Quantitative Dynamic Macroeconomics

Syllabus

Course name	Introduction to Business Cycle Analysis: Quantitative Dynamic Macroeconomics
Course code	07-101-1303.SE01
Number of credits	10 ECTS
Program	**Bachelor Wirtschaftswissenschaften** (also eligible for exchange students)
Position in program	3rd year, 1st semester
Academic year	2023-2024
Language of instruction	English
Format	Lectures, tutorials, discussion, and seminar
Examination	Seminar thesis and presentation

Read this syllabus thoroughly before the start of the course. Minor changes are possible and will be announced on Moodle. © Leipzig University, Konstantin Gantert.

UNIVERSITÄT LEIPZIG

Table of Contents

1 Teaching Staff

Name:	Dr. Konstantin Gantert
Contact:	konstantin.gantert@uni-leipzig.de
Role in course:	Course coordinator and lecturer

Name:	Leonardo Urrutia
Contact:	leon.urrutia@uni-leipzig.de
Role in course:	Teaching assistant

2 Course Description

2.1 Position in the Field

Quantitative macroeconomic policy analysis is conducted in many organizations (e.g. central banks, ministries, government and non-government institutions) as a way to advise decision-making and conduct monetary and fiscal policy on a solid theoretical foundation. A quantitative analysis intends to simulate different economic scenarios and assumptions, emphasize policy trade-offs, and provide clear and quantitative recommendations. It should be persuasive and readable for a non-specialized audience and theoretically concise at the same time. The aim of this course is therefore to combine quantitative expertise with economic intuition, one of the major skills of economists.

2.2 Course Description

This course teaches the basics of modern macroeconomics, especially Dynamic-Stochastic-General-Equilibrium (DSGE) models and the necessary quantitative methods to work with such models. The introduction of the DSGE workhorse models is given in an intuitive and applied approach, leaving detailed discussion about assumptions and theorems for later courses. Hence, this course is meant as a bridge between intermediate macroeconomics in a Bachelor program and a Research Master course.

The content of this course focusses on business cycle dynamics and monetary and fiscal policy. We will analyze efficiency and effectiveness of different discretionary policies and automatic stabilizers. Using quantitative models and computational simulation (Matlab and the Dynare toolbox), we will analyze the trade-offs and pitfalls of both monetary and fiscal policy.

Having passed the course, students should be able to conduct basic quantitative monetary and fiscal policy analysis, a skill widely asked for by central banks and government institutions. Furthermore, students should be able to summarize the major contemporaneous questions of macroeconomics and relate them to the real world and policy issues.

2.3 Course Learning Goals

After successful completion of the course, the student will be able to …

[CG 1]   … contrast the state-of-the-art DSGE models to older macroeconomic models such as the IS-LM or AS-AD model.
[CG 2]   … paraphrase recent macroeconomic research papers and active research gaps.
[CG 3]   … apply mathematical methods to solve systems of linear difference equations.
[CG 4]   … compute macroeconomic simulations of DSGE models using software.
[CG 5]   … organize the building blocks of DSGE models such as RBC and New-Keynesian models.
[CG 6]   … assess monetary and fiscal policy based on computational simulations.

2.4 Entry Requirements

It is required to have knowledge of the following courses (or equivalent for other programs):

1.   BSc Wirtschaftswissenschaften: Makroökonomik

3 Type of Instructions

The classes are a mix of lectures, tutorials, discussions, and seminar presentation sessions. The lectures will be taught by Dr. Konstantin Gantert. Tutorials will be taught by Leonardo Urrutia. The discussions and presentations will be managed by both teachers.

First half of the semester: The lectures will cover the theory behind models and methods. The tutorials practice the application of models and methods, both with pen-and-paper and on a computer.

Second half of the semester: There are no more lectures, but discussion sessions, where we will analyze in depth one core monetary macroeconomic paper. The paper has to be read by every student beforehand. The tutorials are substituted by an "open macroeconomics room" as described below.

Every student writes an individual policy paper (seminar thesis) in the second half of the semester. Policy advice has to be based on quantitative model simulations using a computer. During this time, every student has the chance to receive feedback on his/her policy paper in the weekly "open macroeconomics room". In the last week of the course, every student will present his/her policy paper. The attendance of the presentations is mandatory for all students of the course. Missing a session can have consequences for your final grade.

Instructions and more information on writing the paper and the presentation will be given in the lectures and on Moodle.

Activity	Assessed number of hours
Attending lectures	7 x 3 = 21
Preparing lectures	7 x 3 = 21
Attending tutorials	7 x 2 = 14
Preparing tutorials	7 x 3 = 21
Attending discussions	2 x 2 = 4
Preparing discussions	2 x 10 = 20
Preparation policy paper	169
Preparation presentation	20
Attending presentation sessions	10
Total	**300**

4 Assessment

Graded summative assessments	Weight	Date/periods for exams or submission deadlines
Seminar thesis	70%	End of semester
Presentation	30%	Last week of the semester

5 Course Structure and Outline

Week (Cal. week)	Dates HC: 3h! WC: 2h!	Lecture (HC)	Tutorial (WC)
	Module 1: The Basics of DSGE Models		
1 (42)	HC: 20.10.2023 WC: 23.10.2023	1) Introduction and motivation 2) Two-period equilibrium model 3) Static cash-in-advance model	1) Introduction to Matlab 2) Functions and solver in Matlab
2 (43)	HC: 27.10.2023 WC: 30.10.2023	1) Dynamic cash-in-advance model 2) Steady-state of the CiA model 3) Growth, welfare, and optimal policy	1) Elastic money demand model Lagrangian 2) Analyzing elastic money demand in the model
3 (44)	HC: 03.11.2023 WC: 06.11.2023	1) Markov chains & AR(1)-processes 2) Stochastic CiA model 3) Statistical model and data	1) Money loss model with shocks 2) Solving the money loss model (Markov process) with Matlab
	Module 2: Expanding the CiA Model		
4 (45)	HC: 10.11.2023 WC: 13.11.2023	1) Money supply & interest rate rules 2) Price setting & information frictions 3) Inflation, output & the Phillips curve	1) Unexpected money loss shocks 2) Solving the unexpected money loss shocks model (AR(1)-process) with Matlab
5 (46)	HC: 17.11.2023 WC: 20.11.2023	1) A model with money & capital 2) Labor & capital taxes 3) Modeling government expenditures	1) Lagrangian and FOCs of the stochastic money & capital model 2) Interpretation of the model
6 (47)	HC: 24.11.2023 WC: 27.11.2023	1) Business cycle model with capital 2) Linearization 3) Undetermined Coefficients	1) Applying the method of undetermined coefficients 2) Undet. coefficients with Matlab
7 (48)	HC: 01.12.2023 WC: 04.12.2023	1) Rotemberg price adjustment costs 2) Monetary policy analysis 3) Quantitative computational analysis	1) Introduction to Dynare 2) Solving and analyzing a textbook NK business cycle model with Dynare
	Module 3: A Medium-Sized Monetary DSGE Model		
8 (49)	HC: 08.12.2023	Discussion session	Open room: Q&A and collaboration
9 (50)	HC: 15.12.2023	Discussion session	Open room: Q&A and collaboration
	Module 4: Project Work – Topics in Monetary Macroeconomics		
10 (1)	WC: 05.01.2024	No lecture/discussion	Open room: Q&A and collaboration
11 (2)	HC: 12.01.2024	No lecture/discussion	Open room: Q&A and collaboration
12 (3)	WC: 19.01.2024	No lecture/discussion	Open room: Q&A and collaboration
13 (4)	26.01.2024	*Policy Paper Presentation*	
14 (5)		*Paper Deadline*	

6   List of Materials

- **<u>Main textbook:</u>** Harold L. Cole (2020). Monetary and Fiscal Policy through a DSGE Lens.
- Ben Heijdra (2017). Foundations of Modern Macroeconomics. Third Edition.
- Garın, J., Lester, R., & Sims, E. (2021). Intermediate Macroeconomics.
- Athreya (2013). Big Ideas in Macroeconomics: A Nontechnical View.