl.eu/recherche/cvtheque/khoury-laura)

Langue du cours : Anglais

Description du contenu de l'enseignement :

In most developed countries, inequality has been rising in recent decades, becoming a key political issue at the center of the public debate. This course aims at understanding the historical evolution of between- and within-country inequality from the late 19th century until today, and what are the key drivers explaining this evolution. How to adequately measure inequality? How does globalization impact global inequality? What is the effect of technological change on labor income inequality? What is the role of public policies in mitigating these effects? We will review economic theories and use up-to-date empirical techniques to address these questions. Through the presentations of recent research papers, students will also get acquainted with the multiple dimensions of inequality (e.g. gender inequality, racial inequality, inequality in education outcomes, etc.).

Compétences à acquérir :

At the end of the course, students should be able to:

- Describe the evolution of income inequality in developed and developing countries since the 19th century
- Identify and describe the drivers of the change in labor and capital inequality
- Understand and use models to rationalize the change in labor and capital inequality
- Understand and design policy tools that can mitigate inequality through redistribution

Pré-requis obligatoires

Statistics (Basic level)

Microeconometrics (M1 mandatory course)

Mode de contrôle des connaissances :

Assessment will be based on a presentation (30%), a final written exam (65%) and participation in class (5%). The presentation will consist in presenting in class a research paper addressing the question of inequality. The final exam will be a mix of short questions about concepts seen in class and questions where the student will be asked to develop his own analysis using the concepts seen in class.

Coefficient : 2

Bibliographie, lectures recommandées :

A specific reading list is provided at the start of each session.

Environment and sustainability

ECTS : 3

Enseignant responsable : ANNA **CRETI** (https://dauphine.psl.eu/recherche/cvtheque/creti-anna)

Langue du cours : Anglais

Description du contenu de l'enseignement :

Global warming and the related environmental and social issues raise serious concerns for the welfare of our current and future generations. Such changes require to develop new approaches and solutions to address these key issues so that they can become and remain sustainable. The course Environment and Sustainability will introduce students to key theories and models related to the environment, sustainability, societal issues, and the United Nations' Sustainable Development Goals.

1. Introduction: challenges for sustainability toward the net-zero economy

2. Sustainability: definition and examples

3. Sustainability: theoretical challenges

4. Climate Change: definition and examples

5. Climate Change: theoretical challenges

6. Climate Change policies

7. The energy transition

Compétences à acquérir :

Students will be able to critically evaluate the complex drivers and consequences of global environmental problems for different societal groups, applying academic concepts and theories. They will develop in-depth knowledge in specialist areas of environment and sustainability and gain critical thinking skills. Finally, attendees will be able to assess the effectiveness, equity and trade-offs of different sustainability goals and policies.

Pré-requis recommandés

Advanced Micro and Macro Economics

Mode de contrôle des connaissances :

Final Exam (written dissertation)

Coefficient : 2

Bibliographie, lectures recommandées :

Dasgupta, Sir Partha. "The Economics of Biodiversity The Dasgupta Review Abridged Version." (2021).

Richard S. J. Tol, Climate Economics: Economic Analysis of Climate, Climate Change and Climate Policy Edward Elgar Publishing, 2019 - 234 pages

Selected Videos from https://rtol.github.io/ClimateEconomics/video/

Block 1 - Elective Quantitative courses - 6 ECTS

Advanced Microeconometrics

ECTS : 6

Enseignant responsable : ERIC **BONSANG** (https://dauphine.psl.eu/recherche/cvtheque/bonsang-eric)

Langue du cours : Anglais

Description du contenu de l'enseignement :

This course explores different topics in applied microeconometrics at advanced level for public policy evaluation. It focuses on causal inference and how econometrics can help identify causality. 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 and Regression discontinuity designs. The course will review the theory underlying those different techniques and will discuss the recent studies that have applied these methods to make causal inference.

Compétences à acquérir :

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.

Pré-requis recommandés

  M1 Course: Microeconometrics

Mode de contrôle des connaissances :

  Written exam (70%) + Short empirical paper (20%) + Active participation in class (10%)

Coefficient : 2

Bibliographie, lectures recommandées :

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

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Block 2 - Elective Quantitative courses - 6 ECTS

Advanced Macroeconometrics

ECTS : 3

Enseignant responsable : FABIEN **TRIPIER** (https://dauphine.psl.eu/recherche/cvtheque/tripier-fabien)

Langue du cours : Anglais

Description du contenu de l'enseignement :

1. Identifying the Business Cycles

2. Shock Identification with Structural VARs

3. Non-linear Structural VARs

4. Local Projection Methods versus SVAR

5. Non-linear Local Projection Methods

6. Narrative and High-Frequency Identification Methods

Compétences à acquérir :

The objective of the course is to provide students with the econometric background necessary for an in-depth

understanding of the results presented in recent scientific articles and for the realization of a personal economic analysis using the usual macroeconometric tools. The course provides applications of econometrics tools using STATA routines and Matlab Toolboxes.

After having attended the classes, the students will be able to *i)* apply time series tools to compose the cycle and trends in time series, (*ii*) to identify shocks and their economic effects using various techniques, (*ii*) to interpret the results in light of macroeconomic theory, and (*iv*) to perform these empirical applications while understanding the underlying analytics of econometric tools.

Pré-requis obligatoires

Econometrics; Macroeconomics.

Mode de contrôle des connaissances :

Mini-project: Students must select an article published in a top journal using one of the methods presented in the course. It is advisable to choose an article for which replication files are available online. The students will then replicate one of the main results of the article and perform a robustness analysis by modifying an element of the analysis that could concern for example the data used or the econometric tool used. The results will be presented and analysed in a short report written in LaTeX that supplements the codes written by the students.

Coefficient : 1

Bibliographie, lectures recommandées :

Canova, F. (2011). Methods for applied macroeconomic research. Princeton university press.

Canova, F., Ferroni, F. (2020). A hitchhiker guide to empirical macro models, documentation for the empirical macro toolbox https://sites.google.com/view/fabio-canova-homepage/home/empirical-macro-toolbox

Cochrane, J. H. (2005). Time series for macroeconomics and finance. Manuscript, University of Chicago, 1-136.

Hamilton, J.D. (1994). Time Series Analysis. Princeton University Press.

Bayesian techniques in macroeconomics

ECTS : 3

Langue du cours : Anglais

Description du contenu de l'enseignement :

 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 become 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 Autogressive) 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).

The lectures are structured as follows.

 1. AR, VAR and B-VAR Models.   Constructing a likelihood function to estimate a state-space model. Use   priors to penalize the likelihood function.

 2. Solution methods   and simulations for DSGE models. Linearization and   Perturbation methods.

 3. Estimation of   the workhorse New Keynesian Model. Kalman filter, prior setting, posterior   reading, Metropolis-Hasting algorithm.

 4. Applications

Compétences à acquérir :

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.

Pré-requis recommandés

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

Mode de contrôle des connaissances :

100% Final written exam

Coefficient : 1

Bibliographie, lectures recommandées :

Articles:

An, S., & Schorfheide, F. (2007). Bayesian analysis of DSGE models. *Econometric reviews*, *26*(2-4), 113-172.

Sims, C. A., & Zha, T. (1998). Bayesian methods for dynamic multivariate models. *International Economic Review*, 949-968.

Smets, F., & Wouters, R. (2003). An estimated dynamic stochastic general equilibrium model of the euro area. *Journal of the European economic association*, *1*(5), 1123-1175.

Textbooks:

Galí, J. (2015). *Monetary policy, inflation, and the business cycle: an introduction to the new Keynesian framework and its applications*. Princeton University Press.

Mandatory courses - 15 ECTS

Labor, education and public policies

ECTS : 3

Enseignants : GABRIELLE **FACK**, LIONEL **WILNER**
https://dauphine.psl.eu/recherche/cvtheque/fack-gabrielle

Langue du cours : Anglais

Description du contenu de l'enseignement :

This course will present an overview of topics in Labor and Education. The first part of the course will review the returns to education, the reasons for government intervention in Education, and will then cover three main types of interventions: demand side policies (financial and information interventions), supply side policies (school resources) and policies aimed at reducing inequalities. The second part of the course will cover various topics at the frontier of current research in Labor economics. More specifically, we will consider the fundamentals of wage determination, the forms and consequences of Labor market discrimination, the theory and empirics of job search, and the provision of unemployment insurance. The course will systematically discuss the relevant policy implications.

Planning / Course Schedule

1. Education I: Returns to education

2. Education II: demand side policies (financial and information interventions)

3. Education III: supply side policies (school resources)

4. Education IV: policies aimed at reducing inequalities

5. Labor I: Wage determination

6. Labor II: Labor market discrimination

7. Labor III: Job search and matching models

8. Labor IV: Unemployment insurance

Compétences à acquérir :

The first objective of the course is to equip the students with the tools that will allow them to understand the contemporary labour market and the relevant public policies. With this aim, it will first provide students with advanced knowledge of the

determinants of wages, both from a theoretical and an empirical perspective. At the end of the course, the students will be able to identify the mechanisms underlying employer-employee matching and will have a good understanding of the main quantitative methods used by labour economists. They will also be able to contribute to the design of public policies related to labour market discrimination, job search, unemployment insurance, etc.

The second objective of the course is provide students with a critical analysis of government intervention in education. It will present an overview of the main types of education policies, together with in-depth empirical analysis of the impact of specific policies. At the end of the course, the students will be able to identify the market failures and equity issues that concern education, and the type of policies that may be considered to solve them. They will also have a good understanding of the main quantitative methods used by economists to evaluate the impact of educational policies and contribute to the social debate on education.

This class will be useful to students who want to do a PhD dissertation in the field of applied labour economics and education economics as well as to students who plan to work in institutions that produce studies and policy recommendations regarding education and the labour market, such as the OECD, Ministries of Labour, the ILO, etc.

Pré-requis obligatoires

Graduate Microeconomics

Graduate Econometrics

Mode de contrôle des connaissances :

Written and oral assessment

During the course, students will be asked to present an article chosen in the reading list of the course. This presentation will be graded. A final exam will take place during the exam week. The final grade will be computed as a weighted average of the oral presentation (30%) and written exam (65%) grades, as well as a grade to account for participation (5%).

Bibliographie, lectures recommandées :

Borjas, G. (2013). Labor Economics (6th edition). Mc Graw-Hill Irwin.

Cahuc, P., Carcillo, C., and Zylberberg, A. 2014, *Labor Economics*, 2nd edition, MIT Press.

Hanushek, E., and Welch, D. (eds.), *Handbook of the Economics of Education.* Amsterdam: North Holland volumes 1 to 5

Articles listed on the reading list provided at the start of the course

Health, welfare and health behavior

ECTS : 3

Enseignant responsable : PETER **EIBICH** (https://sites.google.com/site/eibichpe/home)

Langue du cours : Anglais

Description du contenu de l'enseignement :

This course will provide an overview of economic approaches to health investment decision-making. At the societal level, policy makers have to decide which health interventions (incl. preventive measures, drugs and medical procedures) to fund to maximize population health outcomes with limited economic resources. In the first part of the course, we will examine health economic evaluation as one potential framework to make such decisions. The course will cover the principles of economic evaluation and discuss the advantages and downsides of this approach. We will look in detail at cost-effectiveness analyses and how they are conducted in practice, and we will discuss how evidence from such analyses is used in healthcare systems around the world by looking at several countries as case studies.

In the second part of the course we will consider individual decision-making for health and health behaviour. We will discuss economic models of the demand for health and their implications for individual health behaviour and the demand for healthcare. We will also consider behavioural economic models for risky health behaviour (e.g., smoking) and discuss the empirical evidence for these models. The final session of the course is dedicated to the economics of prevention. We will discuss features that distinguish prevention from other types of health behaviour, and we will look at empirical evidence on the determinants of uptake of prevention.

Compétences à acquérir :

After participating in this course, you will:

- Understand how economic evaluation can be used to assess health interventions.

- Be able to critically discuss decision-analytic models for cost-effectiveness analyses.

- Have an overview of how evidence from economic evaluations is used in healthcare decision-making in different institutional contexts

- Understand how economic principles can be applied to model the demand for health and health behaviour.

- Have an overview of the empirical literature on risky health behaviour.

- Be able to critically assess empirical studies on health behaviour.

Pré-requis obligatoires

None

Pré-requis recommandés

None

Mode de contrôle des connaissances :

Examination of this class will consist of two parts –in-class presentations (30% of the final grade) and a written exam (70% of the final grade).

Coefficient : 2

Bibliographie, lectures recommandées :

Textbooks:

Some of the material we will cover is discussed in the two textbooks below. Zweifel et al. (2009) is available online through the library, and especially in the first part of the course we will follow the exposition there closely. There is no need to buy these books if you do not have access to them.

Zweifel, P., Breyer, F., and Kifmann, M, 2009. Health Economics, 2nd Edition, Springer Berlin Heidelberg.

Sloan, F. and Hsieh, C.-H., 2017. Health Economics, 2nd Edition, MIT Press Cambridge Massachusetts.

Papers:

The papers listed below provide some additional background to the material discussed in class.

Cropper, M.L., 1977. Health, Investment in Health, and Occupational Choice. Journal of Political Economy 85, 1273–1294.

Dalgaard, C.-J., Strulik, H., 2014. OPTIMAL AGING AND DEATH: UNDERSTANDING THE PRESTON CURVE. Journal of the European Economic Association 12, 672–701. https://doi.org/10.1111/jeea.12071

Grossman, M., 2000. The Human Capital Model, in: Culyer, A.J., Newhouse, J.P. (Eds.), Handbook of Health Economics. Elsevier, pp. 347–408. https://doi.org/10.1016/S1574-0064(00)80166-3

Grossman, M., 1972. On the Concept of Health Capital and the Demand for Health. Journal of Political Economy 80, 223–255.

Walker, S., Sculpher, M., Drummond, M., 2011. 733 The Methods of Cost-Effectiveness Analysis to Inform Decisions about the Use of Health Care Interventions and Programs, in: Glied, S., Smith, P.C. (Eds.), The Oxford Handbook of Health Economics. Oxford University Press, p. 0. https://doi.org/10.1093/oxfordhb/9780199238828.013.0031

Mandatory courses - 12 ECTS

International Trade & International Macroeconomics

ECTS : 3

Enseignants : GIANLUCA **OREFICE**, LISE **PATUREAU**
https://sites.google.com/site/oreficegianluca/teaching/globalization-of-firms-theory-and-applications
https://dauphine.psl.eu/recherche/cvtheque/patureau-lise

Langue du cours : Anglais

Description du contenu de l'enseignement :

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.

Course Schedule

Part 1 – The New New Trade Theory and the Heterogeneity of firms

1. International Trade with Heterogeneous Firms (Melitz 2003)

2. FDI with Heterogeneous Firms: Helpman, Melitz and Yeaple (2004)

3. Trade Liberalization, Labor Market, Homogeneous Firms (Trefler 2003, Kovak 2013)

4. Liberalization, Labor Market, Heterogeneous firms (Helpman and Itskhoki 2010)

Part 2 – International Macroeconomics

5. The canonical model of international business cycles (1)

6. The canonical model of international business cycles (2)

7. Firm heterogeneity, firm dynamics and international fluctuations

8. Trade, granularity and international business cycles

Compétences à acquérir :

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. A specific focus will be made on the role of firm heterogeneity in shaping international trade flows as well as macroeconomic fluctuations in an international set-up. The students will be trained to read leading research articles on these issues.

After attending the classes, the students will have a sharp understanding of the optimal international strategy of firms, and how such trade microfoundations shed new light on long-standing or novel questions in international 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.

Pré-requis recommandés

Good knowledge of basic models of international trade and macroeconomics

Mode de contrôle des connaissances :

Mid Term : 40% Final exam: 60%

The final grade will be based on two mid-term exams (one for each part) and a written final exam, covering both parts of the course.

Coefficient : 2

Bibliographie, lectures recommandées :

There is no textbook for this course. We will base entirely on published academic papers, based on the (yet non-definitive) list of papers.

Common core paper - compulsory reading

· Melitz,   M. (2003) "The Impact of Trade on Intra-Industry Reallocations   and Aggregate Industry Productivity", *Econometrica* 71: 1695-1725

Part I: International trade

Chapter I: Trade models with heterogeneous firms

· Brainard, S.L. (1997) "An Empirical Assessment of the Proximity- Concentration Trade-off Between Multinational Sales and Trade," American Economic Review, 87(4), pages 520-544 (suggested reading)

· Melitz, M., Helpman, H. and S. Yeaple (2004) "Export Versus FDI with Heterogeneous Firms", American Economic Review 94: 300-316 (compulsory reading).

· Pavcnik (2002) "Trade Liberalization, Exit, and Productivity Improvements: Evidence from Chilean Plants", The Review of Economic Studies 69, January 2002, pp. 245-76 (suggested reading).

Chapter II: The Labour market effect of trade

· Trefler D. (2004) "The Long and Short of the Canada-U.S. Free Trade Agreement", American Economic Review 94: 870-895 (compulsory reading).

· Helpman H. and Itskhoki (2010) "Labour Market Rigidities, Trade and Unemployment", Review of Economic Studies, 77(3): 1100-1137 (compulsory reading).

· Kovak, B. (2013) "Regional Effects of Trade Reform: What is the Correct Measure of Liberalization", American Economic Review, 103(5): 1960-1976 (compulsory reading).

· Autor D., Dorn D., and G. Hanson (2013) "The China Syndrome: Local Labor Market Effects of Import Competition in the United States", American Economic Review, 2013, 103(6), 2121–2168 (compulsory reading).

· Kovak, B and R. Dix-Carneiro (2017) "Trade Liberalization and Regional Dynamics", American Economic Review, 107(10): 1908-2946 (suggested reading).

Part II: International Macroeconomics

Chapter I: The canonical model of international business cycles

· Backus, David K.; Kehoe, Patrick J.; Kydland, Finn E. (1995), "*International Business Cycles: Theory and Evidence*", in Cooley, Tom (ed.), Frontiers of Business Cycle Research, Princeton University Press

· Obstfeld, M. and Rogoff, K. "*The Six Major Puzzles in International Macroeconomics: Is There a Common Cause?*", in NBER Macroeconomics Annual 2000, Volume 15, Bernanke and Rogoff. 2001

Chapter II: Firm heterogeneity, firm dynamics and international fluctuations

· Ghironi, Fabio, and Marc Melitz. 2005. "International Trade and Macroeconomic Dynamics with Heterogeneous Firms." *Quarterly Journal of Economics* 120: 865-915

Chapter III: Trade, granularity and business cycles

· di Giovanni, J., Levchenko, A. and I. Mejean (2018) "The Micro Origins of International Business-Cycle Comovement", *American Economic Review*, Vol 108, 2018

· di Giovanni, J., Levchenko, A. and I. Mejean (2017) "Large Firms and International Business Cycle Comovement", 2017, *American Economic Review P&P*, 107(5):598-602.

· Acemoglu, D., Carvalho, V.M., Ozdaglar, A. and Tahbaz-Salehi, A. (2012) "The network origins of aggregate fluctuations", *Econometrica*, Vol. 80, n°5

· Gabaix, X., 2011, The granular origins of aggregate fluctuations, *Econometrica*, Vol. 79, n°3

Labor market, inequalities and macroeconomics

ECTS : 3

Enseignants : SELMA **MALMBERG**, ARTHUR **POIRIER**
https://sites.google.com/site/poirierarthur

Langue du cours : Anglais

Description du contenu de l'enseignement :

Understanding the behavior of the labor market is key to understanding macroeconomics. Behind well-known aggregates such as unemployment, employment rate, and concepts like inequality lie complex interactions among workers, firms, and policymakers. The aim of this course is to provide students with the necessary tools to understand these mechanisms.

The course is organized as follows. First, it addresses key stylized facts and current challenges facing the labor market. Then, it explains how macroeconomic labor market models are built and how they help disentangle labor market mechanisms. Finally, the course emphasizes how extended models can account for heterogeneity.

Compétences à acquérir :

The aim of this course is to provide students with the necessary theoretical and computational tools to replicate the main stylized facts of the labor market. By the end of the course, students will be able to use and simulate models, and compare their predictions with empirical data. They will also be able to assess the effects of labor market policies.

Pré-requis recommandés

- Macroeconomics (M1)

- Knowledges in modelling and basic mathematics (function, derivation, differential equations, matrices)

- Knowledges in computational (Matlab, Python or, R) can be useful.

Mode de contrôle des connaissances :

Attendance, active participation, and presentation of a research paper in front of the class.

Bibliographie, lectures recommandées :

Heterogeneous agents

- Auclert, A., Bardóczy, B., Rognlie, M., & Straub, L. (2021). Using the sequence-space Jacobian to solve and estimate heterogeneous-agent models. Econometrica, 89(5), 2375-2408.

- Carroll, C. D. (2006). The method of endogenous gridpoints for solving dynamic stochastic optimization problems. Economics letters, 91(3), 312-320.

- Kaplan, G., Moll, B., & Violante, G. L. (2018). Monetary policy according to HANK. American Economic Review, 108(3), 697-743.

- Krusell, P., & Smith, Jr, A. A. (1998). Income and wealth heterogeneity in the macroeconomy. Journal of political Economy, 106(5), 867-896.

Labor market flows

- Cahuc, Pierre, Stéphane Carcillo, and André Zylberberg. Labor economics. MIT press, 2014.

- Elsby, Michael W. L., Ryan Michaels, and Gary Solon. "The ins and outs of cyclical unemployment." American Economic Journal: Macroeconomics 1.1 (2009): 84-110.

- Elsby, Michael WL, Bart Hobijn, and Ayşegül Şahin. "Unemployment Dynamics in the OECD." Review of Economics and Statistics 95.2 (2013): 530-548.

- Elsby, Michael WL, Bart Hobijn, and Ayşegül Şahin. "On the importance of the participation margin for labor market fluctuations." Journal of Monetary Economics 72 (2015): 64-82.

- Shimer, Robert. "Reassessing the ins and outs of unemployment." Review of Economic Dynamics 15.2 (2012): 127-148.

Labor search and matching

- Cahuc, Pierre, Stéphane Carcillo, and André Zylberberg. Labor economics. MIT press, 2014.

- Mortensen, Dale and Christopher Pissarides (1994). "Job Creation and Job Destruction in the Theory of Unemployment" Review of Economic Studies Vol 61, pp 397-416.

- Pissarides, Christopher A. Equilibrium unemployment theory. MIT press, 2000.

- Rogerson, Richard, Robert Shimer, and Randall Wright. "Search-theoretic models of the labor market: A survey." Journal of economic literature 43.4 (2005): 959-988.

- Shimer, Robert. "The cyclical behavior of equilibrium unemployment and vacancies." American economic review 95.1 (2005): 25-49.

Elective Quantitative courses - 6 ECTS - choose 2

Asset pricing theory

ECTS : 3

Enseignant responsable : JEROME **DUGAST** (https://dauphine.psl.eu/recherche/cvtheque/dugast-jerome)

Langue du cours : Anglais

Description du contenu de l'enseignement :

 In this course, we will discuss a wide range of topics ranging from optimal portfolio, the CAPM, factor models, consumption-based asset pricing, and arbitrage pricing, to more special ones including asymmetric information, and limits to arbitrage.

1. Optimal Portfolio Theory and the CAPM
2. Factor Models
3. Decision Making under Uncertainty
4. Consumption-based Asset Pricing
5. Arbitrage Pricing
6. Dynamic Asset Pricing
7. Asymmetric Information and Asset Prices
8. Limits to Arbitrage

Compétences à acquérir :

Master the theoretical concepts of asset pricing

Mode de contrôle des connaissances :

Evaluation: assignment 20%, final exam 80%

Coefficient : 2

Quantitative International Economics

ECTS : 3

Enseignant responsable : FARID **TOUBAL** (https://faridtoubal.com/)

Langue du cours : Anglais

Description du contenu de l'enseignement :

  This lecture covers advanced topics in international economics with a special emphasis on quantitative techniques employed in international trade. This course is divided into two main components: the first part introduces important concepts and provides the theoretical foundations of the structural gravity equation. The second part deals with partial and general equilibrium trade policy analysis with structural gravity

Compétences à acquérir :

- Enhance their understanding of economic methods and data sources for trade policy analysis.
- Applying international trade models and provides recommendations on how to obtain reliable partial and general equilibrium estimates for the effects of trade policy.

Pré-requis obligatoires

Microeconomics, Macroeconomics, Econometrics, International Trade

Pré-requis recommandés

Solid knowledge in Microeconomics, Econometrics and International Trade

Mode de contrôle des connaissances :

Home works

Coefficient : 2

Bibliographie, lectures recommandées :

- Head K. and T. Mayer, 2014. "Gravity Equations: Workhorse,Toolkit, and Cookbook", Handbook of International Economics, 4th ed, 4:131-195.
- Gravity Cookbook website
- Costinot, A., and A. Rodríguez-Clare, 2014. "Trade Theory with Numbers: Quantifying the Consequences of Globalization", Handbook of International Economics, 4th ed, 4:131-195.
- Yotov, Y. V., Piermartini, R., Monteiro, J. A., & Larch, M. (2016).*An advanced guide to trade policy analysis: The*

structural gravity model. Geneva: World Trade Organization.

En savoir plus sur le cours :https://faridtoubal.com/teaching.html

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SEMESTRE 4

Data science course - Elective course - 3 ECTS - choose one

NLP for economic decisions

ECTS : 3

Langue du cours : Anglais

Coefficient : 2 pour le M2 296 et 0,5 pour le M2 346

Machine Learning for Economists

ECTS : 3

Enseignant responsable : Mathilde **GODARD** (https://sites.google.com/site/mathildegodard1/)

Langue du cours : Anglais

Description du contenu de l'enseignement :

Economic science has evolved over several decades toward greater emphasis on empirical work. Ever increasing mass of available data ('big data') in the past decade is likely to have a further and profound effect on economic research (Einav and Levin, 2014). Beyond economic research, governments and the industry are also increasingly seeking to use 'big data' to solve a variety of problems, usually making use of the toolbox from machine learning (ML).

The question we ask in this course is the following : What do we (not) learn from big data and ML as economists? Is ML merely applying standard techniques to novel and large datasets? If ML is a fundamentally new empirical tool, how does it fit with what we know? In particular, how does it fit with our tools for causal inference problems? As empirical economists, how can we use big data and ML? We'll discuss in detail how ML is useful to collect new data, for prediction in policy, and to provide new tools for estimation and inference.

Compétences à acquérir :

Course objectives:

1. Present a way of thinking about ML that gives it its own place in the econometric toolbox.

2 Develop an intuition of the problems to which it can be applied, and its limitations.

3. Think of unstructured data (text, image) as data we can use when economic outcomes are missing.

4. Specific focus on application of ML to social policies (health/labor/taxation/environment etc.).

Pré-requis recommandés

Python (beginner/intermediate), Machine Learning, Microeconometrics.

Mode de contrôle des connaissances :

Grading:

1. In-class pairwise presentation of an academic paper (30% of overall grade).

2. Final exam (in-class written text). 70% of overall grade.

Coefficient : 2 pour le M2 296 et 0,5 pour le M2 346

Bibliographie, lectures recommandées :

- Mullainathan, Sendhil and Jann Spiess (2017). "Machine learning: An applied econometric approach". In: Journal of Economic Perspective 31.2, pp. 87-106.
- Kleinberg, Jon et al. (2015). "Prediction policy problems". American Economic Review 105.5, pp. 491-495.
- Athey, S. (2017): "Beyond prediction: Using big data for policy problems", Science 355, 483–485.
- Kleinberg, J., Lakkaraju, H., Leskovec, J., Ludwig, J. and S. Mullainathan (2018): "Human Decisions and Machine Predictions", The Quarterly Journal of Economics, Volume 133, Issue 1, Pages 237–293.
- Susan Athey, Guido W. Imbens. 2019. Machine Learning Methods That Economists Should Know About. Annual Review of Economics 11:1, 685-725.

- Athey, Susan, and Guido Imbens. 2016. "Recursive Partitioning for Heterogeneous Causal Effects". PNAS 113(27): 7353–60.
- Belloni, A., V. Chernozhukov, S. Mullainathan and J. Spiess and C. Hansen.(2014): "High-Dimensional Methods and Inference on Structural and Treatment Effects" Journal of Economic Perspectives, Volume 28, Number 2 – Spring 2014, Pages 29–50

Mandatory courses - 21 ECTS

Master Thesis Defense

ECTS : 15

Enseignant responsable : LISE **PATUREAU** (https://dauphine.psl.eu/recherche/cvtheque/patureau-lise)

Langue du cours : Anglais

Description du contenu de l'enseignement :

You will work on your master thesis all along the Master 2 year. The Master thesis ends with its defense in front of a jury. The jury is made of your Master thesis supervisor and another researcher, specialist of the topic, to be chosen preferably with the LEDa faculty. The defense lasts 45 minutes, questions and answers included.

Compétences à acquérir :

The Master's thesis is a unique opportunity to develop your own research question and to make use of all the knowledge (theoretical and/or applied) you have acquired so far to address it. The Master's thesis concludes with a defense, during which you present your work before a jury. By defending your thesis, you demonstrate your capacity for innovation in addition to your modeling skills. Preparing your presentation also allows you to develop valuable soft skills: the ability to explain complex ideas in simple terms, to synthesize various results concisely, and to answer questions clearly, succinctly, and convincingly. In this respect, the Master's thesis and its defense are key assets for students applying for a PhD position — and not only for them.

Mode de contrôle des connaissances :

The final grade is based on two grades: 75% on the Master thesis itself, 25% for the quality of the oral defense.

Coefficient : 9

PhD Proposal / Internship

ECTS : 6

Enseignant responsable : LISE **PATUREAU** (https://dauphine.psl.eu/recherche/cvtheque/patureau-lise)

Langue du cours : Anglais

Description du contenu de l'enseignement :

At the start of Semester 2, the student is asked to choose between two options: PhD project or internship. There is no hours in class dedicated to this course.

- If the PhD project option is chosen, the student must write a well-structured PhD proposal that fulfills with the requirement of the SDOSE Doctoral school at Dauphine and/or the requirements of other PhD programs in France or abroad. This should be done in close link with the Master thesis supervisor.

- If the internship option is chosen, the student must find an internship of a minimum of 4 months, to be finished before graduation in early December of the next academic year. At the end of the internship, the student writes a report on this experience.

In all cases, the PhD project / internship report will be graded.

Compétences à acquérir :

This internship/PhD project is intended to prepare the job market insertion of the students after graduation.

If choosing the PhD project option, the student prepares a PhD project to submit to the SDOSE doctoral school and/or to other PhD programs in other universities, in France and/or abroad. Doing so, the student paves the way to his future PhD in economics.

If choosing the internship option, the student will benefit from a long-lasting experience (Internship of 4-month minimum) in a private company, international institution or a research center to improve his competencies in view of his future career.

Mode de contrôle des connaissances :

If PhD project: The PhD project (pdf) should be sent to the Master's director. The list of applications to PhD programs should be provided as well.

If internship: A summary of the internship experience should be written and sent to the Master's director. There is no oral defense.

Elective courses - 6 ECTS - choose 2

Computational social choice

ECTS : 3

Enseignant responsable : JEROME **LANG** (https://www.lamsade.dauphine.fr/~lang/)

Langue du cours : Anglais

Description du contenu de l'enseignement :

The aim of this course is to give an overview of the problems, techniques and applications of computational social choice, a multidisciplinary topic at the crossing point of computer science (especially artificial intelligence, operations research, theoretical computer science, multi-agent systems, computational logic, web science) and economics.
The course consists of the analysis of problems arising from the aggregation of preferences of a group of agents from a computational perspective. On the one hand, it is concerned with the application of techniques developed in computer science, such as complexity analysis or algorithm design, to the study of social choice mechanisms, such as voting procedures or fair division algorithms. On the other hand, computational social choice is concerned with importing concepts from social choice theory into computing.
The course will focus on normative aspects, computational aspects, and real-world applications (including some case studies).
Program:
1. Introduction to social choice and computational social choice.
2. Preference aggregation, Arrow's theorem and how to escape it.
3. Voting rules: informational basis and normative aspects.
4. Voting rules : computation. Voting on combinatorial domains.
5. Strategic issues: strategyproofness, Gibbard and Satterthwaite's theorem, computational resistance to manipulation, other forms of strategic behaviour.
6. Multiwinner elections. Public decision making and participatory budgeting.
7. Communication issues in voting: voting with incomplete preferences, elicitation protocols, communication complexity, low-communication social choice.
8. Fair division.
9. Matching under preferences.
10. Specific applications and case studies (varying every year): rent division, kidney exchange, school assignment, group recommendation systems…

Mode de contrôle des connaissances :

Written exam.

Coefficient : 2

Bibliographie, lectures recommandées :

References:
* Handbook of Computational Social Choice (F. Brandt, V. Conitzer, U. Endriss, J. Lang, A. Procaccia, eds.), Cambridge University Press, 2016. Available for free online.
* Trends in Computational Social Choice (U. Endriss, ed), 2017. Available for free online.

Empirical Industrial Organization

ECTS : 3

Enseignant responsable : Daniel **HERRERA ARAUJO**

Langue du cours : Anglais

Coefficient : 2 pour le M2 296 et 0,5 pour le M2 346

Economie et finance du marché du gaz (en anglais)

ECTS : 3

Enseignants : ANNA **CRETI**, OLIVIER **MASSOL**
https://dauphine.psl.eu/recherche/cvtheque/creti-anna

Langue du cours : Français

Description du contenu de l'enseignement :

Économie des hydrocarbures
Marchés spot et à terme du gaz, stockage, sécurité de l'offre, gaz renouvelables

Compétences à acquérir :

Compétences en économie des hydrocarbures, marché international du gaz, concurrence et régulation des acteurs gaziers en Europe

Pré-requis obligatoires

Economie de l'Energie, Economie Industrielle

Pré-requis recommandés

Economie Industrielle

Mode de contrôle des connaissances :

Analyse écrite d'un papier de recherche

Bibliographie, lectures recommandées :

Une sélection de papiers de recherche sera proposée

Mandatory courses - 27 ECTS

Advanced Health economics

ECTS : 3

Enseignant responsable : Elsa **PERDRIX** (https://dauphine.psl.eu/recherche/cvtheque/perdrix-elsa)

Langue du cours : Anglais

Description du contenu de l'enseignement :

 This 18-hour Advanced Health Economics course offers an in-depth exploration of critical concepts and contemporary research in the field of health economics. Students engage with complex models of supply and demand for health services, analyzing how market dynamics affect healthcare delivery and accessibility. The course provides a detailed examination of various healthcare systems worldwide, highlighting their structure, efficiency, and equity. Special emphasis is placed on understanding the economic behaviors of healthcare providers, patients, and insurers within these systems. Through case studies and empirical research, students explore how insurance mechanisms influence health service utilization, financial risk protection, and overall welfare. They learn about adverse selection, moral hazard, and the design of insurance products to optimize coverage and efficiency. Cutting-edge studies on alternative payment models are discussed to illustrate modern policy challenges and innovations. Advanced econometric techniques are introduced to equip students with the skills necessary for conducting their own health economics research. By the end of the course, students are prepared to critically assess policy proposals.

Compétences à acquérir :

 Knowledge about recent scientific advances in health economics

Ability to read, understand, and criticize scientific health economics articles

Mode de contrôle des connaissances :

Critical review of scientific papers with oral presentations.

Coefficient : 2

Policies in developing countries

ECTS : 3

Enseignant responsable : OLIVIA **BERTELLI** (https://dauphine.psl.eu/recherche/cvtheque/bertelli-olivia)

Langue du cours : Anglais

Coefficient : 2

Advanced environmental macroeconomics

ECTS : 3

Enseignant responsable : LISE **PATUREAU** (https://dauphine.psl.eu/recherche/cvtheque/patureau-lise)

Langue du cours : Anglais

Description du contenu de l'enseignement :

The course focuses on market failures in environmental economics and the appropriate macroeconomic policies to correct them, with a particular focus on carbon taxing in an intertemporal perspective. The course is gradual and starts with a presentation of Integrated Assessment models (IAM) that analyze climate policy in a long perspective. Next, the course introduces the notion of carbon taxing at the business cycle frequency in Dynamic Stochastic General Equilibrium (DSGE) models. Environmental policy in the short term may interfere with the economic cycle, inflation dynamics as well as credit cycles.

The course is structured in five chapters. The two first lectures are given by Lise Patureau (Université Paris Dauphine-PSL). The last three lectures are provided by Garth Heutel (Georgia State University, USA).

1. A presentation of Integrated Assessment models

2. The intertemporal implementation of optimal carbon   tax

3. Environmental economics and real business cycles

4. Environmental economics and nominal rigidities

5. Environmental   economics and financial frictions

Compétences à acquérir :

The objective of the course is to provide students with an overview of recent developments in environmental macroeconomics dealing with carbon tax policies interacting with financial, nominal and economics components of the economy.

Students should be able to solve the theoretical models presented and to interpret their normative predictions. From a practical perspective, students are also expected to learn the relevant institutional framework for implementing these policies.

Pré-requis recommandés

A solid background in both microeconomics and macroeconmics is a prerequisite.

Mode de contrôle des connaissances :

Final written exam of 2 hours, 100% of the final grade.

Coefficient : 2

Bibliographie, lectures recommandées :

Papers studied in class, list provided in the slides

Financial frictions in macroeconomics

ECTS : 3

Enseignant responsable : FABIEN **TRIPIER** (https://dauphine.psl.eu/recherche/cvtheque/tripier-fabien)

Langue du cours : Anglais

Description du contenu de l'enseignement :

1. Why didn't macroeconomic models predict the Great Financial Crisis?

2. Uncertainty in crisis times: a challenge for policy makers

3. New macroeconomic models to assess unconventional monetary policies

4. The European System of Financial Supervision in the Aftermath of the Great Recession

Compétences à acquérir :

The objective of the course is to provide theoretical foundations of financial frictions in up-to-date business cycle models and to assess the ability of these models in explaining the key stylized facts related with business cycles, monetary and macroprudential policies.

Pré-requis obligatoires

Macroeconomics

Mode de contrôle des connaissances :

Exam

Coefficient : 2

Bibliographie, lectures recommandées :

Financial frictions for firms

Bernanke, B. S., Gertler, M., & Gilchrist, S. (1999). The financial accelerator in a quantitative business cycle framework. Handbook of macroeconomics, 1, 1341-1393.

Christiano, L. J., Motto, R., & Rostagno, M. (2014). Risk shocks. American Economic Review, 104(1), 27-65.

Kiyotaki, Nobuhiro, and John Moore. "Credit cycles." Journal of political economy 105, no. 2 (1997): 211-248.

Financial frictions for banks

De Fiore, Fiorella, and Harald Uhlig. "Bank finance versus bond finance." Journal of Money, Credit and Banking 43.7 (2011): 1399-1421.

Gertler, M. and P. Karadi (2011). A model of unconventional monetary policy. Journal of Monetary Economics 58(1), 17–34.

Uncertainty fluctuations

Basu, Susanto, and Brent Bundick. "Uncertainty shocks in a model of effective demand." Econometrica 85.3 (2017): 937-958.

Bloom, N. (2009). The impact of uncertainty shocks. econometrica 77(3), 623–685.

Bloom, N. (2014, Spring). Fluctuations in Uncertainty. Journal of Economic Perspectives 28(2), 153–76.

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