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Notes

Breakdown in multilateral negotiations

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Abstract

We analyze a complete information multilateral bargaining model in which a buyer is to purchase two complementary goods from two sellers. Binding cash-offer contracts are used to govern transactions. In contrast to preexisting literature, we do not normalize the parties' reservation utilities to zero. We show that this assumption holds critical importance by demonstrating that a complete breakdown of negotiations may occur as the unique equilibrium outcome, even if only two sellers are present.

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1. Introduction

In many real-life economic activities, a central party has to bargain and reach an agreement with several other parties. In the perhaps most prominent example by Coase [14], a railroad needs to gain permission from several farmers to undertake a profitable extension. Other examples include firms that negotiate with multiple unions or workers,[1] companies that need to obtain input

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[1] Horn and Wolinsky [7], Jun [10] and Stole and Zwiebel [6] among others investigate how to reach efficient equilibria in multiple-person bargaining between a firm and multiple workers or unions.

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goods from several monopolists, or insolvency trustees that negotiate with several creditors. The existence of institutions such as mandatory bankruptcy procedures or the government's right of eminent domain provides evidence that rational parties may not be able to negotiate towards an efficient outcome.

In the present paper, we consider a complete-information setting where two sellers own exactly one piece of property that a central party needs to acquire in order to start a profitable project. Transactions are governed by so-called *binding cash-offer contracts* under which, upon agreement, the seller receives the amount offered and leaves the game permanently. This type of contract is simple, easy to enforce and, as such, often analyzed in the bargaining literature, cf. Cai [11], Menezes and Pitchford [24] or Chowdhury and Sengupta [13].[2]

In contrast to the previous literature on multilateral bargaining, such as Cai [11] or Chowdhury and Sengupta [13] among others, we do not normalize the sellers' reservation utilities to zero. As a leading example, we consider that the buyer is an airport that needs to obtain two parcels of land, each owned by one farmer, to construct a new runway. The construction is desirable, i.e. the expected profit exceeds the sum of the farmers' stand-alone valuations. However, should the airport obtain only one parcel, it would be of less value to the airport than it is to the farmer. We establish that, focusing on Cai's [11] circular bargaining protocol, a breakdown of negotiations may constitute the unique subgame-perfect equilibrium outcome. In contrast, Cai [11] does normalize the reservation utilities to zero and shows that there always exists at least one efficient equilibrium.

Under the circular bargaining protocol, the airport negotiates with each farmer over the price in an alternating offer fashion. Each period starts with an offer by the airport, which the farmer then accepts or rejects. If he rejects, he makes a counteroffer in the next period which in turn the airport accepts or rejects. Once an agreement is reached, the airport promptly pays the agreed price, resulting in the farmer leaving the game permanently. If the airport rejects the farmer's counteroffer, the airport turns to the other farmer to bargain in the same fashion, moving the first farmer to the end of the queue. Because each farmer values his parcel more highly than the airport does, the bargaining surplus between the airport and the last farmer to agree is larger than the initial total surplus. Hence, the surplus the airport has to hand over to compensate the final hold out may leave the airport with a negative surplus from an agreement. Anticipating this problem, the airport may not reach an agreement with any of the farmers.[3] Finally, we discuss that the holdout problem may be even more severe if the parties use a bargaining protocol in which simultaneous offers are made.

1.1. Relation to existing literature

Whereas asymmetric information is known to lead to bargaining inefficiencies,[4] these are more difficult to show in settings of complete information. One strand of the literature pinpoints

[2] Binding cash offer contracts are often used in practice. Cai [11, p. 261] mentions land procurement as a prominent example.

[3] To see the point, suppose that the first farmer values his parcel at 0.3, the second values his parcel at 0.4, the airport values each single parcel at 0, and the overall value of both parcels to the airport is 1. Moreover, suppose the airport purchased the first parcel for a price of 0.3. Then, the negotiation surplus between the airport and the second farmer would be 0.6, whereas the total benefit of the runway would only be 0.3.

[4] The rejection of an offer can be a signal to be of a particular type. Therefore, it may be optimal to reject an offer, in hopes that the next offer is better. Among others, see Fudenberg, Levine and Tirole [18], Hart [21] and Rubinstein [26] for one-sided asymmetric information; Chatterjee and Samuelson [12] and Fudenberg and Tirole [19] for two-sided