

Economics 609
Winter, 2005

Lorch 312
Department of Economics
University of Michigan

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Office Hours: Thursday, 2:00–2:30
764-2375

This course develops the mathematical tools necessary to analyze optimal decision-making by individual households and firms over time and in the face of risk. Such decisions are building blocks for general equilibrium models, for statistical models of behavior and for theoretical analyses of policy.

Thinking about optimization over time and in the face of risk can seem overwhelming. This course will give you a way to orient yourself when thinking about behavior in a dynamic, stochastic context.

The rapid decline in the price of computing power has led to increased use of the computer as a way of looking at economic models. This raises the value of the complementary activity of understanding results theoretically and intuitively. Understanding is needed both to cross-check computer results and to give them meaning. Theoretical results for a model or class of models can save a lot of time one might otherwise spend looking for the impossible and suggest fruitful directions to look for important effects. General theoretical results are also often publishable in their own right.

I. The Economics of Uncertainty in One- and Two-Period Models

A. Basics

- * Gollier, Part I: General Theory
- * Gollier Part II: The Standard Portfolio Problem

B. Using Extremal Functions

- * Gollier Part III: Technical Tools

C. Precautionary Saving

Kimball, M., 1992: “Precautionary Motives for Holding Assets,” *The New Palgrave Dictionary of Money and Finance*, Peter Newman, Murray Milgate and John Eatwell (eds.), Stockton Press, New York, 158–161.

- * Gollier Part V: Consumption and Saving
- * Kimball, M., 1990: “Precautionary Saving in the Small and in the Large,” *Econometrica* (January), 53–73.
- * Kimball, M., and Philippe Weil, 2003: “Precautionary Saving and Consumption Smoothing over Time and Possibilities,” mimeo.

Kimball, M., 1989: “The Effect of Demand Uncertainty on a Precommitted Monopoly Price,” *Economics Letters*, **30** (September), 1–5.

Kimball, M., 1994: “Discussion of ‘The Importance of Precautionary Motives for Explaining Individual and Aggregate Saving,’ by R. Glenn Hubbard, Jonathan Skinner, and Stephen P. Zeldes,” Carnegie-Rochester Conference Volume, *Journal of Monetary Economics*.

D. Multiple Risk Bearing

- * Gollier Part IV: Multiple Risks

Kimball, M., 1993: “Standard Risk Aversion,” *Econometrica* (May), 589–611.

Elmendorf, E. and Kimball, M., 2000: “Taxation of Labor Income and the Demand for Risky Assets,” *International Economic Review*, 41 (August), 801–832.

II. Dynamic and Stochastic Programming in Discrete Time: Bellman's Equation and Symmetry Methods

Boyd, John H. III (1990): "Symmetries, Dynamic Equilibria, and the Value Function," in *Conservation Laws and Symmetry*, Ryuzo Sato and Rama V. Ramachandran eds., Kluwer.

Merton, Robert C., "Optimum Consumption and Portfolio Rules in a Continuous Time Model," *JET* 3 (1971): 373-413.

Kimball, M. and Mankiw, N. G., 1989: "Precautionary Saving and the Timing of Taxes," *Journal of Political Economy*, **97** (August), 863-879.

* Kimball, Miles: "Consumption Technology Neutrality"

III. Recursive Characterization of the Value Function

Fama (1970): "Multiperiod Decision Problems," *American Economic Review* **60**, 163-174.

A. Horizontal and Vertical Addition of the Marginal Value Function

* Carroll, C. and Kimball, M., 1996: "On the Concavity of the Consumption Function," *Econometrica*, 64 (July), 981-992.

* Carroll, Chris, and Kimball, M., (2001): "Liquidity Constraints and Precautionary Saving." NBER Working Paper # 8496.

* Kimball, Miles S., "Precautionary Saving and the Marginal Propensity to Consume," NBER Working Paper #3403.

B. The Preser-Max Theorem

IV. Perturbation Methods

Kimball, Miles "The Effect of Uncertainty on Optimal Control Models in the Neighborhood of a Steady State."