
SEMİNER

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ANALYSIS OF DYNAMIC BILATERAL PRICE NEGOTIATIONS

*Nur Ayvaz Çavdarođlu
Syracuse University,
Whitman School of Management*

We study a dynamic pricing problem for a monopolist seller that operates in a setting where each potential sale takes the form of a bilateral negotiation. The outcome of each negotiation between the seller and a single independent buyer depends on the valuations of the seller and buyer for that good, their relative negotiation power, and their beliefs regarding the other party's valuation. We first analyze variations of the bilateral negotiation problem and analyze the effect of the buyer's negotiation power. Next, we review the dynamic negotiation problem, and propose a simple deterministic "fluid" analogue. The main emphasis of the paper is in expanding the above formulation to the case where both the buyer and seller have limited prior information on their counterparty valuation. Our first result shows that if both the seller and buyer are bidding so as to minimize their maximum regret, then it is optimal for them to bid as if the unknown valuation distributions were uniform. Building on this result and the fluid formulation of the dynamic negotiation problem, we characterize the seller's minimum price at any given point in time. Finally, we expand on the above formulation to study the seller's problem in the case where the primitives of the buyer valuation distributions are unknown and non-stationary, using ideas from scenario-based robust optimization. The motivating application is from residential real-estate, however, the model and proposed approach are generally applicable.