
THEoretical Studies on IncentiveS 2009-2010

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Overview

The goal of the workshop is, as each year, to discuss in an informal and interactive way recent developments in the Theory of Incentives.

Practically, we should meet most on Tuesdays at 14 :00 pm till 15 :30 pm every other week. You are supposed to give a presentation which may be ideally a mix between the relevant literature on the topic, a particular frontier paper and maybe your own thoughts on the topic. Collaborative work is encouraged. Also, We suggest that everybody reads a little bit about the topic under scrutiny each week so that discussions can really come out of that.

This year, we will cover two topics : Condorcet Jury and market design for pollution permits. Very little relationship between those two except that both are enjoyable topics.

Prerequisites are a good knowledge of Laffont and Martimort *The Theory of Incentives : The Principal-Agent Analysis* (2002, Princeton University Press) and *The Theory of Incentives : Complex Organizations* (forthcoming one of these days, we never have been so close and each year even more so).

Last point, there will be a “feuille de presence” that you need to fill each time you are there....Let explain, this seminar is part of EHESS program and to justify that EHESS exists, we need to provide hard evidence on the seminar. (For those who do not know France and its intricate web of research centers, all this is weird and they should not care without loss of generality.)

Suggested Program on Condorcet and others

Here is a suggested list of readings.

Condorcet.

1. Austen-Smith, D., and J. Banks (1996) : “Information Aggregation, Rationality and the Condorcet Jury Theorem,” *American Political Economy Review*, 90 : 34-45.
The Condorcet Jury Theorem states that majorities are more likely than any single individual to select the “better” of two alternatives when there exists uncertainty about which of the two alternatives is in fact preferred. Most extant proofs of this theorem implicitly make the behavioral assumption that individuals vote “sincerely” in the collective decision making, a seemingly innocuous assumption, given that individuals are taken to possess a common preference for selecting the better alternative. However, in the model analyzed here we find that sincere behavior by all individuals is not rational even when individuals have such a common preference. In particular, sincere voting does not constitute a Nash equilibrium. A satisfactory rational choice foundation for the claim that majorities invariably “do better” than individuals, therefore, has yet to be derived.
2. Myerson, R. (1998) : “Extended Poisson Games and the Condorcet Jury Theorem,” *Games and Economic Behavior*, 25 : 111-131.
The Poisson model of games with population uncertainty is extended, by allowing that expected population sizes and players’ utility functions may depend on an unknown state of the world. Such extended Poisson games are applied to prove a generalization of the Condorcet jury theorem.
3. Chwe, M. S.-Y. (1999) : “Minority Voting Rights Can Maximize Majority Welfare,” *Ame-*

rican Political Science Review, 93 : 85-87.

I use Condorcet's information aggregation model to show that sometimes the best possible decision procedure for the majority allows the minority to "enforce" its favored outcome even when overruled by a majority. "Special" voting power gives the minority an incentive to participate meaningfully, and more participation means more information is aggregated, which makes the majority better off. This result can be understood as a mathematical corroboration of Lani Guinier's arguments that voting procedures can be designed to encourage minority participation, benefitting everyone.

4. Chwe, M. S.-Y. (2008) : "A Robust and Optimal Anonymous Procedure for Condorcet's Model," mimeo.

In Condorcet's model of information aggregation, a group of people decides among two alternatives, with each person getting an independent bit of evidence about which alternative is objectively superior. I define the supermajority penalty (SP) procedure and show that it is incentive compatible for all possible preferences and prior beliefs and is in this sense completely robust. I also show that for an unbiased person, the SP procedure is the optimal anonymous incentive compatible procedure when there are significant biases in both directions (when at least one person is biased toward one alternative and at least one person is biased toward the other). The SP procedure is not monotonic, but this is not unusual : I show that when there are significant biases in both directions, all nontrivial anonymous incentive compatible procedures are non-monotonic.

5. Koriyama, Y., and B. Szentes (2009) : "A Resurrection of the Condorcet Jury Theorem," *Theoretical Economics*, 4 : 227-252.

This paper analyzes the optimal size of a deliberating committee where (i) there is no conflict of interest among individuals and (ii) information acquisition is costly. The committee members simultaneously decide whether to acquire information, and then make the ex-post efficient decision. The optimal committee size, k^* , is shown to be bounded. The main result of this paper is that any arbitrarily large committee aggregates the decentralized information more efficiently than the committee of size k^*-2 . This result implies that oversized committees generate only small inefficiencies.

Information Aggregation.

1. Feddersen, T. and W. Pesendorfer (1996) : "Swing Voter's Curse," *American Economic Review*, 86 : 408-424.

We analyze two-candidate elections in which some voters are uncertain about the realization of a state variable that affects the utility of all voters.. We demonstrate the existence of a swing voter's curse : less informed indifferent voters strictly prefer to abstain rather than vote for either candidate even when voting is costless. The swing voter's curse leads to the equilibrium result that a substantial fraction of the electorate will abstain even though all abstainers strictly prefer voting for one candidate over voting for another.

2. Feddersen, T. and W. Pesendorfer (1996) : "Voting Behavior and Information Aggregation in Elections with Private Information," *Econometrica*, 65 : 1029-1058.

We analyze two-candidate elections in which voters are uncertain about the realization of a state variable that affects the utility of all voters. Each voter has noisy private information about the state variable. We show that the fraction of voters whose vote depends on their private information goes to zero as the size of the electorate goes to infinity. Nevertheless, elections fully aggregate information in the sense that the chosen candidate would not change if all private information were common knowledge. Equilibrium voting behavior is to a large extent determined by the electoral rule, i.e., if a candidate is required to get at least x percent of the vote in order to win the election, then in equilibrium this

candidate gets very close to x percent of the vote with probability close to one. Finally, if the distribution from which preferences are drawn is uncertain, then elections will generally not satisfy full information equivalence and the fraction of voters who take informative action does not converge to zero. .Want the full article?

Costly Voting.

1. Borgers, T., (2004) : “Costly Voting,” *American Economic Review*, 94 : 57-66.
What are good voting rules if voting is costly? We analyse this question for the case that an electorate chooses among two alternatives. In a symmetric private value model of voting we show that majority voting with voluntary participation Pareto-dominates majority voting with compulsory participation. We also demonstrate the potential advantages of asymmetric voting rules. We consider three types of such rules : Rules which do not allow all individuals to vote, rules which rely on an arbitrary status quo which can only be overturned if a majority of individuals participates in the voting process, and sequential voting rules.
2. Gershkov, A., and B. Szentes (2009) : “Optimal Voting Schemes with Costly Information Acquisition,” *Journal of Economic Theory*, 144 : 36-68.
A group of individuals with identical preferences must make a decision under uncertainty about which decision is best. Before the decision is made, each agent can privately acquire a costly and imperfect signal. We discuss how to design a mechanism for eliciting and aggregating the collected information so as to maximize ex-ante social welfare. We first show that, of all mechanisms, a sequential one is optimal and works as follows. At random, one agent at a time is selected to acquire information and report the resulting signal. Agents are informed of neither their position in the sequence nor of other reports. Acquiring information when called upon and reporting truthfully is an equilibrium. We next characterize the ex-ante optimal scheme among all ex-post efficient mechanisms. In this mechanism, a decision is made when the precision of the posterior exceeds a cut-off that decreases with each additional report. The restriction to ex-post efficiency is shown to be without loss when the available signals are sufficiently imprecise. On the other hand, ex-post efficient mechanisms are shown to be suboptimal when the cost of information acquisition is sufficiently small.
3. Gerardi, D. and L. Yariv (2009) : “Costly Expertise”, *American Economic Review*, 98 : 187-193.

Persuasion.

1. Che, Y.K. K. Narvik (2008) : “Opinion as Incentives”, mimeo.
We study a model where a decision maker (DM) must select an adviser to advise her about an unknown state of the world. There is a pool of available advisers who all have the same underlying preferences as the DM; they differ, however, in their prior beliefs about the state, which we interpret as differences of opinion. We derive a tradeoff faced by the DM : an adviser with a greater difference of opinion has greater incentives to acquire information, but reveals less of any information she acquires, via strategic disclosure. Nevertheless, it is optimal to choose an adviser with at least some difference of opinion. The analysis reveals two novel incentives for an agent to acquire information : a persuasion motive and a motive to avoid prejudice. Delegation is costly for the DM because it eliminates both of these incentives. We also study the relationship between difference of opinion and difference of preference.
2. Caillaud, C. and J. Tirole (2008), “Consensus Building : How to Persuade a Group,” *American Economic Review* 97 : 1877-1900.

The paper explores strategies that the sponsor of a proposal may employ to convince a qualified majority of members in a group to approve the proposal. Adopting a mechanism design approach to communication, it emphasizes the need to distill information selectively to key group members and to engineer persuasion cascades in which members who are brought on board sway the opinion of others. The paper shows that higher congruence among group members benefits the sponsor. The extent of congruence between the group and the sponsor, and the size and the governance of the group, are also shown to condition the sponsor's ability to get his project approved.

3. Li, H. (2001) : "A Theory of Conservatism," *Journal of Political Economy*, 109 : 617-636. A free-rider problem arises when a group choice between two alternatives has to be made on the basis of privately collected evidence, leading to insufficient effort in gathering evidence and an ex ante welfare loss for the group. To alleviate the free-rider problem, the group can commit to a conservative rule, whereby the decision is made against the alternative favored by the group's preference or prior when evidence supports it but is not preponderant. Optimal conservatism increases private incentives to gather evidence and improves the quality of the group decision. My result explains why sometimes groups appear overly cautious toward favored alternatives.

Committees.

1. Li, H., S. Rosen and W. Sueng (2001), "Conflicts and Common Interests in Committees," *American Economic Review* : -. Committees improve decisions by pooling members' independent information, but promote manipulation, obfuscation, and exaggeration of private information when members have conflicting preferences. Committee decision procedures transform continuous data into ordered ranks through voting. This coarsens the transmission of information, but controls strategic manipulations and allows some degree of information sharing. Each member becomes more cautious in casting the crucial vote than when he alone makes the decision based on own information. Increased quality of one member's information results in his casting the crucial vote more often. Committees make better decisions for members than delegation.
2. Gerardi, D. and L. Yariv (2009) : "Information Acquisition in Committees," *Games and Economic Behavior*, 66 : 436-459. The goal of this paper is to illustrate the significance of information acquisition in mechanism design. We provide a stark example of a mechanism design problem in a collective choice environment with information acquisition. We concentrate on committees that are comprised of agents sharing a common goal and having a joint task. Members of the committee decide whether to acquire costly information or not at the outset and are then asked to report their private information. The designer can choose the size of the committee, as well as the procedure by which it selects the collective choice, i.e., the correspondence between agents' reports and distributions over collective choices. We show that the ex ante optimal device may be ex post inefficient, i.e., lead to suboptimal aggregation of information from a statistical point of view. For particular classes of parameters, we describe the full structure of the optimal mechanisms.
3. Persico, N. (2004) : "Committee Design with Endogenous Information," *Review of Economic Studies*, 71 : 165-191. Identical agents gather costly information, and then aggregate it through voting. Because information is a public good, information is underprovided relative to the social optimum. A "good" voting rule must give incentives to acquire information, as well as aggregate information efficiently. A voting rule that requires a large plurality (in the extreme, una-

nimity) to upset the status quo can be optimal only if the information available to each agent is sufficiently accurate. This result is independent of the preferences of voters and of the cost of information.

Suggested Program on Market design for Pollution Permits

1. Roberts, M. and M. Spence (1976) : “Effluent Charges and Licences under Uncertainty”, *Journal of Public Economics*, 5 : 193-208.

This paper is concerned with pollution control when the regulators are uncertain about firms’ cleanup costs. Under these circumstances, the regulatory authority can reduce expected total social costs (consisting of damages from pollution and cleanup costs) below the levels achievable with either effluent fees or licenses. The reduction is achieved by the use of licenses supplemented by an effluent subsidy and a finite penalty, when effluents are below or above the levels permitted by licenses. The mixed system retains the property of efficiently distributing cleanup among firms.

2. Hahn, Robert W. (1984) : “Market Power and Transferable Property Rights,” *The Quarterly Journal of Economics*, 99 : 753-65.

The appeal of using markets as a means of allocating scarce resources stems in large part for the assumption that a market will approximate the competitive ideal. When competition is not a foregone conclusion, the question naturally arises as to how a firm might manipulate the market to its own advantage. This paper analyzes the issued of market power in the context of markets for transferable property rights. First, a model is developed and explains how a single firm with market power might exercise its influence. This is followed by an examination of the model in the context of a particular policy problem - the control of particulate sulfates in the Los Angeles region.

3. Rob, R. (1989) : “Pollution Claim Settlements under Private Information”, *Journal of Economic Theory*, 46 : 307-333.

The classical problem of resolving a nuisance dispute between a pollution-generating firm and nearby residents is modelled here as a mechanism-design problem. We assume that the designer of the mechanism is the firm, that it is uncertain about the actual losses suffered by residents and that the initial assignment of property rights is one where each resident is entitled to prevail. We derive a profitmaximizing scheme under the individual-rationality and incentive-compatibility constraints and examine its properties. It is shown that the outcomes it yields are sometimes inefficient. Moreover, when many residents are affected by pollution and the degree of uncertainty with respect to the losses they suffer is large, these inefficiencies become rampant

4. Laffont, J.J. and J. Tirole (1996) : “Pollution Permits and Compliance Strategies”, *Journal of Public Economics*, 62 : 85-125.

This paper analyzes the impact of spot and futures markets for tradeable pollution permits on the potential polluters’ compliance decisions. Polluters can buy permits, invest in pollution abatement, or else stop production or source out. We show that stand-alone spot markets induce excessive investment. The introduction of a futures market reduces this incentive to invest, but is not the optimal way to control pollution. A menu of options on pollution rights, possibly coupled with intertemporally bundled sales, yields higher welfare. Because of its focus on long-run demand elasticities and rent extraction, this paper can be applied to a variety of situations such as demand-side management, public transportation, bypass in telecommunications, or forward sales by a private monopolist.

5. Laffont, J.J. and J. Tirole (1996) : “Pollution Permits and Environmental Innovation”,

Journal of Public Economics, 62 : 127-140.

This paper starts with a warning about the negative impact of plain pollution allowance markets on environmental pollution innovation. Stand-alone spot markets enable the government to expropriate an innovation by offering a competing technology (pollution permits) that puts an arbitrary downward pressure on the licensing price. Advance allowances reduce expropriation but still create suboptimal incentives for innovation. They have the further drawback that permits are inefficiently used when the innovation occurs. Options to pollute at a given striking price fare better than allowances because they create private incentives to phase out pollution in the case of innovation. We characterize the social optimum and show that it can be implemented by issuing options to pollute, inter alia. Finally, the paper compares ex ante and ex post government procurement. Surprisingly, ex post licensing by the innovator to the government may yield a higher licensing fee than an ex ante contract.

6. Ray, D. and R. Vohra (2001) : “Coalitional Power and Public Goods”, *Journal of Political Economy*, 109 : 1355-1384.

We study the provision of public goods when all agents have complete information and can write binding agreements. This framework is in deliberate contrast to a traditional view of the free-rider problem based on hidden information or voluntary provision. We focus on coalition formation as a potential source of inefficiency. To this end, we develop a notion of an equilibrium coalition structure, based on the assumption that each coalition that forms does so under a rational prediction of the society-wide coalition structure. In a simple model, we characterize the (unique) equilibrium coalition structure. Only in some cases does the equilibrium involve full cooperation, resulting in efficient provision of the public good. In other cases, the equilibrium consists of several coalitions and inefficient provision. However, the degree of inefficiency and the number of possible coalitions are bounded.

7. Yates, A. and M. Cronshaw (2001) : “Pollution Permit Markets with Intertemporal Trading and Asymmetric Information”, *Journal of Environmental Economics and Management*, 42 : 104-118.

We consider the problem of determining the permit discount rate in pollution permit markets in which permits may be traded over time and polluting firms have better information about their abatement costs than does the regulator. We show that the preferred permit discount rate may be greater than or less than the money discount rate. We also consider whether or not the regulator should allow intertemporal trading to take place. Allowing intertemporal trading lowers social costs when the slope of the marginal damage function is less than the slope of the aggregate marginal abatement cost function.

8. Disegni Eshel, D. (2005) : “Optimal Allocation of trade Pollution Rights and Market Structures”, *Journal of Regulatory Economics*, 28 : 205-223.

Tradable environmental rights are increasingly pursued as a regulatory instrument, to control for environmental quality. However, in the presence of market power, regulation through an allocation of tradable rights generally yield inefficient outcomes. This article analyzes the effect of the initial distribution of tradable rights on the firms’ strategies and performance in abatement and production, and proposes an efficient criterion for the allocation of tradable rights among firms with market power and competitive fringe firms. The suggested criterion maximizes efficiency of the market based regulation. A simple numerical example illustrates the theoretical discussion.

9. Montero, J.-P. (2005) : “Pollution Markets with Imperfectly Observed Emissions”, *RAND Journal of Economics*, 36 (3), 645-660.

I study the advantages of pollution permit markets over uniform emission (or technology)

standards when the regulator has incomplete information on firms' emissions and costs of production and abatement (e.g., air pollution in large cities). Because the regulator observes only each firm's abatement technology but neither its emissions nor its output, there are cases in which standards can lead to lower emissions and, hence, welfare dominate permits. If permits are optimally combined with standards, in many cases this hybrid policy converges to the permits-alone policy but (almost) never to the standards-alone policy.

10. Liski, A. and J.-P. Montero (2006) : "On Pollution Permit Banking and Market Power", *Journal of Regulatory Economics*, 29, 283-302.

We consider a pollution permit market with a large firm and fringe of competitive firms. To smooth compliance towards a long-run emissions goal, firms are initially allocated a stock (i.e., bank) of permits that can be gradually consumed. We first show how the large firm can credibly manipulate the spot market in subgame-perfect equilibrium. Motivated by features observed in the US market for sulfur dioxide emissions, we then show that the introduction of stock transactions has no effects on market power, but that forward trading and incomplete observability of stock holdings do have pro-competitive effects.