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The role of commitment in bilateral trade ☆

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Abstract

This paper characterizes the set of equilibrium payoffs in bargaining with interdependent values when the informed party makes all offers, as discounting vanishes. The seller of a good is informed of its quality, which affects both his cost and the buyer's valuation, but the buyer is not. To characterize this payoff set, we derive an upper bound, using mechanism design with limited commitment. We then prove that this upper bound is tight, by showing that all its extreme points are equilibrium payoffs. Our results shed light on the role of different forms of commitment in bargaining. In particular, they imply that the buyer's inability to commit before observing the terms of trade is what precludes efficiency.

JEL classification: C70; C78; D82

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1. Introduction

With few exceptions, non-cooperative theories of bargaining concern themselves with the extreme cases of full commitment or no commitment whatsoever. Mechanism design neglects the

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problem of sequential rationality, whereas infinite-horizon bargaining following Rubinstein [16] revels in the asymptotic analysis as frictions, interpreted as commitment, disappear.

Our goal is to better understand how commitment matters in markets with adverse selection. To do so, we consider a standard model of trade, with one buyer and one seller. The setting is that of the lemon problem, as introduced by Akerlof [1], the simplest framework for trade under interdependent values. The seller knows both the value and cost of the unit, while the buyer does not.[1] There is common knowledge of gains from trade.

The full commitment problem has been thoroughly investigated by Samuelson [17] and Myerson [13]. As already pointed out by Myerson [12], optimal mechanisms with interdependent values exhibit surprising properties. In particular, the optimal mechanism need not satisfy "posterior" individual rationality. The buyer may lose from participating in the mechanism given the information that this mechanism reveals: if the buyer were to reconsider his willingness-to-trade in light of the offer that he is meant to accept, he might prefer to pass.

Giving such veto power to the buyer is the second step in our analysis. Note that this is not equivalent to *ex post* individual rationality, a stronger requirement that posits that the buyer gains given the actual state of nature. The difference matters here, since values are interdependent (see Gresik [9], Forges [4] and Matthews and Postlewaite [11]). This property, which we refer to as *veto-incentive compatibility*, following Forges [5], imposes restrictions on the mapping from reported types to the distribution over offers that the mechanism specifies. Veto-incentive compatibility, then, is a requirement on the graph of this map: conditional on any given offer, the posterior belief of the buyer should be such that he is willing to accept this offer. Restricting attention to deterministic offers would entail a loss of generality. This does not mean that the buyer accepts a random price; rather, the price he accepts is chosen randomly.

Veto-incentive compatibility is not only a restriction that is realistic, given current legal and commercial practices, it is also *implied* by standard bargaining protocols. We prove that it is automatically satisfied whenever at most one of the players makes an offer *per* round, whether or not this order is stochastic, history-dependent, etc., and whether the horizon is finite or not.

We characterize veto-incentive compatible mechanisms. We prove that whether a given allocation can be implemented in a veto-incentive compatible way is a property of (the map from reports to) the probability of trade and expected price alone. The problem reduces to standard optimal control. The interesting feature is the restriction implied by veto-incentive compatibility: the necessary and sufficient condition is that the buyer's *ex ante* payoff, conditional on trading with all types above a given threshold be nonnegative, for all possible values of this threshold.

Finally, we consider the case of no commitment, as captured by infinite-horizon bargaining. We focus on the case in which the seller makes all offers. The resulting mechanism must satisfy veto-incentive compatibility, since the buyer can reject any given offer. The temporal monopoly of the seller provides him with a lower bound on his payoff. Namely, he can secure a price equal to the buyer's lowest possible value. We prove that, along with veto-incentive compatibility, this is the only further constraint imposed by bargaining: every payoff vector that can be achieved by a veto-incentive compatible allocation and that gives the seller this security payoff is an equilibrium payoff vector if the two players are patient enough. This might sound like a folk theorem, but this only holds in terms of payoffs: there are allocations that are veto-incentive compatible, and give the seller his security payoff, and yet cannot be implemented in the bargaining game.

[1] By a simple change of variable, all our results apply to the case in which it is the buyer who is informed and who makes offers, and the seller is uninformed.