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Incentive Compatible and Stable Trade Mechanisms on Networks*

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Abstract

We study a network of buyers and sellers where each seller owns an indivisible object and has no incentive to keep it, while each buyer has a downward sloping demand curve which is private information. Only the connected buyer-seller pairs can engage in trade. We search for *trade mechanisms* that are *efficient*, *strategy-proof*, *bilateral trade stable* and *individually rational*. In general, there does not exist a trade mechanism simultaneously satisfying these properties. The tension between strategy-proofness and bilateral trade stability is generated by the intersection between sets of competitors of a buyer at different sellers. Such intersections often allow the buyer to manipulate (via *demand reduction*) the prices paid in the network. The observed tension can be resolved if and only if the underlying network is *cycle-free*. In such a case, there is a unique trade mechanism which satisfies our four properties, a *generalized Vickrey auction*.

Keywords: Trade mechanisms, networks, strategy-proofness, bilateral trade stability, cycles, demand reduction.

1 Introduction

We study a network of buyers and sellers in which buyers have downward sloping demand curves and sellers each have one unit of a homogeneous good to sell (henceforth, an object). While buyers' demand curves are private information, there are known gains from trade as each seller attaches zero value to the unit he owns. In our setting, decentralization may lead to inefficiencies due to coordination failures on mutually beneficial trades (Abreu and Manea (2012), Elliott and Nava (2015)). Following Kranton and Minehart (2001), we take a mechanism

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