

MACROECONOMICS

Department of Economics, National Chi Nan University
Syllabus (Fall 2021)

Instructor: Yo-Long Lin

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Time and Location: Tuesday 2:10–5pm in College of Management Building R210

Office Hours: Tuesday 5–6pm or by appointment

Class code: 115000

Course Objective: The objective of this course is to acquaint you with some fundamental topics in dynamics macroeconomics. In this class you will learn basic mathematical techniques that can be applied to your own original research. A primary emphasis will be on theoretical underpinnings.

Prerequisite: Students are expected to have a good foundation in mathematics at a beginning master's level. For instance, the ability to solve basic problems of linear algebra and differential equation is required. If students have simply forgotten them, the class "Mathematical Economics" or "Mathematics for Economics" is helpful.

Textbooks: The format of the class will be primarily lectures. I won't follow a particular book, but the textbooks below are useful to you.

- Hansen, L.P. and T.J. Sargent, 2013, *Recursive Models of Dynamic Linear Economies*, Princeton University Press.
- Chow, G.C., 1997, *Dynamic Economics: Optimization by the Lagrange Method*, Oxford University Press.
- Chiang, A.C., 1992, *Elements of Dynamic Optimization*, McGraw-Hill.
- Chen, B.-L., 2012, *Economics Growth*, Hwa Tai Publishing.

Grading: There will be several problem sets (10%), one midterm (45%, scheduled on Tuesday, November 16, 2021), and a final exam (45%, scheduled on Tuesday, January 11, 2022).

Course Outlines:

1. Review: Traditional Macro Models
 - 1.1 Policy Effectiveness.
 - 1.2 Linear Simultaneous Equations in Macro.
 - (a) Identification Problem.
2. Dynamic Programming in Discrete Time
 - 2.1 Stochastic Linear Difference Equations
 - (a) An ARMA Process

- (b) A Rational Expectations Model
 - ▶ Cagan, P., 1956, The Monetary Dynamics of Hyperinflation. In Friedman, M. (ed.), *Studies in the Quantity Theory of Money*. University of Chicago Press, 25-117.
 - (c) The State Space Model
- 2.2 The Ramsey Model
- 2.3 The Linear Quadratic Dynamic Programming
3. Dynamic Optimization in Continuous Time
- 3.1 Math Review: The First-order Differential System
- (a) Stability in the Keynesian Model
 - ▶ Chang, W.W. and D.J. Smyth, 1972, Stability and Instability of IS-LM Equilibrium, *Oxford Economic Papers*, 24:3, 372-384.
- 3.2 Business Cycle Models
- ▶ Quah, D.T., 1996, Empirics for Economic Growth and Convergence, *European Economic Review*, 4:3, 1353-1375.
- 3.3 Optimal Control Theory: Introduction
- ▶ Dorfman, R., 1969, An Economic Interpretation of Optimal Control Theory, *American Economic Review*, 59:9, 817-831.
 - ▶ Chow, C.C., 1976, Control Methods for Macroeconomic Policy Analysis, *American Economic Review Papers and Proceedings*, 66:2, 340-345.
- 3.4 The Neoclassical Investment Model: The Dynamics of Tobin's q
- ▶ Tobin, J., and W. Brainard, 1977, Asset Markets and the Cost of Capital, in Balassa, B. and R. Nelson (eds.), *Economic Progress, Private Values, and Public Policy: Essays in Honor of William Fellner*. New York: North Holland, 235-262.
- 3.5 The Neoclassical Growth Model
- (a) The Solow-Swan Model
 - ▶ Solow, R.M., 1956, A Contribution to the Theory of Economic Growth, *Quarterly Journal of Economics*, 70:1, 65-94.
 - (b) The Ramsey-Cass-Koopmans Model
 - ▶ Ramsey, F.P., 1928, A Mathematical Theory of Saving, *Economic Journal*, 38:152, 543-559.
 - (c) The AK Model
 - ▶ Romer, P.M., 1986, Increasing Returns and Long-run Growth, *Journal of Political Economy*, 94:5, 1002-1037.
 - (d) Lucas (1988) Model
 - ▶ Lucas, R.E., 1988, On the Mechanics of Economic Development, *Journal of Monetary Economics*, 22, 3-42.

Other References:

1. Cochrane, J.H., 1994, Shocks, *Carnegie-Rochester Conference Series on Public Policy*, 41, 295-364.

2. Jones, L.E., R.E. Manuelli, and H.E. Siu, 2005, Fluctuations in convex models of endogenous growth II: business cycle properties, *Review of Economic Dynamics*, 8:4, 805-828.
3. Mankiw, N.G., 2006, The macroeconomist as scientist and engineer, *Journal of Economic Perspectives*, 20:4, 29-46.