Programa

Modelos estocásticos dinámicos

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Objetivos

The objective of the couse is to teach the theory and practice of building DSGE models. We begin with some basic concepts of dynamic control and procede to a simple DSGE model (that of Hansen). We gradually add additional economic concepts such as money, frictions in prices and wages, financial intermediaries, international capital and goods movements, and learning. At the end of the course we discuss how to get non-log-linear versions of our solutions.

Modalidad de trabajo y evaluación

Weekly practices will be assigned and the final exam will consist of a take-home assignment to construct and solve a DSGE model. The course will roughly follow my book, The ABCs of RBCs, with some sections left out and additional material added.

Estructura del programa y lecturas

Sección 1

A basic Solow model

Introduction to macroeconomic data, methods for filtering the trend from the data, and working with a stochastic Solow model, finding a linear version of that Solow model and comparing the time path of the full model to a linearized version.

Lecturas

Solow [1956]; "A contribution to the theory of economic growth," Quarterly *Journal of Economics*, vol.70, No. XXX, pp 65-94

McCandless [2008]; *The ABCs of RBCs* (Harvard University Press), Chapter 1

Sección 2

Savings in an OLG model

Introduction to overlapping generations models, solving for a savings function for two period lived agents, optimal social security systems, and the model with production technology and exogenous allocations of labor.

Lecturas

Samuelson [1958]; "An exact consumption loan model of interest with or without the social contrivance of money," *Journal of Political Economy*, vol.66, pp 467-482

McCandless [2008]; *The ABCs of RBCs* (Harvard University Press), Chapter 2

Sección 3

Infinitely lived agents

Introduction to solving infinite horizon models, first deterministic models using variational methods and Bellman's equations and then going on to solving stochastic version of those models.

Lecturas

McCandless [2008]; *The ABCs of RBCs* (Harvard University Press), Chapter 3, 4, and 5

Sección 4

Hansen's DSGE model (two clases)

Hansen's model with divisible and indivisible labor. Brief discussion of linear-quadratic methods. Linearization of the model using log linearization techniques a la Uhlig. Solution of the linearized model using the unknown coefficients methods for the model under rational expectations. Introduction to impulse response functions.

Lectura

Hansen [1985]; "Indivisable labor and the business cycle," *Journal of Monetary Economics*, vol. 16, pp 309-328

McCandless [2008]; *The ABCs of RBCs* (Harvard University Press), Chapter 6

Sección 5

Money: Cash in Advance

Adding cash in advance money to the model a la Cooley-Hansen. Solution using normalization by money stock. Solution using price level for normalization. Inflation via monetary transfers to households. Introduction to solving matrix quadratic equations. Inflation via seigniorage. Welfare effects of inflation.

Lecturas

Cooley and Hansen[1989]; "The inflation tax in a real business cycle model," *American Economic Review*, vol. 79, pp 733-748

McCandless [2008]; *The ABCs of RBCs* (Harvard University Press), Chapter 8

Sección 6

Staggered Pricing Model/Staggered Wages Model (two classes)

Introduction to New Keynesian models with staggered prices and/or staggered wages. Calvo and Taylor staggering rules. Intermediate goods. Quasi-differencing. Effects of monetary policy on output and welfare via impulse response function. Problems with staggered pricing that don't occur with staggered wages.

Lecturas

Calvo [1983]; "Staggered Prices in a Utility-Maximizing Framework," *Journal of Monetary Economics*, vol. 12, pp 383-398

McCandless [2008]; *The ABCs of RBCs* (Harvard University Press), Chapter 10 and 11

Sección 7

Financial markets and monetary policy

Adding banks that take deposits and lend to firms for working capital. Effects of money injections via banks. Impulse response function of output with respect to money injections. Optimal monetary policy: Taylor rule vrs Friedman rule. Stability of economy under different coefficients of Taylor rule.

Lecturas

Lucas [1990]; "Liquidity and Interest Rates," *Journal of Economic Theory*, vol. 50, pp 237-264

Fuerst [1992]; "Liquidity, Loanable funds and Real Activity," *Journal of Monetary Economics*, vol. 29, pp 3-24

McCandless [2008]; *The ABCs of RBCs* (Harvard University Press), Chapter 12

Sección 8

Small open economy models/Trade in an open economy model

Open economy macroeconomics. Solving an economy with foreign borrowing or lending. Introduction to international trade of intermediate goods into the economy.

Lecturas

Schmitt-Grohe and Uribe [2003]; "Closing small open economy models," *Journal of International Economics*, vol. 61, pp 163-185

McCandless [2008]; *The ABCs of RBCs* (Harvard University Press), Chapter 13

Sección 9

Learning in a DSGE model

Learning instead of rational expectations (convergence to rational expectations). Writing and solving problem as state space problem. Constant vrs decreasing gain learning. Escape paths under constant gain learning.

Lecturas

Williams [2918]; "Escape Dynamics in Learning Models," *Review of Economics Studies*, vol. 86, No. XXX, pp 882-912

Evans and Honkapohja [2001]; *Learning and Expectations in Macroeconomics* (Princeton University Press)

Sección 10

Perturbation and Projection

Introduction to non-linear solutions techniques: perturbation and projection techniques. Introduction to Chebyshev polynomials and their use in projection techniques.

Lecturas

Judd [1996]; "Approximation, perturbation and projection methods in economic analysis," Chapter 12 in *Handbook of Computational Economics*, vol. 1, pp 509-585