Universidad Zaragoza

Academic Year/course: 2022/23

61348 - New Macroeconometric models

Syllabus Information

Academic Year: 2022/23
Subject: 61348 - New Macroeconometric models
Faculty / School: 109 - Facultad de Economía y Empresa
Degree: 525 - Master's in Economics
ECTS: 3.0
Year: 1
Semester: Second semester
Subject Type: Optional
Module:

1. General information

1.1. Aims of the course

Given the generalization of its use, economists who today want to go into the field of macroeconomics at the highest level must be able to understand and use the programs with which to exploit all the potentialities of the DSGE models (Dynamic, Stochastic of General Equilibrium models). This is what Dynare allows. Dynare is a digital platform to which the course is dedicated. The knowledge of Dynare allows geting the following specific objectives:
First, to command the general characteristics of macroeconomic models, both neoclassical and neo-Keynesian features. Second, to acquire fluency in the solution and simulation of the appropriate dynamic models for the different situations that usually arise in general. Especially the approaches for stationary and non-stationary models will be characterized.
Third, the student must achieve sufficient knowledge to answer the questions that may be posed according to the type of behavior of the economies that he wants to represent with this type of model.
Fourth, estimate models of any characteristic proposed for specific economies.
All this is done following the instructions of the Dynare platform, especially its User's Guide, its Reference Manual, the website, the forum, etc.
These approaches and objectives are aligned with the following Sustainable Development Goals (SDGs) of the Agenda 2030 of the United Nations (https://www.un.org/sustainabledevelopment/es/), in such a way that the acquisition of the learning outcomes of the subject provides training and competence to contribute to some extent to your achievement:
? Objective 3: Health and wellness
? Goal 8: Decent work and economic growth
? Objective 9: Industry, innovation and infrastructures

1.2. Context and importance of this course in the degree

It is necessary that the digital methods and platforms that are considered nowadays to make macroeconomic models operational are transmitted in a master's degree to all those students who are interested in advanced representations of the aggregate behavior of economies. Not only can partial equilibrium phenomena be represented with these methods and platforms but,, above all, general equilibrium phenomena of an economy or even those that consider interrelationships between different economies. Moreover, this can be done both in the short term and in the long term perspectives or in both simultaneously. In particular, long-term behavior requires the characterization of the stationary equilibrium, which acts as an anchor around which both the short and medium term evolve.

1.3. Recommendations to take this course

The course is self-contained, so there is no need for any special requirement, with the exception of basic computer skills that are of widespread use today.

2. Learning goals

2.1. Competences

Upon passing the course, the student will be competent for:
1. To know the elements that have to be considered as basic to be able to represent numerically the aggregate behavior of an economy according to the objectives that are being pursued.
2. To introduce in the language of Dynare those elements that the programs need to be able to be operative.
3. To understand the fundamentals of Dynare programming to solve macroeconomic models and be able to respond to the demands that the solution of each case requires.
4. To obtain simulation, estimation and prediction results of the economies in which you are interested.

2.2. Learning goals

The student, after passing the course, will have demonstrated:
a) That he knows the fundamental elements of the Dynare software package for dynamic and stochastic general equilibrium models (DSGE models).
b) That he knows how to program, solve analytically and numerically, simulate, predict and estimate macroeconomic models of the New Keynesian synthesis with Dynare.
c) That he can formulate DSGE models by itself for an economy with any characteristic of preferences, time horizon, rigidities in the goods or inputs market, with rational expectations or not, and with any fiscal and monetary policy rule, endowed with the requirements necessary for them to be operational in the Dynare software package.
d) That he is capable of designing simulation exercises of any type of economy in which to determine the consequences of fiscal, monetary or structural policies with the Dynare software package.

2.3. Importance of learning goals

Today the central banks of developed countries and the forecasting agencies of governments and private entities use, to represent the macroeconomic behavior, to predict and to simulate the outcome of economic policies, both in the short and long term , a type of models called DSGE (Dynamic, Stochastic General Equilibrium models). They are models that can be considered as a synthesis of the neoclassical and neo-Keynesian models, because they combine aspects of the two perspectives, which were antagonistic a time ago and are now complementary. Simultaneously, some digital platforms have been developed to facilitate its use, such as Dynare, which is necessary to know how to use and which allows interaction between users. The course is intended to facilitate access to the use of these platform and these models. Knowing how to use and exploit the DSGE models that are currently used with their tools is not only recommended, but also essential to be aware of how the interpretations of macroeconomic reality are represented and justified nowadays at a global level in the developed world. This language is extremely useful for solving, simulating, estimating and predicting the effects of exogenous, structural and/or economic policy shocks.

3. Assessment (1st and 2nd call)

3.1. Assessment tasks (description of tasks, marking system and assessment criteria)

The student must demonstrate that they have achieved the expected learning outcomes through the following assessment activities:

Assessment system	Minimum weight	Maximum weight
Work done, its presentation and participation in classes	0%	50%
Final exam	50%	100%

In accordance with the provisions of the UZ Evaluation Norms Regulation, there will be the possibility of a global evaluation test.
Note: It is expected that the evaluation will be carried out in person but if health circumstances require it, it will be carried out partly or fully online. It should be noted that in any online assessment task the student performance may be recorded, following the regulations described in: ?https://protecciondatos.unizar.es/sites/protecciondatos.unizar.es/files/users/lopd/gdocencia_reducida.pdf?_

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The learning process that has been designed for this subject is based on the methodological elements that are exposed below.

Combination of theoretical presentation by the teacher with the active participation of the student in the different topics under study.
The student will have to prepare readings, problems or assignments proposed by the teacher for some classes.
In the development of most of the classes computer resources will be used, which students are supposed to have, in particular a laptop.
In the learning process, study is necessary and, above all, the individual effort of the student for the practical work that occupies a good part of the subject.
Classes are scheduled to be face-to-face. However, if necessary for health reasons, classes may be taught

blended or online.

4.2. Learning tasks

The program offered to the student to help him achieve the expected results includes the following activities:

Training activity	No. Hours	% Presence
Attendance to theoretical classes	20	100%
Preparation of work and independent study of the student	45	--------
Presentation and defense of the work carried out	10	100%

4.3. Syllabus

The course will address the following topics:

Topic 1. Presentation

1.1. DSGE models, calibration and estimation

1.2. Dynare and Octave

Topic 2. Solution of stacionary DSGE models

2.1. A fundamental distintion: determinist and stochastic models

2.2. Introduction of an example

2.3. The structure of a .mod file in Dynare

2.4. Preamble

2.5. Model specification

2.6. Steady estate and/or initial values

2.7. The inclusion of shocks

2.8. The selected computation

2.9. The complete file

Topic 3. Estimation of stationary DSGE models

3.1. Introduction of an example

3.2. Declaration of variables and parameters

3.3. Model declaration

3.4. Declaration of observed variables

3.5. Steady estate

3.6. Declaration of a priori distributions

3.7. Launching the estimation

3.8. The complete .mod file

3.9. Interpreting the output

Topic 4. Solution of non-stationary DSGE models

4.1. The characteristics of a non-stationary model

4.2. Introduction of an example

4.3. Declaration of variables and parameters

4.4. The origin of the non-stationarity

4.5. Transforming the non-stationary variables to stationary ones

4.6. Preamble

4.7. Model specification

4.8. Steady estate and/or initial values

4.9. The inclusion of shocks

4.10. The selected computation

4.11. The complete .mod file

Topic 5. Estimation of non-stationary DSGE models

5.1. The link between the stationary variables and the data

5.2. The block of the resulting model in the .mod file

5.3. Declaration of observed variables

5.4. Declaration of trends in the observed variables

5.5. Steady estate
5.6. Declaration of a priori distributions
5.7. Launching the estimation
5.8. The complete .mod file
5.9. Summing-up

4.4. Course planning and calendar

Provisional calendar of sessions:

Session	Topic
1	Introduction. DSGE model, calibration and estimation. Dynare and Octave
2	Solution of DSGE stationary models
3	Solution of DSGE stationary models
4	Solution of DSGE stationary models. Homework presentation
5	Estimation of DSGE stationary models
6	Estimation of DSGE stationary models
7	Estimation of DSGE stationary models. Homework presentation
8	Estimation of DSGE stationary models. homework presentation
9	Solution of DSGE non-stationary models
10	Solution of DSGE non-stationary models
11	Solution of DSGE non-stationary models. Homework presentation
12	Estimation of DSGE non-stationary models
13	Estimation of DSGE non-starionary models
14	Estimation of DSGE non-stationary models. Homework presntation
15	Exam

4.5. Bibliography and recommended resources

- Mancini, Tommaso. Dynare: user guide /Tommaso Mancini. Mimeo, 2014
- Dynare: Reference manual, versión 4.4.3 / Adjemian, Stéphane... [et al.] 2014