Advanced Microeconomic Theory:
Dynamic Mechanism Design

Economics 521b
Spring 2012

Time and Location: M., W., 10:30-11:50, 28 Hillhouse, Room 106.

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Program. This course covers selected topics in the economics of information and uncertainty. The theme of the course this year is "Dynamic Mechanism Design". The theory of mechanism design as laid out in the seminal contributions of Vickrey (1961) and Hurwicz (1972) analyzes the performance of various institutions in an economy where information is dispersed amongst participating agents. The key underlying idea is that information is similar to other economic goods in the sense that the agents have autonomy over the decisions regarding their information. How information is used depends on the mechanism in place.

The first generation of (positive) results for mechanism design in Clarke (1971), Groves (1973), Green and Laffont (1977) and D’Aspremont and Gerard-Varet (1979) characterized surplus maximizing mechanisms within private values economies. The second step towards a general theory resulted from a change in focus. Rather than start with surplus maximization as the objective, the work of Myerson (1979), Myerson (1981) and Myerson and Satterthwaite (1983) on revenue maximizing mechanisms started with a characterization of all implementable allocation rules. This opened up the field for a large number of applications ranging from optimal auctions and bilateral trade to regulation and negotiations.

Perhaps surprisingly, almost all of the theory and most of the applications are set in a completely static economic model. The available information comes in the
form of an initial endowment and it is collected from the agents in a static revelation game. Furthermore, the allocation is decided once and for all. If information on the potential uses of a resource arrives over time, then it is quite likely that any optimal allocation mechanism also reallocates the resource over time. The recent literature on dynamic mechanism design has started an investigation of surplus maximization (for example in Bergemann and Välimäki (2010) and Athey and Segal (2007)) and revenue maximization (e.g. Pavan, Segal, and Toikka (2009)) in models that incorporate these dynamic features.

The objective of this course is twofold: First, it is meant to provide an introduction into the main themes and techniques of dynamic mechanism design. Second, it is meant to illustrate the central insights of the theoretical work in the context of important economic applications.

Course requirements. This course has four basic requirements. They are: 

(i) reading the assigned papers before the presentation in class, 
(ii) solving the problem sets, 
(iii) presenting one or two research paper and 
(iv) writing a term paper. The assignments will be given weekly or biweekly. Class participation, assignments, and the term paper will jointly determine the final grade.

Required texts. There is no textbook for this course, however the following books should be in the library of every (micro-)economist: Mas-Collel, Whinston, and Green (1995), Fudenberg and Tirole (1991), Myerson (1991) and Osborne and Rubinstein (1994). Selected sections in these books will often constitute background reading.

\[1\text{The relatively recent literatures on multi-object auctions and auctions with resale are notable exceptions to this.}\]
Weekly Schedule

1. 1/9 - 1/16 (JV): Efficient Mechanisms: 

2. 1/18 - 1/25 (JV): Efficient Dynamic Allocation 

3. 1/30 - 2/1 (DB): Dynamic Incentives and the Ratchet Effect: Baron and Besanko (1984),


6. 2/20 - 2/22 (DB): Guest Speaker: Tim Roughgarden, Stanford University

7. 2/27 - 2/29 (DB): Necessary and Sufficient Conditions for Implementation


12. 4/16-4/18 (JV): Information Aggregation
Reading List:
The reading list below will be updated and augmented as the course proceeds and new material arrives.

**Mechanism Design**
Efficient Mechanism Design
VCG mechanisms, AGV mechanisms, Problems of budget balance, Interdependent values, Dynamic Pivot Mechanism.

**Limits to Efficient Mechanisms**

**Efficient Dynamic Allocation**
Bergemann, D., and J. Valimaki "Learning and Strategic Pricing", Econometrica, 64, 1125-1149.

**Mechanisms and Timing**

**Mechanisms without Transfers: Repeated Games**
Escobar, J., and J. Toikka (2011) "A Folk Theorem with Markovian Private Information", mimeo, MIT.
Renault, J., E. Solan, and N. Vieille (2011) "Dynamic Sender Receiver Games", mimeo, HEC.
1. References


