Syllabus

This course is an introduction to general equilibrium theory and welfare economics. There is no wonderful textbook. Mas Collel Winston and Green's *Microeconomic Theory*, hereinafter referred to as *MWG*, is not bad, but sometimes it is too much about trees and not enough about forests. *A Course in Microeconomic Theory* by David Kreps, referred to as *K* below, is idiosyncratic, but has some interesting points of view. Another interesting read is Bryan Ellickson's *Competitive Equilibrium: Theory and Applications*, also known as *E*. But remember that textbooks are largely to help undergraduates survey lots of material quickly and without depth, which describes neither you nor the goal of this course. More readings come from the journal articles linked below. This course will cover parts 3 and 4 of *MWG*. Naturally, we begin with part 4, and then return to part 3.

There is a lot you should look at on this syllabus but starred (*) readings are *required*. They are fair game for in-class questions and exams.

The single best reading on general equilibrium theory is essay 1 of T. C. Koopmans, *Three Essays on the State of Economic Science.* All serious GE scholars will want this in their library. Although it is out of print, used copies are frequently available and inexpensive at Alibris, Powells, ABEbooks, and the like. Whether you buy it or not, you should read it. An important text for the specialist is Arrow and Hahn's *General Competitive Analysis*. The urtext, of course, is Gerard Debreu's *Theory of Value* (which, by the way, was his thesis).

In addition, this syllabus contains references to useful articles, with links where available. If you link from off-campus, you may need to use the library's proxy server. Access Anywhere is a bookmarklet that you can install on your computer to access library materials. Information can be found here and here.

Background

This material will not be covered in class, and you are not likely to have to sit an exam on it. But the scholars and intellectuals among you should want to know why we're doing what we do, and how it came to be that way.

Why study GE?
- Here is a nice essay by (surprise!) Paul Krugman.
- Arrow, K."General Economic Equilibrium: Purpose, Analytic Techniques, Collective Choice". **American Economic Review** 64, 253-272 (1974).

History of General Equilibrium Theory
- Weintraub, E. Roy. *How Economics Became a Mathematical Science*. Duke U. Press, 2002.
- Weintraub, E. Roy. "On the Existence of a Competitive Equilibrium: 1930-1954". **Journal of Economic Literature** 21, 1-39 (1983).
- Leonard, R.J., "From Parlor Games to Social Science: von Neumann, Morgenstern, and the Creation of Game Theory 1928-1944". **Journal of Economic Lit.** 33, 730-761 (1995). Not strictly our subject, but your friends will think you erudite.
- Duffie, D. and H. Sonnenschein. "Arrow and General Equilibrium Theory". **Journal of Economic Literature** 27, 565-598 (1989).
- Debreu, G. "Economic Theory in the Mathematical Mode". **American Economic Review** 74, 267-278 (1984). His Nobel prize speech.

Methodology

It is important also to have some understanding of the methodology of modern economics. Economics is about fashion. What people like and don't like has as much to do with fashion and taste as with rigorous analytical standards. Two things we all find peachy-keen are *models* and *methodological individualism*.
- Morgan, M. " Modelling as a Method of Enquiry". in Morgan, M. ed. *The World in the Model: How Economists Work and Think*. Cambridge University Press. Forthcoming.
- Kaushik Basu, "Methodological Individualism". in *The New Palgrave Dictionary of Economics*, 2nd edition, edited by Steven N. Durlauf and Lawrence E. Blume, Palgrave Macmillan (Basingstoke and New York).
- Kenneth J. Arrow, " Methodological Individualism and Social Knowledge". **American Economic Review** 89, 1-9 (1994).

The relationship between theory and empirical work is not well understood. Here are two pieces worth looking at:
- Tjalling C. Koopmans, "Measurement Without Theory". **Review of Economic Statistics** 29, 161-172 (1947). Tom Sargent says this is the first call for a micro-founded macroeconomics. Chuck Manski says this is the beginning of modern econometrics. It is a book review!

- N. R.Hanson, *Patterns of Discovery*. The entire book is interesting, but Chapter I, on observation, is particularly so.

Other Takes on Markets

Economics is at its best when it discusses social systems, and this is what general equilibrium theory is about. But other notable economists have had systems models that are not inspired by the Lausanne school from which our formulation of multi-market equilibrium analysis descends. One example is the overrated F.A. Hayek. Here is something good he wrote: The Use of Knowledge in Society, **American Economic Review 35**, 519-30 (1945). I'm looking for something pithy by the 5ft 4in Schumpeter, but I bet he was never pithy for a moment, except perhaps for his famous comment about aspiring to be the greatest lover in Vienna; the greatest rider in Austria, and the greatest economist in the world, and having succeeded in only two out of three.

Introduction

The good and the bad of theory

- *Jorge Luis Borges, On Exactitude in Science.
- *Jean Baudrillard, Simulacra and Simulations (exerpt).

Examples

Linear Economic Models

- *Blume, L. Notes on Linear Programming.
- *Koopmans, T. *Activity Analysis of Production and Allocation*. Cowles Commission for Research in Economics, Monograph 13. Wiley, 1951. In particular, the beginning of Chapt. 3 (for the set-up of the model, not so much for the convex analysis, and Chapt. 7 on the non-substitution theorem.
- *Gale, D., *The Theory of Linear Economic Models*. McGraw-Hill, 1960. Especially Chapter 7
- *Chandar, P., "A Simple Proof of the Non-substitution Theorem". **Quarterly Journal of Economics** , 198--201 (1974).
- De Martino et. al.,""Von Neumann's Growth Model: Statistical Mechanics and Biological Applications""

The Ricardian Model

- *MWG* 15.D
- Chipman, J. "A Survey of the Theory of International Trade: Part I, The Classical Theory". **Econometrica** 33, 477--519 (1965).
- The Ricardian model is having something of a revival in international trade. See J. Eaton and S. Kortum, Putting Ricardo to Work, **Journal of Economic Perspectives** 26, 65--89 (2012).
- The continuum-goods version of this model has been important. See Matsuyama, K., "Ricardian Trade Theory" in The New Palgrave Dictionary of Economics, 2nd edition, edited by Steven N. Durlauf and Lawrence E. Blume, Palgrave Macmillan (Basingstoke and New York).
- Samuelson, P. "Theoretical Notes on Trade Problems". **Review of Economic Studies** 46, 145--54 (1964).
- A recent empirical application: Kondo, I. " Trade-induced displacements and local labor market adjustments in the U.S." **Journal of International Economics** 114, 180-202 (2018).

The 2×2×2 Model

- *Jones, R., "Hecksher-Ohlin Trade Theory" in *The New Palgrave Dictionary of Economic*, 2nd edition, edited by Steven N. Durlauf and Lawrence E. Blume, Palgrave Macmillan (Basingstoke and New York).
- Chipman, J. "A Survey of the Theory of International Trade: Part II, The Neo-Classical Theory". **Econometrica** 33, 686--760 (1965)
- *Mussa, M. "The Two-Sector Model in Terms of Its Dual: A Geometric Exposition". **Journal of International Economics** 9, 513--26 (1979).
- Leamer, E. *The Hecksher-Ohlin Model in Theory and Practice*. *Princeton Studies in International Finance Nr. 77 (1995)*.
- Davis, D., Weinstein, D., Bradford, S. and Shimpo, K. "The Hecksher-Ohlin-Vanek Model of Trade: Why Does it Fail? When Does It Work?." **American Economic Review** 67, (1977).
- A recent empirical application: Arezki, A., Fetzer, T. and Pisch,F. "On the comparative advantage of U.S. manufacturing: Evidence from the shale gas revolution." **Journal of International Economics** 107, 34-59 (2017).

Pure Exchange

- *MWG* 15.B
- *Ellickson* 1.2
- *Kreps* 6.1
- Humphrey, T., "The Early History of the Box Diagram." Federal Reserve Bank of Richmond *Economic Quartery* 82(1): 37-75.

- o Bator, F., "The Simple Analytics of Welfare Maximization." **American Economic Review** 47, 22--59 (1957).

Equilibrium and Welfare

The Welfare Theorems

- o *Arrow, K. J."An extension of the basic theorems of classical welfare economics". in *Proceedings of the Second Berkeley Symposium on Mathematical Statistics and Probability*, ed. J. Neyman, Berkeley: University of California Press, 507-32 (1951)
- o *Bator, F., "The Simple Analytics of Welfare Maximization." **American Economic Review** 47, 22--59 (1957).
- o Debreu, G. "The coefficient of resource utilization." **Econometrica** 19, 273-92 (1951).
- o *Koopmans, T. *Three Essays on the State of Economic Science*, essay 1.
- o *Lange, O. "The foundations of welfare economics". **Econometrica** 10, 215--228 (1942).
- o *Radner, R. "A note on the theory of cost-benefit analysis in the small". in *Capital, Investment and Development: Essays in Memory of Sukhamoy Chakravarty*, ed. K. Basu, T. Mitra and M. Majumdar, Oxford: Blackwell. 1983.
- o Samuelson, P. "The pure theory of public expenditure". **Review of Economics and Statistics** 36(4), 387--89 (1954).

The Right and Wrong of Welfare Economics

- o Sen, A."Utilitarianism and Welfarism." **Journal of Philosophy** 76:9 463-89 (1979).
- o Mongin, P. "Spurious Unanimity and the Pareto principle." **Economics and Philosophy** 32:3, 511-532 (2016).
- o Blume, L., T. Cogley, D. Easley, T. Sargent and V. Tsyrrenikov. "A case for incomplete markets." **Journal of Economic Theory** 178, 191-221 (2018).

Existence and Comparative Statics

Behavioral GE

- o *MWG 17.B,C

Preference-based GE - for self-study, not lecture material

- o *MWG* 17 appendix B
- o This is where you should read *Theory of Value* if you are interested in classical GE. This means *you*, macroeconomists and financiers.

Regular Economies, Local Uniqueness and Comparative Statics

- o *MWG 17.D,G
- o Debreu, G. "Regular Differentiable Economies". **American Economic Review** 66, 280-87 (1976).

Matching

General Reference

- o Roth, A. and M. Oliviera Sotomayor. *Two-Sided Matching: A study in game-theoretic modeling and analysis*. Cambridge U. Press. 1990.

One-Sided Matching

- o *Koopmans, T. C> and M. Beckmann. "Assignment Problems and the Location of Economic Activities". in **Econometrica** 25,1 53--76 (1957).

Transferable Utility

- o *Shapley, L. and D. Shubik. "The Assignment Game I: The Core". in **International Journal of Game Theory** 1, 111-130 (1972).
- o Hurlbert, Glenn. "A Short Proof of the Birkhoff-von Neuman Theorem". Unpublished, Arizona State University (2009).

Matching Without Exchange

- o *Gale, D. and L. Shapley. "College Admissions and the Stability of Marriage". in **American Mathematical Monthly** 69, 9--15 (1962).
- o Abdulkadiroğlu, A., P. Pathak, A. Roth and T. Sönmez. "The Boston Public School Match". **American Economic Review** 95,2 368--71.

Matching with Non-Transferable Utility

- o Kelso, A. and V. Crawford. "Job Matching, Coalition Formation, and Gross Substitutes". **Econometrica** 50,6 1483--1504 (1982).

Applications

- o *Becker, G. "A Theory of Marriage: Part I". **Journal of Political Economy** 81, 813-46 (1973).

- *Browning, M., Chiappori, P.-A. and Weiss. Y., *The Economics of the Family*. Cambridge UK, Cambridge University Press. 2014. Chapters 7 and 8 are concerned with applications of the transferable-utility matching model.
- Pathak, P. "The Mechanism Design Approach to Student Assignment". **Annual Review of Economics** 3 (2011).
- Roth, Al, "What Have We Learned From Market Design". NBER Working Paper 13530 (2007).

Introduction to Asymmetric Information

Key Papers

- *Akerlof, G. "The market for 'lemons': quality uncertainty and the market mechanism". **Quarterly Journal of Economics** 84(3): 488--500 (1970).
- *Arrow, K. "Uncertainty and the welfare economics of medical care". **American Economic Review** 53(5): 941--73 (1963).
- *Rothschild, M. and J. Stiglitz. "Equilibrium in competitive insurance markets: An essay on the economics of imperfect information". **Quarterly Journal of Economics** 90(4): 629-649 (1976).
- *Spence, M."Job market signalling". **Quarterly Journal of Economics** 87(3): 355-374 (1973).

Theory of the Firm

- *Bowles, S. "Marx and Modern Economics". CEPR, 21 April 2018.
- *Coase, R. 1937. "The nature of the firm". **Economica** 4(16): 386--405.
- Williamson, O. **Markets and Hierarchies: Analysis and Antitrust Implications: A Study in the Economics of Internal Organization**. The Free Press. 1975.

Further Applications

Uncertainty

- *Arrow, K. J. "The Role of Securities in the Optimal Allocation of Risk-Bearing". **Review of Economic Studies** **31**, 91-96 (1964).
- *Radner, R. "Existence of Equilibrium of Plans, Prices and Price Expectations in a Sequence of Markets". **Econometrica** 1972, 289--303.
- *Hart, O. "On the Optimality of Equilibrium when the Market Structure is Incomplete". **Journal of Economic Theory** 1975, 418--443.
- Hansen, L., J. Heaton, J. Lee and N. Roussanov. "Intertemporal Substitution and Risk Aversion". in *Handbook of Econometrics* vol. 6, eds. J. Heckman and E. Leamer, 3967--4056 (2007).
- Polemarchakis, H. "The allocation of risk in an incomplete market". **The Geneva Papers on Risk and Insurance Theory** 15(1), 5--16 (1990).

Economic Growth

- Cass, D. "Optimum Growth in an Aggregative Model of Capital Accumulation". **Review of Economic Studies** 32(3) 233-40 (1965).
- Koopmans, T. "On the Concept of Optimal Economic Growth". Cowles Foundation Discussion Paper No. 163 (1963).
- *Ramsey, F., "A Mathematical Theory of Saving". **Economic Journal** 38, 543--559 (1928). This is the urtext for modern growth theory.
- Weitzman, M. L., "Duality Theory for Infinite Horizon Convex Models". **Management Science** 19, 783--9 (1973)
- Malinvaud, E., "Capital Accumulation and Efficient Allocation of Resources". **Econometrica** 21, 233--268 (1953).
- Malinvaud, E., "Efficient Capital Accumulation: A Corrigendum". **Econometrica** 49, 570--573 (1962).

Overlapping Generations

- *John Geanakoplos, Overlapping Generations Model of General Equilibrium, in *The New Palgrave Dictionary of Economics,*, 2nd edition, edited by Steven N. Durlauf and Lawrence E. Blume, Palgrave Macmillan (Basingstoke and New York).
- *David Gale, Pure Exchange Equilibrium of Dynamic Economic Models. **Journal of Economic Theory** 6, 12--36 (1973).

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