

Professor Ramón E. López

Non-convexities in economics

Fall 2017

This course is available only to doctorate students. ME students may take it with the express approval of the Professor.

I. Preliminaries: Early concerns about non-convexities

Koopmans, T. (1961). "Convexity assumptions, allocative efficiency and competitive equilibrium". *Journal of Political Economy*, pp. 467-477.

Bator, F. (1961). "On convexity, efficiency and markets". *Journal of Political Economy*, pp. 480-83.

W.J. Baumol, (1961). "On Taxation and the Control of Externalities", *American Economic Review*, pp. 307-322.

Farrell, M. (1959). "The convexity assumption in the theory of competitive markets", *J. of Political economy*, pp.377-91.

Rothenberg, J. (1960). "Non-convexity, aggregation, and Pareto optimality", *J. of Political Economy*, pp.435-469.

J.de V. Graaff (1957). Theoretical welfare Economics , Cambridge, 1957, pp. 22-70.

II. Foundations: Non-smooth calculus

Rockafellar, R. and R. Wets (1998). "Variational Analysis", in Fundamental Principles of Mathematical Science, Berlin, Springer-Verlag.

Mordukhovic, B. (2006). "Variational Analysis and generalized differentiation: Applications." in Fundamental Principles of Mathematical Science, Berlin, Springer-Verlag.

Freund, R. (2004). "Issues in non-convex optimization". Unpublished, MIT, April 2004.

III. Basic conceptual issues

Arrow, K. (1979). "The organization of economic activity: Issues pertinent to the choice of market versus non-market allocations" , in Public Expenditure and Policy Analysis (R. H. Haveman and J. Margolis, Eds.), Markham, Chicago, 1970

Boyd, J. and J. Conley (1997). " Fundamental non convexities in Arrowian markets and a Coasian solution to the problem of externalities" , *J. of Economic Theory*, pp. 388-407.

Kuosmanen, T. (2003). "Duality theory of non-convex technology". Wageningen University. International Atlantic Conference, Viena, March 2003.

Papadimitriou, C.H. and C. Wilkens (2011). "Economies with non-convex production and complexity equilibria". Proceedings of the 12th ACM conference on electronic commerce, pp. 137-46.

Peters, H. and P. Wakka (1987). "Convex functions on non-convex domains". *Economic Letters*, pp. 251-55.

Mas-Colell, A. (1987). "Non-convexity". In Eatwell, J., M. Milgate and P. Newman, *The New Palgrave: A dictionary of economics*, pp. 653-61.

Starrett, D. (1972). "Fundamental non-convexities in the theory of externalities". *Journal of Economic Theory*, 4, pp. 180-199.

Newman, P. " Convexity", in *The New Palgrave: A Dictionary of Economics*

Starr, R. (1969). " Quasi-equilibrium in markets with non-convex preferences", *Econometrica*, vol. 37, No 1.

IV. Applications to environmental and resource economics

Dasgupta, P. and K.G. Maler (2004). The economics of non-convex ecosystems: Introduction. Cambridge University Press.

Brock, W. and Starrett, D. (2003). "Managing Systems with Non-convex Positive Feedback". *Environmental and Resource Economics*, pp. 575-602.

Mäler, KG., Xepapadeas, A. & de Zeeuw, A. (2003). "The Economics of Shallow Lakes". *Environmental and Resource Economics*, pp. 603-624.

V. Applications to growth theory

Majumdar, M. and T. Mitra (1982). "Intertemporal allocation with a non-convex technology: the aggregative framework". *J. of Economic Theory*, pp. 101-26.

Majumdar, M. and T. Mitra (1983). "Dynamic optimization with a non-convex technology: the case of a linear objective function". *Review of Economic Studies*, 50, pp. 143-151.

Askri, K. and C. Le Van (1998). "Differentiability of the value function of non-classical optimal growth models". *J. of Optimization Theory and Applications* (97), pp. 591-604.

Hung, N. and C. Le Van (2006). "Non-convex aggregate technology and optimal economic growth". Unpublished, Laval University, Canada.

Course Evaluation: 1. Students are required to present and direct the class discussion of 4 pieces each throughout the semester. 2. They will have to write a research paper **strictly and directly** relevant to the course material.

Each component of the evaluation is worth one half of the final grade.