Information Transparency in Electronic Marketplaces: Why Data Transparency May Hinder the Adoption of B2B Exchanges

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INTRODUCTION

A nascent yet highly visible trend in electronic business is the establishment of Internet-based online marketplaces for business-to-business (B2B) transactions and collaborations. An online B2B marketplace is defined as an infrastructure that creates a trading community linked by the Internet and provides the mechanism for business-to-business interactions using common standard and industry-wide computer systems. Recently the emerging strategy of deploying B2B electronic marketplaces to improve supply-chain efficiency has been thrown into question by startup failures, tumbling stock prices, and shakeouts of B2B exchanges. The attitude shifts from exuberance to caution. Clearly, businesses are having a great deal of trouble navigating through the B2B space. Yet, despite the atmosphere of uncertainty, there is little doubt that it is increasingly important for managers to understand the collaborative benefits and risks arising from Internet-driven technologies. A survey (Forrester Research 2000) shows that “around one-third of corporate buyers and sellers believe that online B2B commerce is critical to their businesses today, and more than twice as many, around 70%, believe it will be critical within the next three years.”

Online B2B marketplaces are considered to have the potential to reduce transaction costs, generate market liquidity, reduce costs of search and negotiation, add product and pricing transparency, cut the fat out of inventory and overhead costs, and facilitate bidding by a broad spectrum of potential suppliers in a standardized platform. In particular, online B2B exchanges are claimed to streamline information flow in supply chains. The re-balance of information asymmetry is an important motivation for establishing B2B exchanges. Yet, given the multiple benefits, why do B2B exchanges still have trouble gaining the participation of buyers and sellers? Why are suppliers still reluctant to join a high-profile exchange such as Covisint (Wilson 2000)? In particular, B2B exchanges indeed seem to improve information transparency, but is information transparency a benefit or threat in the first place?

Seeking a better understanding of these issues, we study the informational implications of B2B marketplaces through the lens of economic analysis. The main theoretical framework of this research is built on the foundations of industrial organization, information economics, and market microstructure. We have found that information disclosure rules crucially affect firms’ incentives to join a B2B exchange. For example, non-restricted data disclosure (such as a wide-open public B2B exchange) reduces incentives for firms to join the online exchange.

Abstract

The online B2B environment makes a vast amount of data about prices and costs available on the Internet, which tends to make information more transparent in electronic marketplaces. In this study, we focus on the informational effects of Internet-based B2B exchanges, and explore the incentives for buyers and suppliers to join a B2B exchange. We found that information disclosure rules crucially affect the firms’ incentives. Data transparency benefits some firms but hurts others. We also found that low-cost suppliers and high-value buyers would be early adopters of the B2B exchange. In addition, B2B exchange owners should keep an appropriate balance between information transparency and data confidentiality so as to minimize the competitive risks while safeguarding the collaborative benefits of information transparency.

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Restricted data disclosure (such as a private exchange) restores the incentives. We also find that information transparency benefits some firms but hurts others; market share will be redistributed from high-cost firms to low-cost firms. Further, heterogeneity in willingness-to-pay (cost) induces different incentives for buyers (suppliers) to join the B2B exchange. High willingness-to-pay buyers and low-cost suppliers will have stronger incentives to join the exchange.

Information transmission can be vertical or horizontal. Vertical information transmission occurs among sequential parties along the supply chain (e.g. between a supplier and manufacturer), while horizontal information transmission occurs among parties at the same level of the supply chain (e.g. between suppliers). Vertical information sharing has been actively studied in the recent supply-chain literature (Lee and Whang 2000). It has been shown that vertical information sharing among supply chain partners may be beneficial (Mukhopadhyay et al. 1995), though there is empirical evidence that not all partners benefit from information sharing (Nakayama 2000). On the other hand, the effect of horizontal information transmission among competitors is still unclear and controversial. This issue has not been well studied in the literature. To fill this gap, our study focuses on horizontal information transmission in electronic marketplaces.

The remainder of the paper proceeds as follows. The following section discusses why information transparency has become an important issue and how the Internet increases information transparency. We then present the tradeoffs of information transparency and review related literature. The next section provides the main results and the economic rationale behind these results. This is followed by a discussion of the broader implications for the microstructure design of B2B exchanges. Conclusions are drawn in the final section.

THE RISING ROLE OF INFORMATION TRANSPARENCY

Information technology has in general improved the flow of information. B2B electronic exchanges in particular provide an online platform in which information is gathered, compiled, displayed and transmitted among participant companies. In this sense, online B2B exchanges play a role of transmitting or aggregating information within a particular industry. Examples include Covisint in the automobile industry, Exostar in the aerospace industry, FreeMarkets in the high-tech industry, and e-Steel in the metal industry.3

In addition to public exchanges, Internet-based private exchanges have been created by some large corporations by establishing online links with their suppliers and business partners (Dai and Kauffman 2002). Examples include Wal-Mart, Cisco, Dell, and Hewlett-Packard. In general, private exchanges are owned by a single company with selected memberships that are restricted to a set of pre-qualified trading partners. In contrast, public exchanges are owned by industry consortia or independent operators with non-restricted memberships that are usually open to all companies in the industry.

The proliferation of these Internet-based marketplaces creates a vast sea of information about products, prices, transactions and competitors. Today a huge flow of information is being interchanged between buyers and sellers, between suppliers and manufacturers, and among competitors. This makes information more transparent in electronic markets. Information transparency is defined as the degree of visibility and accessibility of information. The subject of information transparency in the context of electronic markets has gained the interest of both academics and practitioners. Bakos (1998) describes the three main functions of markets: matching buyers and sellers; facilitating the exchange of information; and providing an institutional infrastructure. In our present study, we focus on the second role, as the digitization of information combined with the rise of high-speed networks has heightened the role of information in electronic markets.

Information, unlike a physical good, may slip beyond the boundaries of the firms between which it is exchanged. This is because a firm who has acquired information would act upon it, and its actions, if observable, could make the otherwise confidential information transparent. With the spread of the Internet and B2B electronic marketplaces, greater transparency of information has enabled more efficient pricing and more effective matching of buyers and sellers; value shifts from the product itself to information about the product. While the transfer of physical goods may remain the end result of a business transaction, the information that influences and shapes the transaction – price, quantity, cost, inventory, and customer rating – can now be separated and exchanged electronically. And ‘that information is often more valuable to companies than the underlying goods’ (Wise and Morrison 2000).

B2B exchanges not only enable suppliers to act on their own information, but also serve as a mechanism for them to aggregate their information in the transactions. In electronic markets, data are real time, more transparent, and more synchronized. In traditional physical market, data are typically about past transactions or activities. In this regard, information transparency is one of the key features that distinguish digital exchanges from traditional markets.

How does the Internet increase information transparency?

The Internet increases information transparency in several ways. First, the Internet in general not only creates abundant information but also reduces the search cost for that information. The efficiencies of Internet-based searches are especially clear in the B2B context of industrial procurement. For example, a manufacturer’s options were fairly limited in the past. An auto manufacturer that needed steel either had to rely on its well-worn list of suppliers or hoped to hear of new vendors by word of mouth. But B2B
exchanges such as e-Steel allow a wide range of companies to find one another. The automaker thus may find 20 suppliers for the type of steel it needs. It can use that information to get a much better sense of what the costs of the steel really are.

Internet searches will become increasingly sophisticated with the spread of the extensible markup language (XML). XML protocol is replacing the Web’s traditional HTML for B2B procurement. XML makes it possible to describe products, features, and prices with far greater precision. It lets B2B exchanges set more detailed matching criteria, which give buyers and sellers immediate access to even richer stores of information. Likewise, other technologies such as data mining and intelligent agents are becoming increasingly capable of helping companies make inferences about rivals’ costs when past trading patterns are known.

Consequently, the online trading environment makes a vast amount of information about prices and costs readily available on the Internet. Data that would otherwise be opaque or even proprietary would be made visible online. For example, cost data could be reflected in the bids on the Website of online auctions, which may become visible to not only trading partners but also to potential competitors. Using reverse-auction bidding, XML mapping, data mining, and intelligent agent technologies, online exchanges allow participants to see the ‘price floor’ more easily than they can with traditional markets in which inferring costs has been cumbersome (Sinha 2000).

For example, on FreeMarket’s reverse auction platform, suppliers do not have to guess at their competitors’ bids as they traditionally do with opaque request-for-quotes (RFQ’s). ‘Because we specialize in gathering supplier data during our market-making process, FreeMarkets gives buyers deep, comprehensive market information . . . and access to previously unattainable accounts . . . At FreeMarkets, we maintain data about thousands of potential suppliers including valuable information on their manufacturing processes’ (source: www.freemarkets.com). In such an exchange platform, companies can see what the competition is bidding, in real time, and how low they must go to pocket the deal (Tully 2000). Sooner or later, competitors will come to know the price floor – the lowest price for which a company is willing to sell a product or service, which is typically a good proxy for the firm’s marginal cost.

FreeMarket is just one example. Cost transparency is increasing on all sorts of electronic markets. On Covisint, suppliers can see who is selling clutches and brakes, at what prices and on what quantities. As posted on its website, ‘Covisint allows you to quickly share critical information . . . and to browse, as well as receive and transmit electronic information.’

THE EFFECTS OF INFORMATION TRANSPARENCY

These examples illustrate that information is more transparent on electronic exchanges than in traditional bilateral negotiation markets. Transparent information is typically regarded as a good thing due to possible efficiencies arising from more widespread dissemination of accurate information. Yet, ‘suppliers are finding that, in a transparent environment where competitors can see each other’s bids, the price for goods is being driven down,’ according to Dave McCormick, Senior Vice President of FreeMarkets Inc. (Wilson 2000). That there are risks, as well as potential gains, associated with information transparency is reflected in the comments of the e-business director of a large computer reseller: ‘To have a full collaborative environment is a hard sell for me . . . what I am going to lose in terms of visibility and exposing my information to potential competitors is greater than what I would gain on the collaboration side’ (Meehan 2001).

During the process of this study, we interviewed 20 companies and asked executives about their concerns in joining a B2B exchange. Three concerns – the fear of data exposure, pricing pressure, and margin erosion – turned out to be the major issues. In particular, cost transparency on the B2B exchanges remains a real concern. As concurred by a B2B analyst, ‘For suppliers, the two biggest detractions for exchanges right now are transparency – the fact that every competitor can see what every other competitor is bidding – and lack of liquidity, which means there are not enough buyers to really generate much bidding’ (Wilson 2000).

Exchange of cost information was part of the concern in the Covisint investigation conducted by the Federal Trade Commission (FTC 2000). Despite the fact that the FTC gave approval to the auto exchange, concerns remain about the consequences of exchanging private cost information among rivals. Orbitz is another online marketplace that is subject to anti-competitive scrutiny.

The issues described above give rise to a set of critical research questions regarding the informational role of online B2B marketplaces:

- What incentives will the firms get by joining the B2B exchange?
- How will these incentives be moderated by the data disclosure rules of the B2B exchange?
- Although widely claimed as a benefit, can data transparency actually hinder the adoption of B2B exchanges?

Intuitively, information aggregation tends to have two types of effects: the direct effect on the firm and the cross effect on its rivals. First, receiving more accurate information permits the firms to choose the strategies that are more finely tuned to the actual state of market and hence improves the profits, so the increased transparency of information for a firm has a positive effect. On the other hand, competitors get better information too, which may have a negative effect. Transparent information may affect the degree of correlation among the strategies of all other firms. Increased strategy correlation and rivals’ increased
precision have a rather subtle, complicated effect on the behaviour of the firms.

Given the complex nature of the informational effects, we seek if any theoretical insights can be gained from the IS and economics literature.

**Review of related literature**

Due to the recent emergence of B2B exchange as a recognizable economic phenomenon, prior research aimed directly at the questions posed here has been limited or non-existent. Some more general theory, however, has been developed in the context of interorganizational systems (IOS) in the IS literature (see Kauffman and Walden 2001 for a review). Several papers studied the effects of electronic data interchange (EDI) on buyers and sellers, with issues arising from the intersection of information technology and industrial organization (see, among others, Barua and Lee 1997, Riggins et al. 1994, and Wang and Seidmann 1995). These studies significantly improved our understanding about strategic behaviour arising in the EDI context. The B2B exchange phenomenon has some features in common with EDI on the one hand but also exhibits significant differences on the other hand. In particular, data disclosure and information transparency was less a concern in the proprietary EDI context than in the Internet-based B2B setting. Typically EDI does not provide market transparency as it is often conducted over proprietary value-added networks and controlled by one large buyer.

In the economics literature, several papers took an anti-trust perspective and examined whether information-sharing activities among oligopolists hinder competition in a particular industry (see, e.g., Clarke 1983, Gal-Or 1986 and Vives 1989). The results obtained in the literature have been shown to be sensitive to the particular specifications of the model. In general, the incentives to share information depend on such variables as the type of uncertainty (demand or cost), the mode of competition (Bertrand or Cournot), the nature of the goods (substitutes or complements), and the degree of product differentiation.

We build on these studies, particularly the game-theoretic analysis of interorganizational systems, and address additional concerns related to the informational effects arising in the emerging B2B exchange context.

**ECONOMIC ANALYSIS**

We focus on two different information structures, corresponding to two types of data access/disclosure rules:

1. If the B2B exchange operates by a restricted disclosure rule (so called *quid pro quo*), transaction data is visible to trading members only.

2. If the B2B exchange operates by a public, non-restricted disclosure rule, the information is accessible to all firms in the industry regardless of their memberships or participation in the B2B exchange.

Relatively speaking, the former is often seen in private exchanges, and the latter is more often associated with public exchanges. Firms decide whether to join the B2B exchange with an understanding that the exchange will make transaction data more transparent. As a consequence of the adoption decisions, all firms are partitioned into two subsets, the set of firms that trade in the B2B exchange and its complement set of firms that trade outside of the B2B exchange (e.g. through traditional bilateral negotiation and contracting).

We study the equilibrium of the exchange using the concept of fulfilled rational expectations equilibrium with incomplete information (for reference, see Grossman 1981, Novshek and Sonnenschein 1982 and Radner 1979). One implication of the fulfilled rational expectations equilibrium is that the market participants incorporate the information that is contained in the equilibrium price in their decision-making process. This reflects the aggregation and transparency of information in a market mechanism with very little friction – such as an Internet-based B2B exchange. This notion of equilibrium also requires not only that firms maximize expected profit given their information set, but also that their strategies be not controverted. This means that, when each firm uses its conditional distribution and maximizes expected profit (as a Nash–Cournot equilibrium), the realized distribution is precisely the one given by the conditional belief that is held by the firm (Zhu 2001). Based on this approach, we have obtained several results, to be discussed in turn below. The technical details of the game-theoretic analysis are given in Zhu (2001).

**Incentives to participate in B2B exchange**

The sources of the expected profit gains from information transparency are increased production efficiency and reduced output variability. First, as information transparency makes each firm’s strategy more finely tuned to the perception of what costs are in the market, the mix of market share tends to shift toward lower-cost firms in the presence of the B2B exchange that makes cost information more transparent. Second, transparent cost information reduces the variance of output by eliminating ‘mistakes’, e.g. situations in which each firm produces too much or too little output than it would have had it known its rivals’ costs. Eliminating mistakes raises expected profits for suppliers.

As shown in the industrial organization literature, when firms retain private cost information and compete over time, they may attempt to signal their costs via their output decisions. In Cournot oligopoly, this signalling leads firms to produce more than they otherwise would, which in turn
leads to excess inventory and overstock along the supply chain. Information exchange facilitated by the B2B exchange reduces such signalling and thus tends to reduce the deadweight loss associated with oligopoly market power.

Hence, information transparency among producers tends to contribute to the efficient allocation of resources across firms in the following sense: in a Nash–Cournot equilibrium, the lower (higher) cost firms are likely to increase (decrease) their quantities in response to more accurate information about the cost vector. Therefore, the mixture of market share is shifted toward more efficient (low cost) firms in the presence of information transparency. This is summarized below.

**Proposition 1**: The re-allocation effect is beneficial to the industry as a whole. At the firm level, B2B exchange members on average make higher expected profits than non-members, assuming that the B2B exchange follows a quid pro quo data disclosure rule.

**Alternative data disclosure rules**

Alternatively, the B2B exchange can follow a different data access/disclosure rule, that is, *non-restricted disclosure*, under which transaction data can be accessible to all firms in the industry, regardless of their trading participation in the B2B exchange.

The two sets of firms, trading inside and outside the B2B exchanges respectively, face a similar decision problem, but have asymmetric information. The outside firms actually have more information with which to choose its action. It appears that the latter cannot yield lower expected profits than the former since the latter’s information set is more informative than the former. Intuitively, the tradeoff between direct effect and cross effect, as discussed earlier, will be skewed to the direct effect, because a firm can enjoy the benefit of accessing more data about other firms while not exposing its own proprietary data to the online exchange. We state the result as follows.

**Proposition 2**: When the B2B exchange follows a non-restricted data disclosure rule, firms do not have stable incentives to join the B2B exchange.

Naturally, the strategy of a firm depends on its information structure. Now, if firm $i$ was to withdraw from transacting on the B2B exchange, it would still be able to observe the signals on the exchange (and not have to incur the cost of joining the B2B exchange). Consequently, it pays to deviate from transacting on the B2B exchange. Comparing Propositions 1 and 2, we can see that changing the data access/disclosure structure may induce different incentives for firms to participate the exchange.

**Corollary 1**: Firms’ incentives to join the B2B exchange are sensitive to the data disclosure rules of the exchange.

Restricting data transparency may improve firms’ incentives to join the B2B exchange.

The intuition is as follows. With a non-restricted disclosure rule, information exchange is not stable because of the ‘free rider’ problem; if a firm defects from trading participation it will still keep receiving the data, but it will not subject its own private cost data to the market. With a restricted disclosure rule, information exchange will always be self-enforcing, provided the B2B fee is not too high. If a firm chooses not to join the B2B exchange, it will not get the additional information transmitted by the B2B exchange.

This seems to imply that membership-restricted private exchanges (e.g. Wal-Mart, Dell and Cisco) may have some advantage over the wide-open public exchanges. This does not preclude the possibility that public exchanges could re-design their data access and disclosure structure by adding more protection to data confidentiality. In fact, this is what this paper would recommend.

**What types of suppliers will join the B2B exchange?**

Without the transparent environment facilitated by the B2B exchange, all firms estimate rivals’ cost based on their limited private information, which tends to make their estimates around the mean of the cost vector. With the B2B exchange, the fog clears out and the firms can see through each other’s costs better than before.

The basic tradeoff that influences the incentives for a firm to trade on the B2B exchange is the increased precision of information, decomposed into the effect on the firm itself and on its rivals, and the correlation induced in the strategies of the firms. By making cost data more transparent, firms with differential costs would feel the effects differently. The low-cost firms have much to gain as cost transparency tends to induce their rivals to shrink output by ‘advertising’ their own relatively aggressive reaction curves. In contrast, high-cost firms have much to lose as cost transparency exposes their ‘uncompetitive’ costs. This brings very different incentives toward information transparency on the B2B exchange: low-cost firms will prefer to trade on the transparent online exchange while the high-cost firms will have incentives to trade on an opaque environment where they can hide their cost data. Of course, when costs are too high, no trade takes place. This is summarized below.

**Proposition 3**: Cost heterogeneity among suppliers induces different incentives for them to trade in the B2B exchange. Low cost firms will find it optimal to join the exchange, while high-cost firms will stay away from it.

Low-cost suppliers would choose to participate in the exchange. The suppliers with moderate costs trade in the bilateral negotiation market. The highest-cost suppliers are left out of the transactions. Consequently, in the new
information-transparent equilibrium, more efficient firms produce more. Hence, profits are re-distributed from high-cost firms to low-cost firms. With the result in Proposition 3, the distribution of high-cost and low-cost firms is linked to the following separating equilibrium.

Corollary 2: In equilibrium, those suppliers that are trading through the B2B exchange are the more-efficient (with lower costs or better technology) suppliers, while those less-efficient (higher cost) suppliers continue to trade through traditional bilateral contracting.

We have a self-sorting, separating equilibrium here. Firms sort themselves according to their costs into two separate markets: online exchange and offline markets. This is related to the separating equilibrium analysed by Kauffman and Mohtadi (2002) who use the iso-profit surfaces to find that firms sort themselves based on their size.

Given the separating-equilibrium nature induced by information transparency, the mere existence of the online exchange makes it more difficult for high-cost firms to hide their cost data. Besides information revealed from online transactions data, the action of joining or not joining the B2B exchange may single out the high-cost firms. For example, if firm $j$ chooses to stay away from the B2B exchange, then other firms could infer that firm $j$ is likely to be a high-cost firm (though they still do not know firm $j$’s exact cost). Therefore, we conclude:

Corollary 3: Even though they choose not to participate in the online marketplace, high-cost suppliers are made worse off by the mere existence of the B2B exchange in the industry.

What types of buyers will join the B2B exchange?

So far we have been focusing on the sellers’ side. We now briefly consider the buyers’ side as well. The online trading environment of B2B exchanges not only makes cost more transparent, but also makes willingness-to-pay more transparent, as buyers submit bids based on their willingness-to-pay or the estimated value of the product.

We can perform a similar analysis as above by examining the competition between a B2B exchange and a traditional bilateral negotiation market. Buyers and suppliers have two options. They can transact with either the bilateral market or the B2B exchange. The online exchange can improve the efficiencies of the matching process by providing a central trading hub and by posting buy and sell prices transparently, and hence increase the likelihood of meeting a trading partner for both buyers and sellers. Suppliers are characterized by their production costs ($c$), and buyers by their willingness to pay ($v$). Then, an argument parallel to Proposition 3 can be made for buyers.

Proposition 4: Heterogeneity in willingness-to-pay among buyers induces different incentives for them to trade in the B2B exchange. High willingness-to-pay buyers will have stronger incentives to join the exchange than those buyers with low willingness-to-pay.

The separating equilibrium is defined by four critical values: $v_0$, $\bar{v}$, $\bar{c}$, and $c_0$, as illustrated in Figure 1. Buyers with a high willingness-to-pay ($\bar{v}$) buy from the exchange, and sellers with low costs [$0$, $\bar{c}$] sell through the exchange. Buyers with moderate willingness to pay [$v_0$, $\bar{v}$] and sellers with moderate costs [$\bar{c}$, $c_0$] trade through the bilateral negotiation market. The lowest-value buyers [$0$, $v_0$] and the highest-cost sellers ($>c_0$) are left out of the transactions. Therefore, high-value buyers and low-cost sellers will be early adopters of the exchange, with buyers and sellers in the middle staying with the traditional market.

IMPLICATIONS FOR THE DESIGN OF B2B MICROSTRUCTURE

We have analysed the incentives for suppliers and buyers to participate in the B2B exchange. From the perspective of a B2B exchange owner, what are the implications for the design of operating rules and microstructure of B2B exchanges, especially in terms of information access and data disclosure rules?

Given that firms’ incentives are sensitive to the data access and disclosure rules of the B2B exchange, owners of online marketplaces need to design their microstructure and operating rules carefully. Data disclosure rules are linked to technological capabilities of B2B exchange designs (e.g. reverse auctions, XML mapping, and data management). The kind of data that a B2B exchange collects and the conditions under which the data is made available can make the difference between benefits and risks to participants.

As a general principle, B2B exchanges should keep an appropriate balance between information transparency and data confidentiality so as to minimize the competitive risks while safeguarding the collaborative benefits of information transparency. For public exchanges in particular, we
recommend that their data access and disclosure structure be re-designed by adding more protection to data confidentiality. For example, buyers and suppliers may be required to pass a validation check (registration alone may be insufficient) to secure membership in the exchange. Members may have to pay a subscription fee in order to access information, and show active transactions in order to maintain the information access. In addition, exchanges should allow users to specify a set of trading partners who will have access to the transaction data.

Further, as shown in Figure 1, B2B exchanges need to increase the cost threshold $c$ or decrease the willingness-to-pay threshold $v$ so as to induce more buyers and suppliers to transact on the exchange (i.e. to enlarge the two light shaded areas in Figure 1). To achieve this, exchanges may need to put in place some incentive mechanisms, such as equity stake or subsidy of transaction fee, to encourage participation of those marginal buyers and suppliers. Alternatively, it would improve the incentives for broad participation if B2B exchanges were owned and designed by medium-cost suppliers (the low-cost firms will join anyway). This may sound counter-intuitive, but the benefit of owning the B2B exchange may partially alleviate the loss caused by the information transparency. A similar logic applies to the buy side.

In order to gain in-depth insights, we have limited our attention to the horizontal implications of cost transparency. Of course, this is just one aspect of the multidimensional information effects induced by the B2B exchange. More broadly speaking, information transmission can be horizontal or vertical. It can be about cost, demand or other uncertain parameters. It is often the case that vertical information sharing is about demand or inventory, while horizontal information transmission is about cost. So our results about joining incentives and outcomes must be conditioned on this partial-equilibrium setting.

Finally, as revealed by the analysis above, the dynamics of information transmission are rather subtle and involve strategic behaviours of firms. In particular, information capture without trading remains a challenging issue for exchange operators. Some firms may attempt to get the benefit of the pooled information from the exchange but not reveal their own proprietary data. They may pay the membership fee to join a B2B exchange but do not submit bids or conduct transactions. This free-rider problem may potentially endanger the transaction volumes and thus the viability of the B2B exchanges. This is a fertile area for further research.

CONCLUSIONS

What have we learned about the informational role of B2B electronic marketplaces? We have found that firms’ incentives to join a B2B exchange are sensitive to the data access and disclosure rules employed by the B2B exchange. In particular, due to competitive concerns, non-restricted disclosure reduces the incentives to trade through the online exchange. Restricted disclosure improves the incentives, although certain types of companies (especially high-cost suppliers) will still lack incentives to join the exchange as information transparency hurts more than helps them.

In contrast to the widely held belief about its benefit, information transparency is indeed a double-edged sword. A transparent environment is not necessarily a good thing for all participants. Lower degree of information transparency may actually increase the participation incentives. Apparently, B2B exchanges can reduce cost, save time and money, and increase efficiency. Yet an obstacle of wide adoption might lie in this informational effect.

Our results suggest that the assumptions underlying the creation of large, industry-wide public B2B exchanges are too simplistic to engender adoption by critical numbers of buyers and sellers. Early B2B proponents claimed multiple benefits of B2B exchanges. But our model reveals that the actual experience will be rather complicated – not all exchange effects are positive for all members. Perhaps these results can help to explain the rather slow adoption of public exchanges, the lack of transaction volumes in most of exchanges, as well as the recent movement from public exchanges to private exchanges.

By providing a theoretical interpretation on some of the informational consequences of B2B exchanges, we hope this research helps shed light on how B2B exchanges affect buyers and suppliers, beyond the often-cited search cost perspective. Given the scope of transformations anticipated from the deepening penetration of B2B e-commerce in supply chains, substantial benefits can be gained from this kind of research in the midst of such profound changes.

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Notes

1. According to an e-business survey of 152 companies conducted by AMR Research, sharing information was considered as the first important benefit of joining a B2B exchange, followed by streamlining buying and selling operations, reduced procurement costs, and identification of new suppliers. In a separate survey, McKinsey interviewed executives from 135 B2B e-marketplaces and their customers. ‘The real gains from online B2B commerce will come not from trading but from better access to and the sharing of information’ (Hansen et al. 2001).

2. This process typically involves steps such as these: (a) individual buyers and sellers submit bids to the exchange;
(b) the bids are compiled and displayed on the exchange auction website; and (c) other buyers and sellers can access the bid data. For instance, ‘E-Steel’s Supply Network is configured to . . . capture all transactional information in one place’ (source: www.esteel.com).

3. e-Steel has recently changed its name to NewView Technologies Inc.

References