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Dynamic screening with limited commitment ☆

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Abstract

We examine a model of dynamic screening and price discrimination in which the seller has limited commitment power. Two cohorts of anonymous, patient, and risk-neutral buyers arrive over two periods. Buyers in the first cohort arrive in period one, are privately informed about the distribution of their values, and then privately learn the value realizations in period two. Buyers in the second cohort are "last-minute shoppers" that already know their values upon their arrival in period two. The seller can fully commit to a long-term contract with buyers in the first cohort, but cannot commit to the future contractual terms that will be offered to second-cohort buyers. The expected second-cohort contract serves as an endogenous type-dependent outside option for first-cohort buyers, reducing the seller's ability to extract rents via sequential contracts. We derive the seller-optimal equilibrium and show that, when the seller cannot condition on future contractual terms (either explicitly or implicitly), she endogenously generates a commitment to maintaining high future prices by manipulating the timing of contracting.

JEL classification: C73; D82; D86

Keywords: Asymmetric information; Dynamic mechanism design; Limited commitment; Recontracting; Sequential screening; Type-dependent participation

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1. Introduction

In many contracting settings, agents have private information that changes over time. Recent advances in dynamic mechanism design have highlighted the benefits of using dynamic contracts in such settings. Different short- and long-term prices, option contracts, and introductory offers are all methods by which a principal can provide incentives for agents to reveal new private information over time; by doing so, a principal is able to make contingent decisions that extract greater rents than those generated by unconditional, static contracts. One of the basic intuitions arising from this literature is that by contracting in the earliest stages of a relationship, when her informational disadvantage is at its smallest, a principal can relax the participation and incentive constraints she faces. Thus, early contracting leads to more effective price discrimination and smaller information rents. This intuition arises in large part from the assumption that the principal is able to determine the timing of contracting. In many settings, however, such an assumption need not be justified: in many markets, agents are "born" or enter the market at different times, and they are frequently able to time their transactions or delay entry into contractual relationships. Moreover, a principal may be unable to prevent such delays and treat different agent cohorts differently.

This strategic delay by agents in the timing of contracting is even more of a concern when the principal has limited commitment power. We have in mind settings in which the principal can commit to fully enforceable long-term contracts that bind (with some restrictions) her bilateral relationship with individual agents, but cannot commit in advance to the contractual terms that may be offered in future periods. This form of limited commitment, in addition to being of natural theoretical interest, also arises in a variety of real-world settings. For instance, consider the market for airline tickets. Each ticket sold for future travel is a long-term contract, complete with a commitment to its provisions for future refundability and exchangeability. The features of tickets that may be sold in the future (including prices, fare classes, and other terms and conditions) are not advertised or made available, nor is there any presumption that an airline is pre-committed to these ticket characteristics. Potential ticket buyers, on the other hand, face uncertainty about their value for traveling at the date in question. They must therefore decide whether to purchase a ticket immediately and take advantage of its option-like features (canceling the ticket if their realized value is low), or instead postpone their purchase in hopes of more advantageous contracting opportunities in the future. Optimal ticketing schemes must take this strategic timing of contracting into consideration, accounting for buyers' option values of postponing purchases and the impact of such behavior on the seller's ability to extract rents from different cohorts of buyers.

With this in mind, the present work studies the role of limited commitment in dynamic screening with strategic agents. We construct a simple two-period model in order to isolate the role of limited commitment in a transparent fashion. Our model features a monopolist that faces two cohorts of buyers that arrive over two periods; all consumption occurs at the end of the second period. Each buyer in the first cohort (which arrives in the first period) initially has private information regarding the distribution from which her private value is drawn, but does not learn the realized value until the second period.[1] Buyers in the second cohort arrive in period two, and already know their private value (which is drawn from a commonly known distribution). We assume that buyers are anonymous, so that the seller is unable to distinguish in period two between

[1] This period-one uncertainty about the final value differentiates our sequential screening framework from the Coasian durable goods framework; see Bulow (1982) for a two-period durable goods model.