Trust and Reciprocity in Firms' Capacity Sharing

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Abstract:
We study the use of contractual and relational incentives to facility efficient capacity sharing between two service firms who have limited and substitutable capacity. Contractual incentive is in form of monetary compensation. We show that such incentive can be theoretically designed to induce high efficiency; however, we discuss that monetary compensation may not be practical in a lot of settings with legal constraints or transactional costs. Then, we study collaborative relationship that is built on trust and reciprocity. This type of collaboration is modeled as a game of trading favors between the two firms; it is negotiation-free and does not require much informational exchange between the firms. We characterize the Markov perfect equilibria, and show that any equilibrium is featured by a bounded region for the net number of favors. This indicates that efficiency loss is necessary to construct relational incentives in form of reciprocity. We construct the most efficient Markov perfect equilibrium that consists of a pair of cyclic strategies and satisfies the interior and boundary incentive constraints. Our numerical studies reveal that the efficiency of the trading favor mechanism exhibits insensitivity to firms' relative size (in terms of demand and capacity rates) and lost-sale cost; however, the asymmetry of firms’ congestion levels can significantly affect the collaboration efficiency. In particular, when the two firms have relatively similar congestion levels, the trading favor mechanism can achieve high efficiency close to the full-collaboration upper bound; in contrast, when the two firms are very asymmetric in terms of congestion levels, the efficiency loss can be very high. This thus suggests that in the latter case contractual monetary transfer is most necessary to induce capacity sharing.