

Macroeconomics 1

Course title – Intitulé du cours	Macroeconomics 1
Level / Semester – Niveau /semestre	Master 2
School – Composante	Ecole d'Economie de Toulouse
Teacher – Enseignant responsable	Fabrice Collard & Patrick Fève
Other teacher(s) – Autre(s) enseignant(s)	Alexandre Gaillard (TA)
Other teacher(s) – Autre(s) enseignant(s)	Philipp Wangner (TA)
Lecture Hours – Volume Horaire CM	36
TA Hours – Volume horaire TD	
TP Hours – Volume horaire TP	
Course Language – Langue du cours	English
TA and/or TP Language – Langue des TD et/ou TP	English

Teaching staff contacts:

- email(s) address(es)
- office(s) number(s),
- office(s) hours/day(s) of the week when students can drop by: By appointment
- preferred means of interaction (after the classes, by email, prior appointment,...)

Fabrice Collard: fabrice.collard@tse-fr.eu, Office: T610 by appointment

Patrick Fève: patrick.feve@tse-fr.eu, Office: T608 by appointment

Alexandre Gaillard: alexandre.gaillard@tse-fr.eu

Philipp Wangner: philipp.wangner@tse-fr.eu

Course Objectives: newly acquired knowledge once the course completed should be well identified

In more detail :

- ideas, theories or methods that will be illustrated in class;
- methods that will be used and that students are expected to be proficient in;
- skills that will be developed during the course (type of problems to be resolved, ability to provide written and oral comments on an empirical analysis,...).

It is preferable to specifically list simple objectives with verbs, so that it is easy to evaluate whether these objectives are achieved at the end of the course or to identify the areas for improvement (for instance : for implementation goals - test hypotheses and draw correct

inferences using test statistic; for conceptual goals - characterize first-degree, second-degree and third-degree price discrimination;...).

The objective of this course is to introduce students to the methods and models of modern macroeconomics. Note that although we will study these methods in the context of macroeconomics, they are commonly used in many other fields of economics, such as labor economics, development economics, industrial organization, public economics, international or financial economics (corporate finance or asset pricing).

Macroeconomics, like most areas of economics, is an empirical field. Throughout the course, we will emphasize the need to confront theoretical results to empirical evidence. This will lead us to assess how models address questions raised by the data and impose a discipline on the data, reciprocally how the data also impose discipline on the model, how models can be confronted to the data, how to interpret results.

In the first semester, we will focus on the canonical complete markets model. Although this framework is not without limitations, it allows to analyze a wide variety of phenomena including growth, business cycle analysis, labor markets, asset prices, fiscal and monetary theory ... Methods to develop, solve, simulate and confront these models to the data are studied. The second semester will bring students to the frontier of modern macroeconomics, in which microeconomic heterogeneity and frictions play an important role in shaping cross-sectional and aggregate allocations.

Complete Market Economies: These lectures will develop the baseline complete market economy, and derive some important properties that characterize the associated allocations.

Looking at the facts: We will have a close look at the data to identify (and quantify) the big questions we will tackle in this class. In passing we will see how to look at the data, how theory actually shapes the construction of the data, how to put structure on the data (cycle vs trend, ...) and how to specify a question quantitatively.

A baseline General Equilibrium Model: In those lectures, we will build a first baseline dynamic general equilibrium model (the so-called Real Business Cycle (RBC) model) that aims at explaining some of the facts we will have discussed in the first lectures. We will see how to write the model (and why it is written that particular way), have a critical discussion of the main assumptions, derive a method to solve and simulate the model, and will then confront its predictions to the data. In that sense we will address the main questions raised by Quantitative Macroeconomics.

Business Cycle Accounting: Those lectures will revisit critically the previous model. We will review a method to identify margins on which a model fail to account for the facts, and in so doing will identify dimensions along which models should be improved.

A Case Study: The German Great Depression: This part of the class will show how the baseline model can be used to shed new light on History, build counterfactuals to understand a phenomenon

and isolate the important margins that were driving a particular event ---in this instance the Great Depression in Germany. (If time allows)

Shocks Identification and Their Aggregate Effects: A large strand of the macroeconomic literature assumes an impulse-propagation scheme, by which fluctuations are the results of the propagation of exogenous shocks (impulse) that hit the economy. This is the case for the models developed in earlier lectures, in which the existence and observability of these shocks was assumed. One question was left unexplored: how can such shocks be observed and what are their empirical counterpart? This is the object of these lectures which will show how to properly identify structural shocks in a (dynamic) multivariate setting. This is a critical problem in macroeconomics, but it extends generically to other fields. This will be done in the context of Structural Vector Auto-Regressions (SVARs hereafter) and various associated identification strategies. We will also show how this type of model can be used for business cycle accounting. Three important examples are considered for illustrative purposes: Total Factor Productivity, Fiscal policy and Monetary policy.

From SVAR Models to RBC Models and vice-versa: These lectures will illustrate how SVARs can serve as a useful guide for developing quantitative theories of the business cycle. We first explore the weak propagation mechanism of the RBC model. We then discuss how the estimated response of hours to a technology improvement can be used to strongly reject the basic frictionless setup. But this approach considers SVARs findings at face value. This is why we invert the quantitative analysis and use the RBC model as a laboratory to assess the accuracy of the SVAR approach. Finally, we show how to combine both approaches for a proper quantitative assessment (Indirect Inference).

Identification/Estimation of RBC Models: The estimation of RBC type models allows to properly identify shocks and their contribution to aggregate fluctuations. In a typical business cycle accounting exercise, this approach permits to isolate the main drivers of the business cycle and help the researcher to improve the model in many directions (labor market imperfections, financial frictions, ...). We deeply discuss identification and estimation issues of RBC models using analytical results and simulation experiments. We also show how we can conduct specification tests (cross-equation restrictions, exogeneity restrictions, stochastic process of driving variables, stability tests and testing for the Lucas Critique ...) to improve these models. We finally put a special emphasis on partial versus full information identification/estimation methods.

Prerequisites :

- skills and competences needed/previously acquired
- or the title(s) of the compulsory course(s) which should have been taken before

It is strongly advised that student have already been introduced to optimization

Practical information about the sessions:

- please specify if laptops or tablets are accepted or not in the class,
- expectation on students' participation,
- how will be treated students that arrive to class late.....

This year, due to the pandemic, the sessions will take place remotely over Zoom.

Students are expected to attend all lectures

Grading system :

- final exam or midterm exams
- Teaching Assistant grading
- weights of the weighted average main cours-TA (consistent with the voted examination "arrêté d'examen"),
- semester calendar,
- how to handle late homework...

There will be a midterm and a final exam.

Bibliography/references :

Ljungquist and Sargent, *Recursive Macroeconomic Theory*, 2nd edition (MIT Press, available online): Offers technical background material for various parts of this course

Stokey and Lucas, *Recursive Methods in Economic Dynamics* (Harvard University Press) This book offers background reading on dynamic programming and Markov processes (useful if you want to improve your math skills)

DeJong and Chetan Dav, *Structural Macroeconometrics*, 2nd Edition (Princeton University Press). This book provides a general overview of methodologies, models, and techniques used to analyze aggregate dynamic models.

Fabio Canova, *Methods for Applied Macroeconomic Research* (Princeton University Press). This book offers a very detailed treatment of quantitative techniques in applied macroeconomics.

Additional readings will be provided in the form of lecture notes and references to specific papers throughout the course.