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FREE RIDING AND SALES STRATEGIES FOR THE INTERNET

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**ABSTRACT**

We examine manufacturers' decisions of whether and how to offer their products for sale over the internet. Manufacturers that rely on promotion of their products by brick and mortar retailers must consider the possibility that internet retailers can free ride off of that promotional effort. This creates an incentive for manufacturers to limit the availability of their products over the internet and to control the pricing of their products over the internet. We examine three categories of products: fragrances, DVD players, and side by side refrigerators. Our evidence suggests that manufacturers that limit distribution in the physical world also use various mechanisms to limit distribution online. In particular, we find evidence that these manufacturers attempt to prevent the sale of their products by online retailers who sell goods at deep discounts. Furthermore, we show that manufacturers who distribute their goods directly through manufacturer websites tend to charge very high prices for the products, consistent with the hypothesis that manufacturers internalize free rider issues. While our main focus is on free riding, our evidence on pricing practices is germane to the growing literature on price dispersion on the internet.

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As of this writing, Internet sales still total only about 0.7% of all retail sales in the United States<sup>1</sup>. However, the rapid growth of Internet commerce suggests that this sales channel will eventually become a significant factor for many goods. Because purchasing through the Internet does not allow the consumer to touch and experience the good prior to buying, it is reasonable to anticipate that established branded products will be particularly well suited for Internet sales. The emergence of this new sales channel raises many questions for the manufacturers of branded goods: are there any costs to allowing one's products to be sold over the Internet? If products are sold over the Internet, should the manufacturer sell them directly, via Internet retailers, or via the websites of established brick-and-mortar retailers? What pricing strategy should the manufacturer use for Internet sales? We address these questions in our research.

Manufacturers of branded goods employ various means of restricting distribution of their products with the goal of controlling free-riding on the sales and promotional efforts of their retailers. The emergence of the Internet as a new distribution channel may alter manufacturers' and retailers' incentives to exert promotional effort, and may thus affect the optimal vertical arrangements that manufacturers adopt. Furthermore, new types of antitrust issues are likely to arise as these vertical arrangements evolve. This issue is of immediate practical importance since the Federal Trade Commission and Department of Justice have recently shown an increased willingness to prosecute restricted distribution cases and appear to be giving less weight to free-rider defenses than in previous years.<sup>2</sup>

In this paper, we investigate empirically the extent to which manufacturers of several different types of branded goods appear to control the pricing and availability of their products over the Internet. We analyze the probable impact of these actions on the promotion and sales incentives of brick-and-mortar retailers. We also discuss the types of antitrust issues that are likely to arise because of Internet sales.

The rest of the paper proceeds as follows. In the next two sections, we review the standard theory of free riding and its consequences, noting how these theories apply to distribution via the Internet. We derive several conjectures that we test. Next, we discuss some recent legislative and antitrust activity, showing that the issues associated with restricted distribution are likely to become hotly litigated. We then discuss the data for the three industries that we study: fragrances, DVD players, and refrigerators. These industries were chosen on the basis of data availability and the possibility that free riding is a concern. Finally, we report empirical results that document the availability and price of branded products over the Internet for these industries. We conclude with some general observations.

## **I. Free Riding**

Free riding amongst retailers has been much studied and is well understood.<sup>3</sup> Free riding occurs because the inputs needed to sell a product -- e.g., informed retail sales effort, retail showrooms to display products, retail advertising -- cannot be sold separately from the physical product. Hence, it is possible for one retail store to engage in the activity necessary to sell the product, but for a different lower-priced store to make the final sale. If such free riding occurs, it erodes the incentive of any retail store to promote the product. With lower promotion, total sales could fall, to the chagrin of the manufacturer.

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<sup>1</sup> Source: U.S. Department of Commerce estimates for second quarter 2000. All estimates are located at <http://www.census.gov/mrts/www/mrts.html>.

<sup>2</sup> See, for example, *FTC vs. Toys "R" Us*, 221 F. 3d 928 (Seventh Circuit, 2000) and *United States of America vs. Microsoft Corp.*, Civil Action No. 98-1232 TPJ (D.C.)

<sup>3</sup> For a survey, see Rey and Tirole (1986) and Carlton and Perloff (2000), Ch. 12..

There are myriad ways for a manufacturer to deal with the free rider problem. One common approach is to create exclusive territories or to otherwise limit the number of firms selling a brand in one area. Another is for the manufacturer to take over the sales or marketing function from the retailer. A less extreme form of this approach is for the manufacturer to share in the advertising or employee training expense that the retailer chooses. This decentralization of decision making from the manufacturer to the retail store is usually desirable because the local retail store possesses knowledge about its customers that allows the retailer to sell the product more effectively than the manufacturer.

Another approach to the free rider problem is for the manufacturer to engage in resale price maintenance. Though resale price maintenance (RPM) is a per se violation of the antitrust laws, under the Colgate doctrine<sup>4</sup>, a manufacturer can choose to deal with whomever it pleases and can, if it wants, cease dealing with price cutters. (The tension between the Colgate doctrine and the per se ban on resale price maintenance has been noted many times before.) By preventing retailers from cutting prices, the manufacturer removes the incentive of the consumer to purchase from the firm other than the one providing the sales effort.<sup>5</sup> When we see no discounting off a relatively uniform retail price, we will say, as a convenient shorthand, that the manufacturer is engaging in RPM. (We are not intending to make any suggestion whatsoever that the pricing policy violates the law.)

Finally, manufacturers often limit the types of stores where their products are sold, frequently in conjunction with some type of resale price maintenance. Typically, this restriction takes the form of favoring specialty stores over stores carrying a broad selection of goods. These restrictions often stem from the manufacturer's objection to the use of its product as a loss leader. A loss leader is a product whose price is set very low in an effort to attract consumers into a retail store. Once there, consumers purchase other products sold in the retail store, so there are definite spillover benefits to the retail store. However, the consequence to the manufacturer is that the specialty stores that promote his product will have difficulty capturing the benefit of their sales efforts since consumers will purchase the product at non-specialty stores where the product may be used as a loss leader. In such cases, manufacturers may limit the type of stores where it allows its product to be sold.

Addressing the free rider problem becomes more complicated when consumers differ in their need to obtain sales service. For example, some knowledgeable consumers do not need to deal with a trained sales staff, while others rely heavily on them. In such a case, the manufacturer faces a dilemma. Providing the incentives for the retail store to provide trained assistance ultimately raises the retail price that all consumers must pay, including the price to those consumers who don't need the sales service. One way around this problem is to segment the market -- making one low-priced product available to knowledgeable consumers (or consumers who don't care about sales effort) and another higher-priced product available to the others. As long as the consumers who do consume sales effort are limited in their ability to purchase the lower-priced version (perhaps by being unaware of its existence), the manufacturer can avoid the dilemma of choosing which consumer group to cater to. Since the cost of serving knowledgeable customers is lower than that of serving the others, it is both profitable and efficient for manufacturers to segment the population. Clothing manufacturers who cut out their labels from their product and sell it to discount houses provide a good example of population segmenting--- segmenting between those who care about brand names and

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<sup>4</sup> U.S. vs. Colgate and Co., 250 US 300 (1919).

<sup>5</sup> While RPM mitigates the problem of horizontal free-riding across retailers, it does not necessarily insure that retailers have sufficient incentive to provide the optimal amount of promotion from the manufacturer's viewpoint. Since the retailer captures only part of the total margin on the good, retailer incentives may be inadequate. See, for example Klein and Murphy (1988).

those who do not. Notice though that, identifying consumers who do and do not require sales effort is insufficient; some mechanism must be used to prevent those that do need sales effort from consuming the sales effort at one retailer and then purchasing from the low-priced retailer who was intended to sell only to the knowledgeable consumers.

## **II. Applications of the Theory of Free Riding to Internet Sales**

Our main concern is that, in the absence of vertical restrictions, brick-and-mortar retailers will be vulnerable to free riding on their sales effort by their Internet competitors. Of course, it is theoretically possible that free-riding could occur in either direction. That is, brick-and-mortar retailers could also free ride off of the sales effort of Internet retailers. Brick-and-mortar retailers provide the opportunity to touch and smell the products and brick-and-mortar salespeople will often demonstrate the product for customers. Internet retailers often provided detailed product information, sometimes including commentary on the product from previous customers. The interactive technology often helps customers search for the particular model of a product that most closely matches the customer's needs. Thus, both types of retailers may be providing valuable sales effort.

There are two important distinctions between the type of support offered by Internet retailers and brick-and-mortar retailers that we think make free riding by Internet retailers on brick and mortar retailers more of a problem than free riding in the reverse direction. First, much of the effort of the brick-and-mortar retailers takes the form of a per-customer cost, while Internet retailers incur fixed costs in providing support. Second, because the promotional effort of a brick-and-mortar retailer consists of personal interaction between customers and sales consultants, it is much more difficult to directly verify. Thus, in some sense, the classic free rider problem might not be as important when we think about free-riding across Internet sites or from the Internet sites to physical stores because the manufacturer could, in principle, use fixed fees to compensate Internet retailers who provide information- or promotion-laden sites. However, it is much less practical to use fixed fees to compensate brick-and-mortar retailers for their unverifiable per-customer effort. The most feasible way to compensate brick-and-mortar retailers for sales effort is through a device such as RPM or exclusive territories which allows them to charge high prices. In the absence of restrictions on their competitors on the Internet, the brick-and-mortar retailers will be vulnerable to free riding by Internet retailers.

Another important feature of Internet sales that may lessen the importance of free riding off of Internet retailers is that, unlike sales at brick-and-mortar retailers, Internet sales are typically national not local. The incentive for the manufacturer to delegate promotional effort to the retailer is diminished if the retailer does not have specialized local knowledge that allows the retailer to sell the product better than the manufacturer. The only analogy on the Internet to that local retail knowledge is knowledge of the customers of the particular Internet site. So, for example, if one Internet site attracted consumers who had unusual characteristics known only to the Internet retailer, the manufacturer would have to rely on that retailer for promotional effort.

While the Internet may lower the cost to manufacturers of selling directly to consumers, the costs involved in direct selling are not trivial. The logistics and warehousing functions of selling often have scale economies and expertise associated with them that a manufacturer may lack. Manufacturers avoid these distribution costs by relying on others to distribute the product.

A final relevant feature of Internet retailing is that search costs may be lower than in the physical world. Consider a consumer who visits a specialty men's store to receive fitting advice for an expensive suit. Even if the manufacturer of that suit sells the same suit to a discount store, it may be extremely costly for the

shopper to figure out how to obtain the suit more cheaply. These search costs may mitigate the free rider problem. On the Internet, these search costs are potentially lowered, especially as shopbot technology improves. How low these costs are is an empirical question that others have addressed and that we will consider as well.

Using these facts about Internet sales and our knowledge of free riding, we can make the following observations.

1. Internet sales sites increase the free rider problem for manufacturers. If a customer can obtain sales service from a retail store, but purchase at a lower price on the Internet, free riding occurs. We hypothesize that manufacturers that rely strongly upon sales effort that is necessarily physical may limit the availability of their products on the Internet.

There is, however, an important caveat to this argument. Exclusively distributed goods are generally those that are heavily reliant on retailer sales effort. Allowing those goods to be sold on the Internet exacerbates that free-rider problem. However, the more exclusively a manufacturer distributes a good, the more consumers there are who are outside of the feasible sales area of any brick-and-mortar retailer. The opportunity to reach new customers, then, is particularly valuable for manufacturers using small distribution networks. Thus, manufacturers of exclusively distributed products may authorize Internet retailing but use other vertical control mechanisms to control free-riding.

The first goal of our empirical work, then, is to document the availability of products over the Internet. Is the availability of products over the Internet positively or negatively correlated with their availability in the physical world?

2. In a competitive market with search costs, we know that price dispersion arises. Although search costs seem low on the Internet, significant price dispersion for identical products has been documented by other researchers. We expect manufacturers of branded items that are heavily promoted at the retail level to be more concerned about price dispersion than manufacturers of products that are less reliant on retail sales effort since heterogeneous prices encourage free riding. This might lead the price distributions of heavily promoted products to be tighter both across retail stores and across Internet sites compared to the price distributions of less heavily promoted products.

In our empirical work, we examine the magnitude of price dispersion across Internet retailers. Is the price dispersion across Internet sites lower for heavily promoted items than for other items? Is there evidence that manufacturers of promotion-intensive products attempt to restrict the availability of those products to Internet sites that engage in discounting?

3. Manufacturers face a dilemma in deciding whether to offer products for sale through their own website, through the website of a retailer, or both. Clearly, retailers may threaten to discontinue carrying a manufacturer's product if the manufacturer becomes a retail competitor.<sup>6</sup> However, if manufacturers use their own websites to sell products, the manufacturers will recognize the value of mitigating the free rider problem and we would expect them to do so. Of course, even if the manufacturer website is attractive from the perspective of controlling free-rider issues,

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<sup>6</sup> Home Depot issued a warning in July 1999 that it might discontinue any suppliers who sold product directly over the Internet.

manufacturer site sales may be unattractive if they do not achieve minimum efficient scale in website operation.

In our empirical work, we examine the propensity of products to be offered on manufacturer websites. For which types of products are manufacturer sites used? Do manufacturer websites price as if they are attempting to mitigate the free rider problem?

4. Manufacturers of exclusively distributed products should be more likely to allow price discounts on Internet sales when consumers affected are highly knowledgeable already and require no retail sales effort. In particular, the distinction between initial and repeat sales may be relevant. Initial sales of the good may give rise to the potential for more free riding (e.g., need to see the good in a showroom) than repeat purchases. Repeat purchases of unchanging goods would seem well suited to Internet sales. A manufacturer's Internet strategy may be different for new products whose sales are dominated by first-time purchasers than for older products, whose sales are dominated by repeat purchasers. Alternatively, the manufacturer could use some type of information technology to certify repeat customers for Internet purchases.

To study this issue, we contrast the availability of newer introductions with the availability of older, established goods. This issue is most germane to the one product in our study, perfume, that is subject to frequent repeat purchases.

5. There is an important potential advantage that established brick-and-mortar retailers may have over pure-Internet retailers that has not been given much attention in the popular press discussions of e-commerce. Brick-and-mortar retailers who distribute a branded product might be given preferential access to that product for Internet sales, since the brick-and-mortar retailer can internalize the free-riding between Internet and retail stores. This effect can only be important if the brick-and-mortar retail sector is highly concentrated. If there are many brick-and-mortar retailers, Internet sales provide a vehicle for that retailer to free ride off of other retailers' promotional efforts.<sup>7</sup>

Thus, in our empirical work, we examine the following issue: do brick-and-mortar stores partially internalize the free-rider problem and charge higher prices on the Internet? Do manufacturers appear to source products to brick-and-mortar retailers that they do not source to pure-Internet retailers?

### **III. Antitrust Issues**

Already, the Internet has created legal battles about property rights in the vertical chain of distribution in several retail sectors, including auto dealers and drug stores. We foresee three types of litigation arising under the federal antitrust statutes. The first issue is whether a dealer of a product can be terminated for violating

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<sup>7</sup> It is worth noting that self-free-riding does create some potential problems for the retailer. For example, suppose that the retailer utilizes a commission-based sales staff to sell its product in the brick-and-mortar outlet. The incentives of these salesworkers are diluted by the fact that the sales staff may service customers, only to have the customers purchase the product from the Internet site, potentially bypassing their commissions. When appliances are sold by Sears.com, Sears issues a commission check to the appliance sales force at the Sears store located closest to the delivery address of the Internet shopper. This practice may mitigate, but not solve this internal free-riding problem.

exclusive territories provisions by setting up a website that ships products outside the dealer's territory. A second related issue is whether a dealer can be terminated for reselling goods to an "unauthorized" Internet dealer (creating a so-called "grey market" for the product). Finally, a third legal issue is whether a manufacturer's or franchisor's web sites violate the territorial exclusivity of retailers or franchisees. These conflicts may in part be settled by manufacturers or franchisors agreeing to pay retailers or franchisees whenever product is sold directly by the manufacturer over the Internet.

One of the most powerful dealer groups is auto dealers. Numerous and successful, this group has many state franchise laws to protect them from competition from other dealers located nearby selling the same brand and to protect them from termination by the manufacturer. Auto dealers were initially concerned that GM and Ford would use the Internet to sell cars directly to consumers. Responding to their dealers, both GM and Ford have recently abandoned their plans to use the Internet to sell direct.<sup>8</sup> Moreover, many state franchise laws now prevent (or are being reconsidered to prevent) a car manufacturer from giving high-volume dealers lower wholesale prices. The goal of these new laws is to prevent a dealer from undercutting rival dealers by running a high-volume, low cost Internet business. However, because state law makes termination of dealers so difficult, it seems unlikely that either auto manufacturers or other dealers will be able to prevent dealer sales over the Internet. Furthermore, under current laws, the manufacturer is likely to be powerless to charge higher wholesale prices to retailers whose ratio of sales to test drives given is low due to Internet sales.<sup>9</sup> Other politically influential industries that have succeeded in using state laws to limit online competition include insurance and liquor distribution.<sup>10</sup>

The drugstore industry provides another example of legal conflict over exclusive territories. Drug Emporium franchises drug stores and gives them exclusive territories. When Drug Emporium set up a web site, it initially refused to sell to customers in its franchisees' exclusive territories. Instead, customers in exclusive territories of franchisees were provided with the nearest store location. In Fall 1999, Drug Emporium changed its policy, began selling in its franchisee's territories but offered to provide a sales commission on all such sales to the exclusive franchisee. The franchisees brought a legal action, claiming that Internet sales violate their exclusivity clause. The case is in arbitration.<sup>11</sup>

Legal actions have also been attempted against unauthorized Internet retailers who obtain products from either authorized retailers or wholesalers and then sell those products at discount prices. Parfumsnet.com shut down (at least temporarily) its website in France after having been sued by at least 16 different perfume manufacturers.<sup>12</sup>

#### **IV. Data**

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<sup>8</sup> Source: Auto Dealers, Fearing that Detroit Will Hog the Web, Fight Back by Jeffrey Ball, Wall Street Journal, 5/10/2000, p. 1.

<sup>9</sup> The FTC recently stopped a boycott by local dealers of Chrysler. The dealers wanted Chrysler to cut off a dealer who was selling over the Internet. Source: Mad as Hell by Rochelle Garner, Sales and Marketing Management, 6/1999, pp. 54-61.

<sup>10</sup> Source: State Laws Threaten Some Online Sales by Bill Roberts, Internet World, 6/9/97..

<sup>11</sup> Source: Arbitration: Drug Emporium Franchises Challenge Website by J. Michael Dady and W. Michael Gardner, Business Wire, 3/14/2000. Drugemporium.com is competing for Customers Complaint Says by Debbie Gebolys, The Columbus Dispatch, 3/16/2000, p. 1E (Business section).

<sup>12</sup> Source: C. Brothers, "Litigious luxury firms force cyber-perfumer off web," Yahoo! news, November 6, 2000. [http://dailynews.yahoo.com/h/nm/20001106/wr/luxury\\_cyberwar\\_dc\\_1.html](http://dailynews.yahoo.com/h/nm/20001106/wr/luxury_cyberwar_dc_1.html)



We have gathered data on three categories of branded goods that are highly reliant on retailer sales support and are in product categories where Internet sales are expected to reach at least 5 percent of retail sales by 2003 according to Forrester Research: fragrances, DVD players, and side-by-side refrigerators. Fragrances rely on retail support because consumers of expensive fragrances prefer to try them on prior to purchase. DVD players rely on retail support because they are fairly complex. The features are very different from those offered on a VCR and the hookup procedure is non-trivial if the customer does not have a new DVD-ready television. Side-by-side refrigerators rely on retail support because consumers generally like to examine the attractiveness of its appliances and inspect its features.

### ***Fragrances***

We gathered fragrance data from 17 retail Internet sites plus manufacturer sites. Our goal in selecting retail sites is to obtain representatives of four different types of websites: department store sites, upscale beauty sites, drugstore sites, and discount fragrance sites. To identify department store websites we obtained listings of the largest department stores in the U.S. and selected all of those that sell fragrances over the Internet (Bloomingdales, Dillard's, Macys, Nordstrom, and Nieman Marcus).

To identify other websites that sell beauty products, we obtained a list of top traffic Internet sites selling beauty products from the Media Metrix/NPD Winter 1999 e-visory report (see <http://www.npd.com/corp/beauty/evflyerweb.htm>). From this list of nine sites, we eliminated three sites from consideration. Avon.com and avonorder.com are websites that carry only Avon products. Avon products are not distributed through stores, but rather are direct distributed by "Avon representatives". While the channel conflicts created by launching an Internet site to compete with direct sales agents are quite interesting, we view the channel conflicts faced by this type of firm as sufficiently different from those facing traditional retailers and manufacturers that we eliminate those websites from study. We also eliminated mothernature.com, which does not appear to carry any name brand fragrances. To the remaining list of 6 sites (ibeauty.com, eve.com, drugstore.com, more.com, planetrx.com, and Ashford.com), we added Sephora.com, as private communication with a project manager at NPD group indicated that this site would be added to the list of top beauty sites for the Spring 2000 edition of the NPD/Media Metrix e-visory report. Three of the sites listed in the NPD/Media Metrix report are upscale beauty sites (ibeauty.com, eve.com, and sephora.com).<sup>13</sup> Three are drugstore sites (drugstore.com, planetrx.com, and more.com). The last, Ashford.com, carries all types of luxury goods (perfume, jewelry, watches, etc.). For our purposes, we classify Ashford as an upscale beauty site.

We supplemented this list with perfume-only sites indexed by 4anything.com (a popular index of web sites). One of these, fragrancenet.com is rated by PCDataonline as the second-highest traffic beauty site on the Internet as of September 2000. We also added beauty.com to the list of upscale beauty sites to analyze, since its recent association with Amazon.com suggests that its traffic might increase. Hence, our final list of 17 retail Internet sites consists of 5 department store sites, 5 upscale beauty sites, 3 drugstore sites and 4 discount fragrance sites.

During the month of June 2000, we collected all of the prices for all of the women's fragrances carried by these 17 retail sites.<sup>14</sup> This results in a database containing prices across sites for 3156 total products. Most fragrances are available in a variety size-type-vehicle combinations. By "type" we refer to the formulation of the fragrance. Most fragrances are available not only in the fairly concentrated perfume formulation, but also

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<sup>13</sup> Since our data was collected, eve.com has ceased operations.

<sup>14</sup> That is, we gathered data for perfumes, colognes, etc. We did not gather data for "home fragrances", creams, powders, or aromatherapy products.

in more dilute types such as cologne, eau de toilette, eau de cologne, and eau de perfume. Similarly, most fragrances are available both in the traditional "pour" vehicle, as well as in the "spray" vehicle. For a given fragrance, prices are highly correlated across sizes, types, and vehicles. Thus, for most of the analysis we will consider only the most widely available vehicle-format for each fragrance (most often, the 1.7 oz EDT spray). This results in a dataset of prices for 1106 unique fragrances available for sale on the Internet.

The methodology described above does not allow us to document whether or not there are fragrances that are not available for sale over the Internet but are available for sale at brick and mortar retail locations. We obtained this information in two ways. First, we obtained information from the Fragrance Foundation. The Fragrance Foundation ([www.fragrance.org](http://www.fragrance.org)) presents annual awards (called the "Fifi" awards) for the best new fragrance introductions, as well as an annual "hall of fame" award in which an established classic fragrance is inducted into the Hall of Fame. Using the list of Fifi nominees for 1998 and 1999, and the list of winners for 1972-1997, we matched our list of fragrances to the list of fragrances for sale on the Internet. There are two possible reasons why some nominees/winners would not be available for sale on the Internet. The first possibility is that the manufacturer has decided not to offer the product for sale on the Internet or that retailers have decided not to carry it. The second possibility is that the fragrance has actually been discontinued. Since we do not have sales figures for individual perfumes, it is very difficult to know if low or zero total sales explain unavailability on the Internet. To try to separate out perfumes that were unavailable due to discontinuation or low sales, we asked a research assistant shopper to look for the Fifi nominees/winners at Chicagoland department, beauty, and perfume stores. We consider all perfumes that our shopper was able to buy in Chicagoland as "legitimate" sellers, and document the Internet availability thereof. The list of retail stores visited is given in Data Appendix One.

The Fragrance Foundation provided two other sets of data that we exploit here. First, we obtained data from the Fragrance Foundation on all new fragrance introductions that would qualify for nomination for the 1999 Fragrance Foundation awards, awarded in June 2000. This would encompass fragrances introduced from late 1998 to late 1999.

Finally, as part of the annual Fifi awards, nominees are asked to certify which of the following categories of brick-and-mortar distribution their fragrances fall into: for sale in limited specialty and department stores (to department and specialty stores totaling less than 500 doors), for sale in department stores generally, for sale in chain/mass market stores, for sale exclusively through non-store venues, and for sale only in private label stores. We use this information as a proxy for the extent to which the manufacturer uses exclusive distribution arrangements in the brick-and-mortar world.

For the most part, we will use information only about the first three distribution categories, as fragrances sold in the latter two categories are likely not to be sold in the "general" beauty websites that we examine. In doing this, however, we should note that these two alternative channels are not miniscule. The private label category includes perfumes labeled for the Gap, Banana Republic, Eddie Bauer, and Victoria's Secret. The "not in stores" category includes direct distributed products such as Avon and Mary Kay (companies with all sales totaling approximately \$6 billion). Indeed, Avon is the largest seller of perfume in the US (by volume, not dollar sales).

The data on the exclusiveness of distribution tend to be the same for all of the perfumes within a designer. Because these data appear to be consistent within designers, we infer the availability of any perfume by a designer if we have data from the Fragrance Foundation for a particular perfume in that designer's line. Thus, for example, Estee Lauder's "Pleasures" has been nominated for a Fifi, but not Estee Lauder's

"Knowing". We assume that "Knowing" is distributed to the same type of outlets as "Pleasures".<sup>15</sup>

We used four search engines and links from the Fragrance Foundation to document which of the Fifi-nominated manufacturers listed in our entire database of fragrances had their own Internet sites. We visited all of these Internet sites to establish whether or not the manufacturer sold fragrances directly through the site. For any site that we found that sold fragrances, we recorded the prices. The "manufacturer site" information in the tables below cover, to the best of our knowledge, the universe of manufacturer sites for the Fifi nominees. Several of the manufacturers had websites that appeared to sell fragrances, but did not have English-language websites. We eliminated these from consideration.<sup>16</sup> All prices and availability data are as of June 2000. Since that time, one of the sites that we examine has exited the business (eve.com), while others that we did not consider have gained sufficient popularity that they would have been included in a study covering a later time period (particularly gloss.com).

### ***DVD players***

We undertook several steps to find important Internet retailers of DVD players. First, using Dealerscope Magazine, a trade journal for consumer electronics retailers, we identified the top-selling brands of DVD players and the top-selling brick-and-mortar retailers of DVD players. We searched for the corresponding manufacturer websites and retailer websites. Then, using Media Metrix and PCDataOnline data, we obtained lists of the most visited consumer electronics retailing websites. Finally, we supplemented this list by examining retailers whose products were listed on deja.com, a consumer information site. In all, this methodology identified 41 sites selling DVD players, of which 2 were manufacturer sites and 8 are the websites of brick-and-mortar retailers.

Every major manufacturer of DVD players had a website describing their models (though most of these manufacturers did not sell directly from their sites). Thus we were able to obtain a listing of the universe of potential models. We obtained information from manufacturer websites about authorized versus unauthorized dealers of each manufacturer's products. We will look separately at the behavior of unauthorized and authorized retailers.

### ***Appliances: Side-by-Side refrigerators***

The second category of products that we analyzed is side-by-side refrigerators. We narrowed our focus to only side-by-side refrigerators because of the large number of brands and sellers of compact refrigerators intended for non-home use. All side-by-side refrigerators are large in scale and are designed for home and restaurant buyers. We identified the major appliance manufacturers by consulting with industry data from the Association of Home Appliance Manufacturers (AHAM), the Homebuilders Financial Network (HFN), and Dealerscope magazine, a trade journal for Consumer Electronics Retailers.

We also sought a measure of the "exclusiveness" of an appliance. We suspect that the free rider problem is less pronounced for "standard" appliances in standard sizes and more pronounced for more "custom" type appliances. That is, while it is possible that one could purchase a standard-sized freezer for an apartment

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<sup>15</sup> Note that we make this inference at the "designer", not the manufacturer level. The Estee Lauder companies, for example, own Tommy Hilfiger, which makes fragrances called "Tommy Girl" and "Freedom". We do not infer anything about the distribution of "Tommy Girl" using information on the distribution of "Pleasures."

<sup>16</sup> As best as we could ascertain, these websites would not ship products to the U.S. in any case.

without first inspecting it personally, it is probably unthinkable to purchase a commercial-quality Subzero refrigerator without doing so. We identified "professional" appliances by searching through every page of a set of "high-end" magazines, including several magazines targeted to gourmet cooks. The "high-end" magazines were the set of travel and lifestyle magazines identified by the Fall 1999 Mediamark Magazine Pocketpiece having average readership with a median household income of at least \$60,000 and at least one woman reader per copy. We identified 5 manufacturers of side-by-side refrigerators that have advertisements in those magazines: GE, JennAir, KitchenAid, SubZero, and Viking.

We searched for appliance retail sites using several sources: Yahoo shopping, Alta Vista shopping, 4anything.com, MySimon, and links from AHAM. Despite these efforts we found only a few Internet sites selling appliances and even fewer shipping nationally. Nonetheless, we collected pricing and availability information for all nationally shipping appliance sites that carried any side-by-side refrigerators.

The prices and availability data that we examine are for October 2000. Once again, we have found that the Internet sites selling these products have been in considerable flux since we began this research. For example, in June 2000, we found 2 Internet sites selling SubZero refrigerators. Since then, one of these sites has "gone dark", while the other appears to have dropped SubZero from its offerings.

## **V. Empirical Findings**

### **Fragrances**

#### *Availability*

Our most basic question is whether some manufacturers do not make their products available on the Internet and if they do, whether they limit which Internet sites distribute their products. As discussed above, a retailer using exclusive distribution in the brick-and-mortar world faces a conflict in determining whether to allow its product to be sold over the Internet. On the one hand, manufacturers use exclusive distribution relationships to insure a return to retailer effort. By allowing the sale of products over the Internet, the manufacturer endangers those retailer relationships. This suggests that manufacturers who use exclusive distribution arrangements off-line might be least likely to offer their products online.

A countervailing incentive is to make the product available to consumers who do not live near an authorized retail outlet. The more exclusive a product is, the more compelling is the incentive for the manufacturer to offer sales over the Internet to those consumers who are unserved by the retail network. Indeed, for a product such as a mass market fragrance available in every drugstore and discount store in America, it may well not be worthwhile for anyone to attempt to sell the product over the Internet, as most consumers have access to the product as a matter of course. Thus, it is an empirical question whether more "exclusively distributed" products have a greater or lesser Internet presence.

Table 1 examines the propensity of the fragrances to be available on the Internet. The base sample is the 603 fragrances nominated for a Fragrance Foundation award. Twelve of these are dropped because our research assistant shopper could not find the fragrance for sale in a physical store in Chicagoland. The vast majority of these perfumes are available over the Internet at some type of site, as the third row of Table 1 demonstrates. Interestingly, the least exclusively distributed perfumes offline (those sold through chain stores and mass market outlets) are the least likely to be offered for sale on the Internet. One potential reason for this is the economic unsuitability of these fragrances for shipping. As Table 1 illustrates, the average price of the chain store perfumes is \$14, as compared to \$41 for the less exclusive department store perfumes and \$42 for the more exclusive department store perfumes.

Conditional on offering a product for sale on the Internet, the manufacturer faces several choices as to how

to distribute it. The manufacturer can simply source the product to Internet retailers, the manufacturer can sell it directly through a manufacturer website, or the manufacturer can do both. Of course, both manufacturer and retailer sites have the potential to create channel conflicts with retailers, as either the manufacturer or an Internet retailer can potentially free ride off of the promotional efforts of brick-and-mortar retailers.

As Table 1 shows, direct sales by manufacturers are quite prevalent in perfume. Thirty-eight percent of the fragrances in our sample are available for sale over the Internet through a manufacturer site. This might be expected for manufacturers whose non-Internet operations are vertically integrated into retailing (such as Avon), but, as mentioned before, we are excluding manufacturers who are fully vertically integrated into retailing.<sup>17</sup> Twenty one percent are available exclusively through a manufacturer site. This suggests that, for the majority of fragrance manufacturers, selling on the Internet through retail sites and selling on the Internet through a manufacturer site are substitutes rather than complements. Why would a manufacturer choose to source its perfume through a manufacturer site but not through a retail site? One hypothesis is that a manufacturer that sells fragrances through its own site may, through pricing and product availability policies, be able to control the extent to which retailer effort is diminished by free-riding. Legal restrictions on vertical contracting may prevent a manufacturer who sells through Internet retail sites from exercising the same type of control on free riding. The fourth row of Table 1 provides support for this hypothesis since perfumes that have exclusivity in the brick-and-mortar world have a higher fraction of manufacturing only websites.

Table 2 systematically considers the relationship between Internet availability and proxies for the potential for free riding. The first proxy we use is a measure of the exclusiveness of distribution in the brick-and-mortar stores. We use variables that indicate whether the perfume is sold at brick-and-mortar stores very exclusively (department stores less than 500 doors) or through a wide number of department stores. The omitted variable takes the value of one if the fragrance is available through chain/mass market stores. In addition to the degree of exclusivity in brick-and-mortar stores, the other proxy for the potential for free-riding that we consider for perfumes is whether or not a perfume is a new introduction. Older established perfumes are likely to be largely bought by repeat purchasers who will not need to try the perfume on before purchasing. New perfumes, on the other hand, may be very reliant on retailer inputs, because consumers may only purchase the perfume once they have tried it on in a retail outlet. If a consumer purchases a brand new perfume over the Internet, that consumer is more likely to have free ridden upon a physical retailer's recent efforts than is the purchaser of an older perfume. Complicating any such analysis, however, is the fact that the demographics of purchasers of older and newer perfumes are likely to be radically different. Younger women are probably more likely to both use the Internet to shop and are more likely to use newly introduced perfumes.

Table 2 reports probit coefficients as well as the change in the probability that a fragrance is available on the Internet when the right hand side variable increases from 0 to 1. As suggested by Table 1, Table 2 confirms that overall availability over the Internet is positively correlated with the exclusiveness of distribution offline.

The most exclusively distributed fragrances are the most likely to be available online, while the chain mass market fragrances are least likely to be available online. As discussed above, we attribute this finding to the relatively high ratio of shipping charges to price for the perfumes widely available offline. However, we do find that new fragrances are less likely to be available over the Internet. The coefficients indicate that a fragrance is 6 percentage points less likely to be available over the Internet if it is a new introduction.

In columns 3 and 4 of Table 2, we reestimate the probit specification, replacing the dependent variable with

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<sup>17</sup> See Gertner and Stillman (2000).

an indicator variable that takes the value of one if a perfume is available through an Internet retailer (e.g. availability at manufacturer websites is ignored). There, we find quite different results. The most exclusively distributed fragrances (offline) are significantly less likely to be available through retail Internet sites than are general department store fragrances. That is, the coefficients for exclusively distributed fragrances and general department store fragrances are statistically different from one another at the one percent confidence level. Fragrances distributed offline by chain/mass market outlets are less likely to be available at the surveyed retailer websites than are fragrances distributed offline through general department stores. This is not surprising, given that our retailer Internet site sample consists largely of department stores and upscale beauty websites. The lower weight to value ratio of these fragrances may make shipping them unattractive. The coefficient for "new" remains negative, but is statistically insignificant in this specification.

Finally, in columns 5 and 6 of Table 2, we present for completeness the estimates for the probit specification again, replacing the dependent variable with an indicator variable that takes the value of one if a perfume is available through a manufacturer website. Consistently with the previous columns, the most exclusively distributed fragrances (offline) are the ones most likely to be sold through manufacturer websites compared to other less exclusively distributed fragrances (offline). When we examine pricing patterns below, we will explore whether manufacturers design their websites to attempt to control the amount by which they free ride off of their offline and online retailers.

#### *Websites of brick-and-mortar retailers*

As we argued above, the websites of brick-and-mortar retailers may be expected to obtain exclusive internet access to some products because these retailers will partially internalize the effects of free rider issues.

Table 3 contains data about the availability of fragrances at the websites of brick-and-mortar department stores (Bloomingdales, Dillards, Macys, Nordstrom, and Nieman Marcus). These websites tend to offer a very small number of perfumes. Only 134 of the 1106 fragrances available over the Internet are available at these department store websites. However, a substantial 19% of those fragrances offered at department store sites appear to be available at retail sites *only* at the brick-and-mortar department store websites<sup>18</sup>. The table also shows that perfumes that are "limited distribution" in the physical world are exactly the perfumes that these department store sites are most likely to carry exclusively. Sixteen percent of the "limited distribution" fragrances carried by the department store sites were carried exclusively by the department store sites. In contrast, only 2% of the "general department store" fragrances were carried exclusively by the department store sites.<sup>19</sup> Interestingly, the most "upscale" of these retailers, Nieman Marcus, has a small collection of only 25 perfumes offered for sale on the Internet, but 15 of these cannot be found at any of the pure-internet retailers, discount retailers, or drugstore sites. Surprisingly, considering the potential for free-riding in new introductions, however, no new fragrance introductions are exclusively carried on the department store websites.

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<sup>18</sup> We ignore whether or not these fragrances are also found at manufacturer sites, since manufacturers can control the free rider problem.

<sup>19</sup> It is somewhat difficult to decide how to treat Sephora.com. Sephora is a high-end brick-and-mortar specialty cosmetics store that also has an Internet site. In this section, we consider products available at the department stores. We examine whether their offerings are unavailable at pure-Internet sites, so we exclude Sephora from that category. Sephora has a very large selection of products. Were we to include them with the department stores, we would find many more products offered only at the brick-and-mortar sites.

### *Selection and pricing of Internet retailers*

We have established that the majority of fragrance manufacturers have allowed the sale of their products over the Internet. While most fragrance manufacturers are apparently willing to have their products sold on the Internet, manufacturers may place restrictions on the way that their products are sold. In particular, as discussed above, it is well known that resale price maintenance (RPM) is a way to control the free-rider problem. While manufacturers may encounter legal difficulties with RPM per se, manufacturers are free to supply only retailers with a "no discounting" policy.

We examine the pricing and availability of products at different types of sites in Tables 4 and 5. Table 4 compares the prices at different types of Internet sites. The entry in Table 4 shows the price of the row site minus the price of the column site, divided by the price of the row site. The final column contains data for the set of all manufacturer websites for fragrances made by designers in the Fragrance Foundation subsample. The shaded area shows the price relationships between the "upscale beauty websites" and department store websites, on the one hand, and drugstore and discount fragrance websites, on the other. The price difference is calculated using only fragrances common to both websites. In fact, to be considered in Table 4, both the row store and the column store must sell the most popular vehicle-size combination of the same fragrance. If there are zero or one fragrance-size-type-vehicle combinations in common between the two websites, then the table entry is "NA".

Table 4 shows striking price homogeneity amongst the "upscale beauty" and department store prices (upper left corner of Table 4). The limited information that we have on manufacturer's suggested retail prices (MSRP) suggests that these stores are almost uniformly charging the MSRP for their products. In contrast, as the shaded area of Table 1 shows, the price disparity between the upscale beauty websites and the department store websites, on the one hand, and the drugstore and discount perfume websites, on the other, can be enormous. Paris Fragrance, the cheapest competitor, charges approximately 37% less than the upscale beauty and department stores websites, on average. Shipping cost information is given in the last row of the table. Shipping costs appear to be, if anything, positively correlated with the prices charged at the websites.

These results inform not only our study of vertical relations, but also are informative with regard to previous papers studying price dispersion on the Internet such as Brynjolfsson and Smith (2000) and Clay, Krishnan, Wolff, and Fernandes (2000). While we do not have extensive information about physical store prices, our fragrance dataset represents the largest cross-section of Internet price comparisons of which we are aware. For the websites studied, our data represent price comparisons for the entire universe of perfumes sold.<sup>20</sup> Our findings are consistent with the findings of these other authors in that they too find a very large amount of price dispersion across websites over the Internet.

Some of the most extreme examples of price dispersion in our dataset are quite astonishing. For example, we found one fragrance, Byzance which was sold only at Sephora and PlanetRx. The Sephora price was \$54 for a 1.7 oz EDT spray, while the PlanetRx price was \$7.99. Similarly, 1 fluid ounce of Delicious by Gale Hayman perfume sells for \$12.99 at PlanetRx, \$59.99 at Perfumania, and \$106 at Fragrancenet, and \$190 at the [www.galehayman.com](http://www.galehayman.com), the manufacturer website (although with 20% off the order for those willing to fill out a survey).

We showed that those fragrances that are most exclusively distributed in the physical environment are most reliant on manufacturer websites for Internet sales. We hypothesized that this may be because the use of a

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<sup>20</sup> Although, recall, that we limit attention to the most popular size-type-vehicle combination for each fragrance.

manufacturer site allows the manufacturer better control over the extent of free riding between Internet and physical sales. The right hand column of Table 4 confirms this hypothesis. The right hand column of Table 4 shows the relationship between the prices of Internet retail websites and manufacturer websites for those perfume-vehicle-type combinations being sold by both the retail site and the manufacturer website. The entry in the table is the row store's price minus the manufacturers' price, divided by the row store's price. The results here are unambiguous: manufacturer websites charge high prices. The manufacturer's average price is greater than or equal to the price of each of the 17 retailers in our study. Furthermore, as can be seen in the bottom of Table 4, manufacturers charge high shipping rates on average. Thus, manufacturers appear to mitigate channel conflicts by charging high prices for their products on their own Internet websites.

The manufacturer website prices also seem to be high by the standards of physical retailing. For a subsample of 99 perfumes, we compared manufacturer website prices to the prices charged at brick-and-mortar department stores in Chicagoland. In every case, we found that the price at the department stores was identical to the price at the manufacturer websites. However, while the brick-and-mortar department stores were sometimes offering "free gift" promotions, these promotions appear to be unavailable at manufacturer websites.

From this evidence of enormous price dispersion, both across retailer websites and between manufacturer and retailer websites, one might be tempted to leap to the conclusion that cross-price demand elasticities are extremely low due to high consumer search costs across websites or that there is some *excludable* service element being provided by the high priced websites which leads some customers to pay higher prices in order to shop at these websites. However, we are not convinced that any of these explanations are entirely correct. Rather, we find it plausible that the upscale beauty websites are not selling large amounts of those fragrances that "overlap" with the less expensive websites but are selling significant amounts of those fragrances that do "overlap".

Table 5 reveals some data that are not apparent in Table 4. Table 5 contains data on the availability of various perfumes over the Internet. The entries in Table 5 are the fraction of the row store's fragrances that are also sold in the column store. For this analysis, we define an "overlap" to occur whenever two websites are selling the same fragrance, even if the fragrances are only available in different size, type, and vehicle combinations. The highlighted portion of Table 5 shows the overlap between the upscale/department store websites and the discount/drugstore websites. As is apparent from the table, many of the perfumes sold at the exclusive websites are not sold at any discount/drugstore websites. The second to last column of Table 5 shows the fraction of each site's fragrances that are found at any discount/drugstore website. The table reveals that consumers have no choice on the Internet except upscale beauty websites and department store websites for many products. Thus, while there is tremendous price dispersion for some products, there is effectively zero price dispersion for other products: those products that cannot be found at drugstore or discount websites.

Table 6 extends this analysis by examining the extent to which perfumes are sold exclusively through a single retail website. Table 6 shows that 30% of the Fragrance Foundation subsample of fragrances appear in our sample only at a single retail website. Furthermore, Table 6 reveals that the fragrances for which distribution is limited to a single retailer on the Internet tend to be fragrances for which distribution is limited in the physical world as well. The business press suggests that exclusive relationships with key brands may be important to a retailer's success.<sup>21</sup>

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<sup>21</sup> See for example, Kerry Diamond, "Beauty.com to Launch with 300 Brands," Women's Wear Daily, October 1, 1999, which describes an exclusive relationship with the most popular brands, Estee Lauder, Lancome, or Clinique as a "golden ring" for which beauty sites were competing.



Recall that, due to the legal status of RPM, the manufacturer may not be able to discontinue service to a retailer who charges low prices, and may not be able to contractually arrange the retailer to charge the MSRP.

Manufacturers may be willing to supply retailers who adopt an across-the-board "no discounting" policy and who stick to it even when it is expensive to do so (when others are discounting). Since we don't know the quantities sold by these upscale beauty websites, it could be true that these websites sell very few units of the fragrances for which they have discount competition, and more units of the fragrances that upscale beauty websites sell exclusively.

Our findings for fragrances address several of the hypotheses that we put forth above. First, we show some evidence that exclusively distributed goods may actually be more likely to be available for sale on the Internet.

However, we find that goods that rely on exclusive distribution in the physical world are likely to tightly control distribution on the Internet by avoiding discount retail Internet sites or, in the extreme, by avoiding retail websites overall and selling only through high-priced manufacturer websites. Restrictions on availability are also somewhat more likely for newer products, for which free-riding may be more of a problem. Thus, while we find that extraordinary price dispersion for some fragrances exists on the Internet, we also find that there are many fragrances for which there is no price dispersion. Lastly, there is some evidence that brick-and-mortar stores receive favorable sourcing of products by manufacturers. We do find some potential evidence of internalization of the free-rider problem, as these stores do not engage in significant discounting on the Internet.

## **DVD Players**

### *Availability and Pricing*

The second market that we examined is the market for DVD players. DVD players were selected for evaluation in part because, in the brick-and-mortar environment, manufacturers use authorized dealer networks to distribute the products. The trade press suggests that receiving authorization to sell some of these products is non-trivial. Also, DVD players are a relatively new category of product. Properly hooking up and operating a DVD player can be nontrivial and thus, substantial product support at the retail level might be expected.<sup>22</sup> Nonetheless, the demographics of DVD player purchasers seem to be a very strong match for Internet retailing. Dealerscope magazine estimates that 4.9% of DVD players were sold online in 1999, as compared 0.6% of all VCRs.<sup>23</sup>

Availability of DVD players online through retail websites does not seem to be the issue that it is with fragrances or, as we will show, appliances. Using the information section of the websites of the ten manufacturers with the largest market shares (as identified by Dealerscope), we were able to identify all current model DVD players of these manufacturers. We then examined 39 retail websites and were able to locate every current model DVD player for sale on some retail website. Of course, many retail websites carried not only current model DVD players but prior generation models as well. Furthermore, we could not detect any evidence that the websites of brick-and-mortar stores had some models for sale that were unavailable at pure Internet retailers. Nothing in the data suggested product sourcing practices favoring the Internet sites of brick-and-mortar retailers.

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<sup>22</sup> Of course, some of this product support might occur after the sale is made. If this is the case, this sales effort cannot be free-riden upon and the Internet might serve as a device to separate consumers who forecast needing support from technophiles who do not forecast needing support.

<sup>23</sup> See <http://www.dealerscope.com/articles/0800/0800dvd.html> and <http://www.dealerscope.com/articles/0800/0800vcr.html>

Manufacturer websites do not appear to be an important sales channel for DVD players as yet. Using the 39 retail websites, we identified every manufacturer of a DVD player sold at those websites. There were a total of 34 different brands. Only two of these manufacturers had websites through which direct sales were made. Interestingly, the two manufacturers were Sony and RCA, the two manufacturers identified by Dealerscope as having the two largest market shares of DVD players in the U.S. Summary statistics for DVD player sales over the Internet are contained in Table 7.

An interesting feature of the DVD player market is our ability to identify authorized versus unauthorized retailers. A survey of the business and trade press suggested that manufacturers of DVD players have recently tightened the restrictions placed on retailers regarding sales of their product over the Internet. Most manufacturers have authorized a limited number of retailers to sell their products over the Internet. Some manufacturers, such as Sony, post a notice on their websites cautioning consumers against purchasing from unauthorized retailers.

Despite these restrictions, the number of "unauthorized" retailers abounds. For example, while Amazon.com is an authorized retailer of Philips products, it is not an authorized retailer of Sony products. Nonetheless, many Sony products are for sale on Amazon's site. Sony's official statement to the trade press is that it was "surprised" to see Sony products for sale on Amazon.com. We hypothesize that manufacturers are selective about the retailers that they authorize in part to control the free-riding problem.

While availability of products over the Internet appears not to be a major issue in the DVD player market, as in fragrances, we identified substantial price dispersion across retailers. Table 8 compares prices across Internet retailers for DVD players. The table entry is the row store's price, minus the column store's price, divided by the row store's price. Table entries are calculated using only models in common across both stores. The entry is "NA" if there are only 0 or one overlapping models. Because of the large number of retailers of DVD players, the table includes only those retailers who sell at least 30 models of DVD players plus BestBuy and Circuit City, the largest brick-and-mortar retailers of DVD players.<sup>24</sup>

The pattern of price dispersion across websites for DVD players is very different than for fragrances. In fragrances, there were several retailers who sold at exactly the manufacturer's suggested retail prices, leading to zero price dispersion across those retailers' websites. For DVD players, there are no instances of two retailer websites charging identical prices for all of their offerings. As in the case of fragrances, manufacturer websites charge high prices, perhaps because the manufacturer internalizes the effect of its prices on retailer effort.

The characteristics of price levels are investigated in regression specifications presented in Table 9. The left-hand-side variable in Table 9 is the log price. Each observation is the price for a specific model of DVD player at a specific retailer or manufacturer website. The independent variables are dummy variables for the websites of brick-and-mortar retailers, manufacturer websites, and a dummy variable that equals one if the retailer is an authorized retailer. Model fixed effects are included so that the coefficients only represent price differences across websites for given models, not differences in the models carried. The data include observations only from those manufacturers for whom we could determine the identity of authorized retailers.

The findings in Table 9 confirm and extend the results for fragrances. The results suggest that brick-and-mortar retailers charge 5% higher prices at their websites compared to non-brick unauthorized retailers.

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<sup>24</sup> According to Dealerscope, Best Buy accounts for 21.5% of DVD player sales nationwide, while Circuit City accounts for 16.9%.

Authorized retailers charge 11% more than unauthorized ones and manufacturer's charge 22% more than unauthorized non-brick retailers. All of these coefficients are statistically significant at at least the 5% level. The results accord with our basic beliefs about free riding. That is, manufacturers price their products so as to avoid free-riding effects. The higher prices at the websites of authorized retailers may reflect either manufacturer restrictions or the reputation benefits of manufacturer authorization (or both). However, absent the free-riding explanation, one would be hard-pressed to explain why manufacturers like Sony would not authorize retailers such as Amazon.<sup>25</sup>

Prices are not only higher at the websites of authorized dealers, but price dispersion across authorized dealers is lower than price dispersion across unauthorized dealers. We examined the 18 models of DVD players sold by at least 2 authorized dealers and at least 2 unauthorized dealers. We calculated the standard deviation of the price for the set of authorized dealers and for the set of unauthorized dealers for each model. These average \$61 for unauthorized retailers and \$18 for authorized retailers.

These findings leave open the question of why manufacturers of DVDsd do not work harder to prevent sales by "unauthorized websites". This contrasts with fragrances where, as mentioned above, manufacturers have been active in litigation against unauthorized retailers. One possible explanation is optimal leakage. Those customers who buy from unauthorized retailers face the possibility that the manufacturer will not honor the warranty.<sup>26</sup> Manufacturers want customers who don't anticipate using post-sales service to pay lower prices. However, we have seen a flurry of articles in the trade press suggesting that DVD player manufacturers are paying increasing attention to the free rider problem and are working harder to stop the diversion of supply to unauthorized retailers.<sup>27</sup>

We also find higher prices for the Internet websites of brick-and-mortar retailers. The higher prices of brick-and-mortar stores like Best Buy might also be attributable to reputation, although it is difficult to argue that BestBuy has a much better reputation than a major retailer such as Amazon. Again, partial internalization of the free-rider problem by a high share brick-and-mortar retailer seems like a likely explanation for the brick-and-mortar retailer's higher prices.<sup>28</sup>

Thus, our results for DVD players are in part similar to and in part different from our results for fragrances. We do not find any products that are completely unavailable on the Internet, nor do we find any available solely at manufacturer websites. However, as in perfumes, we do find evidence that manufacturers attempt to control the extent of price discounting on the Internet. As in fragrances, manufacturers charge high prices and those retailers whose sales are "authorized" by the manufacturer charge higher prices as well. While the trade press suggests that it is easier for existing brick-and-mortar retailers to become authorized Internet retailers than it is for a pure Internet retailer, we do not find much evidence in the data that the brick-and-mortar retailers are the sole suppliers for any products. However, consistent with our findings for fragrance, we find that the websites of brick-and-mortar retailers charge somewhat higher prices than pure

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<sup>25</sup> On its website, Sony lists some criteria that authorized Internet retailers must meet, such as 24 hour response time to customer emails. These all appear to be criteria that Amazon.com would meet.

<sup>26</sup> In principle, manufacturers like Sony reserve the right not to honor the warranties of consumers purchasing from unauthorized retailers. In practice, they honor all warranties unless the serial number of the product has been obliterated by the dealer (a practice frequently used to prevent tracking the retailer's supply source).

<sup>27</sup> See, for example, "Harman's strict web policy gets stricter," *Audio Week*, August 16, 1999 and "Toshiba to Roll out Authorized Dealer Policy", *Consumer Electronics*, April 24, 2000. .

<sup>28</sup> Employees of Chicago-area Best Buy and Circuit City stores stated that their online prices are always the same as their in-store prices.

Internet retailers.

## **Side-by-side Refrigerators**

### *Availability and Pricing*

The third category of products that we examined are side-by-side refrigerators. Refrigerators were selected because of the use of authorized dealer networks in appliances as well as the wide quality gradient in refrigerators. In sharp contrast to DVD players and fragrances, we found very few websites selling side-by-side refrigerators and even fewer that would ship nationally. Given the large economies of scale in the logistics of shipping refrigerators, the paucity of sellers is not, perhaps surprising. The largest selection of products seems to be offered by the brick-and-mortar retailers (Sears, Abt,) and US Appliance, a brick-and-mortar distributor. These brick-and-mortar retailers are the only ones who carry the upscale brand Jenn-Air. The only pure Internet retailer with a large selection of products is helpfindit.com.

In contrast to fragrances and DVD players, we found no examples of direct sales by manufacturers over the Internet. This is probably largely due to the logistics issues involved in shipping refrigerators.

Table 10 shows price dispersion and product availability data for each of the retailers in our sample. Price dispersion is very low once helpfindit is excluded from consideration. Since helpfindit typically charges above the manufacturer suggested retail price for its products, it is hard to see how it stays in business. The lowest prices are recorded by Shop4.com. The small selection of models at Shop4.com suggests that that site is fulfilling a "closeout" role.

The right hand columns of Table 10 show the availability of high end/professional quality brands at each website. Sub-Zero and Viking, brands that we identified as the two most expensive brands advertised in wealthy-targeted and cuisine-oriented magazines, are unavailable for sale at any Internet site. Since it seems quite unlikely that a consumer would purchase these items without first visiting a retail store, free rider considerations may explain the absence of these products. Thus, for appliances, the most promotion-intensive products appear to be completely unavailable for sale over the Internet.

Dealerscope estimates Sears's share of the overall appliance sales in the U.S. as exceeding that of the next twelve largest competitors combined. Thus, appliances might be a category in which a very high share retailer completely internalizes the free rider problem. Sears's average prices, only 3% below the MSRP in our sample, supports that interpretation.

## **VI. General Findings Across Industries**

Cross-sectional evidence in our data align with our hypothesis that manufacturers of more promotion-intensive products are more likely to restrict Internet distribution. For fragrances we find evidence that the most exclusively distributed perfumes in the physical world have a greater tendency to distribute only through a manufacturer website, where the manufacturer controls all aspects of Internet selling. We find that the most expensive professional-quality refrigerators (Subzero and Viking) are not available online at all.

Given that there will be some Internet availability of the product, how have manufacturers dealt with the free rider problem? For perfume, especially for the select brands that have high levels of exclusion in the physical world, we found a) significant ability to prevent price discounts, b) significant ability to prevent availability at drugstore/discount websites, c) some ability to withhold the newly introduced brands from Internet sites and d) the use of manufacturer websites with high prices. For refrigerators, there are no manufacturing websites,

the expensive high-end brands (exclusively distributed in brick-and-mortar stores) are unavailable at all on the Internet, and there is minimal discounting on Internet sites. This suggests, as seems reasonable, that the need to control free riding in appliances is a significant concern of manufacturers. Finally for DVD players, we see widespread availability on the Internet, yet only two manufacturers have websites. Just as in fragrances, these manufacturer websites have high prices.

Consistent with the findings of other Internet researchers, we find a considerable amount of price dispersion on the Internet for DVD players and fragrances. However, we do not find significant price dispersion for appliances.<sup>29</sup> For both fragrances and DVD players, however, there are caveats to this finding and these caveats illustrate the extent to which manufacturers have tried to mitigate the free rider problem. Many fragrances simply cannot be found on websites that offer discounts, implying that there is zero price dispersion for a large number of fragrances. Furthermore, for those fragrances, consumers can expect not to save any money by purchasing over the Internet. In fact, our research assistant shopper found many instances of "free gift" promotions at brick-and-mortar stores that were unavailable over the Internet. For DVD players, the low end of the price distribution is created by unauthorized retailers. As noted above, we are somewhat skeptical that manufacturers are making an effort to stop sales by unauthorized retailers. Internet sales now account for a nontrivial amount of sales (about 4.9 percent), and the trade press has reflected an increased sensitivity on the part of DVD manufacturers to channel conflict.

While it does appear that RPM and availability restrictions are used widely to control vertical relationships between manufacturers and Internet retailers, there are other mechanisms of vertical control that do not appear to be used widely. In particular, one might imagine that the technology for enforcing exclusive territories is quite simple: one could allow Internet websites to only ship to consumers who live in certain zip codes, those zip codes outside the existing retailers' territories. In our searches, we found no instances of this practice in fragrances. Indeed, in all three of the categories studied, we found only one potential instance of this practice: US-Appliance.com sells many high-end appliance brands. They have a note on their site that states that they will ship Thermador brand products only to Michigan or New York. While we could not get the site to confirm this precisely, this restriction is most likely due to manufacturer geographic restrictions.<sup>30</sup>

Finally, our results suggest that large brick-and-mortar stores retailers may partially internalize the effects of free-riding when choosing prices for their Internet stores. On average, brick-and-mortar retailers chose high prices in our study. We do find limited evidence for this leading to them receiving favorable treatment in obtaining product from manufacturers. In fragrances, we see that 19% of the fragrances on the websites of brick and mortar department stores are not found on the websites of any pure Internet retailers or discount/drugstore websites. For DVDs, the result is less clear. Brick and mortar retailers seem are more likely to be authorized retailers than are pure Internet retailers. However, DVD player manufacturers have not been successful in preventing the sale of their products by many unauthorized retailers on the Internet.

## **VII. Conclusion**

Our research indicates that channel conflict is and should be a serious concern for manufacturers. Where exclusivity is used in offline brick-and-mortar retailing to control free riding, some comparable restraint is needed to control Internet websites. The two most common restraints are pricing (with no discounts allowed) and, less frequently, the restriction of available supply to Internet websites. The most striking

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<sup>29</sup> Ignoring the one appliance retailer that consistently offers goods at significantly above the MSRP.

<sup>30</sup>The stringency with which territorial restrictions are enforced is unclear. Correspondence with US-Appliance.com suggested that they would be willing to ship a particular Thermador product to Illinois.

empirical regularity in our data is that manufacturers appear not to use their Internet websites to undercut the prices of their retailers.

We regard any conclusions that we draw as preliminary, since retailing over the Internet is in its infancy. The patterns that we observe today could well change as Internet penetration alters the characteristics of the marginal consumer. It appears to us, from examining both the trade press and trends in litigation, that there is a growing recognition that uncontrolled Internet sales through unauthorized websites are not always in a manufacturer's best interest where free riding can occur and sales service is important. Accordingly, in the future, we expect to see manufacturers paying more attention to channel conflict and further restricting Internet pricing and availability for products where sales service is important.

Table 1: Fragrance Foundation subsample: summary statistics

	Overall	Exclusive distribution department stores <500 doors	Distribution through department stores >500 doors	Distribution via chain stores/mass merchants
Fraction available at Internet retail websites	0.76	0.69	0.94	0.74
Fraction available at manufacturer websites	0.38	0.47	0.15	0.33
Fraction available at any Internet website	0.96	0.98	0.96	0.88
Fraction available exclusively at manufacturer websites	0.21	0.29	0.01	0.14
Average price	\$42.17	\$47.54	\$41.92	\$14.74
Number of observations	591	380	138	73

Table 2: Probit specifications of Internet availability and offline distribution exclusivity. Standard errors are in parentheses.

Independent variables	(1)		(2)		(3)		(4)		(5)		(6)	
	Dep variable equals one if: available on any Internet site		Dep variable equals one if: available on Internet retail site		Dep variable equals one if: available on manufacturer website		Probit		Probit		Probit	
	coefficients	% point dif	coefficients	% point dif	coefficients	% point dif	coefficients	% point dif	coefficients	% point dif	coefficients	% point dif
rated "limited distribution" <500 doors	1.060 (0.255)	9.1	-0.137 (0.172)	-4.0	0.380 (0.165)	14.0						
rated "general department stores"	0.631 (0.273)	2.8	0.942 (0.235)	22.3	-0.570 (0.200)	-19.9						
1999 introductions	-0.598 (0.290)	-5.6	-0.128 (0.204)	-4.0	-0.296 (0.200)	-10.6						
constant	1.185 (0.189)		0.650 (0.159)		-0.428 (0.152)							



Table 3: Fragrance availability on websites of five brick-and-mortar department stores: Bloomingdale's Dillards, Macys, Nordstrom, and Nieman Marcus.

	Total number at department store websites	Fraction of these for sale on Internet retail sites only at department store websites
Total fragrances	134	0.19
Total fragrances that have FF distribution information	100	0.06
rated "limited distribution" <500 doors	44	0.16
rated "general department stores"	56	0.02
rated "chain/mass market"	0	--
1999 introductions	20	0.00

Table 4: Differences in price levels across websites. Table entry is the row stores price minus the column store's price divided by the row store's price. For two prices to be compared, the two stores must carry the same size, type, and vehicle of the fragrance. Shaded cells show overlap between upscale/department store websites (i.e., "exclusive" sites) and discount/drugstore sites. The final row shows the shipping costs for two \$50 1.7 oz. EDT sprays at each website. The shipping figures for the manufacturers is the average across websites.

	Ashford	Beauty	Eve.com	Ibeauty	Sephora	Bloomingdales	Dillard's	Macys	NeimanMarcus	Nordstrom	Parfumsraffy	ParisFrag	Perfumania	Fragrancenet	Drugstore	More	PlanetRx	Manufacturer
Ashford		0.00	0.00	0.00	0.01	NA	0.00	-0.01	NA	NA	0.27	0.41	0.32	0.17	0.07	0.06	0.15	0.00
Beauty			-0.01	0.00	0.00	0.00	0.00	-0.02	NA	NA	0.26	0.44	0.40	0.21	0.10	0.11	0.13	0.00
Eve.com				-0.01	0.00	0.00	0.00	-0.02	0.00	NA	0.26	0.42	0.37	0.20	0.08	0.08	0.20	0.00
Ibeauty					0.00	NA	0.00	0.00	0.00	NA	0.27	0.44	0.40	0.21	0.09	0.02	0.12	-0.01
Sephora						0.00	0.00	-0.01	0.00	0.00	0.24	0.41	0.37	0.19	0.07	0.04	0.17	0.00
Bloomingdales							0.00	0.01	0.00	NA	0.21	0.36	0.30	0.14	NA	0.05	0.12	NA
Dillard's								-0.01	NA	NA	0.25	0.32	0.31	0.11	0.04	0.08	0.11	-0.01
Macys									0.00	NA	0.18	0.29	0.28	0.13	0.06	0.08	0.13	-0.01
NeimanMarcus										NA	0.12	0.36	0.18	0.22	NA	NA	NA	NA
Nordstrom											NA	NA	NA	NA	NA	NA	NA	NA
Parfumsraffy												0.29	0.27	-0.02	NA	NA	-0.04	-0.14
ParisFrag													-0.02	-0.38	-0.36	-0.36	-0.15	-0.45
Perfumania														-0.33	-0.42	-0.33	-0.27	-0.42
Fragrancenet															-0.08	-0.10	-0.01	-0.03
Drugstore																-0.03	0.06	NA
More																	0.12	-0.15
PlanetRx																		
Ship Cost	0.00	3.95	0.00	0.00	0.00	10.95	8.95	4.00	10.00	9.95	0.00	3.99	4.90	0.00	3.95	0.00	3.95	5.64

Table 5: Availability of fragrances across Internet sites. Table entry is the fraction of the row store's fragrances that are also available at the column store. The shaded area shows the fraction of the fragrances offered by upscale beauty websites and department store websites that can also be found at discount and drugstore websites.

	Ashford	Beauty	Eve.com	Ibeauty	Sephora	Bloomingdales	Dillard's	Macys	NeimanMarcus	Nordstrom	Parfumsraffy	ParisFrag	Perfumania	Fragrancenet	More	Drugstore	PlanetRx	Some disc/drug site
Ashford	1	0.62	0.64	0.44	0.73	0.04	0.15	0.17	0.04	0.04	0.15	0.35	0.44	0.60	0.18	0.14	0.26	0.64
Beauty	0.32	1	0.50	0.42	0.49	0.03	0.11	0.13	0.01	0.01	0.21	0.25	0.38	0.47	0.10	0.14	0.16	0.53
Eve.com	0.31	0.47	1	0.48	0.52	0.04	0.12	0.17	0.03	0.04	0.24	0.30	0.40	0.56	0.09	0.12	0.15	0.64
Ibeauty	0.26	0.49	0.60	1	0.44	0.03	0.12	0.15	0.02	0.02	0.27	0.39	0.53	0.66	0.12	0.18	0.18	0.76
Sephora	0.16	0.20	0.23	0.16	1	0.04	0.09	0.14	0.02	0.03	0.15	0.20	0.26	0.41	0.04	0.08	0.10	0.44
Bloomingdales	0.12	0.15	0.23	0.15	0.62	1	0.38	0.62	0.12	0.04	0.38	0.42	0.73	0.88	0.12	0.15	0.27	0.88
Dillard's	0.23	0.31	0.37	0.19	0.65	0.19	1	0.73	0.02	0.04	0.17	0.62	0.69	0.90	0.21	0.38	0.40	0.90
Macys	0.17	0.26	0.36	0.24	0.64	0.21	0.49	1	0.04	0.05	0.29	0.56	0.78	0.88	0.17	0.33	0.38	0.92
NeimanMarcus	0.12	0.08	0.20	0.12	0.36	0.12	0.04	0.12	1	0.04	0.24	0.24	0.20	0.36	0.00	0.00	0.04	0.40
Nordstrom	0.19	0.13	0.38	0.19	0.69	0.06	0.13	0.25	0.06	1	0.31	0.38	0.44	0.81	0.06	0.13	0.00	0.81
Parfumsraffy	0.06	0.15	0.18	0.17	0.25	0.05	0.04	0.11	0.03	0.02	1	0.50	0.51	0.71	0.07	0.14	0.11	
ParisFrag	0.08	0.11	0.14	0.15	0.21	0.03	0.09	0.13	0.02	0.02	0.32	1	0.46	0.67	0.08	0.13	0.14	
Perfumania	0.12	0.21	0.24	0.25	0.34	0.07	0.13	0.22	0.02	0.03	0.40	0.57	1	0.88	0.12	0.20	0.23	
Fragrancenet	0.08	0.12	0.16	0.15	0.26	0.04	0.08	0.12	0.02	0.02	0.26	0.39	0.41	1	0.06	0.12	0.11	
More	0.40	0.43	0.43	0.46	0.46	0.09	0.31	0.37	0.00	0.03	0.46	0.74	0.97	0.94	1	0.49	0.66	
Drugstore	0.13	0.26	0.22	0.27	0.33	0.05	0.24	0.31	0.00	0.02	0.35	0.54	0.64	0.82	0.20	1	0.48	
PlanetRx	0.26	0.33	0.33	0.30	0.46	0.09	0.28	0.39	0.01	0.00	0.30	0.63	0.84	0.87	0.30	0.54	1	
Total fragrances	78	152	163	131	365	26	52	78	25	16	215	341	274	583	35	85	76	

Table 6: Fragrance exclusivity. Table shows the number of fragrances on each website whose only appearance at an Internet retail site in our sample is at the row store.

	Number of fragrances exclusive to this retail site	E xclusive fragrances with FF data	E xclusive fragrances with FF data & not sold on mf site	Fraction of exclusive fragrances on site found at		
				Chain stores	Dept stores > 500 doors	Dept stores < 500 doors
Ashford Beauty	4	1	1	0.00%	100.00%	0.00%
Eve.com	29	7	7	0.00%	14.29%	85.71%
Ibeauty	8	-	-	-	-	-
Sephora	173	87	22	0.00%	1.15%	98.85%
Bloomingdales	2	-	-	-	-	-
Dillard's	2	-	-	-	-	-
Macys	1	1	1	0.00%	100.00%	0.00%
NeimanMarcus	15	5	5	0.00%	0.00%	100.00%
Nordstrom	2	2	2	0.00%	0.00%	100.00%
Parfumsraffy	37	13	13	0.00%	7.69%	92.31%
ParisFrag	89	19	18	78.95%	5.26%	15.79%
Perfumania	11	5	5	0.00%	20.00%	80.00%
Fragrancenet	180	33	27	18.18%	27.27%	54.55%
More	0	-	-	-	-	-
Drugstore	6	1	1	0.00%	100.00%	0.00%
PlanetRx	2	1	1	100.00%	0.00%	0.00%

Table 7: DVD player summary statistics

	Overall	Manufacturer sites	Websites of Authorized retailers	Sites of brick & mortar retailers
Number of sites surveyed	39	2	*	8
Number of unique models for sale	201	11	36	74
Number of total offerings	997	11	92	145
Mean price	\$488.57	\$571.73	\$588.92	\$491.11
Price std. dev.	349.15	391.38	460.04	393.73
Fraction of models current	0.89	1.00	0.89	0.87

\* A site can be an authorized retailer for some manufacturers and an unauthorized retailer for others.

Table 8: DVD player price dispersion. Shown are all retailers sell at least 30 models of DVD players, plus the two largest brick-and-mortar retailers, Best Buy and Circuit City. The table entry is the price of the row store minus the price of the column store divided by the price of the row store (for common items). The shipping cost is the cost of shipping a \$250 machine to the 60637 zipcode (Chicago).

	<i>lcache.com</i>	<i>Amazon.com</i>	<i>amdv.com</i>	<i>brandsmall.com</i>	<i>buy.com</i>	<i>crutchfield.com</i>	<i>etronics.com</i>	<i>moreaudiovideo.com</i>	<i>pcwonders.com</i>	<i>proactiveelectronics.com</i>	<i>shop4digital.com</i>	<i>tekgallery.com</i>	<i>bestbuy.com</i>	<i>circuitcity.com</i>	<i>Manufacturer sites</i>
<i>lcache.com</i>		0.01	0.13	0.13	0.03	-0.19	-0.14	0.16	0.13	0.07	0.14	-0.01	-0.03	-0.07	NA
<i>Amazon.com</i>			0.17	0.13	-0.02	-0.04	0.17	0.19	0.18	0.03	0.18	0.44	-0.01	0.01	-0.09
<i>amdv.com</i>				0.04	-0.15	-0.32	0.04	0.04	0.02	-0.05	0.04	-0.20	-0.19	-0.28	-0.40
<i>brandsmall.com</i>					-0.10	-0.31	0.03	0.05	0.02	-0.04	0.00	-0.18	-0.25	-0.22	NA
<i>buy.com</i>						-0.08	0.12	0.13	0.14	0.05	0.12	-0.07	-0.04	-0.01	-0.14
<i>crutchfield.com</i>							0.25	0.26	0.25	0.05	0.26	0.13	0.03	0.01	-0.08
<i>etronics.com</i>								0.01	0.01	-0.12	0.01	-0.20	-0.21	-0.21	-0.21
<i>moreaudio.com</i>									-0.03	-0.24	-0.02	-0.22	-0.24	-0.33	-0.47
<i>pcwonder.com</i>										-0.19	0.00	-0.19	-0.21	-0.22	-0.39
<i>proactive.com</i>											0.15	-0.12	-0.22	-0.06	0.02
<i>shop4digital.com</i>												-0.18	-0.19	-0.21	-0.36
<i>tekgallery.com</i>													0.01	-0.04	NA
<i>bestbuy.com</i>														-0.02	-0.17
<i>circuitcity.com</i>															-0.05
Ship Cost	10.00	0.00	29.95	9.95	11.05	9.95	22.00	18.00	12.30	18.00	29.95	13.95	0.00	0.00	4.53

Table 9: DVD player prices. Observations are price observations for different models at different online retailers. The dependent variable is the log price. Standard errors are in parentheses.

	All models coefficients	Current models coefficients
Brick-and-mortar store	0.045 (0.017)	0.051 (0.019)
Authorized retailer	0.112 (0.018)	0.11 (0.020)
Manufacturer site	0.224 (0.037)	0.225 (0.037)
Model fixed effects?	Yes	Yes
Observations	709	550
R-squared	0.974	0.974

Table 10: Side-by-side refrigerator price dispersion and product availability. Table shows relative prices of side-by-side refrigerators at Internet appliance sites, the number of models carried by each sites, and the availability of high end/professional quality brands. Shipping costs equal the cost of shipping a \$1500 refrigerator to the 60637 area code (in Chicago). Note that Abt is headquartered in the Midwest; shipping to the East or West Coast is not free.

	<i>Number of models</i>	<i>Abtelectronics.com</i>	<i>helpfindit.com</i>	<i>netmarket.com</i>	<i>sears.com</i>	<i>shop4.com</i>	<i>us-appliance.com</i>	<i>MSRP</i>	<i>Sell GE</i>	<i>Sell Jenn-Air</i>	<i>Sell Kitchenaid</i>	<i>Sell Subzero</i>	<i>Sell Viking</i>
Abtelectronics.com	85		-0.41	0.04	-0.11	0.19	-0.04	-0.13	Y	Y	Y	N	N
helpfindit.com	315			0.31	0.20	0.40	0.30	0.19	Y	N	Y	N	N
netmarket.com	46				-0.12	0.08	-0.09	-0.12	Y	N	N	N	N
sears.com	327					0.19	0.06	-0.03	Y	Y	Y	N	N
shop4	22						-0.32	-0.21	Y	N	N	N	N
us-appliance.com	154							-0.07	Y	Y	Y	N	N
Ship Cost		0.00	0.00	0.00	35.00	0.00	39.00						



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## Data Appendix One

Stores visited or called for availability information:

### Carsons

Yorktown: (630) 620-2600

Aurora: (630) 892-2600

### Bloomingdale's

Old Orchard: (847) 675-5200

Chicago: (312) 440-4460

Mall of America (612) 883-2500

### Marshall Fields

Stratford Square: (630) 924-4700

Water Tower: (312) 335-7700

Spring Hill: (847) 551-4800

Orland Square: (708) 873-4100

Woodfield: (847) 706-6000

### Neiman Marcus

Northbrook (847) 564-0300

Oak Brook (630) 572-1500

Chicago (312) 642-5900

Troy, Michigan (248) 643-3300

### Nordstrom

Oak Brook (630) 571-2121

Old Orchard (847) 677-2121

Woodfield (847) 605-2121

### Saks 5th Avenue

Chicago (312) 944-6500

Oak Brook (630) 574-7000

Old Orchard (847) 676-3450

New York, NY (212) 753-4000

Garden City, NY (516) 248-9000

### Perfumania

Chicago (773) 237-7020

Riverside (708) 442-0070

### Sephora

Oak Brook (630) 368-3322

Woodfield (847) 330-0203

L'Occitane

Oak Brook (630) 572-7680

Wal-Mart

Glen Ellyn (630) 545-1060

Osco

Downers Grove (630) 969-7264

Westmont (630) 986-8065

ICPenney

Yorktown (630) 629-7750

Chanel Boutique

Drake Hotel (312) 787-5500

New York (212) 355-5050

Ulta 3

Naperville (630) 527-0065

Oak Brook (630) 573-9324

Downers Grove (630) 852-6380

Perfume Pyramid

Cal City (708)862-1802

Lacyn

Chicago (312) 341-1869