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Communications of the Association for Information Systems

Exploring Market Dispersion and Factors that Predict Auction Success of a Commodity: The Case of Three E-Auction Markets

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Abstract:

The current study presents emerging evidence of the heterogeneities of dispersion in price and number of bidders and the combination of factors that predict auction success across electronic auction (e-auction) markets in various countries. We argue that heterogeneities in e-auction markets exist and understanding them can benefit market participants. A spider program was developed to collect live auction data of commodity transactions from e-auction markets in three different countries: Australia, the United Kingdom, and the United States. Our results confirm heterogeneities across these markets. We also found that each e-auction market has a different set of success factors. The article concludes with recommendations to participating members of auctions.

Keywords: electronic auctions, online auctions, electronic commerce, cross-country studies, price dispersion

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I. INTRODUCTION

It is almost impossible to overstate the role of electronic markets (e-markets) in today's economy. The estimated seasonally adjusted 2009 third quarter U.S. retail e-commerce sales totaled \$34 billion—a 1.8 percent increase over the same quarter of 2008 [U.S. Census Bureau News, 2009]. A major promise of e-markets is their ability to reach customers in various countries. With this promise, early research in the e-commerce area suggests that the Internet will unite a global economy, allowing different markets across national boundaries to be more homogeneous [Bakos, 1997]. Some prior research suggested otherwise and supported the idea that heterogeneities would be expected across markets in various countries (e.g., de Mooij and Hofstede, 2002; Peng and Jan, 2009). Although an Internet store can be reached virtually by online users around the world, there exists limited research in the area of market dispersion and auction success predictors across national boundaries, especially in the e-auction environment.

In recent Information Systems (IS) research, several attempts have been made to investigate the impact of electronic commerce on pricing dimensions such as price levels, price transparency, and price dispersion. For example, the commercialization of the Internet was claimed to be one of the driving forces for businesses to reduce their product prices due to the increased competition among retailers [Bakos, 1998]. Soh and her colleagues presented evidence of how price transparency or lack thereof affects success of electronic marketplaces [Soh et al., 2006]. Such transparency allows IS researchers to observe that changes in price in online computer markets occur in a synchronized fashion among online sellers [Oh and Lucas, 2006]. The change in prices made by the online retailers produces a phenomenon called *price dispersion*, which later received growing interest from the IS community (e.g., Ba et al., 2011 forthcoming; Bock et al., 2007; Chen and Hitt, 2001; Walter et al., 2006).

The current research investigates two entities of market dispersion—price and number of bidders. Price dispersion is commonly studied in the form of price variability (e.g., Ba et al., 2011 forthcoming; Baye and Morgan, 2001; Pan et al., 2002). It benefits merchants because it is a reflection of a firm's strategy to avoid price predictability by customers [Baye et al., 2004b]. Suppliers use variability in prices to differentiate their offerings and make their brands or products more distinctive or more desirable as compared with competitors [Redmond, 2002]. Price dispersion, however, can harm consumers through higher search costs and potential errors in their purchase decisions [LeClair, 2006].

Most research on price dispersion has been conducted in fixed-price markets where merchants largely determine prices. We argue that electronic auction (e-auction) markets are viable environments to observe levels of price dispersion mainly because prices are allowed to vary according to buyers' and sellers' preferences and actions. For example, prices may vary with auction durations, starting prices, buy-it-now prices, reserve prices required for an item to sell, and sellers' performance indicated by feedback scores and comments (e.g., Ba and Pavlou, 2002; Lucking-Reiley et al., 2007; Song and Baker, 2007; Standifird and Roelofs, 2005). Buyer-related factors such as timing of bids, frequency of bids, and number of unique bidders can also influence the final price of an item (e.g., Bapna et al., 2004; Segev et al., 2001; Song and Baker, 2007; Wilcox, 2000).

The dynamic nature of e-auction transactions allows researchers to observe not only price dispersion across different transactions but also dispersion in the number of bidders. In the auction context, bidders are imperative to auction success. As the number of unique bidders increases, the success rate of the auctions increases [Akula and Menascé, 2007]. Prior research, however, focuses primarily on price dispersion, and, to the best of our knowledge, no research provides an empirically-based discussion of bidder dispersion. To achieve our goal of investigating dispersion and auction success in e-auctions, we employ data from eBay in three different countries: Australia, the United Kingdom, and the United States. The primary purposes of our research are to explore the heterogeneities in (1) e-auction dispersion in price and number of bidders and (2) variables that influence auction success (final auction price) across e-auction markets in the three countries of interest.

II. LITERATURE REVIEW

Dispersion in Price and Number of Bidders

The current research investigates dispersion in terms of price and number of bidders. Price dispersion is defined as the distribution of or variance in price for identical products across sellers [Chen and Hitt, 2001; Pan et al., 2002]. The emergence of electronic markets greatly renewed researchers' interest in this topic. Initial efforts were mostly directed at comparing relative amounts of price dispersion in electronic markets to that in traditional markets (see

Table 1). Early expectations predicted lower price dispersion in e-markets relative to traditional ones. Yet empirical evidence provides ambiguous results. Some studies found comparable price dispersion in electronic and traditional markets, and others found differences in the two market types [Bailey, 1998; Pan et al., 2004; Scholten and Smith, 2002; Stylianou et al., 2005]. For example, consumers paid up to a 60 percent difference in prices across different online merchants, with 28 percent of this price dispersion unexplained by disparities across merchants [Baye et al., 2004b].

Table 1 provides a summary of relevant research studies explaining price dispersion in e-business. The commonly studied variables used to explain price dispersion in electronic markets are type of retailer (i.e., e-tailers—retailers using electronic channels only versus traditional and multichannel retailers), service quality heterogeneity, and asymmetrically informed consumers. As indicated by Table 1, there is no consistent agreement across studies about the effect of the variables on price dispersion. Nonetheless, a brief synthesis of the research indicates some common findings. It is often found that price dispersion is higher among e-tailers compared to traditional and multichannel retailers, though there are exceptions to this finding. Service and product category differences among e-tailers do not completely explain price dispersion. Price dispersion among e-tailers is positively related to asymmetrically informed consumers but is not adequately explained by heterogeneity of consumer search costs. The influence of the number of e-tailers on price dispersion is ambiguous. Price dispersion among e-tailers has not diminished over time. Limited research conducted on other factors found to influence price dispersion among e-tailers includes the effects of sales promotions, market development, country, and product evaluation factors (but not product lifecycle stage or product popularity).

There has been some consensus in theories that aim to explain price dispersion. In their review of the literature, Brynjolfsson and Smith [2000] identified three main explanations for price dispersion: search costs; asymmetric information across consumers; and product heterogeneity. Grover, Lim, and Ayyagari [2006] posited three theoretical reasons to explain price dispersion: search cost, service differentiation, and market characteristics. Baylis and Perloff [2002] offered three drivers of price dispersion: market immaturity [Bock et al., 2007; Brynjolfsson and Smith, 2000]; firms' oligopolistic strategies to raise or lower prices over time, both collectively and randomly [Shilony, 1977; Varian, 1980]; and service premiums [Varian, 1999]. Within these three studies, we observe three broad themes that are used to explain price dispersion: (1) asymmetric information and search costs, (2) differences in products and/or services, and (3) differences in market characteristics or market maturity.

In Stigler's seminal work regarding traditional markets, he argued price dispersion was due to "ignorance in the market" [Stigler, 1961, p. 214]. Since then, researchers maintain that lack of information is one of the primary explanations for price dispersion in both online and traditional markets. The Internet, however, provides a breadth of information not available in traditional markets to consumers for comparing products and prices at a relatively low cost [Bailey, 1998; Bakos, 1997; Brynjolfsson and Smith, 2000; Grover et al., 2006; Li et al., 2009]. This characteristic of electronic markets arguably decreases both price dispersion as well as the average price charged for a particular item. Nevertheless price dispersion does exist and is prevalent in electronic markets [Walter et al., 2006].

Differences in the products and services offered as well as e-tailer differences result in price dispersion in the market [Brynjolfsson and Smith, 2000; Grover, Lim, and Ayyagari, 2006]. Retailers with higher brand awareness among consumers gain higher prices than their competitors [Chen and Hitt, 2001]. Service quality (i.e., reliability, shopping convenience, product information, and shipping and handling) explains very little e-tailer's pricing power [Pan et al., 2002]. In fact, Pan, Ratchford, and Shankar [2002] and Baylis and Perloff [2002] found that price can go down with increased service—a finding that contradicts most commonly held beliefs. Ba, Stallaert, and Zhang [2011 forthcoming] later attempted to explain such a phenomenon by investigating the interplay between firm recognition and service and its affect on price dispersion. In short, they found that highly recognized and less recognized firms exhibited different relationships between price and their provided services. In addition, the identity of high-priced and low-priced firms generally remained consistent over time [Baylis and Perloff, 2002], contradicting previous studies (e.g., Baye et al., 2004b). Other researchers attributed price dispersion to firms' strategies of mixed pricing to prevent consumers from learning which stores offer the lowest prices [Baye et al., 2004b; Varian, 1980].

The only studies we found that compared price dispersion across national boundaries are those of Rupert, Gatti, and Kattuman [2003] and Bock, Lee, and Li [2007]. While they were both carried out in fixed-price e-markets, the two studies focused on different aspects of the market. Rupert, Gatti, and Kattuman [2003] focused on supply factors, while Bock, Lee, and Li [2007] focused on demand factors (i.e., buyer). The first study unmasked price dispersion of thirty-one products in seven European countries [Rupert et al., 2003]. Their study collected data over the course of thirty weeks. The price information was downloaded weekly from a price listing service website called *Kelkoo*. Their results confirmed varying degrees of price dispersion across countries. Italy, the Netherlands, and Sweden exhibited

Table 1: Summary of Key Research Findings—Explanatory Variables Predicting e-Business Price Dispersion

Key Findings	Units of Study
Explanatory Variable: Type of Retailer	
• Higher than expected price dispersion was found among e-tailers (i.e., retailers using only electronic channels) compared to traditional and multichannel retailers [Brynjolfsson and Smith, 2000].	Books, music CDs
• Price dispersion is greater for e-tailers compared to multichannel retailers [Stylianou, Kumar, and Robbins, 2005].	Twelve over-the-counter pharmaceutical products
• Price dispersion for homogenous products among e-retailers is greater than the price dispersion among traditional retailers [Bailey, 1998].	Books, music CDs, computer software
• Among e-tailers, traditional retailers, and multichannel retailers, e-tailers exhibit the widest range of prices, but the lowest variability (standard deviation). Multichannel retailers exhibit the highest variability in prices [Ancarani and Shankar, 2004].	Books, CDs
• In the U.S. and China, e-tailers realize lower price dispersion than multichannel retailers [Bock, Lee, and Li, 2007].	Books, music CDs, digital cameras
• After controlling for e-tailer service quality, retailer type explains some price dispersion. For six of eight product categories, e-tailer prices are lower than multichannel retailer prices [Pan, Ratchford, and Shankar, 2002].	Books, music CDs, DVDs, computer software, computer hardware, consumer electronics
Explanatory Variable: Service Quality Heterogeneity	
• Service levels and brand recognition explain the majority of an e-tailer's effect on price dispersion. High-service/high-recognition is positively related to price. For low service e-tailers, there is a negative association between service and price [Ba, Stallaert, and Zhang, 2011 forthcoming].	DVDs, projector replacement bulbs, external hard drives, global positioning systems (GPS) equipment
• Differences in service do not result in price dispersion for e-tailers [Baylis and Perloff, 2002].	Digital cameras, flatbed scanners
• Price dispersion is not adequately explained by service differences among e-tailers [Brynjolfsson and Smith, 2000].	Books, music CDs
• Differences in e-tailer service quality explain price dispersion only to a limited extent. Results suggest heterogeneity of e-tailer services may not result in price premiums [Pan, Ratchford, and Shankar, 2002].	Books, music CDs, DVDs, computer software, computer hardware, consumer electronics
Explanatory Variable: Asymmetrically Informed Consumers	
• Price dispersion is a result of e-tailers varying prices for informed and uninformed consumers [Baylis and Perloff, 2002].	Digital cameras, flatbed scanners
• Information overload and equivocality regarding product quality are statistically significant and positively related to price dispersion in e-tailers [Grover, Lim, and Ayyagari, 2006].	Consumer electronics, computer hardware
• For e-tailers, price dispersion is not explained adequately by informed versus uninformed consumers [Brynjolfsson and Smith, 2000].	Books, music CDs
Explanatory Variable: Product Category	
• Price dispersion is a prevalent feature of e-tailers across all product categories [Rupert, Gatti, and Kattuman, 2003].	Printers, PDAs, scanners, game consoles, computer games, music CDs
• Price dispersion is prevalent across all product categories for e-tailers [Walter, Gupta, and Su, 2006].	PDAs, groceries, hotel rooms, airline tickets, flowers (commodity products); books, music CDs, toys, videotapes (quasi-commodity products); shoes, furniture, online trading service, fragrances, wine (differentiated products)
Explanatory Variable: Number of Sellers	
• Price dispersion is greater when small numbers of e-tailers list prices compared to large numbers of e-tailers [Baye, Morgan, and Scholten, 2004a].	Consumer electronics
• Influence of number of e-tailers in a market on price dispersion is ambiguous (depending on measure of price dispersion used and country of consideration) [Rupert, Gatti, and Kattuman, 2003].	Printers, PDAs, scanners, game consoles, computer games, music CDs

Table 1: Summary of Key Research Findings—Explanatory Variables Predicting e-Business Price Dispersion - Continued

Key Findings	Units of Study
Explanatory Variable: Consumer Search Costs	
<ul style="list-style-type: none"> The Internet does not compress search-cost heterogeneity for consumers [Walter, Gupta, and Su, 2006]. 	PDAs, groceries, hotel rooms, airline tickets, flowers (commodity products); books, music CDs, toys, videotapes (quasi-commodity products); shoes, furniture, online trading service, fragrances, wine (differentiated products)
<ul style="list-style-type: none"> Price dispersion among e-tailers is not adequately explained by consumer search costs [Brynjolfsson and Smith, 2000]. 	Books, music CDs
Explanatory Variable: Time	
<ul style="list-style-type: none"> Price dispersion among e-tailers is not diminishing over time [Baye, Morgan, and Scholten, 2004a]. 	Consumer electronics
<ul style="list-style-type: none"> Price dispersion in 2000 for both traditional retail and e-tail markets is at least as large as that observed in traditional retail markets in 1976. Price dispersion in e-tail markets and traditional retail markets is about the same in 2000 [Scholten and Smith, 2002]. 	Twenty consumer goods (traditional retail markets); Eleven consumer goods (electronic retail markets)
Explanatory Variable: Others	
<ul style="list-style-type: none"> Price dispersion is a result of short-term, unpredictable price promotions used by e-tailers to avoid price competition [Baye, Morgan, and Scholten, 2004b]. 	Consumer electronics
<ul style="list-style-type: none"> Price dispersion in more developed online markets (U.S. e-tailers) is significantly lower than in less developed online markets (China e-tailers) [Bock, Lee, and Li, 2007]. 	Books, music CDs, digital cameras
<ul style="list-style-type: none"> Product life-cycle stage and product popularity do not explain much e-tailer price dispersion [Pan, Ratchford, and Shankar, 2002]. 	Books, music CDs, DVDs, computer software, computer hardware, consumer electronics
<ul style="list-style-type: none"> Significant differences found in the degree of price dispersion across e-tailers in different countries [Rupert, Gatti, and Kattuman, 2003]. 	Printers, PDAs, scanners, game consoles, computer games, music CDs
<ul style="list-style-type: none"> Effect of product evaluation factors on e-tailer price dispersion depends on the product [Walter, Gupta, and Su, 2006]. 	PDAs, groceries, hotel rooms, airline tickets, flowers (commodity products); books, music CDs, toys, videotapes (quasi-commodity products); shoes, furniture, online trading service, fragrances, wine (differentiated products)

greater price dispersion more consistently than the other countries. Spain and France exhibited the lowest degree of price dispersion. They argued that the relative development of electronic markets among countries (as indicated by the number of firms listing prices in each market, that is, number of suppliers) was one of the drivers of these results. For example, price dispersion markedly increased as the number of firms selling online changed from two to eight or more.

The latter study focused on demand factors (i.e., buyer) and involved the concept of Internet market maturity [Bock et al., 2007]. They argued that a more mature market would exhibit lower price dispersion. They defined market maturity as the developmental level of Internet infrastructure and the adoption level of the Internet by users. Different buyer/user factors related to Internet technology, such as the number of Internet users and online spending per buyer, influenced their concept of market maturity. They collected prices of three products (books, CDs, and digital cameras) in the U.S. and China and found significantly lower price dispersion in the U.S. markets for all three products. They argued that their finding provided a confirmation of the Internet maturity effect—which assumes that as Internet technologies become more widespread, price dispersion declines because there are more buyers in the market. They encouraged more studies to be conducted in an international context to further examine the role of Information Technologies on price dispersion.

In addition to price dispersion, our study explores dispersion in number of bidders in e-auction markets. Relatively little research exists on the topic of bidder dispersion, especially in regard to e-markets. Research tangential to bidder dispersion indicates that the volatility and unpredictability of customer demand is amplified and growing, especially in highly competitive markets [Cachon et al., 2007; Huang et al., 2008]. This volatility of demand is attributable to accelerating economic cycles, strong competition, unpredictable consumer preferences, and the rapid advancement of products [Huang et al., 2008]. In fixed-price markets, decreased dispersion in the number of customers makes demand forecasting easier and more accurate [Gilliland, 2003; Huang et al., 2008]. It is easier to match customers' preferences, and thus increase the opportunity for profit maximization [Waller, 2004]. In other words, if a firm can better meet customer needs, prices and revenues can be maximized [Waller, 2004]. While demand predictability is generally a goal in markets, it is implied that sellers willing to deal with demand volatility and the associated risk premiums may benefit from higher returns [Bekaert and Harvey, 1997].

One of this study's prime objectives is to explore heterogeneities in dynamic pricing and bidder environments. Although prior studies provide evidence indicating price dispersion is both ubiquitous and persistent, not much research regarding dispersion in the number of bidders exists. While a substantial amount of e-auction research exists, no studies to the best of our knowledge explore dispersion in prices and number of bidders across different e-auction markets. We argue that while much attention is given to observing and studying price dispersion in fixed-price and auction markets—in terms of how auction prices are formed or what helps shape price premiums for auction sellers—more efforts should be directed at studying both dynamic pricing and bidder environments of e-auction markets. Our discussion above indicates that different markets exhibit varying levels of dispersion in price and the number of bidders. Rupert, Gatti, and Kattuman [2003] suggest this differing dispersion is particularly true for markets in different countries. Therefore, the current study examines dispersion in prices and number of bidders across different e-auction markets. Our first research question and its associated hypotheses are:

Research Question 1: Is there heterogeneity in dispersion of price and the number of bidders for a commodity across e-auction markets?

H1a: Heterogeneity in dispersion of final auction price for a commodity across e-auction markets exists.

H1b: Heterogeneity in dispersion of the number of bidders for a commodity across e-auction markets exists.

Auction Success Predictors

As mentioned above, the second goal of our study is to demonstrate that various auction factors (e.g., seller feedback, auction duration, and opening bid) influence auction success differently in different e-auction markets. Auction success factors can be operationalized in many ways. Using a dummy variable, Gilkeson and Reynolds [2003] identified a materialized auction (i.e., an auction that resulted in a sale, where at least one bid exceeded a minimum or reserve price if used by a seller) as success. However, we argue that using final auction price is more appropriate for many reasons. First, it has been used more frequently in the literature (e.g., Akula and Menascé, 2007; Ba and Pavlou, 2002; Lucking-Reiley et al., 2007). Second, varying levels of final auction prices can reflect influences of different auction design factors and sellers' strategies. A myriad of proposed models attempt to explain the factors that shape final auction price—most of which employ regression models (e.g., Ba and Pavlou, 2002; Lucking-Reiley et al., 2007). These prior studies provide us with a framework upon which to build. Very frequently, the number of bidders, seller feedback, opening bid, and auction duration are used as independent variables in predicting auction success (e.g., Ba and Pavlou, 2002; Lucking-Reiley et al., 2007).

Number of bidders is employed as a predictor of auction success mainly because to complete an auction, bidder participation at some level is necessary [Gilkeson and Reynolds, 2003]. The number of bidders can enhance the success rate of an auction (i.e., an auction with a winner). For example, Akula and Menascé separately analyzed over 2,000 product categories from Yahoo! auctions and found that each product category will have success approaching 100 percent (all auctions are sold) if its average number of bidders passes the threshold of fifteen unique bidders [Akula and Menascé, 2007]. Empirical evidence demonstrates that the addition of a bidder can raise the final auction price approximately 2 percent [Dewally and Ederington, 2006]. It is conjectured that as the competition heats up, bidders become more emotional as commitment escalates, and ultimately bid more than they initially anticipated [Staw, 1981]. In contrast, in a study of computer auctions it was found that each additional bidder encouraged existing bidders to lower their bids by approximately 1 percent [Yin, 2006]. Such a phenomenon can be explained in the situation where auction participation is largely driven by opportunistic bidders who are actively engaged in finding a good deal [Bapna et al., 2000]. It is beyond the scope of this study to investigate the underlying causes of these mixed results. Rather, we draw on past literature to demonstrate potential heterogeneities in predictors of final auction price.

Heightened and exacerbated risk is a prominent feature of digital transactions and trust issues are further compounded in short-term relationships, such as those observed in e-auction markets. Accordingly, buyer-provided

feedback about sellers is necessary to demonstrate trustworthiness to prospective bidders and, therefore, most electronic markets and auction sites publish comments, scores, and/or rankings [Utz et al., 2009]. Accumulated evidence shows that sellers with relatively high positive feedback scores or relatively low negative feedback scores receive higher price premiums and fewer transaction disputes compared to sellers with relatively low positive or high negative feedback scores in e-auction markets (e.g., Lucking-Reiley et al., 2007; MacInnes et al., 2005). Feedback scores, especially the negative ones, are indicative of a seller's future performance [Gregg and Scott, 2006]. In one study, the positive and negative feedback scores explain approximately 30 percent of sellers' price premiums in e-auctions and approximately 57 percent of bidders' trust [Ba and Pavlou, 2002]. Similarly, highly reputable sellers in auctions are found to receive almost an 8 percent higher price premium, compared to new sellers [Resnick et al., 2006].

Opening auction bid is another variable that is frequently used to predict final auction price with various explanations of the relationship. It is postulated that different levels of opening bids could send different signals to buyers in terms of product quality [Milgrom and Roberts, 1986]. This proposition is largely used to explain the final price of items whose values cannot be easily determined, such as antiques and used vehicles. Many prior studies selectively employ commodity-like products and electronics as their products to rule out this signaling effect and allow a fair comparison (e.g., Ba and Pavlou, 2002; Reynolds et al., 2009; Song and Baker, 2007). Despite this product selection approach, there are still mixed findings in the relationship between final auction price and opening bid. For example, relatively low opening bids draw more competition to auctions, resulting in increased final prices [Bajari and Hortacsu, 2003; Lucking-Reiley, 2000; Reynolds et al., 2009; Standifird, 2001]. Yet such a strategy also increases sellers' risk of having low bids and risk-averse sellers protect themselves with high opening bids [Reynolds et al., 2009; Schlägel and Wolff, 2007].

Mixed findings are also evident in the auction duration and price relationship. For instance, Lucking-Reiley [2000] argued that auction duration could increase average auction price through increased bidder participation; however, it was found that longer auction durations do not necessarily produce higher revenues to sellers [Bapna et al., 2001; Hou, 2007]. Another study in this area showed a positive correlation between consumer surplus and auction duration in auctions with durations of five to seven days [Bapna et al., 2008]. For low-priced products, relatively long auction durations can be detrimental to sellers' revenues. Some argue that inexpensive products do not need long auction durations because buyers of these products are willing to pay more for immediate product acquisition [Muthitacharoen et al., Working Paper].

Our literature review identified a few studies that compared predictors of final price across multiple countries. For instance, Hou [2007] used eBay data from computer monitor auctions and found that both opening bids and sellers' positive feedback exhibited significant positive relationships with final auction price in both the U.S. and Chinese markets. A significantly negative relationship was found between sellers' negative feedback and final auction price in both markets. Auction duration was not found to be predictive of final price.

In a study of three auction markets, it was found that negative feedback significantly influenced the price of CDs in Denmark and the U.K. though not in the U.S. market [Schlägel and Wolff, 2007]. Positive feedback was found significantly related to final auction price only for U.S. and U.K. markets. Only in the U.S. were opening bids for digital cameras a significant predictor of the final price. Auction duration was found to influence final auction price of video consoles in the U.S. market negatively—an antithesis to results found in prior studies (e.g., Lucking-Reiley et al., 2007; Standifird, 2001). Clearly, predictors of final price vary among countries, and this leads us to our second research question and its associated hypothesis.

Research Question II: Is there heterogeneity in the set of success predictors for a commodity across e-auction markets?

H2: Heterogeneity exists in the set of factors that predict final auction price for a commodity across e-auction markets.

The predictor variables of final auction price were selected based on prior e-auction research (e.g., Lucking-Reiley et al., 2007). For example, opening auction bid was used to test empirically the expectation of standard auction theory that there is no effect of opening bid on final auction price when there is more than one bidder because the opening bid is not binding, versus the alternative that it operates as a reference point that influences the levels of bidders' bids [Lucking-Reiley et al., 2007]. Based on eBay data from 1999, Lucking-Reiley et al. [2007] found that auction duration positively influenced final auction price. However, they postulated that at some point this effect could decline over time in e-auction markets because of the significant increase in eBay bidders. Auction duration was used to test this contention empirically. Other predictors we used in our analysis include number of bidders and feedback scores. Standard auction theory indicates that the number of bidders influences the final auction price, such that as the number of bidders increases, the final auction price increases [Gilkeson and Reynolds, 2003]. Seller

feedback variables were used to test for various extents of effect of positive versus negative feedback on final price [Lucking-Reiley et al., 2007].

III. RESEARCH METHOD

An iPod Nano 2GB was selected as the product of focus for this study because it is a universal product, widely used around the world, and available in the three countries being studied. The choice of this product is in accord with prior research on price dispersion that frequently used commodity-like products to ensure a fair comparison and rule out a signaling effect attributable to different levels of product quality. Thus eBay auction websites in three different markets, specifically, Australia, the United Kingdom (U.K.), and the United States (U.S.) were chosen because of their similarities in language and eBay auction rules (e.g., hard-closing auctions), as well as the availability of the selected product in the three markets. Currently eBay has more than 90 million users—mostly in the United States. There are over 8 million and 14 million users in Australia and United Kingdom, respectively. While consumer interest level and perceived value may vary across markets, examining each market independently of the other markets will demonstrate heterogeneities in dispersion and predictors of auction success.

Two spider programs were developed to collect data from the three eBay auction websites. The data were collected from early October 2007 to early December 2007. The first program identified new auction listings that matched the provided keyword (iPod 2GB) by going to the auction websites every two hours. Once the program found matching items, it downloaded the listing information, start date/time, and end date/time and stored the HTML information in an SQL server database. These data were later extracted and used to monitor the auctions. Immediately after an auction ended, the other spider program downloaded additional information such as seller feedback scores, final auction price, and number of bidders.

Sample

Online auction data of new iPods Nano 2GB were collected over a two-month period, producing an initial sample size of 2,950. The data cleaning process eliminated 1,299 data points, rendering a final sample of 1,651. The majority of data that was eliminated included used iPods, iPod accessories, and bundled items. The data were later migrated from the SQL server database to an SPSS program for the analysis.

Table 2 shows the sample characteristics. Of the 1,651 auction samples, 231 were transactions from the Australian eBay, 342 were from the U.K. eBay, and 1,078 were from the U.S. eBay. Such a distribution indicates that the U.S. is a much larger market. The largest number of sellers was found in the U.S. market. The data indicated a total of 94, 154, and 601 unique sellers in the Australian market, the U.K. market, and the U.S. market, respectively. Although most sellers in the three markets were individual sellers or those with only one iPod Nano 2GB for sale, the largest number of business sellers were found in the U.S. market. Twenty-two of the U.S. sellers held at least five similar auctions. In terms of bidders, the Australian market displayed the smallest number of unique participating bidders. There were 2,253 and 6,650 unique bidders in the U.K. and the U.S. markets, respectively. Interestingly, the data showed that forty-one bidders (0.39 percent) participated in cross-country bidding. Only two of them won the cross-country auctions.

Table 2: Sample Characteristics				
	Australia	United Kingdom	United States	Total
Auction Transactions	231	342	1,078	1,651
Unique Sellers	94	154	601	849
Unique Bidders	1,656	2,253	6,650	10,559

Measurement

The auction success factor—final auction price—was extracted directly from the auction HTML page immediately upon the conclusion of an auction. Because auction transactions took place in different monetary currencies, a common currency was needed to ensure a fair comparison. Currency units were converted to the U.S. dollar using the daily currency exchange rate provided on www.x-rates.com. Such a conversion was necessary for performing tests of the hypotheses (e.g., a test of homogeneity of variance in prices).

The opening auction bids were extracted directly from the auction HTML page. Auction duration was calculated using the start date/time and end date/time of an auction. The number of bidders was extracted at the end of each auction. Two measures of seller feedback were collected—positive and negative feedback scores. The approach adopted in prior studies was followed to transform seller feedback scores by using log transformations [Ba and Pavlou, 2002; Lucking-Reiley, 2000; MacInnes et al., 2005]. As Ba and Pavlou [2002] argue, there are diminishing marginal benefits of a positive (or negative) rating. Specifically, one more positive (or negative) feedback rating has

more impact for an individual who has no or few feedback ratings as compared to an individual who already has many positive (or negative) ratings. For example, a new seller who just started selling items is in more need of having positive feedback than those who have received many positive feedback ratings before. Case in point, eBay bidders are protected up to \$2,000 if they use PayPal to buy items from sellers with fifty feedback scores or more and at least 98 percent of them are positive (http://reviews.ebay.com/Buyer-Tips-For-Buying-Protection_W0QQugidZ10000000005451556). Once an individual has many positive (or negative) feedback ratings, one more positive (or negative) feedback rating gives little additional information about the seller's past performance [Ba and Pavlou, 2002]. The log transformation of the variable is consistent with this argument.

IV. FINDINGS

Heterogeneities in Dispersion in Price and Number of Bidders

Two dispersion variables in three e-auction markets were examined by comparing the dispersion of final auction price and the dispersion of the number of bidders. One important observation to be made regards the various ways researchers calculate price dispersion—for example, range, standard deviation, variance, and gaps between various prices (e.g., Baye et al., 2006). The use of different measures in different studies is perhaps an attributable cause of the mixed findings in the previous studies [Pan et al., 2004]. The question of why different measures engender different results remains unanswered [Pan et al., 2004] and is beyond the scope of this study. To find a thorough discussion of these measures, see Rupert, Gatti, and Kattuman [2003] and Scholten and Smith [2002]. Despite the myriad ways to calculate price dispersion, the two most commonly used variables in the literature are variance (s^2) and coefficient of variation (C_{var} ; a ratio of standard deviation of prices to mean prices). We report and discuss both the variance and coefficient of variation for our variables of interest.

H1a and H1b state that there is heterogeneity in dispersion of final auction price and the number of bidders for a commodity across the three e-auction markets. Our analysis confirmed that there is heterogeneity of variance in the two variables. Table 3 displays the means, variances, and coefficients of variation statistics. Table 4 presents the paired comparison of F -statistics across the three e-auction markets. As expected, the dispersion of final auction price across the three markets was statistically significantly different for the U.K. versus U.S. market and the Australian versus the U.S. market. The results indicated relatively similar degrees of price dispersion in the Australian and U.K. markets. The Australian and U.K. markets displayed significantly lower dispersion in price (smaller final price variance) than that of the United States (higher final price variance) (see Table 3). The findings provide support for H1a.

Table 3: Descriptive Statistics of Dispersion Variables

	Australia	United Kingdom	United States
Final Auction Price			
Mean (US \$)	163.07	158.88	135.60
Variance (s^2)	356.08	384.55	2,512.01
Coefficient of Variation (C_{var})	11.57	12.34	36.97
Number of Bidders			
Mean (per auction)	11.40	8.86	9.70
Variance (s^2)	20.16	9.12	22.75
Coefficient of Variation (C_{var})	39.39	34.09	48.87

Table 4: Summary of Homogeneity of Variance Test (Paired Comparisons of F-Values)

	Australia vs. United Kingdom	Australia vs. United States	United States vs. United Kingdom
Final Auction Price	1.08	7.05***	6.53***
Number of Bidders	2.21***	1.13**	2.49***
* Significant at $p \leq 0.10$, ** Significant at $p \leq 0.05$, *** Significant at $p \leq 0.01$			
d.f. of Australian sample = 230, d.f. of U.K. sample = 341, d.f. of U.S. sample = 1,077			

Additionally, the results suggest significant heterogeneity in variance of the number of bidders across the markets in the three countries (all paired comparisons of F -values, $p \leq 0.01$). The highest fluctuation in the number of bidders was in the U.S. market. The number of bidders per auction in Australia and the U.K. was less dispersed than in the U.S. market. As shown in Table 3, the least dispersion in terms of the number of bidders was in the U.K. market. These findings provide support for H1b.

Heterogeneities in Predictors of Auction Success Factors

A regression analysis was performed separately on each of the three datasets from the different countries to obtain a more comprehensive picture of e-auction success predictors (in terms of predicting final auction price). H2 states that there is heterogeneity in the combination of factors that predict final auction price for a commodity across the three e-auction markets. The three e-auction markets differed in their combination of predictors of auction success. As expected, the level of variance explained in the final auction price by the combination of predictor variables was different across the three e-auction markets, as evidenced by the range of R^2 values (see Table 5). These differences suggest that heterogeneities exist across the markets.

Opening bid positively influenced final auction price in all three markets (see Table 5). Auction duration negatively effected final auction price in the Australian market, positively effected price in the U.K. market and was not significantly related to price in the U.S. market. The number of bidders was positively associated with final auction price in the U.K. and the U.S. markets, but was not statistically significant in predicting final auction price in the Australian market.

Table 5: Summary of Final Auction Price Regression Models			
	Australia	United Kingdom	United States
Opening Bid	0.17**	0.12*	0.88***
Auction Duration	- 0.12*	0.27***	0.00
Number of Bidders	0.10	0.13**	0.39***
Ln (Positive Feedback +1)	0.11	- 0.25***	0.23***
Ln (Negative Feedback +1)	- 0.23***	- 0.11	- 0.16***
R^2	0.07	0.14	0.61
* Significant at $p \leq 0.10$, ** Significant at $p \leq 0.05$, *** Significant at $p \leq 0.01$			
Note: All regression models were significant at $p < 0.05$. All VIF values were found less than 3.00.			

Seller feedback (both positive and negative) was a significant predictor in the U.S. market. No significant influence of negative feedback in the U.K. market and positive feedback in the Australian market was found. However, the negative feedback score was the only feedback variable that significantly influenced final auction price in the Australian market. Surprisingly, the positive feedback score was negatively related to the final auction price in the U.K. market.

To test for statistically significant differences among regression models, Chow's test was performed on each pair of regression results [Chow, 1960]. The Chow test is used to determine whether the same relationship between independent and dependent variables holds for different subgroups. Chow's statistic is distributed as an F -statistic under the null hypothesis that the two regressions being tested belong to the same regression [Chow, 1960]. The results show that there are statistically significant differences in the combination of factors that predict final auction price across the three e-auction markets (see Table 6). All the test statistics were significant at $p \leq 0.01$. The results of the test indicated that heterogeneity existed in the combination of factors that predict final auction price across the three e-auction markets. These test results provide support for H2.

Table 6: Comparing Regression Models (Chow's Test)			
	Australia vs. United Kingdom	Australia vs. United States	United States vs. United Kingdom
Final Auction Price			
Chow's Statistic	623.06***	151.97***	49.31***
d.f. for numerator	8.00	8.00	8.00
d.f. for denominator	557.00	1,293.00	1,404.00
*** Significant at $p \leq 0.01$			

V. DISCUSSION

The prime objectives of this study were to demonstrate heterogeneity in price and bidder dispersion across different e-auction markets and to show that e-auction success for a commodity in different markets was influenced by different sets of variables. The results above helped achieve these objectives. We found that the Australian and U.K. markets were least dispersed in final auction price. The U.K. market was also least dispersed in the participation from online bidders. The U.S. market was found most dispersed both in terms of final auction price and number of bidders participating in auctions. Such results provide evidence that heterogeneity exists in the dispersion of final auction price and number of bidders across e-auction markets.

Contributions to Theory

Several factors can be used to explain the heterogeneities in price dispersion across the three auction markets. Two of these factors are market maturity levels and seller heterogeneities [Ancarani and Shankar, 2004; Baye et al., 2004b; Bock et al., 2007; Brynjolfsson and Smith, 2000; Rupert et al., 2003; see Table 1]. Significantly higher price dispersion was found in our study in a more mature (i.e., older) market—the U.S. market—when compared to the two other markets. The eBay business started in the U.S. in 1995—many years before eBay expanded to the U.K. and Australia (both were launched in 1999). While this finding signified the role of market maturity in explaining price dispersion, our results were in the opposite direction to those reported in earlier studies [Bock et al., 2007; Brynjolfsson and Smith, 2000]. In fixed-price markets, it was found that immature markets solicited higher price dispersion [Bock et al., 2007; Brynjolfsson and Smith, 2000]. As markets become more mature, prices will arguably converge because of more buyers in the market [Bock et al., 2007]. While this may be true in fixed-price or traditional markets, it may not hold true for an e-auction market. As the number of buyers grows larger, so may the number of sellers in e-auction markets. While in fixed-price markets sellers may be very similar, the growing number of sellers in a more mature e-auction market may actually create more heterogeneity among sellers. This is especially true for e-auction markets such as those found on eBay that support C2C transactions.

Sellers's heterogeneity was claimed to be a source of price dispersion [Brynjolfsson and Smith, 2000]. We argue that the reputation/feedback systems found in many e-auction markets help magnify sellers' heterogeneities. During the initial development of e-auction markets, sellers are generally homogeneous. As the market grows and produces more transactions, the feedback to the sellers and the entry of new sellers increasingly differentiate sellers' quality. Some researchers shed light on the role of the number of competing firms and its influence on price dispersion [Ancarani and Shankar, 2004; Baye et al., 2004b]. Rupert, Gatti, and Kattuman [2003] found that price dispersion, measured by range, increased from 20 percent to 40 percent when the number of firms changed from two to nine (i.e., price dispersion increased from 20 percent of the minimum price to 40 percent of the minimum price). Thus, we believe that examining the effect of market maturity alone on price dispersion is insufficient. The intertwining role between market maturity and sellers' heterogeneities should be more thoroughly investigated to uncover its influence on price dispersion.

Another contribution of our study is the examination of the dispersion in the number of bidders, a form of dispersion that is rarely investigated. Unlike the fixed-price market, e-auction markets offered us an opportunity to put this dispersion under a microscope. We argue that market structure plays an important role in shaping such dispersion, at least for commodity products. In our study, the larger U.S. market consisted of many more sellers (i.e., 601 unique sellers) than the other two markets studied. We argue that the larger U.S. market may create an opportunity for bidders to choose from a larger pool of sellers according to their feedback scores. In smaller markets, this opportunity is likely to decrease.

The regression models (Table 5) showed differences in the set of variables that significantly influence e-auction success for a commodity in each market. Despite their uniqueness, opening auction bid was one variable that held its significant explanatory power for final auction price across the three e-auction markets. Its relationship to final auction price was in the same direction across the three e-markets. When used to predict final auction price, it varied in explanatory powers across the three countries.

We examined the opening bids at a more granular level. The analysis demonstrated that sellers in the Australian and U.K. markets were more uniform in terms of their opening bid strategies. They typically started their auctions with lower prices—that is, beginning bids were lower than AU\$1.00 and £1.00 in the Australian and U.K. markets, respectively. Approximately 70 percent of Australian sellers and 63 percent of British sellers adopted this strategy. Starting an auction in that price range helps avoid paying higher eBay listing fees. In contrast, U.S. sellers were more diverse in using different ranges of opening bids. Approximately 52 percent of the U.S. sellers started their auctions with beginning prices lower than US\$1.00. It is interesting to note that 26 percent of the U.S. sellers started their auctions with opening bids greater than US\$50.00, whereas only 11 percent and 15 percent of the Australian and U.K. sellers, respectively, adopted similar strategies. The uniform opening bids in the Australian and U.K. markets can perhaps be one of the contributing factors that promotes lower price dispersion in the two markets. Appendix A provides additional support for the uniformity and diversity of opening bid strategies in the three e-auction markets. The variance of opening bids found in the Australian and U.K. markets was much lower than that of the U.S. market.

Our study additionally demonstrated that prior findings in the e-auction area hold their validity mostly in the U.S. market. Because most prior auction research was conducted in the U.S. market, we argue that it is impractical or perhaps detrimental for businesses in one country to take lessons learned in other countries and directly apply them to their market without a thorough understanding of their own market structure. For instance, while Australian and U.K. sellers should pay more attention to devising their auction duration strategies in order to promote their final

prices, U.S. sellers are freer to choose different durations for their auctions. The final price in this market does not depend upon sellers' auction duration strategies (see Table 5). We believe that the insignificant relationship between auction duration and final price in this market stemmed from its relatively large customer base. More than 6,000 unique U.S. bidders participated in this sample. This large customer base allowed U.S. sellers to sell their products quickly despite the auction duration.

Sellers in the Australian and U.K. markets were more tightly clustered around specific auction durations. Appendices A and B provide evidence that U.S. sellers used a wide variety of auction duration strategies. In other words, the U.S. sellers were more diverse in the use of their auction duration strategies, compared to the Australian and U.K. sellers. We conducted a Chi-Square test and it confirmed this argument. The test indicated that the U.K. auctions were significantly more uniform in the use of auction duration than those in the two other countries. As shown in Appendix B, the distribution of auctions across different auction durations appears more even in the U.K. market with the exception of the ten-day auctions.

It is interesting to note that there appears to be a learned behavior as indicated by the distribution of auction durations in the U.S. auction market. The majority (61 percent) of the U.S. sample adopted one-day and three-day auctions—relatively short duration auction formats. Auction sellers in the market might observe that longer exposure of their auctions did not necessarily improve final auction price. Hence, they opted to use these auction formats to expedite the transaction and improve the product turnaround time.

The analysis further indicates that the influence of auction duration on final auction price is more complex than previous studies suggested. The U.K. market was the only market where auction duration significantly improved final auction price. We found no significant influence on final price in the U.S. market. More interestingly, its relationship to final auction price in the Australian market was negative and significant. The direction of the relationship between these two variables was in the reverse direction with the average number of bidders per auction (Australia = 11.40 bidders, U.S. = 9.70 bidders, and U.K. = 8.86 bidders). The negative relationship can perhaps be explained by factors such as buying behavior of Australian bidders or availability of the products in the regular retail market, which renders itself as a future research opportunity.

Analysis of feedback scores in the regression model unveiled interesting results. We found that while feedback scores (both positive and negative) can be influential to final auction price in the U.S. market (see Table 5), they did not produce similar results in the other two markets. The negative feedback was the only feedback variable that significantly influenced final auction price in the Australian market. Thus, we argue that in a more competitive market where there are many sellers from which buyers can choose, such as the U.S., sellers must excel in all areas. The U.S. sellers generally face more intense competition when selling commodities. Therefore, their feedback scores become a more valuable asset that can help them achieve higher price premiums when compared to the sellers in the two other markets.

A few unexpected findings deserve special attention. First, the highest R^2 in the final auction price regression model was reported from the U.S. dataset. While heterogeneities in auction success predictors were hypothesized, the relatively low explanatory power of the combination of predictors in the Australian and U.K. markets was not expected. Second, the feedback scores (both positive and negative), especially in the U.K. market, did not manifest significant explanatory power similar to those found in prior research studies. Finally, sellers in the U.K. market generally were more experienced (as reflected by higher overall feedback scores) than those in the U.S., despite the fact that the U.S. market is an older online auction market (see Appendix C). These findings all point to the need for more research in this area.

Pragmatic Guidelines

Before discussing guidelines for different auction members, it is important to understand different sets of goals and priorities of different members in the e-auction environment. Specifically, using the concept of incentives in Information Systems [Ba et al., 2001], we argue that the views of different business participants in the e-auction environment regarding the optimum level of dispersion in price and number of bidders may differ. For instance, sellers' goals include both selling their items and maximizing final auction prices; however, they may find the latter goal more important. Furthermore, e-auction sellers may prefer lower levels of dispersion in price and number of bidders compared to bidders who may view high dispersion in final auction prices and dispersion in the number of bidders as opportunities to gain financial savings. Excessively low dispersion in final auction prices may reduce bidders' opportunities to gain financial savings. This lack of dispersion may lower participation from online bidders. The auctioneers such as eBay, on the other hand, may view materialized auctions as their first priority because they can receive final value fees only if an item is sold. Thus, the incentives to use the lower opening bid strategies may help auctioneers attain their goals but can be detrimental to sellers' overall revenues. An additional goal of auctioneers may be to promote optimal price variability to avoid a fixed-price characteristic in their market. Online

auctioneers generally consider developing a mechanism that allows some price dispersion. Without this dispersion, e-auction markets can lose their unique charisma of being able to provide bargains and potentially become fixed-price markets.

Taking the different sets of goals and their priorities into account, we propose different sets of guidelines for different business partners in e-auction markets. Electronic auction sellers should take into consideration the time-sensitive nature of their products and their market demand. Electronics, such as iPods, may be more suited to sell in a market that provides assurances in terms of the number of bidders. If sellers can gain similar final auction prices in different markets, the Australian and U.S. markets could be more favorable choices for a quick sale of commodities at an acceptable price. Auction duration, especially in the U.S. market, did not significantly influence final auction price. With such freedom, sellers can manage their inventory and avoid obsolescence in their products by using shorter auctions without sacrificing their revenue.

A number of guidelines to online auctioneers are offered. First, special attention should be given to promoting an optimum level of dispersion in price and number of bidders in each market. Excessively low dispersion in a market can be harmful to their businesses. Relatively small variances in final auction price suggest that markets for commodities could be moving toward fixed-price markets. Lower price dispersion was found in the smaller markets, such as the Australian and U.K. markets, compared to the larger U.S. market. Although economic theory predicts that prices converge in efficient markets, such a market characteristic can be detrimental to e-auction businesses because it provides little incentive for bidders to participate. This fixed-price nature may propel bidders and later sellers away from the market. Therefore, online auctioneers may consider promoting final auction price fluctuations through their reduced listing fees. More uniform strategies of sellers' opening bids were found in these relatively smaller markets compared to the larger U.S. market. We recommend that an intelligent agent be developed and used to provide suggestions to sellers who attempt to sell multiples of similar items. In the process of listing their items, sellers can be given options of using lower or higher opening bids according to their previous auction listings. Such a practice can later enhance price dispersion in the auction markets.

An intelligent agent program can also be used by online auctioneers to make other important suggestions to their sellers. For instance, online auctioneers can develop a program to monitor how frequently different sellers use each auction duration. If one specific duration is excessively being used, the program may prohibit sellers from choosing such an option so that diversities in auction duration strategies are enhanced. However, such a program should take into consideration the relationship between auction duration and final auction price in different markets. For instance, a suggestion for sellers to use shorter auction durations, such as one-day or three-day auctions, may not be beneficial to the auctioneers in the U.K. market, since this shorter duration can significantly reduce final auction prices.

Second, online auctioneers should investigate the use of payment intermediaries in their markets and later consider providing different bidder protection policies that are customized to each market. Although payment options are rarely discussed in auction research, some (such as PayPal) provide added protection to the bidders and may influence how seller feedback scores affect final auction price. Generally eBay bidders are protected by PayPal when they make purchases from sellers whose feedback scores meet a certain feedback score requirement set by PayPal. An examination showed that the majority of the U.S. sellers (greater than 96 percent) offered PayPal as one of their alternative payment methods. We found a much smaller adoption rate of PayPal in the Australian market (less than 40 percent). The low PayPal adoption rate may be one of the contributing factors that diminished the effect of seller feedback scores on final auction price. Thus, promoting the use of this payment intermediary may stimulate the effect of feedback scores on auction success and later allow higher dispersion in final auction price and number of bidders.

Because sellers' feedback scores are influential in shaping final auction prices, we also encourage online auctioneers to consider allowing buyers to award different feedback scores according to the value of the auction items to expedite sellers' reputation building processes. For example, eBay is currently giving one feedback score (positive, neutral, or negative) for each transaction regardless of the transaction values. In a less mature market, such as the Australian market, online auctioneers may consider adopting a different rule by allowing auction winners to give higher feedback scores to sellers of more expensive products. Online auctioneers can also encourage auction winners to leave feedback scores for sellers by giving them incentives such as eBay bucks—a form of credit that their users can use for future purchases. This proposed feedback policy can increase diversity in the sellers which in turn can promote price dispersion in their marketplaces.

Limitations and Directions for Future Research

Like other studies, our research faces some constraints and limitations. As we are the first to bring evidence of heterogeneity in dispersion of both final auction price and number of bidders into the literature, some of the findings

need additional theoretical support. The findings in the U.S. auction market were more in line with those in prior studies and consistent with prior online auction theories. Several theories that explain differences in national culture may not be applicable in this study. For example, the U.K. market now embraces customers from several countries, making it difficult to identify bidders' nationalities. Thus, using a well-known theory such as Hofstede's [1980] cultural dimensions theory to explain the risk-averse nature of customers in this market could produce bias in a study.

While it is possible for buyers to buy from eBay sites other than their place of residence (our study indicated a very small percent of cross-country bidding), our results demonstrated that additional work is needed to examine the predictors of e-auction success in multiple markets. A result from one market may not necessarily be useful in others. While the regression model explained 61 percent of the final auction price variance in the U.S. market, it explained only 14 percent and 7 percent of variances in the U.K. and Australian markets, respectively. More research attention should be given to study the predictors of final auction prices outside the U.S. Our findings suggest that a smaller market (a market with fewer buyers and sellers) is more likely to resemble a fixed-price market than a larger market. To explain more of price dispersion, one may consider including factors outside the markets, such as changes in the retail values, offering new and substitute products, and other related factors in future works. Many of these factors are not endogenous from the auction markets and are mostly under the control of product manufacturers and, therefore, can have an influential impact on dispersion of prices and customers.

The product that was used in this study, although it was a universal product, was a time-sensitive product. While our data were collected in a relatively short time frame (i.e., a two month period), one may argue that prices of this product changed over the period of data collection. We encourage researchers in this area to include more product varieties in the analysis in order to examine the affect of product heterogeneity on price dispersion thoroughly. Bock, Lee, and Li [2007], for instance, found that price dispersion is significantly higher in relatively low-priced products compared to that of higher-priced products. Another limitation stems from the exclusion of factors outside the e-auction markets from the analysis. Price fluctuation is generally an outcome that reflects demand and supply in a certain economy. Our regression model employed only factors found in the eBay system.

One of our goals was to demonstrate that auction success, in different e-markets, was influenced by different sets of factors. Despite a relatively high R^2 for the final auction price regression model from the U.S. dataset, one may find our model rather parsimonious. A more sophisticated and complex model, such as one that includes reserve price and buy-it-now variables, can be included in future research. Qualitative factors such as the use of images in the page design and page layout design were also not included in the study and provide opportunities for future research.

Our study was the first to examine not only final auction price dispersion but also number of bidders dispersion in e-auction markets. Previously, we addressed the adverse effect of excessively low dispersion. We also believe that excessively high dispersion of final e-auction price and number of bidders can impede market growth. Thus, we encourage future research to study and define the ranges of optimum dispersion of these two variables. In addition, we encourage a replication of our work in different auction settings. Future studies that compare dispersion in hard-closing and soft-closing (ending time is extendable) e-auction formats will provide interesting insight for research in this domain.

Our study addressed how influential sellers' strategies and reputations are to final auction price. Bidding strategies can also be included in future research. Bapna, Goes, Gupta, and Jin [2004] developed different online bidder profiles according to their strategies. One of these profiles was labeled opportunists, who are generally last-minute bidders. Researchers can examine how bidders' strategies affect fluctuation of e-auction success. We expect that auctions with a larger number of opportunists may face higher dispersion in auction price and number of bidders. Such bidders' strategies variables can also be studied together with auction format. Their interactions and effect on e-auction success can be further investigated. Another opportunity for research on bidders' strategies is the theory of flow [Csikszentmihalyi, 1988]. The application of flow theory to Information Technology relies on shoppers' perceived balance of challenge and skill [Guo and Klein, 2009]. Researchers could investigate the relationship of bidder profiles and flow characteristics during online bidding.

To examine heterogeneities of predictors of auction success factors, we adopted models from previous studies that included five auction variables (opening bid, auction duration, number of bidders, sellers' positive and negative feedback). A further examination of how such variables interact and the impact of their interaction on final auction price can perhaps produce meaningful findings for research in this domain. We found that sellers who chose to open their auctions with higher starting prices are more likely to adopt longer auction durations. We believe that using longer auction durations helps mitigate the risk of having a nonmaterialized auction. The interaction between opening bid and auction duration has significant influence on final auction price, but only for the U.S. sample. There is, however, little improvement in variance explained of final auction price (0.4 percent), as it is highly correlated with

the opening bid variable ($VIF = 10.60$). We encourage future research to further examine how auction variables interplay with one another and craft a more comprehensive final auction price model.

In the current study, less than 1 percent of the bidders engaged in cross-country bidding. Of these few cross-country bidders, only two won the auctions. Researchers can further investigate how sellers' willingness to participate in cross-country transactions will influence their premiums and the fluctuation of final auction price in their markets. Last but not least, we encourage future studies to examine the role of bidders' search results on e-auction success. From our data cleaning experience, we found that the Australian market experienced much cleaner item listings (much less irrelevant auctions from the searching activities). Bidders in such an environment, therefore, can compare different auctions more easily. In the U.S. dataset, we found several irrelevant products such as iPod accessories. These types of auction listings could prohibit bidders' comparison processes and their identification of external reference prices. These irrelevant auction items may be additional contributing factors that increase price and bidder dispersion in the U.S. market.

VI. CONCLUSION

In this study we presented emerging evidence of the heterogeneities of dispersion in price and number of bidders and the combination of factors that predict market success across e-auction markets, specifically, Australia, the United Kingdom, and the United States. A characteristic of e-auctions is to provide new markets for sellers, potential bargains to bidders, and new business opportunities for online auctioneers. The future of e-auctions lies in their ability to avoid becoming fixed price markets. Understanding heterogeneities across e-auction markets benefits the participating members by providing guidelines to avoid becoming fixed price markets.

REFERENCES

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- Akula, V., and D.A. Menascé (2007) "Two-Level Workload Characterization of Online Auctions," *Electronic Commerce Research and Applications* (6)2, pp. 192–208.
- Ancarani, F., and V. Shankar (2004) "Price Levels and Price Dispersion Within and Across Multiple Retailer Types: Further Evidence and Extension," *Journal of the Academy of Marketing Science* (32)2, pp. 176–187.
- Ba, S., and P.A. Pavlou (2002) "Evidence of the Effect of Trust Building Technology in Electronic Markets: Price Premiums and Buyer Behavior," *MIS Quarterly* (26)3, pp. 243–268.
- Ba, S., J. Stallaert, and A.B. Whinston (2001) "Introducing a Third Dimension of Information System Design—The Case for Incentive Alignment," *Information Systems Research* (12)3, pp. 225–239.
- Ba, S., J. Stallaert, and Z. Zhang (2011) "Online Price Dispersion: A Game Theoretic Perspective and Empirical Evidence," *Information Systems Research* (22)1, forthcoming, accepted 12-31-08.
- Bailey, J. (1998) *Intermediation and Electronic Markets: Aggregation and Pricing in Internet Commerce*, Doctoral Dissertation, Cambridge, MA: Massachusetts Institute of Technology.
- Bajari, P., and A. Hortacsu (2003) "Winner's Curse, Reserve Prices and Endogenous Entry: Empirical Insights From eBay Auctions", *Rand Journal of Economics*, (34)2, pp. 329–355.
- Bakos, Y. (1997) "Reducing Buyer Search Costs: Implications for Electronic Marketplaces," *Management Science* (43)12, pp. 1676–1692.
- Bakos, Y. (1998) "The Emerging Role of Electronic Marketplaces on the Internet," *Communications of the ACM* (41)8, pp. 35–42.
- Bapna, R., P. Goes, and A. Gupta (2000) "A Theoretical and Empirical Investigation of Multi-Item Online Auctions," *Information Technology and Management* (1)1, pp. 1–23.
- Bapna, R., P. Goes, and A. Gupta (2001) "Insights and Analyses of Online Auctions," *Communications of the ACM* (44)11, pp. 42–50.

- Bapna, R., et al. (2004) "User Heterogeneity and Its Impact on Electronic Auction Market Design: An Empirical Exploration," *MIS Quarterly* (28)1, pp. 21–43.
- Bapna, R., W. Jank, and G. Shmueli (2008) "Consumer Surplus in Online Auctions," *Information Systems Research* (19)4, pp. 400–418.
- Baye, M., and J. Morgan (2001) "Information Gatekeepers on the Internet and the Competitiveness of Homogenous Product Markets," *The American Economic Review* (91)3, pp. 454–474.
- Baye, M.R., J. Morgan, and P. Scholten (2004a) "Price Dispersion in the Small and in the Large: Evidence From an Internet Price Comparison Site," *The Journal of Industrial Economics* (52)4, pp. 463–496.
- Baye, M.R., J. Morgan, and P. Scholten (2004b) "Temporal Price Dispersion: Evidence from an Online Consumer Electronics Market," *Journal of Interactive Marketing* (18)4, pp. 101–115.
- Baye, M.R., J. Morgan, and P. Scholten (2006) "Persistent Price Dispersion in Online Markets," In Jansen, D.W. (ed.), *The New Economy and Beyond: Past, Present and Future*, Northampton, MA: Edward Elgar, pp. 122–143.
- Baylis, K., and J.M. Perloff (2002) "Price Dispersion on the Internet: Good Firms and Bad Firms," *Review of Industrial Organizations* (21)3, pp. 305–324.
- Bekaert, G., and C.R. Harvey (1997) "Emerging Equity Market Volatility," *Journal of Financial Economics* (43)1, pp. 29–77.
- Bock, G-W., S-Y.T. Lee, and H.Y. Li (2007) "Price Comparison and Price Dispersion: Products and Retailers at Different Internet Maturity Stages," *International Journal of Electronic Commerce* (11)4, pp. 101–124.
- Brynjolfsson, E. and M.D. Smith (2000) "Frictionless Commerce? A Comparison of Internet and Conventional Retailers," *Management Science* (46)4, pp. 563–585.
- Cachon, G.P., T. Randall, and G.M. Schmidt (2007) "In Search of the Bullwhip Effect," *Manufacturing & Service Operations Management* (9)4, pp. 457–479.
- Chen, P-Y. and L. Hitt (2001) "Brand Awareness and Price Dispersion in Electronic Markets," In Storey, V.C., S. Sarkar, and J.I. DeGross (eds.), *Proceedings of the 22nd International Conference on Information Systems*, New Orleans, LA: pp. 233–246.
- Chow, G.C. (1960) "Tests of Equality Between Sets of Coefficients in Two Linear Regressions," *Econometrica* (28)3, pp. 591–605.
- Csikszentmihalyi, M., and I.S. Csikszentmihalyi (eds.) (1988) *Optimal Experience: Psychological Studies of Flow in Consciousness*, Cambridge, NY: Cambridge University Press.
- de Mooij, M., and G. Hofstede (2002) "Convergence and Divergence in Consumer Behavior: Implications for International Retailing," *Journal of Retailing* (78)1, pp. 61–69.
- Dewally, M., and L. Ederington (2006) "Reputation, Certification, Warranties, and Information as Remedies for Seller-Buyer Information Asymmetries: Lessons from the Online Comic Book Market," *The Journal of Business* (79)2, pp. 693–729.
- Gilkeson, J.H., and K. Reynolds (2003) "Determinants of Internet Auction Success and Closing Price: An Exploratory Study," *Psychology and Marketing* (20)6, pp. 537–566.
- Gilliland, M. (2003) "Fundamental Issues in Business Forecasting," *Journal of Business Forecasting Methods and Systems* (22)2, pp. 7–13.
- Gregg, D.G., and J.E. Scott (2006) "The Role of Reputation Systems in Reducing On-Line Auction Fraud," *International Journal of Electronic Commerce* (10)3, pp. 95–120.
- Grover, V., J. Lim, and R. Ayyagari (2006) "The Dark Side of Information and Market Efficiency in E-Markets," *Decision Sciences* (37)3, pp. 297–324.
- Guo, Y.M., and B.D. Klein (2009) "Beyond the Test of the Four Channel Model of Flow in the Context of Online Shopping," *Communications of the Association for Information Systems* (24) Article 48, pp. 837–856.
- Hofstede, G. (1980) *Culture's Consequences*. Beverly Hills, CA: Sage.
- Hou, J. (2007) "Price Determinants in Online Auctions: A Comparative Study of eBay China and US," *Journal of Electronic Commerce Research* (8)3, pp. 172–183.

- Huang, M-G., P-L. Chang, and Y-C. Chou (2008) "Demand Forecasting and Smoothing Capacity Planning for Products with High Random Demand Volatility," *International Journal of Production Research* (46)12, pp. 3223–3239.
- LeClair, M.S. (2006) "Achieving Gasoline Price Stability in the U.S.: A Modest Proposal," *Energy Journal* (27)2, pp. 41–54.
- Li, S., K. Srinivasan, and B. Sun (2009) "Internet Auction Features as Quality Signals," *Journal of Marketing* (73)1, pp. 75–92.
- Lucking-Reiley, D. (2000) "Auctions on the Internet: What's Being Auctioned, and How?" *Journal of Industrial Economics* (48)3, pp. 227–252.
- Lucking-Reiley, D., et al. (2007) "Pennies from eBay: The Determinants of Price in Online Auctions," *Journal of Industrial Economics* (55)2, pp. 223–233.
- MacInnes, I., Y. Li, and W. Yurcik (2005) "Reputation and Dispute in eBay Transactions," *International Journal of Electronic Commerce* (10)1, pp. 27–54.
- Milgrom, P., and J. Roberts (1986) "Price and Advertising Signals of Product Quality," *The Journal of Political Economy* (94)4, pp. 796–821.
- Muthitacharoen, A., K.A. Saeed, and M. Barut (Working Paper) "Through the Lens of Product Types: Examining the Changing Roles of Sellers' Strategies, Buyers' Strategies, and Market Dynamics in Online Auctions."
- Oh, W., and H.C. Lucas Jr. (2006) "Information Technology and Pricing Decisions: Price Adjustments in Online Computer Markets," *MIS Quarterly* (30)3, pp. 755–775.
- Pan, X., B.T. Ratchford, and V. Shankar (2002) "Can Price Dispersion in Online Markets Be Explained by Differences in e-Tailer Service Quality?" *Journal of the Academy of Marketing Science* (30)4, pp. 433–445.
- Pan, X., B.T. Ratchford, and V. Shankar (2004) "Price Dispersion on the Internet: A Review and Directions for Future Research," *Journal of Interactive Marketing* (18)4, pp. 116–135.
- Peng, Y-S., and L-T. Jan (2009) "Pricing Strategies, the Strength of Bidding Intentions, and Online Auction Performance: A Cross-Cultural Study," *CyberPsychology & Behavior* (12)5, pp. 523–528.
- Redmond, W.H. (2002) "The Potential Impact of Artificial Shopping Agents in e-Commerce Markets," *Journal of Interactive Marketing* (16)1, pp. 56–66.
- Resnick, P., et al. (2006) "The Value of Reputation on eBay: A Controlled Experiment," *Experimental Economics* (9)2, pp. 79–101.
- Reynolds, K.E., J.H. Gilkeson, and R.W. Niedrich (2009) "The Influence of Seller Strategy on the Winning Price in Online Auctions: A Moderated Mediation Model," *Journal of Business Research* (62)1, pp. 22–30.
- Rupert, J., J. Gatti, and P. Kattuman (2003) "Online Price Dispersion Within and Between Seven European Countries," *Advances in Applied Microeconomics* (12), pp. 107–141.
- Schlägel, C., and B. Wolff (2007) "Country-Specific Effects of Reputation and Information: A Comparison of Online Auctions in Germany, the U.K., and the U.S.," *Econ Papers*, <http://econpapers.repec.org/paper/magwpaper/07027.htm> (current Oct. 22, 2011).
- Scholten, P., and S.A. Smith (2002) "Price Dispersion Then and Now: Evidence from Retail and e-Tail Markets," *Advances in Applied Microeconomics* (11), pp. 63–88.
- Segev, A., C. Beam, and J.G. Shanthikumar (2001) "Optimal Design of Internet-Based Auctions," *Information Technology Management* (2)2, pp. 121–163.
- Shilony, Y. (1977) "Mixed Pricing in Oligopoly," *Journal of Economic Theory* (14)2, pp. 373–388.
- Soh, C., M.L. Markus, and K.H. Goh, (2006) "Electronic Marketplaces and Price Transparency: Strategy, Information Technology, and Success," *MIS Quarterly* (30)3, pp. 705–723.
- Song, J., and J. Baker (2007) "An Integrated Model Exploring Sellers' Strategies in eBay Auctions," *Electronic Commerce Research* (7)2, pp. 165–187.
- Standifird, S.S. (2001) "Reputation and e-Commerce: eBay Auctions and the Asymmetrical Impact of Positive and Negative Ratings," *Journal of Management* (27)3, pp. 279–295.
- Standifird, S.S., and M.R. Roelofs (2005) "The Impact of eBay's Buy-It-Now Function on Bidder Behavior," *International Journal of Electronic Commerce* (9)2, pp. 167–176.

- Staw, B.M. (1981) "The Escalation of Commitment to a Course of Action," *Academy of Management Review* (6)4, pp. 577–587.
- Stigler, G.J. (1961) "The Economics of Information," *Journal of Political Economy* (69)3, pp. 213–225.
- Stylianou, A.C., R.L. Kumar, and S.S. Robbins (2005) "Prices on the Internet and in Conventional Retail Channels: A Study of Over-The-Counter Pharmaceutical Products," *International Journal of Electronic Commerce* (10)1, pp. 135–148.
- U.S. Census Bureau News (2009) *Quarterly Retail E-Commerce Sales 3rd Quarter 2009*, <http://www.census.gov/retail/mrts/www/data/pdf/Q3Q3.pdf> (current Nov. 18, 2009).
- Utz, S., U. Matzat, and C. Snijders (2009) "On-Line Reputation Systems: The Effects of Feedback Comments and Reactions on Building and Rebuilding Trust in On-Line Auctions," *International Journal of Electronic Commerce* (13)3, pp. 95–118.
- Varian, H.A. (1980) "A Model of Sales," *The American Economic Review* (70)4, pp. 651–659.
- Varian, H. (1999) "Market Structure in the Network Age," *Understanding the Digital Economy Conference*. Washington, DC: Department of Commerce, May 25–26.
- Waller, B. (2004) "Market Responsive Manufacturing for the Automotive Supply Chain," *Journal of Manufacturing Technology Management* (15)1, pp. 10–19.
- Walter, Z., A. Gupta, and B-C. Su (2006) "The Sources of On-Line Price Dispersion Across Product Types: An Integrative View of On-Line Search Costs and Price Premiums," *International Journal of Electronic Commerce* (11)1, pp. 37–62.
- Wilcox, R.T. (2000) "Experts and Amateurs: The Role of Experience in Internet Auctions," *Marketing Letters* (11)4, pp. 363–374.
- Yin, P.-L. (2006) "Information Dispersion and Auction Prices", *Massachusetts Institute of Technology (MIT)—Sloan School of Management, Stanford Institute for Economic Policy Research Working Paper No. 02-024*, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=690201 (current Nov. 20, 2006).

APPENDIX A: DESCRIPTIVE STATISTICS OF AUCTION SUCCESS PREDICTORS

Table A-1: Predictors of Auction Success: Descriptive Statistics (Means and Variances)			
	Australia	United Kingdom	United States
Opening Bid (US \$)	17.60	20.05	30.92
	(1,612.83)	(1,445.52)	(4,294.18)
Auction Duration (Days)	4.62	4.03	3.69
	(5.95)	(6.81)	(5.66)
Positive Feedback	130.73	443.78	342.35
	(46,864)	(5,573,141)	(2,703,953)
Negative Feedback	0.82	2.08	2.92
	(4.75)	(74.65)	(386.02)

APPENDIX B: AUCTION DISTRIBUTIONS BY THEIR DURATIONS

Table B-1: Distribution of Auctions by Auction Durations			
	Australia	United Kingdom	United States
1 Day	18 (7.79%)	92 (26.90%)	338 (31.35%)
3 Day	111 (48.05%)	103 (30.12%)	324 (30.06%)
5 Day	24 (10.39%)	53 (15.50%)	132 (12.24%)
7 Day	61 (26.41%)	76 (22.22%)	278 (25.79%)
10 Day	17 (7.36%)	18 (5.26%)	6 (0.56%)

Figure B-1. Auction Distribution by Durations

Figure B-2. Auction Distribution by Durations (Percentage)

APPENDIX C: SELLER DISTRIBUTION BY FEEDBACK SCORES

Table C-1: Distribution of Sellers in Different Markets by Feedback Scores			
	Australia	United Kingdom	United States
0	3 (3.19%)	5 (3.25%)	10 (1.66%)
1-25	38 (40.43%)	40 (25.97%)	201 (33.44%)
26-50	8 (8.51%)	25 (16.23%)	90 (14.98%)
51-100	14 (14.89%)	23 (14.94%)	86 (14.31%)
101-250	18 (19.15%)	33 (21.43%)	104 (17.30%)
251-500	6 (6.38%)	9 (5.84%)	42 (6.99%)
501-1,000	5 (5.32%)	10 (6.49%)	34 (5.66%)
>1,000	2 (2.13%)	9 (5.84%)	34 (5.66%)

Australia: Overall Feedback Scores

Figure C-1. Australia: Overall Feedback Scores

United Kingdom: Overall Feedback Scores

Figure C-2. United Kingdom: Overall Feedback Scores

United States: Overall Feedback Scores

Figure C-3. United States: Overall Feedback Scores

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