Dynamic Contracts and Repeated Games Using Continuous-Time Methods

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Dynamic incentive problems are crucial in economics. They appear in many fields. In macroeconomics incentives pose constraints that lead to inequality. In corporate finance, incentives justify financial frictions and impose limits on optimal capital allocation.

This course is designed to give a brief introduction of continuous-time optimization, and illustrate the use of stochastic calculus in for studying dynamic incentives. Continuous-time methods can, in many cases, lead to powerful models to understand economic phenomena. There is an established tradition in continuous-time asset pricing, and there is increasing use of these methods in other fields, such as game theory, contract theory, market microstructure and macroeconomics. Stochastic calculus provides powerful ways to characterize optimal solutions, and to study dynamics – what incentives imply about the distribution of wealth and future outcomes.

Reading list

Sannikov, Y. (2008) "A Continuous-Time Version of the Principal-Agent Problem," *Review of Economic Studies*, 75, 957-984.

Biais, B., T. Mariotti, G. Plantin, and J.-C. Rochet (2007) "Dynamic Security Design: Convergence to Continuous Time and Asset Pricing Implications," *Review of Economic Studies,* vol. 74(2), pages 345- 390

DeMarzo, P. and Y. Sannikov (2006) "Optimal Security Design and Dynamic Capital Structure in a Continuous-Time Agency Model," *Journal of Finance* 61: 2681-2724.

DeMarzo, P., M. Fishman, Z. He and N. Wang (2011) "Dynamic Agency and the *q* Theory of Investment," working paper, Stanford GSB

Sannikov, Y. (2007) "Games with Imperfectly Observable Actions in Continuous Time," *Econometrica*.

Williams, Noah (2011) "Persistent Private Information," *Econometrica*

Di Tella, S. and Y. Sannikov, Y. (2016) "Optimal Asset Management Contracts with Hidden Savings," working paper

Gonzalo Cisternas (2016), "Two-Sided Learning and Moral Hazard," working paper, MIT