International Journal of Economics, Commerce and Management
United Kingdom Vol. IV, Issue 10, October 2016
http://ijecm.co.uk/ ISSN 2348 0386

THE PREVALENCE OF PRODUCT OBFUSCATION AND BAIT AND SWITCH TACTICS IN ONLINE SHOPPING

David J DiRusso, PhD
Assistant Professor of Marketing, Millersville University, United States of America
david.dirusso@millersville.edu

Abstract

Previous research concerning price dispersion has analyzed price levels in physical stores, on the web and in both physical and online international markets. Contrary to expectations, it has been shown that there is significant price dispersion online and that one of several likely causes of this is due to sellers offering misleading information about products they sell, their inventory, or prices that they actually charge vs those they advertise. This research analyzes 10 different electronics products on the Amazon.com marketplace and on the Google Shopping Shop-bot to determine which market has greater dispersion due to product obfuscation as well as bait and switch tactics. Compelling evidence is found which indicates that online marketplaces have potential to reduce price dispersion and average prices.

Keywords: Online Pricing, Price Dispersion, Shop-Bots, Online Advertising, Bait and Switch

INTRODUCTION

There have been numerous empirical studies concerning online price dispersion (Bailey, 1998; Brynjolfsson & Smith, 2000; Tang & Xing, 2001; Clay & Tay, 2001; Bayliss & Perloff, 2002; Lee &Gosain, 2002; Brown & Goolsbee, 2002; Pan et al., 2003; Ancarani & Shankar, 2004; Venkatesan & Bapna 2007; Akimoto & Takeda, 2009; Pan et al., 2009) and shop-bots (Smith & Brynjolfsson, 2001; Brynjolfsson & Smith 2002; Nelson, Cohen & Rasmussen, 2007; Garfinkel, Gopal, Tripath & Yin, 2008; Haynes & Thompson, 2008; Ellison & Ellison, 2009). Online price dispersion research is important as it is an indicator of market efficiency (Pan et al., 2004), has implications for consumer search and purchasing behavior as well as managerial pricing strategy and public policy (Baye et al., 2003; Ratchford, Pan & Shankar, 2003). Studies have

consistently found high levels of price dispersion on the web for numerous reasons (Pan et al., 2009). There were many who expected that shop-bots would mitigate this dispersion due to the organization of sellers and by providing clear information concerning the prices they charge (Smith, 2002; Pan et al., 2004). However, research concerning shop-bots concludes that there are serious issues with them, which prevent reductions in price dispersion (Ellison & Ellison, 2009).

Online marketplaces function in a similar fashion to shop-bots. However, due to the design of online marketplaces, they do not boast the same weaknesses of shop-bots. It is the goal of this research to determine the levels of price dispersion that exists in online marketplaces and to compare this dispersion to levels found in shop-bots.

HYPOTHESIS DEVELOPMENT

It has been stated that shop-bots reduce buyer search costs by up to 30-fold compared to telephone based shopping, and even more than that when compared to actually visiting retail stores (Brynjolfsson & Smith, 2000). Shop-bots list information for both well-known and lesser-known retailers and have the ability to rank them in terms of price or shipping time. Despite these reductions in search costs, shop-bots have been shown to display high levels of variation in terms of price, delivery times and product availability (Smith & Brynjolfsson, 2001).

Previous research concerning price dispersion has noted that many online retailers seek to take advantage of consumers through various tactics which include price discrimination, bait and switch as well as product obfuscation (Ellison & Ellison, 2009). It has been asserted that these tactics increase price dispersion online (Pan et al., 2004). Price discrimination has been empirically tested in previous literature and has been found to both present and a key contributor of online price dispersion (Bayliss & Perloff, 2002). This research identifies the price dispersion found on price-bots and empirically tests the levels of price dispersion by comparing the levels found there to the dispersion in an online marketplace. This is particularly interesting because online marketplaces boast the strengths of shop-bots, but do not carry the potential for product obfuscation and bait and switch tactics which distort prices and confuse consumers. Moreover, due to the fact that sellers do not have their own websites in online marketplaces, the risk of discrimination and bait and switch strategies are removed, which should also lower price dispersion (Ellison & Ellison, 2009), thus the following hypothesis is offered:

Hypothesis 1: Price dispersion is higher on shop-bot websites than on Online Marketplaces

In their research study, Iyer and Pazgal (2003) show that shop-bots do not necessarily lower prices on the web. Some retailers could offer low prices to informed consumers who are

searching for the lowest price, while other retailers could choose not to be part of a shop-bot and would charge high prices to their loyal (uninformed) customers. What makes the online marketplace so interesting is that all sellers operating in it are part of the search function. Hence, there should be a greater focus on price competitiveness that results in lower price dispersion (Bakos, 1997) and lower overall prices (Bailey &Bakos, 1997). Due to these dramatically reduced search costs and the presence of nearly perfect information, theory dictates that prices should be set at or very close to marginal costs (Brynjolfsson& Smith, 2000).

The dysfunctional impact of bait and switch and product obfuscation has been noted in previous research (Ellison & Ellison, 2009). Many companies could show extremely low prices on the shop-bot website only to: not really offer the product on their website, not show any prices or different prices for the product on their website, offer used or refurbished items instead of new ones, or attempt to charge multiple different prices for the same product. All of these forms of obfuscation and bait and switch could result in sellers offering lower prices on the shop-bot website, while, in actuality, charging higher prices or not offering the product in the stated condition.

In light of these key differences between shop-bot websites and online marketplaces, it is expected that average prices will be lower on the online marketplace. Hence the following hypothesis:

Hypothesis 2: Average prices are higher on shop-bot websites than on online marketplaces

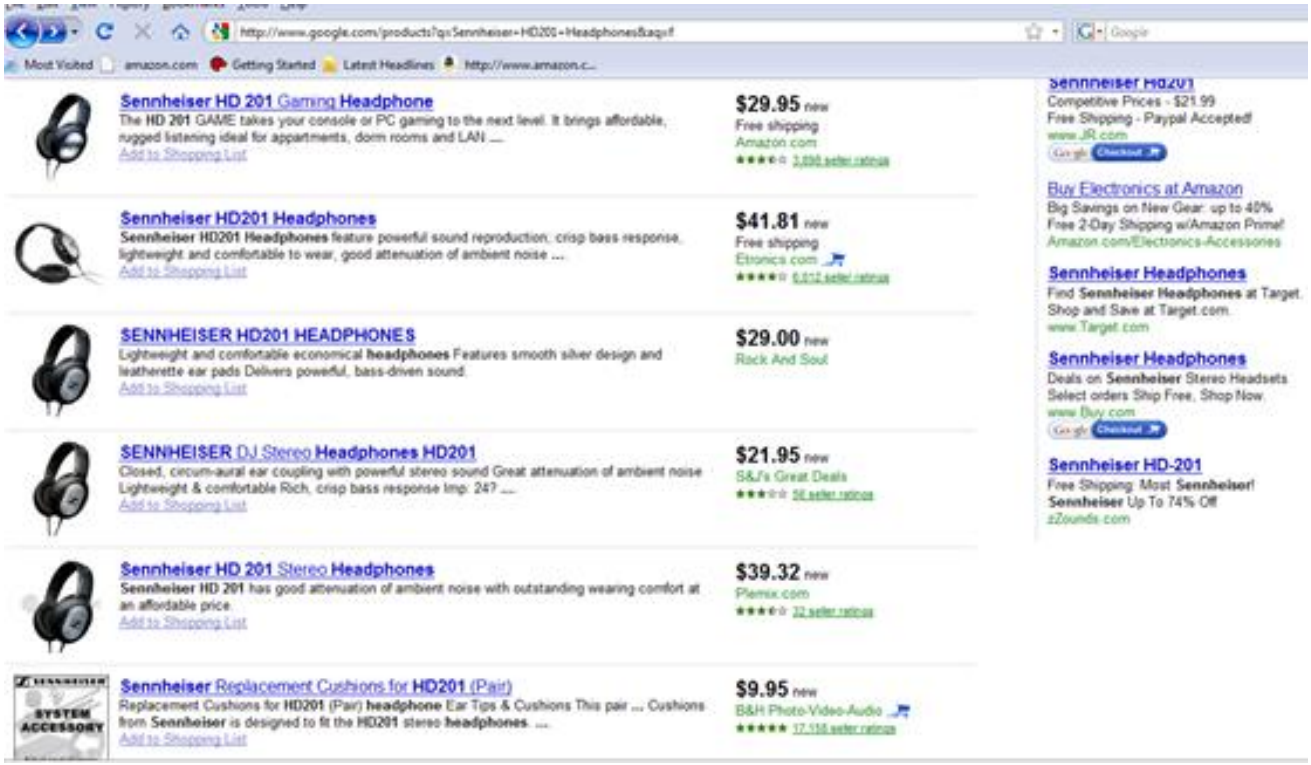
Websites used for Comparison

The Amazon.com Marketplace will be used in order to test the dispersion in the online retail marketplace format. Amazon.com is the world's largest online marketplace. The company boasts multibillion dollar profits and a significant amount of their revenue comes from online marketplaces (Amazon.com, 2016). They offer guarantees that ensure that all posted information from sellers are accurate, including prices, shipping times, product stock, and shipping time (Amazon.com, 2016). These guarantees, as well as the absence of seller websites, eliminate the ability for sellers to engage in bait and switch as well as obfuscation. Hence, data from the Amazon.com marketplace will be collected and used for analysis.

Most shop-bots require retailers to pay a fee to be listed on searches. This can create biased results as it adds an additional cost that low-cost, low-price providers would not want to pay (Smith, 2002). In effect, the barrier imposed by a listing fee has the potential to remove those sellers who offer the lowest prices. Hence, in order to offer a comparison of shop-bots versus online marketplaces a shop-bot that relies on a model of advertising has been selected

for analysis. A shop-bot with this type of revenue structure does not require fees that could increase prices. A shop-bot with this type of revenue model is the Google Shopping shop-bot. The Google Shopping shop-bot is described by the company as a fast, powerful, and unbiased product search engine. It differs from traditional shop bots in that retailers wishing to list their product do not pay a fee for doing so. Sellers must simply submit product information to Google to be listed in the results. Google makes revenue from this search using Adwords, the same method for their traditional search results. Google also uses specialized software to search the web for retailers who offer the specified product. In addition there are no preferred sellers on Google Shopping. Users may search for only new or used products and can sort results by price (Google Shopping FAQ, 2016). Figure 1 below offers an example of search results found by using the Google Shopping Shop-bot:

Figure 1. Google Shopping Sample Results List



Due to the fact that the Google Shopping Shop-bot and Amazon.com are both run by powerful, established online firms, and that each company's design fits very well into the category of online marketplace and shop-bot respectively, these websites were chosen for sources of data collection.

METHODOLOGY

Data Collection

While price dispersion is a clear concept, there have been numerous differing approaches to its measurement. Empirical studies have analyzed variance, standard deviation, range, the difference between two lowest prices (price gap), and the difference between the average price and the lowest price (Pan et al., 2004). There are strengths and weaknesses with each approach. Table 1 below summarizes the key measures of price dispersion examined in the literature.

Table 1. Major Measures of Price Dispersion

Measure	Pros	Cons
Standard Deviations* and Variances (Ancarani& Shankar 2004; Pan et al., 2004)	Takes into account all variation	Should not be used as dependent variable in regression
Range (Pan et al., 2004)	Insight into high and low values	Ignores all values in the middle
Two lowest prices (Baye et al., 2004)	In a competitive market only the lowest price matters	Does not account for seller differentiation
Difference in average price and lowest price (Baye et al., 2003; Pan et al., 2003; Ratchford et al., 2003)	Gives insight into relative prices	No major weaknesses discussed in literature

*Method employed for this study

Ranges only analyze extreme observations and offer no insight into all values in the middle. This ignores the competitiveness of a market. Baye et al. (2004) proposed the use of the two lowest prices. The authors note that in a competitive market, only the lowest prices really matter. However, many companies are attempting to differentiate based on service quality, brand name etc., hence the “two lowest prices” approach ignores these higher prices that those sellers are charging and perhaps a key driver of price dispersion in a market.

Pan et al. (2003) and Ratchford et al. (2003) note that the difference in average price, which is used as a proxy to determine the price a completely uninformed consumer wishes to pay, measures the value of price information and has similar results to a price range. Standard deviations and variances take into account all price observations. However, if these factors are used as dependent variables in a linear regression, they may yield inconsistent results (Pan et al., 2004). The differing measures of price dispersion have yielded different results as evidenced

by work from Ancarani& Shankar, (2004) Baye et al., (2004); and Brynjolfsson& Smith, (2000), although there is no basis in theory for these different results.

It appears as though multiple measures of dispersion should be employed, as each has their own strengths and weakness. For this study, the author will employ the following measures: Range, including minimum and maximum values, means, standard deviation and variation. It should be noted that there is no single cutoff point or standard formulaic approach to determining price dispersion using any of these measures. For comparison purposes, standard deviations will be used as the key measure of price dispersion.

There has been some debate on whether or not to analyze shipping fees and the appropriateness of doing so in the price dispersion literature. Shipping fees can have a dramatic impact on a consumer's decision to purchase. It has been found that while both higher shipping charges and higher product charges reduce the probability of purchase, the marginal effect of shipping prices are twice as large as product price, hence consumer demand is more sensitive to the shipping fee (Harrington & Leahey, 2007). Additionally, Smith and Brynjolfsson (2001) found that consumers could be more sensitive to tax and shipping, as compared to the raw price of the product. It has also been found in at least one study that shipping and handling charges represent up to 22.09 percent of the total price for certain goods (Nelson et al., 2007). It was also found that there is a negative correlation between product price and shipping charges, which shows that firms compensate in part for low prices by charging higher shipping fees. Including shipping fees did result in higher variation for some products.

Generally, shipping prices should be taken into account when analyzing price dispersion. However, for this study, analysis of shipping fees is not appropriate. Amazon.com has exact shipping prices set without regard to consumer location. However, this is not the case for the Google Shopping shop-bot, which offers an estimate of shipping prices. As noted by previous research, some shop-bots will calculate *expected* shipping costs, but the actual shipping costs imposed by the retailer can be quite different (Haynes &Thompson, 2008). The prices estimated by Google Shopping are based on consumer location, and the prices that many retailers charge is also based on consumer location. Hence, inclusion of shipping prices is not included in this analysis. However, this should not be an issue. It has been found that when shipping prices are not considered, item prices alone exhibit a significant amount of dispersion (Smith and Brynjolfsson, 2001). Also, there has been previous research which indicates that price dispersion found in online markets is similar whether shipping prices are included or not (Pan et al., 2009).

Some price dispersion studies employ software to scour information for a given product category across the web in order to obtain very high sample sizes (Pan et al., 2003; Pan et al.,

2009). However, such an approach also limits the authors to only using websites which allow such software to function. This has led to a stream of research papers based off of random samples of products from Bizrate.com (Pan et al., 2002; Grover, Lim, Ayyagari, 2006; Venkatesan et al., 2007). Neither Amazon.com nor Google Shopping will allow for this approach, as their websites do not offer users the ability to download information concerning products and prices. As a result of this, a different approach is required.

For this study, 10 distinct products were selected and analyzed. With this approach, data can be gathered quickly and efficiently without the need of software to collect data quickly and efficiently. Due to the speed of data collection, a static data set could be collected in order to ensure that variations in dispersion over time would not impact the collected data.

Products Tested

As noted by researchers of price dispersion, electronic products are commonly studied due to the fact that they have been established in the price dispersion literature (Pan et al., 2004; Grover et al., 2006; Venkatesan et al., 2007). Since this is a study focused on an online market, whose price dispersion has been minimally researched, and is based on previous price dispersion studies, it would be best to use products that have been already well established in previous research. Hence, this paper focuses on consumer electronics of varying types.

There are differing methods of researching price dispersion. Some authors have opted to analyze numerous types of heterogeneous offerings of a product using hedonic regression to control for differences in the product or service (Pan et al., 2004). However, if not all differences are accounted for, then inaccurate results can be obtained (Pan et al., 2009). These studies generally obtain price quotes concerning numerous products from a relatively small, randomly selected group of sellers.

Another approach used in price dispersion studies is the selection of a single product in a category and obtaining a relatively large sample of sellers of that particular product. Baylis and Perloff (2002) analyzed two distinct products, an Olympus C-2000Z digital camera and a Hewlett-Packard 6300 flatbed scanner and they used traditional regression to determine the effect of service factors on dispersion. This approach is also acceptable since it has been noted that by drawing the data from an online source, price comparisons of identical products instead of similar but somewhat differentiated products (Pan et al., 2004).

This study will employ the method of selecting single products in each category. By employing this method, information can be obtained from every seller in the marketplace that is offering that specific product. Table 2 identifies the products that were selected for analysis.

Table 2. Products and Product Categories Analyzed

Product Category	Specific Product
CD Player	COBY MP-CD521 Personal MP3/CD Player with 120 Second Anti-Skip Protection
Memory Stick	Sony MSMT4G 4GB Memory Stick PRO Duo
GPS	Garmin nüvi 255 3.5-Inch Portable GPS Navigator
Portable DVD Player	Audiovox VE927 9-Inch LCD Drop-Down TV with Built-In DVD Player and Clock Radio
Router	D-Link Ethernet Broadband Router EBR-2310
Digital Camera	Canon Digital Rebel XSi 12.2 MP Digital SLR Camera with EF-S 18-55mm f/3.5-5.6 IS Lens (Black)
Printer	Canon MP480 All-in-One Photo Printer
Mouse	Logitech 931690-0403 VX Revolution Cordless Laser Mouse for Notebooks (Black)
Universal Remote	DirecTV RC64 Universal Remote Control
Headphones	Sennheiser HD201 Headphones

In order to obtain sufficient data points for a robust analysis, the product which was selected in each of these categories was chosen using the following methodology:

1. *Go to Amazon.com*
2. *Search for product in product category*
3. *Analyze search results in order and identify the number of sellers offering the product in new condition*
4. *If the number of sellers offering the product in new condition is less than 50, then dismiss that product and move to the next product in search results. Repeat this step until a product which has at least fifty offerings in the Amazon.com marketplace is identified.*

The best starting point for the identification of products was to find the product on the Amazon.com marketplace. Google Shopping scours information from retailers all across the web, hence specific products found on the Google Shopping Shop-bot might not be found on the Amazon marketplace. While the Amazon.com marketplace does offer numerous products in every category, it simply does not compare with the offerings of all retailers across the web. Hence products were searched for on Amazon.com under the assumption that they can be found on Google Shopping.

In the Amazon.com search function, the product category was searched for. The product's results were viewed in the order they appeared starting with the first result. The product was clicked on and from the product page the marketplace portion was selected in

order to determine how many sellers were offering the product. Amazon.com has a screening feature to only select sellers who offered the product in new condition, this feature was employed.

Also, the comment sections, (where sellers can offer a brief description of the product) were checked in order to verify that the product was in new and unopened condition. If there were at least 50 sellers that were offering the product in this condition then that product was selected for analysis. Only products that boasted at least 50 sellers were selected as this would allow for enough data points for a robust analysis. Once the product was selected, the price, shipping costs and numerous other seller attributes were collected.

Descriptive Statistics and Price Dispersion Levels

Below, Table 3 shows the number of products selected in each category, and the percentage of the total sample that each product represents.

Table 3. Products by Category from Amazon.com Marketplace

Product Type	N	% of Sample
CD Player	54	9.6
Digital Camera	58	10.3
Memory Stick	51	9.1
Printer	86	15.3
GPS	53	9.4
Mouse	50	8.9
DVD Player	51	9.1
Universal remote	56	10.0
Router	52	9.3
Headphones	51	9.1
Total	**562**	**100.0**

562 total data points were obtained. For most products, there were between 50 and 60 sellers offering it in the Amazon.com marketplace. The only exception is the printer, which had 86 sellers offering the product. Aside from the printer, the products selected represent between 8.9 and 10.3 percent of the sample.

Table 4 below, shows the measures of price dispersion found in the Amazon Marketplace.

Table 4. Dispersion Measures in Amazon.com Marketplace

Product	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
CD Player	54	30.77	16.21	46.98	23.32	5.66	32.04
Digital Camera	58	673.00	626.99	1299.99	761.79	123.39	15224.63
Memory Stick	51	39.49	12.00	51.49	28.51	10.93	119.45
Printer	86	73.95	55.00	128.95	87.61	18.28	333.98
GPS	53	150.00	149.99	299.99	190.65	28.46	810.25
Mouse	50	49.72	37.00	86.72	60.33	12.10	146.41
DVD Player	51	148.11	189.99	338.10	251.14	30.94	957.08
Remote	56	97.03	2.96	99.99	20.18	16.95	287.21
Router	52	32.95	25.00	57.95	40.08	6.10	37.25
Headphones	51	26.04	15.95	41.99	25.44	5.43	29.48

While there exist no widely accepted standard of what constitutes high or low levels of dispersion (Pan et al., 2004), it can be seen in table 1.4 that there is variation in price for all of the products in the Amazon.com Marketplace.

Once data was collected on Amazon.com's marketplace, then the product was searched for on Google Shopping. To do this, the exact product was entered into Google Shopping's search function. Every product in the results list was reviewed to determine if the product listing was exactly the same as the product searched. Google Shopping also has an option to screen out used and refurbished products. This option was selected to filter out these products. Table 5 below shows the sample size for each product found in Google Shopping:

Table 5. Products by Category from Google Shopping

Product Type	N	% of Sample
CD Player	28	7.5
Digital Camera	42	11.2
Memory Stick	30	8.0
Printer	50	13.4
GPS	10	2.7
Mouse	22	5.9
DVD Player	30	8.0
Universal remote	40	10.7
Router	35	9.4
Headphones	87	23.3
Total	**374**	**100.0**

A total of 374 data points were found using Google Shopping Shop-bot. The headphones represented a high percentage of the sample (23.3%) with 87 data points. The GPS represented only 2.7% of the sample with 10 data points. The remainder of the products represented between 5.9 and13.4 percent of the sample. Despite the smaller number of data points found on Google Shopping as opposed to the Amazon.com Marketplace, reliable analysis could still be performed for nearly all products except for the GPS. The GPS was not included in the analysis which specifically test the hypotheses in this study. Table 6 below shows the levels of price dispersion found from the products in Google Shopping.

Table 6. Dispersion in Google Shopping

Product	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
CD Player	28	40.06	8.94	49.00	27.09	10.75	115.53
Digital Camera	42	510.99	539.00	1049.99	773.66	108.09	11684.23
Memory Stick	30	55.59	0.99	56.58	13.57	17.63	310.87
Printer	50	53.69	74.99	128.68	102.87	9.57	91.55
GPS	10	167.01	120.99	288.00	173.49	48.86	2387.59
Mouse	22	76.33	46.99	123.32	75.87	22.46	504.29
DVD Player	30	275.05	194.95	470.00	283.38	88.75	7876.23
Remote	40	43.05	5.95	49.00	19.11	10.10	102.10
Router	35	69.02	25.34	94.36	48.30	15.30	234.00
Headphones	87	86.01	12.99	99.00	31.92	13.12	172.18

As with the Amazon.com Marketplace, price variation exists for all product categories in the sample from Google Shopping Shop-bot.

The search results were reviewed for accuracy by selecting the result from Google Shopping Shop-bot and then comparing them to the listings on the retailer's website. As noted by Ellison and Ellison (2009), the results found via search bots can have issues in terms of reliability when these results are cross-referenced with what is actually being offered on retailer's website. Hence in order to check for these reliability issues and test for the impact of bait and switch tactics as well as product obfuscation, the following specific phenomena were noted.

Bait and Switch Tactics

Bait and switch involves advertising a product in order to lure in customers, only to then persuade them to purchase another product. Ellison and Ellison (2009) noted numerous

different ways in which retailers listed on pricewatch.com engaged in bait & switch tactics. While checking the accuracy of search results on Google Shopping, it was determined that there are two key ways in which sellers were engaging in bait and switch. The first would is advertising a lower price on the search results and then actually charge a higher price for the product on the retailer's website. The next would be to advertise the product at a low price only to find that it is no longer in stock on the retail website, then offering other higher priced products to consumers. Hence, price consistency and stock status were analyzed to ascertain the presence of bait and switch tactics.

First, **price consistency** is analyzed. The price shown in Google Shopping's results were compared with the price actually being charged on the website. As noted earlier in this paper, shipping prices are set without regard to consumer location in the Amazon.com marketplace and they vary based upon geographic location for numerous retailers on Google Shopping. Hence shipping prices were not taken into account for this analysis.

Next, **stock status** is analyzed. Stock status was determined through analysis of the retailer's website. If it was initially unclear whether or not the product was in stock, the product would be added to the shopping cart and all purchase steps up until before actual purchase of the item was performed until a notification of the product's stock status was found.

Product Obfuscation

Obfuscation is defined as: "an action that raises search costs and/or the fraction of consumers who incur search costs" (Ellison and Ellison, 2009, p. 430). The authors identified complex sources of obfuscation in their analysis of pricewatch.com such as companies offering prices for very poorly constructed items or prices with unattractive service terms attached to them such as 20% restocking fees and no warranty. Consumers were often forced to pay more for fully functional products with normal levels of customer service. In this analysis, the obfuscation should be much more obvious due to the nature of the products analyzed. Ellison and Ellison (2009) researched generic computer components, whereas this study analyzes very specific products. Hence, in this analysis it should be relatively clear if product obfuscation is taking place by observing whether or not the product advertised matches the product being sold on the website. This was achieved by ensuring the product's condition, model number, and brand matched what was being advertised on the search results.

First, **product consistency** is analyzed. The product name and specifications were reviewed on the retailer's website to determine if they were actually selling the same product noted in the results and not another model or brand.

Second, **product condition** is analyzed. All search results were assumed to be in new condition as this filter was selected during the search. However, the condition of the product was verified on the retail website to ensure that this was indeed the case.

Third, the presence of **multiple prices** was analyzed. This check was not originally part of the analysis due to the fact the phenomenon has not been noted by previous research, however the analysis was implemented after reviewing the results of Google Shopping. It was discovered that some retailers offered multiple prices for the same product in the same new condition. There could be numerous plausible explanations for this, however there is cause for concern. Under this circumstance, the exact same model number is listed, along with the exact same picture, however, a different link is used to take consumers to a different webpage, a different price is charged and when the model was searched for directly on these websites only a single version could be found. Additionally, retailers that offer multiple prices and have different web pages for the same product also have the added benefit of showing up multiple times in Google Shopping and perhaps other search engines. Evidence of malicious behavior on the part of these retailers may be purely circumstantial, however the fact remains that numerous retailers were engaging in this activity, it was found for numerous products, could be contributing to price dispersion, and fits the definition of product obfuscation as defined by Ellison and Ellison (2009) very well. Hence this check was included in the analysis.

Each product search result was thoroughly examined in order to determine if either bait and switch or product obfuscation was prevalent. Below, Table 7 offers a breakdown of the number of the various types of bait and switch and obfuscation found with the Google Shopping Shop-bot data.

Table 7. Total Bait and Switch and Obfuscation by Type

Type	Number Found	% of Sample
Inconsistent Price	26	6.7
Multiple Prices	54	14.4
Product Inconsistency	0	0
Used	2	0.5
Out of Stock	27	7.2
Total	**109**	**29.1**

It can be seen here that out of 374 total data points from Google Shopping Shop-bot, 109 of them faced an issue of bait and switch or obfuscation of some sort. The most common of these problems is the presence of multiple prices being offered by the same retailer. Interestingly,

there were no occurrences of discovering a different product than advertised on the search engine results. This could be due to careful scrutiny of the search results. As mentioned in previous sections, there were different products appearing in the search results, however the fact that they were different brands or models was easily visible in the results.

There were only two instances in which retailers attempted to offer a used or refurbished product instead of one in new condition. Due to the fact that previous researchers have found this issue on other shop-bots (Ellison & Ellison, 2009), this finding is likely more of a credit to Google Shopping's ability to correctly screen out non-new products as opposed to more ethical behavior by sellers.

The out of stock issue was found to occur in 27 instances. Previous shop-bot research has yet to identify a reliable way to determine whether or not the retailer was truly out of stock or if they never carry stock of the item and simply use their advertised low price to attract buyers to the website. However it should be noted that many of these occurrences were found with the memory stick, where the retailer advertised a 99 cent price whereas the average price for the product was significantly higher (the product sold for approximately 28 dollars on Amazon.com). It is very possible that the retailers had no intention of selling this product.

Table 8 below breaks down the total instances of bait and switch and obfuscation by the type of product.

Table 8. Instances of Bait and Switch and Obfuscation by Product

Product	Out of Stock	Inc. Price	Used	Mult. Prices	Total B+S	Total Obf.	Final Total
CD Player	*1*	*0*	*0*	*0*	**1**	**0**	**1**
Digital Camera	*3*	*2*	*0*	*13*	**5**	**13**	**18**
Memory Stick	*14*	*4*	*0*	*0*	**18**	**0**	**18**
Printer	*3*	*4*	*0*	*6*	**7**	**6**	**13**
GPS	*1*	*2*	*0*	*0*	**3**	**0**	**3**
Mouse	*1*	*0*	*0*	*0*	**1**	**0**	**1**
DVD Player	*1*	*1*	*0*	*4*	**2**	**4**	**6**
Remote	*0*	*4*	*1*	*9*	**4**	**10**	**14**
Router	*1*	*3*	*1*	*4*	**4**	**5**	**9**
Headphones	*2*	*6*	*0*	*18*	**8**	**18**	**26**
Total	**27**	**26**	**2**	**54**	**53**	**56**	**109**

It can be seen in Table 8 that there is a relatively even split of bait and switch as well as obfuscation with 53 and 56 occurrences respectively. The headphones have the highest

occurrences of obfuscation with 18 instances and the memory stick has the highest occurrences of bait and switch also with 18 instances. While all products boast at least one occurrence of bait and switch, there are four products for which obfuscation tactics could not be found at all: the CD player, memory stick, mouse and GPS.

DATA ANALYSIS

With price quotes obtained from both Amazon.com's marketplace and the Google Shopping Shop-bot, product prices are compared with T-tests to determine which market has lower prices and through Levenes tests to determine which market has lower overall price dispersion. This method is similar to previous work in price dispersion that compared prices and price variation for products in physical locations as opposed to the internet (Ancarani& Shankar, 2004).

The Levenes test is appropriate as it determines whether the difference in standard deviation between the two samples is statistically significant. Since standard deviations are an accepted measure of price dispersion (Pan et al., 2004), if statistically different standard deviations are found, then the market with the lower level of variation would also have lower price dispersion. Hence this method will be employed to test Hypothesis 1.

T-tests will be employed to determine which market offers lower overall prices for each product as they will show if there are statistically significant differences in average prices. This analysis will test hypothesis 2. Table 9 highlights the t-tests and Levenes analysis performed on the data.

Table 9. Comparison of Dispersion between Amazon and Google Shopping

Product	Site	N	Mean Price	Std. Deviation	Std. Error	Sig.	Sig (Uneq.Var)	Levenes	Total B+S & Obf.
CD Player	**Amazon**	54	23.32	5.66	0.77	0.04	0.091	0	1
	Google	28	27.09	10.75	2.03				
Mouse	**Amazon**	50	60.33	12.1	1.71	0	0.005	0	1
	Google	22	75.87	22.46	4.79				
DVD Player	**Amazon**	51	251.14	30.94	4.33	0.02	0.063	0	6
	Google	30	283.38	88.75	16.2				
Router	**Amazon**	52	40.08	6.1	0.85	0.001	0.004	0	9
	Google	35	48.3	15.29	2.58				
Printer	**Amazon**	86	87.61	18.28	1.97	0	0	0	13
	Google	50	102.87	9.57	1.35				
Remote	**Amazon**	56	20.18	16.95	2.26	0.721	0.698	0.605	14
	Google	40	19.11	10.1	1.6				

Table 9...

Camera	**Amazon**	58	761.79	123.39	16.2	0.618	0.611	0.879	18
	Google	42	773.66	108.09	16.6				
Mem Stick	**Amazon**	51	28.51	10.93	1.53	0	0	0	18
	Google	30	13.57	17.63	3.22				
Headphones	**Amazon**	51	25.44	5.43	0.76	0	0.001	0	25
	Google	87	31.92	13.12	1.41				

EMPIRICAL RESULTS

Below, table 10 summarizes the findings of this study. Detailed results concerning differences in prices and price dispersion are then offered.

Table 10. Summary of Results

Product	**Price Lower on Amazon (H2)**	**Dispersion lower on Amazon (H1)**
CD player	Yes*	Yes***
Mouse	Yes***	Yes***
DVD Player	Yes*	Yes***
Router	Yes***	Yes***
Printer	Yes***	No
Remote	No	No
Camera	No	No
Memory Stick	No	Yes***
Headphones	Yes***	Yes***

*p<.05, **p<.01, ***p<.001

Average Prices

Average prices were found to be lower on Amazon for 6 out of the 9 products tested. Data for the CD player shows that the mean price of the product on the Amazon.com marketplace is $23.32 whereas on Google Shopping Shop-bot the average price is $27.09 (p<.1). The other products which display lower average prices on Amazon.com's marketplace are the Mouse 60.33 vs. 75.87 (p<.01), DVD player 251.14 vs. 283.3 (p<.1), Router 40.08 vs. 48.80 (p<.01), Printer 87.61 vs. 102.87 (p<.001), and the headphones 25.44 vs. 31.92 (p<.01). The average price for the remote was 20.18 on Amazon marketplace and 19.11 on Google Shopping Shop-bot, this difference was not statistically significant (p>.1). The average prices of the camera were 761.79 on Amazon Marketplace and 773.66 on Google Shopping Shop-bot. These differences are also not statistically significant (p>.1). The only product to display a lower

average price on Google Shopping Shop-bot was the memory stick with an average price on Amazon.com of 28.51 and 13.57 on Google Shopping Shop-bot ($p<.001$). However, it must be noted that for the memory stick, there were 17 sellers offering the product at 99 cents on Google Shopping Shop-bot, and then would state that the product was out of stock. This diminished the average price on Google Shopping Shop-bot significantly.

The fact that 6 out of the 9 products displayed lower average prices on Amazon.com, 2 were not significantly different and 1 was lower on Google Shopping Shop-bot offers support for hypothesis 2.

Ideally, it would be best to remove all instances of bait and switch and product obfuscation and rerun the t-test analysis to compare average prices. However, 109 out of 374 data points on Google Shopping Shop-bot were affected. Because of this, simply removing all data with bait and switch and obfuscation, would result in extremely low sample sizes, making t-tests unreliable. Hence, the current results are cross-referenced with the total numbers of bait and switch and obfuscation found for each product under the assumption that bait and switch obfuscation tactics tend to increase the prices charged to consumers, and that the presence of competitors who engage in this activity combined with those who do not, increases price dispersion. This assumption is grounded in previous research which has noted these effects (Smith, 2002; Haynes & Thompson, 2007; Ellison & Ellison, 2009). Table 9 also highlights these instances found for each product in the last column (Total B+S and Obf.), and the products are sorted based on the number of instances of bait and switch and obfuscation that were found. The products with the lowest instances are: the CD player with 1, mouse also with 1, the DVD player with 6 and the router with 9. With these products, the price was indeed lower on Amazon.com as expected. As the number of inconsistencies rises, it was expected that average price would decrease on Google Shopping Shop-bot due to the fact that sellers were posting low prices on the search results portion. However, this does not appear to be the case. The printer had 13 inconsistencies in the data and the price was still lower on Amazon.com. A lower price was also found for the headphones which had the highest number of inconsistencies at 25. The remote and camera had 14 and 18 inconsistencies respectively, and for these products, there was no difference in average price in the two markets. The memory stick did have a lower price on Google Shopping Shop-bot with a total of 18 inconsistencies. The fact that there were still 2 products with lower prices on Amazon.com and 2 with no statistically significant difference in price among the products with the highest instances of bait and switch and obfuscation offers greater support for Hypothesis 2. Hence, it can be concluded that prices are lower on the Amazon.com marketplace.

Price Variation

The Levenes test indicates that the Amazon.com marketplace has a lower variation for 6 out of the 9 products, no statistically different variation for two products, and higher variation for one product. The standard deviation values for the CD player price is 5.66 on Amazon.com and 10.75 on Google Shopping Shop-bot ($p<.001$). The other products which follow the pattern of lower standard deviations on Amazon.com are the: mouse 12.10 vs. 22.46 ($p<.001$), DVD Player 30.94 vs. 88.75 ($p<.001$), router 6.10 vs. 15.29 ($p<.001$), memory stick 10.93 vs. 17.63 ($p<.001$), and headphones 5.43 vs. 13.12 ($p<.001$). The two products with no difference in variation are also the two products with no statistically significant difference in average price, the remote and the camera. The remote had a standard deviation of 16.95 on Amazon.com and 10.1 on Google Shopping Shop-bot ($p>.1$). For the camera the standard deviation values are 123.39 for Amazon.com and 108.90 for Google Shopping Shop-bot ($p>.1$). The product a higher standard deviation in Amazon.com is the printer with standard deviations of 18.28 on Amazon and 9.57 on Google Shopping Shop-bot ($p<.001$). The fact that the standard deviations were lower on the Amazon.com Marketplace for 6 out of the 9 products, indicates that dispersion is also lower on that marketplace for those products. This offers support for hypothesis 1.

When looking at the specific products and cross referencing them with the total instances of bait and switch as well as obfuscation it is particularly interesting to note that the same products which had the lowest instances of bait and switch: the CD Player, mouse, DVD Player and router, also had lower variation on Amazon.com as well as lower prices. While the two products with the highest number of inconsistencies, the memory stick and the headphones also had higher variation on Google Shopping Shop-bot as expected, it was not expected for those products with fewer inconsistencies to have higher variation of Google Shopping Shop-bot as well. This not only offers support for hypothesis 1, but also shows that the lower variation on Amazon.com may not be entirely caused by absence of bait and switch as well as obfuscation.

Discussion

As indicated by Table 11 below, both hypotheses were partially supported in this study.

Table 11. Summary of Hypotheses

Hypothesis	Supported?
Hypothesis 1: Price dispersion is higher on shop-bot websites than on Online Marketplaces	Partially Supported
Hypothesis 2: Average prices are higher on shop-bot websites than on online marketplaces	Partially Supported

Numerous conclusions are yielded in this research. First, there are significant levels of price dispersion in both the Amazon.com Marketplace as well as Google Shopping Shop-bot. The fact that price variation is found in Google Shopping Shop-bot is consistent with previous research which found significant dispersion in shop-bot markets (Smith &Brynjolfsson, 2001; Baye et al., 2004b; Harrington &Leahey, 2007; Haynes & Thompson, 2008). However, it was also determined that retailers may be charging different prices for the same product on shop-bots. Previous research concerning shop-bots have made the assumption that the shop-bot constitutes a distinct market in which buyers and sellers trade with each other exclusively and that sellers cannot offer multiple contemporaneous prices (Baye et al., 2004a; Haynes &Thompson, 2008). This research shows that there is at least the possibility that such an assumption may indeed be false.

It is particularly surprising that the Amazon.com marketplace had lower levels of price dispersion due to the fact that previous research concerning online price dispersion has consistently found that as the number of competitors in a market increases, price dispersion increases (Pan et al., 2009). There were a much higher number of competitive offerings identified in the Amazon.com Marketplace (564) as opposed to Google Shopping Shop-bot (372). Because of this, it would not have been surprising if Amazon.com did indeed have higher levels of price dispersion.

The fact that the Amazon.com Marketplace boasts lower levels of price dispersion and lower average prices opens up a new stream of research concerning price dispersion. Many dispersion studies have focused on shop-bot markets due to their potential to reduce price dispersion online (Smith &Brynjolfsson, 2001; Brynjolfsson& Smith, 2000; Nelson et al., 2007; Garfinkel et al., 2008; Haynes & Thompson, 2008; Harrington &Leahey, 2007; Ellison & Ellison, 2009). While these studies have succeeded in finding issues with shop-bots that cause dispersion, none have concluded that price dispersion is being dramatically reduced because of shop-bots.

In this study it has been shown that online marketplaces display lower levels of price variations and lower average prices than shop-bots. This highlights the notion that they have the potential to reduce online price dispersion. It has been established in this research that online marketplaces have lower average prices shop-bots, even when exploring a shop-bot which does not add an additional cost for participation.

Lower dispersion was found in the online marketplace for products that only had one instance of bait and switch or obfuscation in shop-bot market. There is also a lack of evidence indicating that these practices are possible in online marketplaces. This means that other drivers of price dispersion should be analyzed to explain the variation.

LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

This study shows that there may indeed be higher levels of price dispersion on shop-bot websites than on marketplace websites, and future research can shed greater light on this phenomenon. This study specifically focused on a select group of electronics products. In order to boost the generalizability of the results, products in other categories should also be researched to see if differing levels of price dispersion are prevalent among them as well. In addition, this research focused on a single marketplace website and a single shop-bot website. While Amazon and Google Shopping are among the largest of each, future research should examine other marketplaces and shop-bot websites.

REFERENCES

Akimoto, T., & Takeda, F. (2009). Price movements in the Japanese online home electronics market. Electronics Research and Applications, 8, 28-36.

Ancarani, F., & Shankar, V. (2004). Price levels and price dispersion within and across multiple retailer types: Further evidence and extension. Journal of Academy of Marketing Science, 32, 176–187.

Amazon.com. (2016) Amazon.com Company Report. Retrieved from http://phx.corporate-ir.net/phoenix.zhtml?c=97664&p=irol-reportsannual on January 15 2016

Bailey, J. (1998). Intermediation and electronic markets: Aggregation and pricing in Internet commerce (Doctoral dissertation). Retrieved from http://www.smith.umd.edu/faculty/jbailey/pub/phdthesis.pdf

Bailey, J.P., &Bakos, J.Y., 1997. An exploratory study of the emerging role of electronic intermediaries. International Journal of ElectronicCommerce, 1(3), 7–20.

Bakos J. Y. (1997). Reducing buyer search costs: Implications for the electronic marketplace. Management Science, 43 (12), 1676-1692.

Baye, M.R., Morgan, J., &Scholten, P. (2003). The value of information in an online consumer market. Journal of Public Policy and Marketing, 22, 17–25.

Baye, M., Morgan, J., &Scholten, P. (2004b). Temporal price dispersion: Evidence from an on-line consumer electronics market. Journal of Interactive Marketing, 18, 101–115.

Baylis, K., &Perloff, J.M. (2002). Price dispersion on the Internet: Good firms and bad firms. Review of Industry Organization, 21, 305–324.

Brown, J., &Goolsbee, A. (2002). Does the Internet make markets more competitive? Evidence from the life insurance industry. Journal of Political Economy, 110(3), 481–507.

Brynjolfsson, E., & Smith, M. (2000). Frictionless commerce? A comparison of Internet and conventional retailers. Management Science, 46, 563-585.

Ellison, G & Ellison F. (2009). Search, obfuscation and price elasticities on the internet. Econometrica, 77, 427-452

Garfinkel, R., Gopal, R., Tripathi, A., & Yin, F. (2006). Design of a shopbot and recommender systems for bundle purchases. Decision Support Systems, 42, 1974-1986.

Google.com. (2009) Google Shopping FAQ. http://www.google.com/products/intl/en_us/about.html

Grover, V., Lim, J., &Ayyagari, R. (2006). The dark side of information and market efficiency in e-markets. Decision Sciences, 37, 297-324.

Harrington, J. &Leahey, M. (2007). Equilibrium pricing in a partial search market: The shopbot paradox. Economics Letters, 94, 111-117.

Haynes, M. & Thompson, S. (2008). Price, price dispersion and number of sellers at a low cost entry shopbot. International Journal of Industrial Organization, 26, 459-472.

Iyer, G. &Pazgal, A. (2003). Internet shopping agents: Virtual co-location and competition. Marketing Science, 22, 85-106.

Lee, Z., &Gosain, S. (2002). A longitudinal price comparison for music CD's in electronics and brick-and-mortar markets: pricing strategies in emergent electronic commerce. Journalof Business Strategies, 19(1), 55–71.

Nelson, R., Cohen, R., & Rasmussen, F. (2007). An analysis of pricing strategy and price dispersion on the Internet. Eastern Economic Journal, 33, (1), 95-110.

Pan, X., Ratchford, B., & Shankar, V. (2003). The evolution of price dispersion in Internet retail markets. Advances in AppliedMicroeconomics: Organizing the New Industrial Economy, 12, 85–105.

Pan, X., Ratchford, B., & Shankar, V. (2004). Price dispersion on the Internet: A review and directions for future research. Journal of Interactive Marketing, 18 (4) 116–135.

Pan, X., Ratchford, B., & Shankar, V. (2009). Drivers of price dispersion among e-tailers during the boom, shakeout, restructuring, and mature periods of e-commerce. (Working Paper) Retrieved April 19, 2009, from http://econweb.tamu.edu/workshops/PERC%20Applied%20Microeconomics/Venkatesh%20Shankar.pdf

Ratchford, B., Pan, X., & Shankar, V. (2003). On the efficiency of Internet markets for consumer goods. Journal of Public Policy and Marketing, 22, 4–16.

Smith, M. (2002). The impact of shopbots on electronic markets. Journal of the Academy of Marketing Science, 30, 446-454.

Smith, M. &Brynjolfsson, E. (2001). Customer decision-making at an Internet shopbot: Brand still matters. Journal of Industrial Economics, 49, 541–558.

Tang, F., & Xing, X. (2001). Will the growth of multi-channel retailing diminish the pricing efficiency of the web? Journal of Retailing, 77, 319–333.

Venkatesan, R., Mehta, K. &Bapna, R. (2007). Do market characteristics impact the relationship between retailer characteristics and online prices? Journal of Retailing 83, 309-324