

Delivering Liquidity: An Analysis of the Impact of Dealers in Electronic Markets

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1. INTRODUCTION

The past decade has witnessed an explosive growth of electronic marketplaces supported by the new Internet-based technologies (Brynjolfsson and Smith 2000; Smith and Brynjolfsson 2001; Weber 2006). Electronic marketplaces are consumer-to-consumer (C2C) communities through which multiple buyers and sellers exchange information about products and prices, identify and select trading partners, and transact using the Internet technologies (Bakos 1998). Prominent examples of such markets include eBay, Yahoo!, and Amazon's online auctions. It was widely believed that the availability of real-time market information, reduced search cost, and instant electronic transaction would allow buyers and sellers to bypass traditional intermediaries in the market (Bakos 1991; Bakos 1997). Experience over the past years has shown little evidence to support such a belief (Choudhury et al. 1998). Just as asserted by Russell Brazier (2001): *"Intermediaries are not inefficiencies to be wrung out of spot markets by e-commerce. Instead, they are key to the development of efficient, electronic transaction processes."*

The web behemoth eBay is by far the most popular and successful C2C electronic market, with more than 100 million users and \$40 billion gross in 2005. While eBay does provide a marketplace to millions of users to sell off their unwanted stuff, currently most of the trading volume on the site is conducted by actual businesses.² For instance, the top 5% of eBay's music sellers are mostly professional dealers or retailers, who generate over 50% of the sites' business.³ Since the addition of the "Buy it Now" feature which allows the seller to sell at a fixed price, it has attracted a growing volume of transactions from dealers and retailers. The growth of eBay shows that, intermediaries (e.g. dealers and retailers) not only still exist, but also seem to play an important role in electronic markets. In this paper we aim to take the initial step to examine the role of intermediaries (dealers in our context) in C2C electronic markets.

The key function for intermediaries to exist in the first place is to make transactions happen, i.e. to provide liquidity in the market (Cosimano 1996). Extant economics and finance literature suggests that intermediaries can make markets more liquid by increasing the probability of successful trade and stabilizing market price (Cosimano 1996; Barclay and Henershott 2006; Grossman 1992). Such a function is still indispensable in electronic marketplaces. For an electronic market, liquidity is about a critical mass of transactions that draws buyers and sellers to the market. For the buyers and sellers, liquidity can be defined as the capability to get transactions done quickly at a fair price. Dealers' knowledge of products and the market enables them to be more informed of the intrinsic value of items in the marketplace and to match unsynchronized supply and demand over time. Accordingly, the presence of dealers increases the probability of trade. In addition, dealers also can be more resilient to changes in transaction volume in the market given their large inventory. They can choose to strategically enter or exit the market as opposed to occasional buyers and sellers, thus providing liquidity to the market. Furthermore, existence of dealers also provides product quality and price references for other buyers and sellers, which facilitate price discovery in the marketplace, resulting in higher market prices.

Electronic marketplaces are also susceptible to information asymmetry between buyers and sellers (Dewan and Hsu 2004). First, buyers face higher uncertainty of product quality in online markets without direct observations than in conventional brick and mortar stores. Second, participants in electronic markets are often remote buyers and sellers who have little or no prior interactions. Third, electronic transactions expose participants to an even greater risk with the lack of enforceable regulatory policies. Building trust has therefore become a crucial factor in influencing trading in electronic marketplaces (Ba and Pavlou 2002). Existing literature has addressed the roles of third parties, institutions, and feedback and reputation systems in evaluating sellers' credentials and improving trust building (Pavlou and Gefen 2004). Consequently, new entrants would face the barrier of establishing reputation in the market before they can be fully recognized. The presence of dealers can reduce such reputation penalty in dealing with less established buyers and sellers. Dealers often have established reputation and can bear more risks in buying and selling. As a result, they can

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² Forrester research report 2005

³ Music Trades, August, 2004

gain price premium in online marketplaces by selling to risk-averse buyers. They are also more willing to take the risk of purchasing from less established sellers.

In this research, we consider two roles of intermediaries in helping provide liquidity in electronic markets: price discovery and trust building. Intermediaries provide buffer for temporary misalignment between supply and demand by buying low and selling high, which provides product liquidity to buyers and sellers in online markets and increases prices. Intermediaries also help build trust by engaging in transactions with risk-averse buyers and sellers who otherwise will not participate in the market. We empirically examine these two functions using stamp auction data from eBay. Our results suggest that the presence of dealers has a significant impact on market liquidity, resulting in more successful trades and higher auction prices. In addition, we find that dealers are more likely to engage in transactions with less established buyers and sellers. Their presence reduces reputation penalty faced by these players and further improves market liquidity.

2. DATA

Millions of items are listed on eBay on any given day, which are organized into thousands of categories and subcategories. In this paper, we choose the stamp auctions on the eBay US site as our research context for four reasons. First, stamps are one major category in online auction sites such as eBay where there are more than 100,000 listings every day. Second, stamps are widely recognized as common value items that require specialty knowledge to evaluate. Third, the stamp auction market traditionally has the dominant feature of having quality variation in the items, which imposes risks in electronic markets. Finally, the retail value of stamps can be obtained from various stamp catalogs. One of the most widely referenced stamp catalogues is the Scott Standard Postage Stamp Catalogue (SCC). SCC is updated and published annually according to the survey of stamps dealers worldwide. In this study we use 2006 Scott Value as a proxy for the book value of stamps (Dewan and Hsu 2004).

We collected data from one of the eBay’s stamp auction subcategories: “1941-Now: Unused US Stamps”, which has a consistently large number of listings (more than 2000 listings on each day). Our data collection is conducted monthly through eBay Market Data API Service to get detailed item information, bidding, and transaction data for all the ended listings in the past month. The completeness of history makes it possible to compile a data set with great wealth of information. We started our data collection in February 2006 and each month we collected more than 6000 listings. For the purpose of our research, it is important to identify the dealers in the market. We define the following two types of agents as dealers. The first type is the traditional stamp dealers who usually hold bulky inventory and sell large number of stamps. The second type is individuals who take the opportunity of buying low and selling high to make profits. They are usually stamp collectors themselves who have expertise on stamp assessment. Both types of dealers can be readily identified through their seller level, descriptions and trading history.

Table 1. Summary Statistics					
Variable	N	Mean	SD	Min	Max
Auct_Len	3015	6.74	1.04	1.00	10.00
Scott_Value	3015	16.82	36.48	0.20	750.00
StartPrice/Value	3015	0.78	0.93	0.00004	31.58
Seller_FbScore	3015	3921.50	5895.03	0.00	21485.00
Seller_Level	3015	2.11	1.18	1.00	7.00
Dealer_Seller_Level	1975	3.48	1.20	2.00	7.00
% Seller_Dealer	1975 (65.51%)				
% Sold	1681 (55.75%)				

To generate some initial insights for our research questions, we analyze our data of listings ended between February 20 and March 10, 2006. To control for the cross-product heterogeneity and ensure the accuracy of evaluation, our analysis is restricted to the single-item auction listings for commemorative stamp sets. As reported in Table 1, the average book value of stamps is \$16.82, ranging from \$0.2 to \$750, reflecting the wide dispersion of stamp book values. The average normalized (price to value ratio) start price is 0.78 with a fluctuation from 0.00004 to 31.78, indicating the variation of sellers’ expertise on stamp values. While some sellers may set a very low start price with the strategic consideration of attracting more buyers, there is no rational justification for setting a start price much higher than the book value. Sellers’ feedback scores vary from 0 to 21485 with an average around 4000, indicating that the market accommodates both

novices and veterans.⁴ To further differentiate sellers, eBay provides a “PowerSeller” ranking system with tiers from Bronze to Titanium. Qualified sellers must sustain a consistently high volume of monthly sales and a high level of total Feedback.⁵ We assign a numeric value to the descriptive ranking, so that None equals to 1 and Titanium equals to 7. In Table 1, we notice that the average seller level is around 2, suggesting that there are many inexperienced sellers in the market. Table 1 also shows that there are about 65% listings are from dealers and a little more than half (55.75%) items are successfully sold.

Table 2 demonstrates the summary statistics for sold items. The mean of the normalized start price is 0.61 which is lower than the total sample (0.78). The normalized end price ranges from 0.02 to 4.14 with a mean of 0.84. This suggests that on average the end price is lower than the book value. However, some listings also can be sold at a price 3-4 times higher than their book value. Such a market well exhibits the opportunity of generating profits of buying low and selling high. Table 2 also tells us that around 64% sold items are from dealers, but only about 2% buyers are dealers. It is also worth noting that the average buyer feedback score (294.42) is much lower than sellers’ (3533.82). The buyers’ seller level is also fairly low with a mean of 1.08 and maximum of only 4, suggesting that most buyers in the market are relatively inexperienced.

Variable	N	Mean	Std. Dev.	Min	Max
Auct_Len	1681	6.79	0.94	1.00	10.00
Bid_Count	1681	3.17	3.39	1.00	28.00
StartPrice/Value	1681	0.61	0.51	0.00004	3.93
EndPrice/Value	1681	0.84	0.55	0.02	4.14
Seller_FbScore	1681	3533.82	5779.58	0.00	21485.00
Buyer_FbScore	1681	284.42	573.09	0.00	4053.00
Buyer_Seller_Level	1681	1.08	0.39	1.00	4.00
% Seller_Dealer	1077 (64.07%)				
% Buyer_Dealer	28 (1.67%)				

Our data can be further classified into two categories: the commemorative year set (CYS) and the souvenir sheet set (SSS). Both categories are very popular in the stamp market with high collection values. The values of SSS are easily identified even for stamp novices, but to evaluate different year sets (the complete set of commemorative stamps in a specific year) requires considerable effort and expertise. For the current sample, the percentage of dealers in the category of CYS (83.67%) is higher than that in SSS (50.45%). In addition, the average seller feedback score is much higher in CYS (5148.01) than that in SSS (2905.48), indicating that there are much more experienced sellers in CYS. Comparing these two categories allows us to identify the impact of dealers in different markets.

3. EMPIRICAL ANALYSES

In order to test the impact of dealers on the success rate of trade, we run a logistic regression with the probability of sale as the dependent variable. The key independent variables are a binary specification indicating whether the item was listed by a dealer, and the interaction term between dealer and their feedback scores. The dealer’s liquidity provision function indicates that the participation of a dealer will increase the success rate of a transaction. In this case, liquidity can be measured by the incremental success rate of the transaction after controlling for all other factors that could influence its success. Drawing from previous empirical auction literature (e.g. Bajari and Hortaçsu 2003; Dewan and Hsu 2004), we add control variables that are likely to influence the possibility of sale including auction length, the normalized start price, and the indication of whether the auction ends during the weekend. Moreover, as a liquidity provider, the success rate of a transaction initiated by a dealer shall depend more on his liquidity provision function. As such, it is less influenced by the dealer’s seller characteristics such as his reputation scores.

The regression results are shown in Table 3. As we expected, dealers’ listings enjoy a significantly higher probability of sale after controlling for other factors including the dealer’s reputation effect. In addition, the results show that for a dealer, the success rate of sale no longer depends on his feedback score. This finding is demonstrated by adding the coefficients of feedback score and the interaction term (0.13 + -0.19 = -0.06), which is not statistically significant. Therefore, the presence of dealer increases the probability of sale in the market, regardless of their feedback scores. We

⁴ Feedback score is an aggregation of feedbacks from both buyers and sellers.

⁵ PowerSeller must maintain a 98% or better positive rating by other eBay users.

also compare the two markets of CYS and SSS in light of whether dealers play a role in facilitating trade. As shown in Table 4, dealers significantly increase the success rate of sale only in CYS, but not in SSS. Given that the percentage of sold listings in CYS (54.17) and SSS (57.06) are very similar, this result suggests that dealers' influences are more pronounced in the market that requires expertise knowledge of the product with greater information asymmetry between sellers and buyers.

Variable	Parameter Estimate
Seller_Dealer	1.40*** (0.37)
log (Seller_FbScore)	0.13*** (0.04)
Seller_Dealer*log(Seller_FbScore)	-0.19*** (0.06)
log (Auction_Len)	0.72*** (0.21)
log (StartPrice/Value)	-0.88*** (0.06)
Weekend	0.15* (0.08)
Constant	-2.33 (0.48)
Number of Observations	3015
Log-Likelihood	-1874.14

***, **, and * denote significance at 1%, 5%, and 10% respectively.

Variable	Year_Set	Sheet_Set
	Parameter Estimate	
Seller_Dealer	5.24*** (0.75)	0.15 (0.46)
log (Seller_FbScore)	0.56*** (0.11)	0.03 (0.05)
Seller_Dealer*log (Seller_FbScore)	-0.80*** (0.13)	-0.02 (0.07)
log (Auction_Len)	1.89*** (0.34)	-0.15 (0.31)
log (StartPrice/Value)	-0.86*** (0.09)	-0.96*** (0.08)
Weekend	0.19 (0.12)	0.16 (0.11)
Constant	-6.92 (0.88)	-0.36 (0.67)
Number of Observations	1366	1649
Log-Likelihood	-817.14	-1026.20

***, **, and * denote significance at 1%, 5%, and 10% respectively.

To test the influence of dealers on the market price and their interactions with buyers and dealers, we run a regression using the normalized end price as the dependent variable. We include the following key independent variables. 1) Dummy variables indicating whether the seller or the buyer is a dealer. These variables capture the influence of dealers on end prices. 2) Dummy variables indicating whether sellers or buyers have low or high feedback scores. These variables measure the influence of their reputation on market prices.⁶ 3) The interaction terms of dealers (seller or buyer) and their counterparts' reputation score dummy variable (buyer or seller). The interaction terms are key to our analysis as they capture the impact of dealers in interacting with users with different levels of reputation scores. We expect that sellers or buyers with lower reputation score will face reputation penalty in ordinary eBay transactions. But the reputation penalty will decrease or even disappear if they engage in transactions with dealers. We also add other control variables including auction length, the normalized start price, number of bids, and the indication of whether the auction ends during the weekend.

Table 5 shows the regression results. We can see that the participation of dealers as either a seller or a buyer increases the normalized end price. This validates dealers' role of buying low and selling high in the market, providing liquidity and leading to higher market prices. It is also shown that the influence on price by dealers is more pronounced for sellers with lower feedback scores (the interaction term of Buyer_Dealer and Seller_FbScore_d is negative and significant). This supports our argument that dealers reduce the reputation penalty faced by sellers with lower reputation scores, thus increasing market liquidity by facilitating sales in the market. We also find that the interaction term of Seller_Dealer and Buyer_FbScore_d is positive and marginally significant, while the coefficient on Buyer_FbScore_d is negative and marginally significant. This indicates that buyers with lower reputation score need to pay higher premiums in transactions with non-dealer sellers. But in transaction with dealers, such reputation penalty disappears. This finding

⁶ The binary user feedback score is determined by the median of the sample feedback score. For example, for data with buyer feedback score greater the sample median, the dummy variable Buyer_FbScore_d equals to 1, otherwise equals to 0.

can be demonstrated by adding the coefficients of feedback score and the interaction term ($-0.07 + 0.08 = 0.01$), which is not statistically significant. Overall, our findings suggest that dealers are more likely to engage in transactions with less established sellers and buyers and reduce their reputation penalties. Such a result provides initial support for our argument that dealers can bear more risk and help trust building among inexperienced players in the market.

Variable	Parameter Estimate
Seller_Dealer	0.15*** (0.03)
Buyer_Dealer	0.36*** (0.11)
Seller_FbScore_d	0.16*** (0.03)
Buyer_FbScore_d	-0.07* (0.03)
Seller_Dealer*Buyer_FbScore_d	0.08* (0.04)
Buyer_Dealer*Seller_FbScore_d	-0.59*** (0.17)
log (Auction_Len)	0.05 (0.06)
log (StartPrice/Value)	0.43*** (0.01)
log (Bid_Count)	0.39*** (0.02)
Weekend	0.005 (0.02)
Constant	-0.53 (0.12)
Number of Observations	1681
Adj. R Sq	0.48
<i>Note: ***, **, and * denote significance at 1%, 5%, and 10% respectively.</i>	

4. CONCLUDING REMARKS

Our empirical analysis of the stamp auction data indicate that the presence of dealers help provide liquidity in electronic markets. Our data show that over 50% of the volume is contributed by dealers. We find that the presence of dealers improves the probability of sale especially for the stamp category that requires more knowledge and expertise. Moreover, our results indicate that dealers are more likely to engage in transactions with less experienced sellers and buyers, which further facilitate the liquidity. Our findings lay the foundation for future development of this research in the following directions. First, we will investigate more extensively on the “trust building” between dealers and users in the online auction market as well as the role of dealers on stabilizing market price. Second, we will not only analyze the auction data, but also compare and contrast them with the fixed price items. The analysis will also be extended to longer time periods to capture the dynamics of the impact of dealers in the market. Third, our sample will be segmented in detailed level based on the book value. Finally, we will include more categories of items in our analysis to generate more insights of the roles of dealers in different markets.

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