Market Transparency in Business-to-Business E-Commerce: A Simulation Analysis

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ABSTRACT

Market transparency refers to the level of current trade information revealed to participants by market makers. This paper analyzes the effect of market transparency on the outcomes of posted-offer style Business-to-Business e-commerce markets. First, increasing market transparency improves the price-tracking ability of sellers, and results in higher efficiency. However, revelation of quantity information on transactions is not very crucial as opposed to price information. Second, although sellers extract significantly higher surplus (profit) than buyers can do in a posted-offer market, the difference vanishes with increasing market transparency. Lastly, sellers in posted-offer markets respond poorly to external demand shocks. Interestingly, the poor price-tracking performance of sellers hurts buyers more. In other words, seller profits are much less sensitive to demand shocks as compared to buyer surpluses.

Keywords: Demand Shocks, E-Commerce, Efficiency, Market Transparency, Simulation

INTRODUCTION

Proliferation of the Internet has led to development of many types of online markets, including electronic exchanges, net marketplaces, e-hubs, clearinghouses, and private industrial networks (Raisinghani et al., 2005). The design and implementation of these markets require vital decisions about ownership, structure, and procedures. The transparency of a market, in this respect, is profoundly important and can by itself lead to market failure if not managed properly. Market transparency, in its most succinct form, refers to the level of current trade information revealed to the public by market makers. Transparency is considered as a fundamental issue in the design and regulation of markets, with the United States taking a strong position in favor of it. For example, the U.S. Securities and Exchange Commission (SEC) argues that transparency increases the fairness and efficiency of the markets by linking dispersed markets and improving price discovery. The issue is more complicated for online
Business-to-Business (B2B) exchange markets, because one major objective for these markets is to aggregate buyers and sellers around the world by decreasing information asymmetry inherent in traditional markets (Hansen et al., 2001). Examples of popular B2B markets include Covisint in the automobile industry, FreeMarkets (Ariba) in the high-tech industry, Exostar in the aerospace industry, and e-Steel (New View Technologies) in the metal industry. In electronic markets, data are real time, more transparent and synchronized; information flows more instantaneously (Grover et al., 1999). In this regard, transparency becomes one of the key features that distinguish digital exchanges from traditional markets (Zhu, 2004a). For example, on Covisint, suppliers can see who is selling which parts, at what prices, and in what quantities. On FreeMarkets (Ariba) reverse-auction platform, suppliers do not have to guess their competitors’ bids as they traditionally do with opaque request-for-quotes. They can see what the competition is bidding in real time, so that they can decide whether to undercut their competitors’ bid. On eBay’s B2B exchange section, data about bidding prices, quantity, winning bids, and seller identity are all visible. Since the level of transparency in these markets may deter one or both of the groups, market makers should find the optimal transparency level to maximize participation, liquidity, and revenue. Intuitively, buyers should prefer a transparent market since it eases price search and lets them find the best deal whenever price is the only factor. Transparency in this respect may lead to a price war among sellers that would drive prices down to marginal costs. Indeed, many suppliers initially refused to join B2B markets in an attempt to avoid commoditization of their products (Zhu, 2002).

B2B exchanges have two dominant market mechanisms: buyer catalogs and dynamic pricing tools such as auctions (Otair & Hattab, 2008). The focus of this study is on catalog sales where prices are posted for buyer search, just like the way price tags serve in the retail sector. In posted-offer B2B exchanges, market makers have the opportunity to change the extent of information revealed to participants, and the effect of these adjustments on market outcomes is an open question. The apparent lack of definite analytical results in this topic reflects the complexity of interactions of variables in electronic markets. Given this complexity, studying transparency via simulation analysis becomes a useful approach. In this study, we report findings of a simulation analysis we conducted by using proprietary software. Our primary objective is to gain insights regarding the impact of transparency on (1) the rents earned by buyers and sellers, (2) mean prices, and (3) market efficiency. We first seek answers to these questions by systematically varying transparency level in our simulated markets under stationary demand condition, and then extend the analysis to non-stationary demand treatment.

The paper is organized as follows. The next section reviews two streams of relevant literature, and details our simulation design. We present the simulation results and finally, implications and suggestions for managers and policy makers are discussed.

**LITERATURE REVIEW**

**Buyer and Seller Behavior in Posted-Offfer Markets**

Two trading institutions mainly studied in the literature are double auctions and posted-offer markets. While many financial markets utilize double auctions, the vast majority of trade in the United States occurs in posted-offer markets. The simulation results reported in this paper thus reflect the characteristics of an important segment of the economy, and analyze one of the primary mechanisms of B2B exchanges.

Past research indicates that posted-offer markets, in comparison to double auctions, exhibit lower efficiency (Davis & Holt, 1997) and a slower convergence to competitive equilibrium (CE) (Ketcham et al., 1984). One explanation for such a difference between the two institutions is the inability of sellers to update their prices during a period in a posted-offer session. Sellers cannot correct their mistakes, that is, they cannot lower artificially high prices...
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