Stochastic Dynamic Programing with complete and incomplete markets

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Tentative Syllabus

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Course Description

This course will review in detail the literature on Stochastic Dynamic Programming. We will start studying a canonical recursive problem. We will learn how to show the existence, uniqueness (or not) and main properties of bellman equations. The goal in these lectures is to build a toolbox that allows students to prove analogous results in less standard models. Then we move to Aiyagari-Bewley-Hugget economies. We analyze in detail the main characteristic and implications of self-insurance standard model using the martingale convergence theorem and show the existence and uniqueness (or not) of a wealth distribution in general equilibrium.

Finally, we study models with heterogeneous returns on investment (savings). These models sometimes allow for analytic aggregation with aggregate uncertainty and deliver more "reasonable" wealth distributions.

Lectures plan.

The course will last five 2 weeks with 5 lectures of two hours each. **Possible dates: October 6-17.**

Week 1: The benchmark and some preliminary math

Class 1 Some preliminary math. Contraction Mapping theorem. Theorem of Maximum. Properties of value functions. Deterministic environment.

Class 2: Existence and uniqueness of value functions (and equilibrium) in stochastic environments. Example: insurance problem with complete markets. General Equilibrium and aggregation.

Week 2: Models with incomplete markets.

Class 1: Partial Equilibrium: The standard Chamberlain and Wilson model.

Class 2: General Equilibrium 1: Aiyagari-Hugget economy: characterizing the equilibrium wealth distribution. Approximate aggregation.

Class 3: General Equilibrium 2: Angeletos-Bisin economy. Uninsured idiosyncratic returns.

References (some not of all them and in random order)

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Marco Cagetti & Mariacristina De Nardi, 2006. "*Entrepreneurship, Frictions, and Wealth*," Journal of Political Economy, University of Chicago Press, vol. 114(5), pages 835-870, October.

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Ana Castaneda, Javier Diaz-Gimenez and Jose Victor-Rios-Rull. "*Accounting for earnings and wealth inequality*". Journal of Political Economy, Vol. 111, no 4, 818-857, (2003).

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