

Participation Constraints in Adverse Selection Models¹

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This paper characterizes the optimal contract offered by an uninformed principal to an informed agent when the latter's reservation utility depends on his type. The informational rent is nonmonotonic so that interior types may have a vanishing rent or be excluded from trade. The paper identifies conditions for the optimal contract to be separating, to be nonstochastic, and to induce full participation. It also discusses the nature of the solution when bunching occurs. The results are applied to nonlinear pricing under price cap regulation and bypass competition and to competition in nonlinear pricing. *Journal of Economic Literature* Classification Numbers: D82, D42, D23, D78, L51, L15. © 2000 Academic Press

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1. INTRODUCTION

This paper proposes a general analysis of the uninformed principal–informed agent model, allowing the reservation utility of the agent to depend on his private information. Standard contract theory, as exposed by Baron and Myerson [5], Guesnerie and Laffont [19], or Maskin and Riley [31], derives the optimal contract under the assumption that the agent's informational rent (what he gets above his reservation utility) grows with the agent's private information parameter (his type): better types get higher rents. When the reservation utility is type-dependent, this property may fail. The informational rent is nonmonotonic and may vanish for interior types; the set of agents for which this occurs is endogenous and a priori not identified. Far from being pathological, nonmonotonic informational rents emerge naturally in many economic contexts where trading with the principal implies some *foregone opportunity* for the agent.

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(i) *Competing principals*: When two principals compete for exclusive dealing with an agent, one principal's offer determines the agent's reservation utility in the negotiation process with the other principal.²

(ii) *Fixed trading costs*: The agent's type may concern not only the benefits from trade but also some fixed costs (see Lewis and Sappington [25]). This occurs in particular when trading with the principal requires specialization of an asset, which changes the set of outside opportunities of the agent.

(iii) *Renegotiation*: When two parties renegotiate a contractual agreement, the agent's reservation utility corresponds to his utility level under the initial contract (see Dewatripont [17] and Caillaud *et al.* [11]).

I address the first two cases in this paper and the third case is a companion paper [21].³

This paper focuses on situations where the two parties contract upon a quantity and a monetary transfer. Utility is transferable, the private information characteristic is continuous and one-dimensional, and the standard sorting condition holds: agents can be ranked according to their marginal benefit from trade (their type). There is no restriction on the link between the reservation utility of the agent and his type. The model allows for the possibility that some types do not trade with the principal (referred to as exclusion or partial participation as opposed to full participation). It also allows for bunching. In this context, I present a full-fledged characterization of the optimal contract for the principal, including optimality conditions, uniqueness conditions, and conditions for the optimal contract to be separating and to be nonstochastic. The results are illustrated by means of two applications of interest. The first application is motivated by the recent developments in regulation theory and related to the deregulation process: I analyze an optimal nonlinear pricing problem under price cap regulation and bypass competition. The second illustration is a model of competing principals, where three producers compete for an exclusive dealer.

The characterization of the optimal contract differs from standard contract theory by taking into account nontrivial participation constraints. Since standard analysis relies heavily on the monotonicity of the informational rent, I adopt a different methodology. The shadow value of the participation constraint is represented by a unit mass distribution over the set of types. In the standard theory, this distribution is a Dirac mass

² See [7, 13, 23, 37, 39].

³ All these examples involve some type of exclusivity, but related issues arise in contexts without exclusivity but involving externalities between several agents, such as auctions (see [10, 12, 20]). The reservation utility of one agent is then endogenous and depends on the contract offered to the other agents.

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