Nonconvex Factor Adjustments in Dynamic Equilibrium Models

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Course Description

We will survey recent research on the aggregate implications of nonconvex factor adjustment costs. We will examine their effect on the long-run distribution of investment and job turnover, and on aggregate fluctuations. Lectures will cover both empirical papers that provide evidence of these nonconvexities with quantitative equilibrium research that attempts to assess the aggregate implications of such phenomena. An additional focus of the class will be on numerical methods that allow us to address some of the heterogeneity seen in the data using stochastic dynamic general equilibrium models.

Outline

1) A brief review of quantitative business cycle analysis

The data

Kydland, Finn E. and Edward C. Prescott (1990) 'Business Cycles: Real Facts and a Monetary Myth' Federal Reserve Bank of Minneapolis Quarterly Review Vol. 14 No. 2 (http://research.mpls.frb.fed.us/research/qr/qr1421.html)

King, R. G. and S. T. Rebelo (1999) "Resuscitating Real Business Cycles," chapter 14 in M. Woodford and J. Taylor (eds.) Handbook of Macroeconomics IB. Elsevier Science.

Stock, J. H. and M. W. Watson (2002) `Has the business cycle changed and why?' Harvard University working paper.
(http://ksghome.harvard.edu/~JStock/pdf/stock&watson_macroannual.pdf)

Quantitative business cycle models

Robert G. King, Charles I. Plosser and Sergio T. Rebelo (1988) ('Production, growth and business cycles : I. The basic neoclassical model' Journal of Monetary Economics Volume 21, Issues 2-3, (March - May 1988): *195-232*

Prescott, E. C. (1986) "Theory Ahead of Business Cycle Measurement," Federal

Reserve Bank of Minneapolis Quarterly Review 10, 9-22, Federal Reserve Bank of Minneapolis. (http://research.mpls.frb.fed.us/research/qr/qr1042.html)

2. Nonlinear numerical methods: solving the indivisible labour model using splines

The indivisible labour economy

Hansen, Gary D. 'Indivisible labor and the business cycle' *Journal of Monetary Economics, Volume 16, Issue 3, November 1985: Pages 309-327*

Rogerson, Richard 'Indivisible labor, lotteries and equilibrium' *Journal of Monetary Economics, Volume 21, Issue 1, January 1988, Pages 3-16*

Rogerson, Richard and Randall Wright **'**Involuntary unemployment in economies with efficient risk sharing' *Journal of Monetary Economics, Volume 22, Issue 3, 1988, Pages 501-515)*

Spline approximation

De Boor, C. (1978) *A practical guide to splines*. Springer-Verlag

Johnson (1989) *Spline Approximation in Discrete Dynamic Programming with Application to Stochastic Multi-Reservoir Systems,* Cornell University dissertation.

Johnson, Stedinger, Shoemaker, Li and Tejada-Guibert (1993) "Numerical Solution of Continuous-State Dynamic Programs Using Linear and Spline Interpolation" *Operations Research* 41

Khan, Aubhik and Julia K. Thomas "Notes on Piecewise Polynomial Interpolation" (2004)

Van Loan (2000) *Introduction to scientific computing: A matrix-vector approach using MATLAB*®. Second edition. Prentice Hall.

3. Lumpy investment

Empirical evidence and partial equilibrium analysis

Caballero (1999) "Aggregate Investment" *Handbook of Macroeconomics* IB

Caballero, Engel and Haltiwanger (1995) "Plant-Level Adjustment and Aggregate Investment Dynamics" *Brookings Papers on Economic Activity* 2

Cooper, Haltiwanger and Power (2000) "Machine Replacement and the Business

Cycle: Lumps and Bumps" *American Econoimc Review* 89

Cooper and Haltiwanger (2000) "On the Nature of Capital Adjustment Costs" Boston University working paper

Doms and Dunne (1998) "Capital Adjustment Patterns in Manufacturing Plants" *Rev. Economic Dynamics* 1

General equilibrium analysis

Thomas (2002) "Is Lumpy Investment Relevant for the Business Cycle?" *Journal of Political Economy*, 110 (3): 508-534

Khan and Thomas (2003) 'Nonconvex Factor Adjustments in Equilibrium Business Cycle Models: Do Nonlinearities Matter?' *Journal of Monetary Economics* 50: 331-360. (available at http://research.mpls.frb.fed.us/research/sr/sr306.html)

Numerical methods for solving heterogeneous agent models

Krussel and Smith (1997) "Income and Wealth Heterogeneity, Portfolio Choice, and Equilibrium Asset Returns" *Macroeconomic Dynamics* 1

Krussel and Smith (1998) "Income and Wealth Heterogeneity in the Macroeconomy" *JPE* 106

4. Job Turnover with firing costs

Alvarez, Fernando; Veracierto, Marcelo (2001) 'Severance Payments in an Economy with Frictions' *Journal of Monetary Economics*, vol. 47, no. 3, June 2001, pp. 477-98

Alvarez, Fernando; Veracierto, Marcelo (1999) 'Labor-Market Policies in an Equilibrium Search Model' *NBER macroeconomics annual 1999* pp. 265-304

Hopenhayn, Hugo and Ricahrd Rogerson (1993) 'Job-Turnover and Policy Evaluation: A General Equilibrium Analysis' *Journal of Political Economy*, vol 101, no. 5, October 1993, pp. 915-938.

Veracierto, Marcelo (2001) 'Employment Flows, Capital Mobility, and Policy Analysis' *International Economic Review*, vol. 42, no. 3, August 2001, pp. 571-95