

*Good Marketing to “Bad Consumers”:
Outlet Malls, Gray Markets, and Warehouse Sales*

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Comments Welcome

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Abstract

Many apparel manufacturers have opened shops in outlet malls or actively distribute products in “consumer” trade shows today, in addition to selling through traditional retailers. As noted by Kotler (1997), a key motivation behind the increase in the number of channels is the desire to find a channel that fits the needs of customers better. Our work examines whether and when a low price/low service channel provides an advantage to firms, in a competitive context, by segmenting and serving heterogeneous customers differently.

The focus of our analysis is apparel categories where the main differences between channels are the level of in-store service (for example, sales advice, sales assistance, and checkout services) and prices. We develop an analytic model to investigate whether and under what circumstances differentiated, competing manufacturers would choose to sell through multiple retail channels. We assume the market is heterogeneous with consumers that differ on two dimensions (price sensitivity and service sensitivity), both of which are motivated by differences in the cost of time. The primary retail channel is comprised of regular retail outlets, which have higher prices and better service. We assume that primary retailers make decisions about both retail prices and the level of in-store service to provide. The alternate channel is manufacturers’ outlet stores.

The primary insight of the paper is that the nature (not just the magnitude) of consumer heterogeneity affects the attractiveness of dual distribution. When price sensitivity is the primary dimension of heterogeneity, implementing outlet mall distribution will have a positive effect on the profits of manufacturers. The outlet mall provides the opportunity to charge higher prices to consumers who remain in the primary channel. This outweighs the disadvantages of serving a significant fraction of consumers in highly competitive “low priced” outlet malls.

In contrast, when the primary dimension of heterogeneity in a market is service sensitivity and not price sensitivity, implementing outlet mall distribution will reduce profits for both manufacturers and primary retailers. In this situation, the advantage of higher prices (that can be obtained by reducing the fraction of price-sensitive consumers in the primary market) is outweighed by unrestrained efforts of the primary channel to woo the remaining customers with high levels of service.

Key Words: Dual distribution, outlet malls, service competition, consumer trade shows, gray marketing, market segmentation.

1. Introduction

1.1 Outlet Malls: History, Extent and Retailing Strategy¹

The concept of outlet stores extends back more than a century, when apparel and shoe mill stores on the East Coast of the United States began to offer excess or damaged goods to their employees at price discounts. After some time, the mill stores started to sell to non-employees as well. Generally these stores were located adjacent to (or even on the property of) mills themselves but in 1936, Anderson-Little (a men's clothing manufacturer) opened the first set of outlet stores not adjacent to the factory, all of which were located far from primary retail centers.

In the 1990's, manufacturers' outlets have ranked as the fastest-growing segment in the U.S. retail industry, generating sales of \$6 billion in 1990, \$6.3 billion in 1991, \$9.9 billion in 1993, and \$12 billion in 1997. The number of outlet malls has also increased significantly over the last 10 years, from 113 in 1988 to 276 in 1991, 300 in 1994, and 325 at the end of 1997. According to one study, 37 percent of Americans visited an outlet mall in 1997.

Outlet malls today offer a mix of manufacturer outlet stores, retail outlets, and selected non-outlet service locations (such as film developing stores and restaurants). Apparel stores account for roughly 48% of the stores in Chicago area outlet malls. Table 1 reports on the percentage of apparel stores in Chicago-area outlet malls that are manufacturer-branded stores. The data show that a majority of these apparel stores are manufacturer-branded. By opening outlet stores, manufacturers can create differentiated channels without transgressing the legal restrictions that prohibit the creation of differentiated channels through wholesale pricing.²

The table shows that these malls are located in outlying areas that are about an hour's driving distance from downtown (North Michigan Avenue is the main shopping area in downtown Chicago). This is consistent with national data on travel distances to outlet malls.³ In contrast, a standard mall draws customers from an average eight-mile radius ("Factory outlets, 'mills' growing..." 1991), suggesting a shorter average travel time for the standard mall shopper. For example, the distance between Old Orchard Mall and Woodfield Mall in the Chicago area (two typical primary malls) is about 14 miles, whereas the distance from Kenosha, Wisconsin to the areas adjacent to these two malls is about 45 miles.

¹ Information for this section is drawn from Consumer Reports (1998); Ward (1992); Vinocur (1994); Stovall (1995); Beddingfield (1998); and the Prime Retail website at <http://www.primeretail.com/primeretail/outlets>.

² A manufacturer cannot charge two different wholesale prices for two different non-vertically-integrated distribution channels (unless justified on a basis of cost), and hope that the channel paying a higher wholesale price provides more service. This option is foreclosed to manufacturers in the US, by the Sherman Act and the Robinson-Patman Act, in the European Community by the EEC Treaty, Articles 85 and 86 and in Canada, by the Canadian Competition Act.

³ The Prime Outlets website (<http://www.primeoutlets.com/primeretail/industry>) also finds an average travel time of 60 minutes to an outlet mall. McGovern (1993) notes "Across the country, most factory outlets are located 60, 70, 80 miles from major urban-area department stores."

Table 1
Outlet Malls in the Chicago Metropolitan Area

<i>Outlet Mall</i>	<i>Date Founded</i>	<i>Distance from N. Michigan Ave. (km.)</i>	<i>Distance from Closest Major Mall (km.)</i>	<i>Number of Apparel Stores</i>	<i>% of Apparel Stores that are Manufacturer branded</i>
The Original Outlet Mall, Kenosha, WI	October 1986	93	42	29	69%
Prime Outlets, Kenosha, WI	September 1988	88	37	40	93%
Gurnee Mills, Gurnee, IL	August 1991	73	22	77	53%
Huntley Factory Shops, Huntley, IL	August 1994	78	41	30	70%
Prime Outlets, Michigan City, IN	November 1987	97	68	64	88%

SOURCE: primary data collection by the authors

When a manufacturer opens an outlet store, it makes several decisions. Sometimes a manufacturer's policy is to distribute items to outlet stores later than they are available in primary retail stores. However, in a survey of 16 outlet stores, we found that 13 stores offered current-season merchandise.

Another decision concerns the price level that the outlet adopts for its merchandise. For *identical items*, we found that pricing at the outlet malls was 27% lower on average than pricing at primary retailers (one outlet even had pricing that was 40% less on average). Given that standard pricing policy in apparel retailing is a markup of 50 percent on retail price (that is, 100 percent on the cost of goods sold), the manufacturer's margin on outlet-store merchandise is probably quite small (particularly after accounting for the costs of running the outlet store).

Further, the manufacturer decides what level of in-store service to offer to its outlet customers. Outlet stores offer significantly lower service levels than primary retail outlets. . Sales clerks are not abundant and it is up to the shopper to match items of clothing into outfits. In addition, the retail environment is significantly less luxurious than in an upscale department store or boutique. In short, manufacturers want outlet-store shopping to be a positive experience, but there are significant differences with the service and attentiveness afforded customers at full-service primary retailers.

Outlet-store retailing thus appears to give manufacturers an opportunity to offer their branded merchandise through a different retail channel with lower service levels and prices. Given the success and growth of outlet malls, it might seem that *all* manufacturers should want them. But many manufacturers choose not to open outlet stores. We obtained a list of merchants who are members of the Greater North Michigan Avenue Association in Chicago. Thirty-three

manufacturers have brand-apparel stores but only 9 operate outlet stores in the Chicago area.⁴ Many of the manufacturers without outlet stores (the Chanel Boutique, Giorgio Armani, Ermenegildo Zegna, and Hermes for example) are both exclusive and have a distinctly upscale cachet. This contrasts with the outlet-store strategy of “popular” designers such as Anne Klein, Brooks Brothers, Jones New York, Liz Claiborne, Izod, and Tommy Hilfiger. Understanding the motive for outlet-store retailing requires some attention to this fact.

Finally, we should note that other dual-distribution practices bear resemblance to outlet-store retailing. For instance, in Germany, apparel manufacturers hold trade shows for the general public. The president of FJM Collections, an apparel and accessories manufacturer, states that trade-show venues are low on service and stressful (consumers feel considerable pressure to make a purchase decision and “move on”). In addition, the temporary aggregation of FJM and its major competitors under one roof makes pricing extremely competitive. FJM sees the combination of trade shows and their usual primary retail stores as an opportunity to service different types of consumers. The primary stores cater to consumers who like a high degree of service and who dislike shopping in crowded conditions. In contrast, trade shows appeal to consumers who are price-sensitive and are willing to tolerate the inconvenience of the trade show for the chance of a better deal.⁵

Another example of dual distribution is the concurrent availability of product through primary retail stores and so-called “gray markets.” Gray-marketed goods are branded products sold through ostensibly unauthorized distribution channels. They are typically sold at very attractive prices but with minimal service at retail. Gray marketing is commonly attributed to opportunistic behavior by intermediary channel agents who exploit price differences across geographic boundaries. But the phenomenon of gray marketing can also result in convenient dual distribution with the same product sold in a primary channel with high service and price levels, and in another channel (the gray market) with low service and price levels.

1.2 Research Objective

In all three of the instances described above (outlet mall retailing, consumer trade shows, and gray marketing), dual distribution acts as the mechanism to position the same product to the market at different price and service levels. We will focus in this paper primarily on the outlet mall phenomenon and seek to explain the factors and manufacturers’ motivation for this type of dual distribution. There are a number of rationales that come to mind to explain the phenomenon.

One is that outlet stores are a convenient “dumping ground” for unforeseen overstocks and end-of-season leftover merchandise. But the evidence presented in section 1.1 does not support this rationale. Outlet stores frequently offer current-season merchandise and

⁴ Data from the Prime Retail group confirms that the pattern observed in Chicago is also observed in other US markets.

⁵ We thank Franz-Joseph Miller for sharing this information with us.

manufacturers make commitments to run outlet stores in a number of markets (one manufacturer has more than 70 outlet stores) for long periods of time. Such investment would be unwise if they only hoped to have an outlet for stochastic inventory overruns. Our survey finds outlet mall stores to be fully stocked, with a variety of current and traditional apparel available in complete size ranges. Industry research shows that "Irregular and damaged merchandise accounts for less than 15 percent of all outlet goods and the majority of merchandise is first-quality and in-season."⁶

Another rationale is that outlet malls expand market coverage by serving a previously unserved set of consumers, a group of buyers who are too price-sensitive to buy at a high-service primary retail store. In some cases, there is evidence that outlet malls have expanded market coverage and have tapped into a segment that previously bought unbranded merchandise ("Developers bring value closer to shoppers" 1998). The business press also contains references to the attraction of tourists to outlet malls (Silcoff 1998). Nonetheless, not all outlet malls benefit from being located in key tourist areas and the business press contains many quotes referring to the sales that outlet malls divert from traditional, primary retail areas ("Off price but upscale..." 1996; McGovern 1993; Okell 1987). These references clearly indicate that a significant percent of the business secured by the outlet malls is at the direct expense of primary retail areas. Indeed, primary retailers themselves recognize this pattern and have sought to respond to it proactively. In this context, an executive at a large U.S. primary retailer says, "We used to try and be all things to all people, but that is not appropriate any more. We are trying to focus on the moderate and better customers who put price as only a piece of the equation" (Gatty 1985). Thus, while market expansion is a possible explanation for outlet mall sales, it is clearly not the only one, and the evidence is compelling that market share transference from primary retailers to the outlet malls is a major factor in outlet mall success.

A third possibility is that manufacturers are trying to "challenge" their primary retailers' power by offering the same merchandise through their own outlets, to discipline primary retailers. But the distances from primary retail malls to the outlet malls are not consistent with this hypothesis; if the manufacturers wanted to directly challenge their primary retailers, they would not locate outlet stores so far away from those in the primary retail market, inflicting high travel costs on the consumers who choose to shop there.

Finally, perhaps manufacturers are practicing simple market segmentation through a dual distribution strategy. Highly service-sensitive consumers can shop at the primary retail outlet, where they will pay higher prices but get better service. Less service-sensitive consumers can shop at the outlet store, where lower service levels but also lower prices are available. However, the high degree of price competition and proximity of competitive manufacturers (e.g. Brooks

⁶ Research done by Value Retail News (an industry periodical) and J.P. Morgan Outlet Industry Update, cited on the Prime Retail website (1998).

Bros. and Ralph Lauren, Liz Claiborne and Anne Klein) at many outlet malls (within a minute's walk of each other) raise doubts about the profitability of outlet mall retailing. In fact, the outlet mall consumers who previously patronized primary retailers are clearly paying lower prices than they paid in the primary market⁷. Thus if outlet mall retailing is truly a profitable strategy for manufacturers, the explanation must be more complex than simple segmentation. As we will show below, it is not just *whether* the market is heterogeneous, but *how* it is heterogeneous, that affects the profitability of outlet-store retailing. Moreover, the model provides a basis for understanding why some *but not all* manufacturers open outlet stores.

We believe that segmentation is clearly a driving force behind the decision of many manufacturers to adopt dual distribution. However, we believe that competition has a fundamental impact on the decision of manufacturers to engage in outlet-mall retailing. We show that analyzing the need to serve different groups of customers differently in a competitive context leads us to new insights about (a) why manufacturers may open and run outlet stores; (b) when manufacturers would choose *not* to do so; and (c) why manufacturers would choose this strategy over other possible strategies (such as product differentiation).

1.3 Research Framework

We develop an analytic model to investigate whether and under what circumstances differentiated apparel manufacturers would choose to sell through primary retail stores and outlet stores. In our model, the primary retail channel is comprised of regular retail outlets, which have higher prices and better service. The alternate channel contains manufacturers' outlet stores. As in the apparel industry, we assume that primary retailers make decisions about both retail prices and the level of in-store service to provide.

We assume the market is heterogeneous with consumers that differ in their cost of time. Following Winter (1993) and Foot with Stoffman (1997), consumers with a high cost of time tend to be both more service sensitive, and less price sensitive, than consumers with a low cost of time.⁸ Accordingly, we assume that consumers who require high levels of service are also less price-sensitive. In this framework, consumers with a high cost of time always remain in the primary channel and consumers with low cost of time will shop at outlet stores if manufacturers open them. The objectives of the analysis are first, to examine how the profits of manufacturers and retailers are affected by the existence of alternate channels and second, to identify the conditions that make the existence of these channels attractive.

⁷ As previously mentioned, many outlet malls source their clientele by switching consumers from the primary market.

⁸ In a study of consumer shopping behavior and attitudes, convenience, "defined as ease of shopping ... faster checkout, increased hours open, merchandise in stock and easy to find" was listed as a key factor determining store choice by 44 percent of respondents, suggesting the presence of a large segment of consumers with a high cost of time. Added value services such as more selection, free delivery, baby sitter service, and personal shoppers were cited as means of increasing the quality of the shopping experience (Liebmann 1996).

1.4 The Key Results

Our primary result is that the attractiveness to manufacturers of dual distribution through both a primary channel and an alternate channel rests not on the "overall level" of heterogeneity in the market (i.e. *whether* consumers are different), but on the nature of heterogeneity between consumer segments (i.e. *how* consumers are different). This result is counterintuitive because the standard segmentation story would imply that the more consumers cluster into distinct segments, the more a marketer's profitability is enhanced by serving each segment differently. In contrast, we find that it is often attractive for manufacturers to serve two very heterogeneous consumer segments through a single standardized channel. The main driver of this result is the structure of the competitive market in which two manufacturers are both fighting for the same consumers.

When the primary source of consumer heterogeneity is price sensitivity and not service sensitivity, bargain-hunters are "bad for business" in primary retail channels. They create a Prisoners' Dilemma in the primary channel with fierce price competition and hence reduced prices at both the manufacturer and retail level. If outlet malls divert bargain-hunters from the primary channel, only price-insensitive consumers continue to shop in the primary retail market. This reduces price competition in the primary channel, leading to increased profits for both manufacturers and primary retailers. Surprisingly, we find that it can be attractive to serve the market through segmented retail outlets of this type *even when the alternate channel generates no profits in and of itself*.

But the optimality of segmented retailing does not always hold. When the primary source of consumer heterogeneity is sensitivity to service rather than to price, the advantage of using an alternate channel such as an outlet mall can evaporate. Implementing outlet-mall retailing and diverting the bargain-hunters to outlet stores leaves only consumers who are highly service sensitive in the primary channel. When a market is very responsive to service (as the primary market becomes when bargain hunters go to outlet stores), primary retailers have a tendency to "over-compete" in service. Because service is costly to provide, profits fall in the primary retail channel. Thus, when service sensitivity is the primary differentiator between consumer segments, manufacturers lose the incentive to implement outlet store distribution. Even in conditions that might seem to favor segmentation (consumers are extremely heterogeneous), manufacturers will forego discrimination between the segments and treat all consumers the same.

It is reasonable to question whether manufacturers are best served in their desire to profitably serve a segmented market by opening outlet stores at all. In particular, selling competing product lines that are quality-differentiated might serve the same function of siphoning off price-sensitive consumers.⁹ However, at least three arguments suggest that outlet stores can be a superior choice to product-line differentiation in this regard:

⁹ We thank a reviewer for suggesting this alternative.

- First, the literature makes frequent mention of a large segment of consumers who are looking for brand-name merchandise at low prices.¹⁰ Inferior-quality brands would not satisfy such consumers.
- Second, when cost of time is the primary dimension that differentiates consumers, a direct response is to serve consumers through two channels that are distinguished by the time needed to shop at each. The evidence is compelling that the main difference between primary retailers and outlet stores is the time required to make a purchase. Not only are outlet mall shoppers obliged to travel further, they also spend somewhat more time shopping than do consumers visiting full-service stores.¹¹ Quality-differentiated product lines would not address “cost of time” as a primary dimension that distinguishes consumers.
- Third, while opening an outlet store is not a low-cost proposition, the development of a well-known brand is also very expensive, and thus differentiating the product line does not necessarily offer a lower-cost way of segmenting the market. Industry estimates show that even \$200 million is unlikely to develop tangible levels of awareness for a new brand in the United States.

Opening outlet stores thus seems a feasible, responsive, and cost-effective way of responding to the relevant segmentation dimension, cost of time, that differentiates consumers in the retail marketplace. A dual distribution strategy using outlet malls can also be effective at minimizing the arbitrage that plagues many segmentation schemes, precisely because it plays on the difference in cost of time between consumer segments. Highly service-sensitive consumers (who tend not to be very price-sensitive) may find outlet store prices attractive, but they are not willing to make the drive to the outlet mall because of the time it takes to get there. Time, of course, is what is so valuable to them. Thus, while remote outlet mall stores may seem like a very complicated way of siphoning off unwanted price-sensitive consumers, it is in fact both simple and effective.

In what follows, we first review the literature on dual distribution and channel management from the perspective of manufacturers. In section 3, we present the modeling framework and in section 4, we present the results of our analysis and discuss their relevance for channel and consumer segment management. We conclude in section 5.

¹⁰ See, e.g., Gatty 1985 and "Off-price but upscale..." 1996. In McGovern (1993), Tracy Simon of Jones New York states that consumers expect high-quality merchandise at outlet stores, "where they get 'quality clothing and name brands that cost a lot less.'" Another owner of both full-service and outlet stores says "The idea that a supplier can establish brands to sell only to off-price stores is a 'fallacy'" (Wessling 1984).

¹¹ See, for example, "Developers bring value closer to shoppers" 1998.

2. Related Research

Kotler (1997) reports that many firms have adopted multi-channel marketing due to the proliferation of both customer segments and channel possibilities. He notes that one of the major advantages that firms can realize by adding channels is finding a channel that fits the needs of customers better. Bucklin's work (1966) underlines the importance of service outputs as determinants of channel structure and the markets we consider are ones in which the main differences between channels are the level of service provided to customers. Of course, there are costs to adding channels beyond the cost of simply managing and dealing with another customer. As noted by Stern, El-Ansary, and Coughlan (1996), these costs include "conflict" that can occur when these channels compete for the same customers.

In a monopolistic framework, Betancourt and Gautschi (1998) (B/G) investigate a retailer's incentives to provide service on a manufacturer's product. They find that the ability to set service levels can be used by a retailer to gain "leverage" over the manufacturer.¹² Our approach to the problem is different from that of B/G. First, we allow for the retailer's service decision to be strategic, that is, to precede the retailer's pricing decision (B/G make the retail service and pricing decisions simultaneous).¹³ Second, we consider competition, which we show has a profound effect on the channel structure and profitability outcomes for manufacturers and retailers. Competition makes it difficult for retailers to reap economic benefits from extra investments in service. In the B/G framework where there is no competition, a retailer is able to benefit from extra investments made in service. This suggests that it is important to take account of competitive effects in retail pricing and service research.

Significant empirical literature considers issues that face a producer who is using several routes to reach his customers. Considerations in this literature include the intensity of distribution [Frazier and Lassar, 1996], territory selectivity [Fein and Anderson, 1997] and governance [Heide, 1994]. While this research considers systems with multiple channels, the channels are essentially homogeneous. The research does make reference to the use and existence of heterogeneous channels (or hybrid channels), but the operation of such channels has yet to figure prominently in empirical channel research.¹⁴

Several analytical articles consider the use of multiple channels to reach a set of customers. Ingene and Parry (1995a, 1995b) consider wholesale pricing decisions in the context of competing retailers who have a degree of market power. The retailers in this model simply

¹² B/G define "leverage" to be the ratio of retailer to manufacturer profits (not the absolute level of profits).

¹³ Service is clearly a strategic decision in apparel retailing (relative to price). Significant planning is required to implement decisions such as the number of staff in the store, the training of the staff and the offering of delivery or alteration services.

¹⁴ For example, Heide (1994) discusses the use of direct salespeople as a form of monitoring in the context of a system of independent agents.

mark-up product procured from the manufacturer and do not add service. In contrast, competing retailers in Iyer's model (1998) make strategic investments that affect customer valuations at each retailer. A key insight of this paper is that a manufacturer can optimize its profitability by using a menu of contracts (which are offered to retailers ex-ante) to induce retail differentiation. Our work differs from these models in that we focus on competitive manufacturers that need to consider the option of operating an alternate channel.

Similar to our work, Balasubramanian (1998) considers a model in which consumers can obtain product through a regular retail channel and an alternate channel (a direct electronic channel). However, this work takes channel structure as given, and hence does not consider the strategic decisions of a manufacturer who might choose whether to distribute through two different channels. Our work provides a rationale for the creation and growth of outlet malls and also helps fill a gap in the literature about the nature and impact of competition between manufacturers that can distribute through hybrid channels.

3. Model Structure and Solution Method

3.1 Structure of the Market and the Rules of the Game

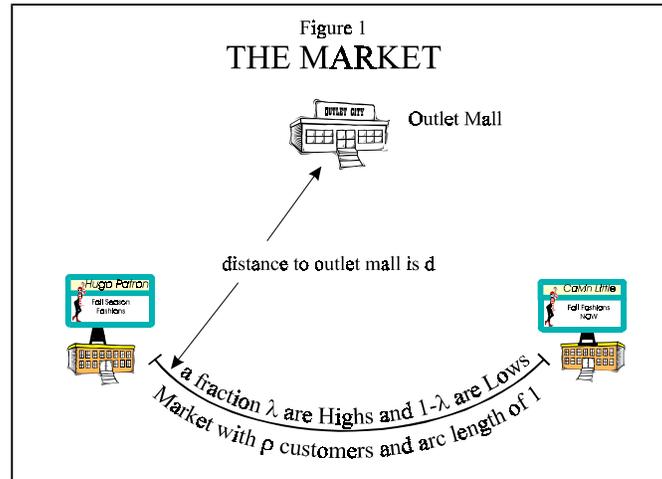
To approach this problem, we use a spatial model with two competing primary retailers who are exclusive distributors of the products of two manufacturers at either end of a linear market of uniformly distributed consumers. This is similar to Hotelling's (1929) linear city, except we assume that the line is an arc of unit length with an outlet mall located a distance d from every consumer in the market (note that the outlet mall is effectively located at the center of a circle which contains the arc). This formulation is designed to capture two key aspects of outlet mall retailing. First, consumers are distributed densely in urban areas and their distribution is such that certain primary retail areas are closer than others for a given consumer.¹⁵ Second, outlet malls are a significant distance away from urban areas (where primary retail shopping areas are located) and this distance is relatively much more significant for consumers living in the primary retail area than is the relative distance between two primary retail shopping areas.¹⁶ By using an arc representation, we capture both the spatial differentiation between primary retail

¹⁵ For example, the population density in Cook County (Chicago and outlying suburbs, including those containing malls like Old Orchard and Golf Mill) is approximately 6,000 per square mile. Investigation of the population density shows that it is relatively uniform throughout the county. In contrast, the population density in Kenosha county (where the Original Outlet Mall and Prime Outlets, Kenosha from Table 1 are located) is about 450 per square mile. In addition, Cook County's population (over 5 million people) is almost 40 times greater than that of Kenosha County (128,000). It is thus reasonable to assume that almost all of the outlet mall shoppers come from Cook County.

¹⁶ Again, to use the Chicago area as an example, consider that Old Orchard Mall is about fourteen miles away from Woodfield Mall, in fact essentially on a single road. The towns along this road are all about 45 miles away from Kenosha, where both the Prime Outlets mall and the Original Outlet mall are located. Thus, our arc representation is in fact a good fit to the actual geographic representation of the market.

shopping areas *and* the significant distance that outlet malls are from all consumers in urban areas.

Consumers are assumed to be distributed uniformly along the market with a proportion λ of consumers being price insensitive and a proportion $(1-\lambda)$ of consumers being price sensitive (see Figure 1).



The position of the outlet mall implies that every consumer in the market faces the same travel cost to get to the outlet mall. This assumption lets us represent a retail market structure where the outlet mall is at some distance from the standard retail market, as the evidence in section 1.1 suggests. Moreover, we show that there exist values of d such that price-sensitive consumers will choose to shop at the outlet mall while service-sensitive consumers will prefer to remain in the primary retail channel.

The products offered by the two manufacturers are similar (there is no differentiation based on product characteristics). We assume that differentiation in the market is due to the distance between the full service retailers (retailer 1 on the left and retailer 2 on the right). In addition to pricing, the two retailers compete on the basis of the service offered along with the product. Consumers value low price, low transportation costs, and high service levels, although the marginal valuation for these varies across segments in the market. Each consumer buys at most one unit of the product.¹⁷

We model consumers, retailers, and manufacturers as maximizing actors who make a series of decisions in a single period model. We assume that the demand is certain and common knowledge, given price and service levels. This allows us to abstract away from the role that outlet stores could play of allowing manufacturers to liquidate excess inventory outside primary markets. We make the assumption that no service is provided to consumers at outlet malls.

¹⁷ The amount spent per shopping trip is somewhat larger at outlet malls than regular malls but trips to regular malls include trips for items not typically purchased at outlet malls like books, OTC drugs, and kitchenware where the amount spent is typically lower (Prime Retail Website, Murray 1985 and Silcoff, 1998).

While this is not always the case, there is no doubt that outlet stores have a lower level of service than primary retailers. Consumers' decisions are assumed to be individually rational and incentive-compatible. Individual rationality implies that consumers will only participate in the market if doing so provides them with a positive benefit. Incentive compatibility means that each consumer in the market will purchase from the retailer (or discounter) that provides him/her with the maximum benefit.

The market unfolds in four stages as follows:

Stage 1: Manufacturers decide their outlet store policy, i.e. they decide whether or not to sell through a manufacturer's outlet store.

Stage 2: Manufacturers set wholesale prices simultaneously. The environment for this decision is different depending on the decisions made in Stage 1. If manufacturers have decided to sell through an outlet store, they set wholesale prices accounting for the availability of merchandise at the outlet mall.

Stage 3: Retailers choose service levels and retail prices given the wholesale prices set in Stage 2. If a manufacturer has chosen to distribute through outlet malls, he will set outlet mall retail prices.

Stage 4: After service levels and prices have been set, the market opens and consumers decide where to shop.

In solving the model, we use the concept of subgame perfection, and hence solve the game recursively from the last stage forward.¹⁸

3.2 Consumers

While there are many types of consumers in the real world, we consider a stylized market with two consumer segments. The two segments differ fundamentally in their cost of time as discussed in the previous section. One segment, the "Highs," has a high cost of time, while the other segment, the "Lows," has a lower time cost. We assume that the total number of consumers in the market is ρ with a fraction λ of consumers being "Highs," and a fraction $1-\lambda$ being "Lows." Because of their higher time cost, Highs face a higher cost of travel to shop for bargains. They also value service more than Lows, because service produces value by reducing the time cost of shopping.

Consider, for example, the "personal shoppers" now available at many upscale specialty and department stores (Faircloth 1997); these shoppers (who are retail store employees) choose clothes and accessories before their time-constrained, price-insensitive clients arrive at the store, thus saving the client the time and effort necessary to find merchandise. There is no extra charge for using a personal shopper but consumers who do typically pay full retail price. Such

¹⁸ We use a refinement of subgame perfection, the Sequential Equilibrium of Kreps and Wilson (1982), to ensure a unique prediction in the manufacturer's distribution strategy.

consumers are prototypical “Highs.” Conversely, Lows may be more willing to make a long trip to buy a low-priced product with little service since service is of less value to them.¹⁹ The following functions describe the consumer surplus for a High-type consumer, located at point x on the unit arc, to shop at retailers 1 and 2 respectively:

$$CS_{H1} = V_H + \theta S_1 - xt_H - p_{1A} \quad (1)$$

$$CS_{H2} = V_H + \theta S_2 - (1-x) t_H - p_{2A} \quad (2)$$

V_H is the utility to a High consumer of consuming the product. S_i ($i=1,2$) is the level of service provided by primary retailer i , and θ (>0) is the marginal valuation of service by High consumers. The parameter t_H is the unit cost of travel for a High, and p_{iA} ($i=1,2$) is the retail price at primary retailer i .

If a High located at x were to travel the distance d to the outlet mall to buy product from either of the manufacturer’s outlet stores, her consumer surplus would be:²⁰

$$CS_{H,OUT} = V_H - dt_H - p_{OUT} \quad (3)$$

where p_{OUT} is the price at the outlet store. Outlet malls are located such that when manufacturers decide to distribute there, they are close enough to the primary market for Lows to find it advantageous to “defect” to the alternate market, but sufficiently far from the primary market such that Highs will not.

For Highs, this implies that $CS_{H1} > CS_{H,OUT}$ for the High who is most likely to defect to a low price outlet. The High located at $x=1/2$ is the most likely to defect from the primary retail market to shop at the outlet mall.²¹ Mathematically this implies:

$$V_H + \theta S_1 - \frac{t_H}{2} - p_{1A} > V_H - dt_H - p_{OUT} \Rightarrow p_{1A} - p_{OUT} < \theta S_1 + t_H (d - \frac{1}{2}) . \quad (4)$$

The left-hand side of the inequality above ($p_{1A} - p_{OUT}$) is the benefit a High obtains in terms of lower price by shopping at the outlet mall. The right-hand side is the loss that the High incurs by

¹⁹ An alternative for modeling a segmented market (as in Narasimhan, 1984) uses three segments: “switchers” who buy the lowest-priced product and two segments of loyal consumers who are loyal to each of two brands. In our model, the Lows are akin to “switchers” because their low cost of travel implies a greater propensity to brand-switch. However, our model structure offers greater generality than the three-segment model, as it provides for a continuum of “loyalty” in both Highs and Lows, rather than a discrete representation. In particular, even when Lows shop at the outlet store, the primary retailers still compete for sales to the Highs because of the imperfect monopoly power they possess. In Narasimhan (1984), the absence of switchers reduces the model to a market with two monopolists. We are indebted to a reviewer for suggesting this alternative view.

²⁰ Products from the manufacturers are undifferentiated at the outlet mall because there is neither service provision nor geographic differentiation at the outlet mall. As a result, $p_{1,OUT} = p_{2,OUT}$ whenever both manufacturers have stores in the outlet mall. For presentation purposes, we show the outlet mall price as p_{OUT} , recognizing that its actual value will depend on the number of manufacturers who sell at the outlet mall.

²¹ Assuming the ultimate equilibrium in the model is symmetric, the High with the least surplus from shopping in the primary market is the one who must travel the furthest.

shopping at the outlet mall, consisting of the value of the foregone service and the utility cost of the incremental travel distance. It follows that a sufficiently high d guarantees that this inequality will be satisfied.

For Lows, the assumption about the location of outlet malls implies that if the outlet mall is too far away, Lows may be unwilling to make the trip. We assume that a Low located at point x on the unit line derives consumer surplus from shopping at primary retailers 1 and 2, respectively, of:

$$CS_{L1} = V_L - xt_L - p_{1A} \quad (5)$$

$$CS_{L2} = V_L - (1-x)t_L - p_{2A} \quad (6)$$

To simplify the analysis, lower marginal valuation of service for Lows is captured by setting it to zero, i.e. Lows place no value on in-store service. Also, consistent with the difference in the cost of time between Highs and Lows, t_H , the transportation cost for Highs is higher than t_L , the corresponding cost for Lows. Finally, we assume that $V_L - t_L < V_H - t_H$. This implies that Lows place a lower overall valuation on the product than do Highs. This assumption is based on the general observation across markets that people who are price-insensitive are willing to pay more for products. A Low located at any point x on the unit line derives consumer surplus from shopping at the outlet mall of:

$$CS_{L,OUT} = V_L - dt_L - p_{OUT} \quad (7)$$

We now derive the condition that must be satisfied for all Lows to shop at the outlet mall, given that product is available there. For the Low who is least likely to “defect” to the outlet store (i.e. the Low at $x=0$ or 1), we require that $CS_{L1} < CS_{L,OUT}$.²² Thus, all Lows will shop at the outlet mall if:

$$V_L - p_{1A} < V_L - dt_L - p_{OUT} \Rightarrow p_{1A} - p_{OUT} > dt_L \quad (8)$$

This expression implies that for a Low, the savings obtained by shopping at the outlet mall must be greater than the cost of making the trip there.

To summarize, conditions (4) and (8) ensure that outlet stores, when opened, will effectively segment the market, leaving only Highs in the primary market. The distance d to the outlet mall is an exogenous parameter, and we assume that its location always satisfies both conditions. Later in the paper, we provide analysis that shows that both conditions can indeed be

²² Assuming the ultimate equilibrium is symmetric, the Low at $x=0$ (or the Low at $x=1$) gains the least by shopping at the outlet mall because her consumer surplus from shopping at the primary retailer is highest.

satisfied. We also discuss how the existence and size of the allowable region for d is affected by the consumer level parameters.²³

We assume that consumers decide where to shop by comparing the surplus from the options that they face.²⁴ When manufacturers have not opened outlet stores, this involves comparing the surplus from each of the two primary retailers. When outlet stores have been opened, consumers compare the surplus from all available outlets. When consumers purchase in the primary retail market, the demand for each retailer is derived by identifying the consumer in each segment who is indifferent between shopping at retailer 1 and retailer 2. Given prices and service levels, all consumers to the left of the indifferent consumer will shop at retailer 1 and all consumers to the right of the indifferent consumer will shop at retailer 2. The indifferent consumer in segment j ($j=H$ for Highs and $j=L$ for Lows) is located at a point x_j^* in the market, where the surplus from shopping at each of the primary retailers is equal:

$$x_j^* = \frac{t_j + \theta_j(S_1 - S_2) - p_{1A} + p_{2A}}{2t_j} \quad (9)$$

where $\theta_j = \theta$ for $j=H$ and $\theta_j = 0$ for $j=L$. The assumption of individual rationality being satisfied implies that $V_L \geq V_{MIN}$, where V_{MIN} makes $CS_{L1} = 0$ at $x_L = 1/2$:

$$V_{MIN} = \left(\frac{t_L}{2} + p_A \right) \quad (10)$$

When products are not available at outlet stores, p_A is the retail price prevailing at primary retail stores.

Thus, in the absence of outlet mall distribution, demand from the Low segment for primary retailers is $(1-\lambda)\rho x_L^*$ (retailer 1) and $(1-\lambda)\rho(1-x_L^*)$ (retailer 2) and from the High segment is $\lambda\rho x_H^*$ (retailer 1) and $\lambda\rho(1-x_H^*)$ (retailer 2). With outlet mall distribution, demand from the Low segment for primary retailers is zero and the expressions for demand from the High segment are identical to those above, since Highs do not shop at the outlet mall.

3.3 Primary Retailers

Each primary retailer is assumed to choose both the service level and the retail price for its product in order to maximize its profits. Retailer i pays a wholesale price of w_i ($i=1,2$) per

²³ The location of outlet malls is essentially exogenous: manufacturers decide whether or not to distribute through a pre-existing outlet mall. It follows that the locational choice made by a mall developer is somewhat complex (and outside the scope of this analysis).

²⁴ We assume that the utility offered by the product is sufficient for all consumers to buy, i.e., individual rationality is satisfied for all consumers. The consumer located at $x=1/2$ pays the highest travel costs and hence is the marginal consumer.

unit to manufacturer i and resells at price p_{iA} . The cost of retail service provision is assumed quadratic.

In the absence of outlet mall distribution, primary retailers serve both Highs and Lows, and the profit for each retailer is therefore:

$$\Pi_{R1} = \rho \cdot (p_{1A} - w_1) [\lambda \cdot x_H^* + (1 - \lambda) \cdot x_L^*] - (S_1)^2 \quad (11)$$

$$\Pi_{R2} = \rho \cdot (p_{2A} - w_2) [\lambda \cdot (1 - x_H^*) + (1 - \lambda) \cdot (1 - x_L^*)] - (S_2)^2 \quad (12)$$

where x_j^* is as defined in (9) and j is the segment.

When the manufacturers open outlet stores, primary retailer profit is based only on sales to Highs, and is given by:

$$\Pi_{R1} = \rho \cdot (p_{1A} - w_1) [\lambda \cdot x_H^*] - (S_1)^2 \quad (13)$$

$$\Pi_{R2} = \rho \cdot (p_{2A} - w_2) [\lambda \cdot (1 - x_H^*)] - (S_2)^2 \quad (14)$$

3.4 Manufacturers

Manufacturers are symmetric, produce product at a unit marginal cost of c , and choose the wholesale price at which they will supply product to the primary retailers. Similar to McGuire and Staelin (1983), manufacturers are Stackelberg leaders relative to the primary retailers. If manufacturers operate outlet stores, their cost for supplying product to the outlet store is marginal cost. If one manufacturer decides to distribute through the outlet mall (and the other does not), its outlet store price will be by definition above marginal cost (regardless of what happens in the primary retail market). Using this fact and the Sequential Equilibrium concept, it can be shown that the equilibrium in this market involves either no manufacturers or both manufacturers distributing through outlet malls.²⁵

When both manufacturers distribute at the outlet mall, their offerings are not differentiated either geographically or in terms of service. Thus, when outlet mall distribution is an equilibrium, prices at the outlet mall equal marginal cost. Therefore, the value of operating outlet stores must stem from strategic and competitive factors in the primary market and not from outlet-store profits. The profits that manufacturers realize are a function of the wholesale price and the demand that is ultimately realized downstream at each of their respective primary retailers. When manufacturers do not implement outlet mall distribution, all consumers (Highs and Lows) purchase in the primary market. Accordingly, each manufacturer's demand is a function of the fraction of each segment captured by each of their respective primary retailers:

²⁵ Sub-game perfection does not allow identification of a unique outcome in this game. Sequential equilibrium is a stronger concept of equilibrium developed by Kreps and Wilson (1982) and it restricts our attention to an outcome reached by a convergent sequence of mixed strategies.

$$\Pi_{M1} = \rho \cdot (w_1 - c) [\lambda x_H^* + (1 - \lambda) x_L^*] \quad (15)$$

$$\Pi_{M2} = \rho \cdot (w_2 - c) [\lambda (1 - x_H^*) + (1 - \lambda) (1 - x_L^*)] . \quad (16)$$

Conversely, if manufacturers distribute through outlet malls, only Highs are left in the primary market, so demand in the primary market is a function of the fraction of the High segment captured by each of the respective primary retailers. Product is sold to Lows in this situation but the margin is zero (price equals marginal cost in the outlet mall) and no profits are realized on these sales.

$$\Pi_{M1} = \rho \cdot (w_1 - c) [\lambda x_H^*] \quad (17)$$

$$\Pi_{M2} = \rho \cdot (w_2 - c) [\lambda (1 - x_H^*)] \quad (18)$$

Manufacturers weigh the profitability of operating or not operating outlet stores by comparing the profit functions above, understanding the implications of their choices for retail prices and service levels. Operating outlet stores means that no margin is made on a fraction $(1 - \lambda)$ of the market, so the strategic question is what impact eliminating the Lows will have on profits in the primary market.

3.5 The Location of Outlet Malls and Implications for the Feasibility of Outlet Retailing

We focus on outlet stores owned and operated by manufacturers themselves. These account for an average of 73 percent of all apparel outlet stores in the Chicago area. As discussed above, we assume that the prevailing retail price at the outlet stores is equal to c , the manufacturer's marginal cost.²⁶

At this price level, conditions (4) and (8) must be satisfied for outlet stores to be feasible.

Both (4) and (8) hold when $\frac{1}{t_H} \left(p_{1A} - p_{OUT} + \frac{t_H}{2} - \theta S_I \right) < \frac{1}{t_L} (p_{1A} - p_{OUT})$.

$$\Rightarrow \left(\frac{t_H - t_L}{t_H t_L} \right) (p_{1A} - p_{OUT}) - \frac{1}{2} + \frac{\theta S_I}{t_H} > 0 \quad (19)$$

We cannot verify that this condition holds until we solve the channel maximization problem. Note that condition (19) is necessary, but not sufficient, for the operation of manufacturers' outlet stores. Outlet mall distribution is a choice variable for manufacturers and will be implemented only when this condition holds *and* manufacturers can increase their profit by operating outlet stores.

In section 4.0, we first calculate equilibrium prices and service levels under the two distribution scenarios (no outlet mall distribution and outlet mall distribution). We use these to

²⁶ In a market where prices higher than marginal cost are sustainable at outlet malls, the attractiveness of outlet malls would be higher. Nonetheless, the forces that reduce the attractiveness of outlet mall distribution (which we discuss later) are present in any market where authorized retailers provide more service and charge higher prices.

show that equation (19) is always satisfied. This ensures the existence of a d (the distance from the primary market to the outlet mall) such that in equilibrium, Lows would choose to shop there (given that manufacturers chose to distribute there) and Highs would not.

4. Analytic Results from the Model

In this section, we first calculate the equilibrium prices and service levels for manufacturers and retailers with and without outlet stores. We use these results to show the existence of regions in which outlet stores are feasible, that is, where (a) the traveling constraint is satisfied (Lows are willing to travel to the outlet mall to buy); and (b) Highs are unwilling to shop at an outlet store. Given such a feasible region, we then analyze whether outlet malls are *profitable* for the manufacturers. To simplify our analysis, we normalize the density (ρ) of the market to one.

4.1 Characterization of Equilibrium Prices and Service With and Without Outlet Stores

Equilibrium wholesale prices, retail prices and retail service levels for the cases of no outlet stores and both manufacturers operating outlet stores are reported in Table 2 (the solution is described in the Technical Appendix). The symmetry of the problem generates equal values of these variables for both manufacturers. Before discussing the significance of the results in Table 2, we first examine the feasibility conditions discussed in Section 3.5.

4.2 Outlet Store Location: The Constraints on d

To ensure that outlet malls are feasible, we check equation (19) to ensure that it can be satisfied using the results of Table 2. This leads to our first proposition.

Proposition 1. *When the second order conditions on wholesales prices are satisfied, there exists a range for d , the distance to the outlet mall, such that Lows will defect to the outlet mall and Highs will not.*

Table 2
Equilibrium Prices and Service Under No Outlet Stores and Outlet Stores

VARIABLE	EQUILIBRIUM OUTCOME	
	NO OUTLET STORES	OUTLET STORES
Wholesale prices ($w_1=w_2$)	$\frac{3t_H t_L}{\tau} - \frac{\theta^2 t_L^2 \lambda^2}{3\tau^2} + c$	$3t_H - \frac{\lambda\theta^2}{3} + c$
Authorized retail prices ($p_{1A}=p_{2A}$)	$\frac{4t_H t_L}{\tau} - \frac{\theta^2 t_L^2 \lambda^2}{3\tau^2} + c$	$4t_H - \frac{\lambda\theta^2}{3} + c$
Authorized service levels ($s_1=s_2$)	$\frac{\theta t_L \lambda}{6\tau}$	$\frac{\theta \lambda}{6}$
Second Order Conditions: wholesale prices $\left(\frac{\partial^2 \pi_M}{\partial w_2^2} \right)$	$\theta < \frac{3}{\lambda} \left[\frac{t_H \tau}{t_L} \right]^{\frac{1}{2}}$	$\theta < 3 \left[\frac{t_H}{\lambda} \right]^{\frac{1}{2}}$

Notes: $\tau = \lambda t_L + (1-\lambda) t_H$.

While positive, the range of d in Proposition 1 does not have a simple relationship to the other parameters in the model²⁷. Implicitly, we are assuming that the location decision for an outlet mall developer is made carefully, given that the outlet mall's success depends on the participation of manufacturers. We suggest that it is not by coincidence that outlet malls are generally located 50 to 60 miles from major shopping centers (Vinocur 1994; see also the distances noted in Table 1 of this paper). We now turn to a discussion of equilibrium outcomes and profitability with and without outlet malls.

4.3 Market Outcomes and Profitability

First, we discuss the characteristics of the equilibrium wholesale and retail prices and retail service levels that we use later to provide intuition for the profitability results. Inspection of Table 2 shows that service levels and retail prices at primary retailers are higher with outlet stores than without them. This is a result of the withdrawal of Lows from the primary market in the presence of outlet stores. When both Lows and Highs are served in the primary retail market, retail pricing and service levels strike a balance between their needs. Since Lows do not value service and have a lower cost of store-switching, downward pressure on both service and retail price levels is exerted by their presence in the primary retail market. With outlet stores, however, only the Highs are served in the primary retail market, and hence service and retail

²⁷ The size of this range is positively related to the service sensitivity of Highs (θ) when the price sensitivity differences between segments are large (i.e. $t_H > 1.5t_L$) and negatively related to the service sensitivity of Highs when price sensitivity differences between segments are small.

price levels rise. As mentioned previously in Gatty (1985), this is entirely consistent with a revised focus taken by primary retailers who are now faced with competition from outlet malls.

Similarly, authorized retail margins ($p_i - w_i$) in the presence of outlet stores (equal to t_H per unit) exceed those in their absence (equal to t_{HL}/τ per unit). It is interesting that the retail margin is influenced neither by θ (the service sensitivity of Highs) nor c (the marginal cost of production).

Although the retail price in the case of outlet stores is always higher than in the no-outlet-stores case, the same is not true of wholesale prices. The following Lemma establishes the relative position of the wholesale prices (where w_{NOOUT} and w_{OUT} denote wholesale prices in the no-outlet-stores case and the outlet-stores case, respectively):

Lemma 1. *Wholesale prices in the outlet-stores and no-outlet-stores cases have the following*

$$\text{relationship: } w_{OUT}^* \underset{<}{\overset{\geq}{>}} w_{NOOUT}^* \text{ as } \theta \underset{>}{\overset{\leq}{<}} \theta_1, \text{ where } \theta_1 = 3 \cdot \left[\frac{t_H \tau (\tau - t_L)}{\lambda (\tau^2 - \lambda t_L^2)} \right]^{\frac{1}{2}} \text{ and}$$

$$\tau = \lambda t_L + (1 - \lambda) t_H.$$

Lemma 2 is helpful to understand when and why dual distribution is attractive for manufacturers.

Lemma 2. *Consider a hypothetical, benchmark case of partial collusion between primary retailers.²⁸ Were the retailers to collude on service but not price, service would be set to zero. Thus, service levels in a competitive primary retail market are inefficiently high relative to the hypothetical collusive case. The inefficiency versus the hypothetical case is higher when a) the market is comprised entirely of Highs (i.e. when Lows are diverted to outlet stores) and b) θ , the service sensitivity of Highs, is higher.*

Lemma 2 contrasts competitive service levels (with and without outlet stores) to the level of service that *would* occur if the retailers *could* collude in the provision of service. In reality, retailers cannot collude; but this is a useful benchmark to understand the profit losses from providing service (under competition) versus a first-best collusive outcome. The adoption of outlet mall distribution by manufacturers means that primary retailers have only Highs to serve and the retailers compete vigorously for them by providing high levels of service. This creates a Prisoners' Dilemma problem of over-investment in service, which is worse, the more service-sensitive are Highs.

²⁸ We use the term “partial” here to describe a hypothetical situation in which retailers set service collusively but then compete vigorously in prices.

We now compare manufacturer and primary retailer profits with and without outlet stores in Table 3:

Table 3
Profitability Results Under No Outlet Stores and Outlet Stores

VARIABLE	EQUILIBRIUM OUTCOME	
	NO OUTLET STORES	OUTLET STORES
Manufacturer profit ($\Pi_{M1}=\Pi_{M2}$)	$\frac{3t_H t_L}{2\tau} - \frac{\theta^2 t_L^2 \lambda^2}{6\tau^2}$	$\frac{3t_H \lambda}{2} - \frac{\theta^2 \lambda^2}{6}$
Authorized retailer profit ($\Pi_{R1}=\Pi_{R2}$)	$\frac{t_H t_L}{2\tau} - \frac{\theta^2 t_L^2 \lambda^2}{36\tau^2}$	$\frac{t_H \lambda}{2} - \frac{\theta^2 \lambda^2}{36}$

Notes: $\tau = \lambda t_L + (1-\lambda) t_H$.

Interestingly, despite the incentive to over-invest in service (in the presence of outlet stores), and the loss of *all* profits from the Low segment, there are still conditions under which dual distribution is optimal:

Proposition 2. *When $\theta < \theta_2$, where $\theta_2 = \frac{3}{\lambda} \left[\frac{\tau^2 \lambda t_H - \tau t_H t_L}{\tau^2 - t_L^2} \right]^{\frac{1}{2}}$ and τ is as defined in Table 2,*

*manufacturers have a profit incentive to sell through outlet stores as well as through primary retailers.*²⁹

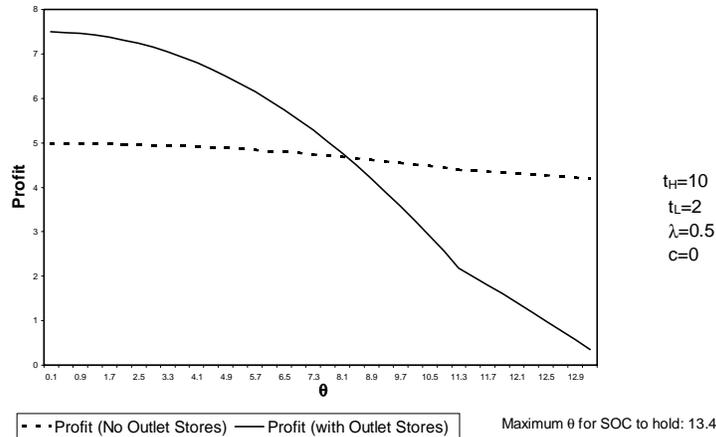
We demonstrate the essence of Proposition 2 using a parametric example. In Figure 2, at low levels of θ , manufacturer profits with outlet-mall retailing clearly exceed the profits earned without an outlet mall. However, once θ exceeds θ_2 (in this example $\theta_2 \approx 8.22$), there is a switch and the profits without outlet stores are higher.

In addition, given the condition on θ that relates to the attractiveness of outlet mall distribution, we can further show that:

Lemma 3. *Because $\theta_1 > \theta_2$, whenever outlet stores are optimal for the manufacturers, wholesale prices rise under dual distribution. When $\theta \in \{\theta_2, \theta_1\}$, wholesale prices with outlet stores are higher versus without outlet stores yet distributing through outlet stores is not an equilibrium.*

²⁹ θ_2 is positive and real for any value of $t_H > \frac{1+\lambda}{\lambda} t_L$ i.e. given λ , a minimum difference in the price sensitivities is necessary for the feasibility of outlet mall retailing.

Figure 2
Profit with and without Outlet Stores as a Function of θ



Proposition 2, our key result, establishes that for low values of θ , outlet-store retailing along with primary-store retailing can be optimal, even when it involves losing all profits from sales to Lows. The Lemmas help us to understand this result by showing that (a) a necessary but not sufficient condition for outlet-store retailing is that wholesale prices in the context of outlet stores exceed those observed in their absence (Lemmas 1 and 3); and (b) the over-provision of service is worse with (versus without) outlet-mall retailing, the more service sensitive are Highs (the higher is θ). Putting these results together helps to explain when and why outlet mall distribution can be optimal.

First, for outlet stores to be profitable, manufacturers must be able to make at least as high a margin under outlet-store retailing (as without it), because of the need to compensate for the loss of profits on Lows. This explains the result in Lemma 3. However, Lemma 3 also implies that a higher manufacturer margin with outlet stores is not a sufficient condition for the superior profitability of outlet mall distribution. Margins alone cannot explain the switch point between dual distribution and primary market distribution. A key determinant of the optimal channel structure is the degree of pressure on primary retailers to compete in costly service provision when outlet stores exist. Lemma 2 tells us that the over-provision of service is worse when Lows leave the primary market to shop at outlet stores. The more service-sensitive are Highs (i.e. the higher is θ), the worse is the problem, and the greater is the pressure on retail profit margins. As θ rises, manufacturers set lower and lower wholesale margins until for θ high enough, outlet stores are simply not worthwhile.

There are really two effects warring against one another in the battle for optimal channel structure: differences in service sensitivity between segments, and differences in price sensitivity

between segments. Lemma 4 clarifies the relationship between the profitability of outlet malls and the relative importance of price sensitivity and service sensitivity.

Lemma 4. *For a given value of θ , outlet-store retailing is more likely to be profitable, the greater is the difference in price sensitivity between Highs and Lows (as measured by the ratio of t_H to t_L). Conversely, for a given difference in price sensitivity between segments, outlet-store retailing is more likely to be profitable, the smaller is the difference in service sensitivities between segments (i.e., the lower is θ).*

The tension that occurs when outlet-stores are opened in addition to traditional primary retailers revolves around the benefits of outlet stores in reducing price competition versus the cost of primary retailers over-competing in service provision. In addition, outlet stores eliminate profitable sales from the Low segment so the benefit of reducing price competition must be higher than both the cost of over-competition in service *and* the incremental loss of serving Lows at marginal cost. A concern for manufacturers (that establish outlet stores) might be that primary retailers attempt to stock their stores by purchasing stock at outlet stores. Because the manufacturer outlet-store price is marginal cost (i.e. lower than the transfer price of w to the primary retailers), the possibility of intra-channel diversion arises.³⁰ This would hurt manufacturers since profits are not earned on product sold at marginal cost. However, intra-channel diversion does not seem to happen empirically for a number of reasons. First, the transaction costs for a primary retailer to travel to an outlet mall to purchase stock may be significant. Second, many outlet mall stores put limits on the numbers of similar items they permit a customer to purchase (perhaps manufacturers are worried about a diversion problem). Third, the purchasing mechanism at outlet stores (a cashier and typical check-out counter) are not suited to the purchase of huge quantities of stock. It may in fact be infeasible for a primary retailer to buy enough at an outlet store to stock a primary store.

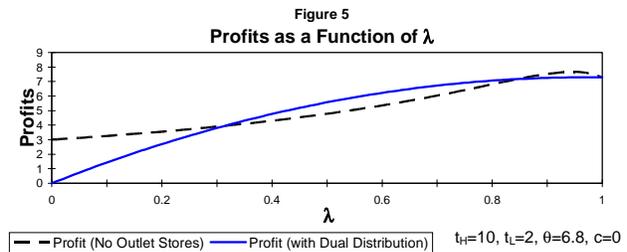
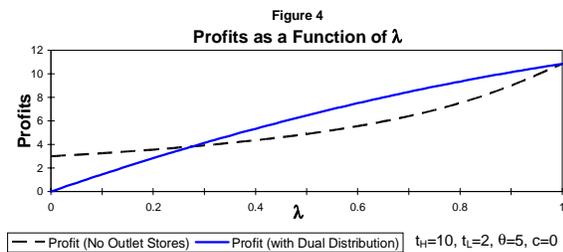
A natural question to ask is what are the effects of changes in λ (the proportion of consumers who are Highs) on the viability of outlet-store retailing. Proposition 3 shows that the attractiveness of outlet stores is complex, but does depend on the distribution of Highs and Lows:

Proposition 3. *When $\lambda=0$ (all consumers are Lows), dual distribution with outlet stores is strictly less profitable than selling only through primary retail channels. When $\lambda=1$ (all consumers are Highs), manufacturer profits are equal with or without outlet stores. If outlet stores are profitable for some interior value λ^* , then there exists a λ' ($0 < \lambda' < \lambda^*$) below which outlet stores are strictly less profitable than is selling through the primary market alone.*

³⁰ We thank a reviewer for pointing out this possibility to us.

The results concerning $\lambda=0$ and $\lambda=1$ are endpoints but they provide insight for understanding the second part of the proposition. Obviously, if all consumers are Lows ($\lambda=0$), selling at marginal cost through outlet stores is strictly less profitable than serving them in the primary retail market. If all consumers are Highs ($\lambda=1$), the outlet mall has no role to play, since Highs will not shop at outlet malls even if product is available there. Whether or not outlet-store retailing ever becomes profitable as we increase λ depends on the difference in price sensitivity between Highs and Lows (is there sufficient opportunity for gain by selling through an outlet mall?) and the level of θ (if θ is too high, then outlet stores are never attractive, because the cost of over-competition in service always exceeds the benefit of reduced price competition).

Figures 4 and 5 illustrate the relationship of manufacturer profits to λ (with and without outlet stores) for two values of θ ($\theta=5$ and $\theta=6.8$), where at some level of λ , outlet stores are in fact, advantageous (i.e. there is sufficient spread between t_H and t_L and θ is not too high). In both examples, at a sufficiently high λ , the profits associated with outlet-store retailing exceed the profits associated with serving all customers through primary channels. However, in Figure 5 (where θ is higher at 6.8), we have an unusual reversal at λ close to 1 where outlet stores are once again unattractive. While this might seem to go against the logic of the last paragraph, we can explain this result by remembering that the force limiting the attractiveness of outlet-stores is “over-competition” in service. The degree of “over-competition” is primarily a function of θ but it is also affected by λ as shown in Table 2. When θ is sufficiently high (in the example above ≈ 5.9), and λ is sufficiently close to 1, “service competition” is sufficiently intense that manufacturers prefer to keep Lows in the primary market.



Our model is based on decentralized primary retailers who are independently owned. However, there is evidence that a number of upscale apparel boutiques in primary retail areas are manufacturer-owned.³¹ This leads to two questions. First, is the need for outlet malls an artifact of the decentralized structure that we have chosen for the primary retail market? Manufacturers

³¹ Manufacturer-owned stores in the North Michigan Avenue area (the prime retail space in Chicago) include Brooks Brothers, Burberrys Ltd., Chanel, Escada, Gap, Giorgio Armani, Gucci, Hermes, J. Crew, Louis Vuitton, Polo – Ralph Lauren, Salvatore Ferragamo, Sonia Rykiel, Sulka, Talbots, Timberland, and Ultimo. Several of these also operate outlet stores (Brooks Brothers, Burberry Ltd., Escada, Gap, J. Crew, Polo – Ralph Lauren, Talbots, and Timberland). Lewison (1997) also notes that a number of fashion apparel manufacturers market directly to consumers through company owned stores.

do not make decisions about the level of service in a decentralized structure and vertical integration would allow them to do so. Second, if the need for outlet malls exists even in the context of vertically integrated distribution, is the need stronger or weaker than when distribution is decentralized? Proposition 4 answers these questions by showing that vertically integrated manufacturers have *stronger* incentives to sell through outlet stores than do manufacturers who operate through a decentralized channel.

Proposition 4. *When $\theta < \theta_3$, where $\theta_3 = \sqrt{2} \cdot \theta_2$ and θ_2 is as defined in Proposition 2, vertically integrated manufacturers prefer a channel structure that includes outlet stores to one with only primary retailing.*

Because θ_2 is the limit for the attractiveness of outlet stores with decentralized primary retailing, the area in which outlet-store retailing is attractive for vertically integrated manufacturers is strictly larger. This implies that one is more likely to observe outlet stores run by manufacturers who are vertically integrated into primary retailing versus manufacturers whose retail outlets are decentralized. We explain this result by remembering that a key benefit provided by outlet stores is reduction of price competition. In a decentralized channel, the benefits of reduced price competition accrue to both primary retailers and manufacturers, not just to manufacturers. In contrast, a vertically integrated manufacturer is the sole beneficiary of outlet-store retailing. This explains why the “outlet store” zone is larger under vertical integration.

4.4 Authorized Retailers and Outlet Mall Distribution: In Sync or In Conflict?

It is logical to suspect that primary retailers would be hurt by outlet stores that offer the same merchandise and attract the Lows who would otherwise shop in the primary channel. We investigate this idea by examining when the incentives for dual distribution for manufacturers and primary retailers are aligned and when they are not.

Proposition 5 establishes that the incentives for outlet mall distribution between manufacturers and primary retailers are not perfectly aligned. In contrast to the intuition outlined in the previous paragraph, the parameter space where manufacturers have an incentive to implement outlet mall distribution is a subset of the parameter space where primary retailers gain from the operation of manufacturer-operated outlet mall stores.

Proposition 5. *When $\theta < \theta_3$, where $\theta_3 = \sqrt{2} \cdot \theta_2$ and θ_2 is as defined in Proposition 2, primary retailers prefer a channel that includes manufacturer-operated outlet stores to one with only primary retailers.*

Since $\theta_3 > \theta_2$, the condition for primary retailers to benefit from manufacturer-operated outlet stores is strictly less binding than for manufacturers. Thus, whenever manufacturers benefit from outlet stores, so do primary retailers. In addition, there are parametric conditions where primary retailers benefit from manufacturer-operated outlet mall distribution but manufacturers do not (i.e. when $\theta_2 < \theta < \theta_3$).

The intuition for this finding is that the primary retailer margin is higher in the presence of manufacturer-operated outlet stores (than in their absence) and is unaffected by an increase in θ . In contrast, the manufacturer's margin is adversely affected by an increase in θ . Indeed, the manufacturer's margin falls more with an increase in θ when there are outlet stores than when there are not. The partial derivative of w_i with respect to θ with outlet stores is $(-2\theta\lambda/3)$ and without outlet stores is $(-2\theta\lambda/3)(\lambda t_L^2/\tau^2)$. The latter is less than the former in absolute value. Thus, the primary retailers benefit more from the implementation of manufacturer-operated outlet mall distribution as θ rises than do manufacturers.

When $\theta_2 < \theta < \theta_3$, manufacturers will not open outlet stores. What then might retailers do, given that they would benefit from manufacturer-operated outlet stores? One option might be for primary retailers to establish outlet mall distribution themselves. In contrast to manufacturers however (who supply outlet stores at marginal cost), primary retailers must supply outlet stores at "their marginal cost" i.e. the wholesale price. There are areas of parameter space where it is possible for primary retailers to increase their profits by opening outlet stores when manufacturers would not do it themselves.³² However, these observations relate to the attractiveness of outlet stores to retailers, *not their feasibility*. When retailers open outlet stores, they must prevent Highs from shopping there (this is a problem for manufacturers but it is more serious for retailers). Prices at retailer-operated outlet stores are higher because retailers pay wholesale price (not marginal cost) to supply their outlets. Thus, outlet stores would need to be much closer (to the primary market) to attract Lows, but the distance of outlet malls from the primary market is what keeps Highs in the primary retail market.³³ Once Highs defect to retailer-run outlet stores, the attractiveness of outlet mall distribution disappears completely.

In summary, Proposition 5 provides an explanation why the growth of outlet malls has received little opposition from primary retailers. This channel structure, when optimal, seems to be a win-win situation for both channel members.

³² Manufacturers' profits would strictly increase were this scenario to materialize, since the optimal wholesale price would exceed w_{NOUT}^* .

³³ Except for extreme differences in price sensitivity between segments, the proximity of the outlet mall will not be sufficient to keep all Highs away from it when it is close enough such that all Lows want to go there.

5. Conclusion

When does it make sense for a manufacturer to pursue dual distribution in retailing? We consider this question on dual distribution where one of the channels offers low service and low prices. Second, is the decision to use multiple channels driven mainly by the degree of consumer heterogeneity or is it also dependent on the nature of heterogeneity? An important final question is whether certain customers can be “bad for business” even though they may be willing to pay more for the product than it costs to serve them. We focus on a model combining segmentation and competition to attack these questions, and our results suggest that low service/low price channels are particularly interesting due to the indirect effects that they have on competition in authorized channels.

The primary insight of the paper is that the relationship between customer heterogeneity and the attraction of dual distribution is complex and cannot be determined by simply asking how different consumers are. We contend that a fundamental difference between customers in many markets is their “cost of time.” This manifests itself in two ways, both of which have a critical effect on the functioning of markets. The first is through consumers’ price sensitivity. If a consumer has a high cost of time, he will need a big saving in terms of price paid to make a trip to a shop that is further away. In contrast, a consumer with a lot of time on his hands will take the time to search for the lowest price in the market (i.e. to search for bargains). The second way in which the “cost of time” manifests itself is in consumers’ need for and valuation of in-store service. Consumers with a high cost of time will place a high value on service such as quick checkout, style and size selection, and packaging services because they allow consumers to complete their shopping quickly. In contrast, a consumer with a low cost of time is not willing to pay extra for in-store service.

We find that the relative importance of price versus service sensitivity (as measures of consumer heterogeneity) in the presence of retail competition drives the predictions of our model and ultimately the optimal channel structure. When price sensitivity is the primary dimension of heterogeneity in a market, implementing outlet mall distribution will have positive effects on the profits of both manufacturers and primary retailers. The outlet mall gives primary retailers the opportunity to charge higher prices to those who remain in the primary market. This outweighs the disadvantages of lost profits on customers who leave the market and additional costs of providing higher service. Under these conditions, price sensitive Lows have a “bad effect” on profits and performance in the primary retail market. In spite of their willingness to pay more for the product and service than it costs to serve them, these customers are effectively “bad for business.”

In contrast, when the primary dimension of heterogeneity in the market is service sensitivity and not price sensitivity, implementing outlet mall distribution reduces profits for both

manufacturers and primary retailers. In this situation, the advantage of higher prices (that can be obtained by diverting Lows to an outlet mall) is outweighed by unrestrained efforts in the primary channel to woo customers who remain with high levels of service. It is interesting that even when a market is highly heterogeneous but mainly in terms of service sensitivity, it is disadvantageous for a manufacturer to implement segmented distribution. In this situation, segmentation intensifies profit-reducing service competition in the primary channel.

To broaden our understanding of the viability of outlet stores, we also consider vertical integration into primary retailing. We show that vertically integrated manufacturers have even more incentive to sell through outlet stores than manufacturers who operate through decentralized retailers. It is interesting that the role of outlet stores is important even when manufacturers have full control of both the service and retail pricing functions.

We have modeled consumers as differing in their costs of time. Consumers with a high cost of time (Highs) are both more service-sensitive and less price-sensitive than are those with a low cost of time (Lows). We assume that service sensitivity can take one of two values: zero (for the Lows) and $\theta > 0$ (for the Highs). An interesting direction for future research would be to allow service sensitivity to vary on a continuum. The work of Shaked and Sutton (1982) and Moorthy (1988) suggests that such an extension might produce an equilibrium with differentiated retailers in the primary market: one retailer offering a high service level and the other offering a low service level.

We have further chosen to model competing manufacturers' products as physically undifferentiated, focussing instead on locational differentiation. A natural question is how our results might be changed if the differentiation between manufacturers were psychologically-based instead of locationally-based.³⁴ Interestingly, the qualitative conclusions would not change. As shown in the preceding analysis where differentiation is locational, products at the outlet mall are not differentiated. Therefore, retail prices are competed down to marginal cost, c . In contrast, when products are psychologically differentiated, physical proximity would not be sufficient to force prices down to c ; instead, they would be sold at a price of $(t_L + c)$. In such a model, (a) the distance d to the outlet mall would have to be shorter to attract the Lows because of higher outlet-mall prices; (b) outlet-mall retailing would generate strictly positive profits for the manufacturers; and (c) higher levels of service sensitivity on the part of Highs would be necessary to make outlet mall distribution unattractive. Nevertheless, even with this modified interpretation of the differentiation between retailers, the basic findings that (a) high service sensitivity on the part of Highs makes outlet mall distribution unattractive and (b) high price sensitivity on the part of Lows makes it attractive, are identical to the findings achieved with a locational interpretation of differentiation.

³⁴ For example, Brooks Brothers, Polo Ralph Lauren, and J. Crew have all spent significantly to develop their own brand equity, despite the fact that their clothes are quite similar in style and price point.

We focus our discussion on manufacturers' outlet stores as a second, lower-priced, lower-service channel, but the insights apply equally to other institutional channel mechanisms with the same impact such as consumer trade shows and gray markets. In these situations, other factors may play a role; but this does not negate the role of the discount channel in providing a means of balancing price and service competition.

Technical Appendix: Derivation of Primary Market Retail Prices, Service Levels, and Wholesale Prices with Outlet Stores and under No Outlet Mall Stores

The solution procedure for the “with outlet stores” and “no outlet stores” cases is the same, and has the following steps:

- Primary retailer i maximizes its profits with respect to retail price p_i ; the Nash solution concept produces functions $p_i(S_i, S_j, w_i, w_j; \lambda, \theta, t_L, t_H)$.
- These best-response functions are substituted back into the primary retailers’ profit equations, and primary retailer i maximizes profit with respect to S_i ; the Nash solution concept produces functions $S_i(w_i, w_j; \lambda, \theta, t_L, t_H)$.
- The best-response functions for primary retail prices and retail service levels are substituted into the manufacturers’ profit functions, and manufacturer i maximizes its profit in a Nash fashion with respect to w_i . Solving the two manufacturers’ first-order conditions simultaneously produces equilibrium wholesale prices of the form $w_1^* = w_2^* = w_i^*(\lambda, \theta, t_L, t_H, c)$.
- This equilibrium wholesale price is then substituted back into the best-response functions for retail service and primary retail price (knowing already that the equilibrium outlet mall price is $p_{OUT}^* = c$) to produce equilibrium reduced-form expressions for these as well as for manufacturer and primary retailer profits.

The second-order conditions (SOC's) and Routh-Herwitz conditions for retail prices hold both with and without outlet stores. A sufficient condition for the SOC's in service and wholesale prices to hold both with and without outlet malls is $\theta < 3 \left[\frac{t_H}{\lambda} \right]^{1/2}$, a condition we impose

throughout our analysis.

Finally, our equilibrium can be shown to be stable (Selten 1975, Bernheim 1984, Pearce 1984). Details are available from the authors.

Proof of Proposition 1. To prove this proposition, we first show that prices at the outlet mall are equal to marginal cost given that product is available there. Assume that manufacturers have an incentive to implement outlet mall distribution because it would increase profit in the primary retail market. If only one manufacturer establishes outlet mall distribution, there would be no competition at the outlet mall. In this situation, the price at the outlet store will exceed marginal cost (unless the outlet mall is located at a distance from the primary market where a price of c is necessary to attract all of the Lows i.e. at a distance d_{MAX}). In this situation, the profit of the manufacturer that distributes through the outlet mall exceeds the profit of the manufacturer who does not. Using subgame perfection, the manufacturer who does not distribute through the outlet mall has no incentive to distribute there since if he does, the price at the outlet mall will equal marginal cost and his profit will remain unchanged.

Using Sequential Equilibrium (Kreps and Wilson, 1982), we look for a sequence of mixed strategies $\{\sigma^k\}_{k=1}^\infty$ over the strategy space (no outlet store, outlet store) and beliefs μ_k , such that $\lim_{k \rightarrow \infty} \sigma^k = \sigma$ and $\mu = \lim_{k \rightarrow \infty} \mu^k$ for both manufacturers. With this concept, when manufacturer i mixes over (no outlet store, outlet store) and manufacturer j believes this to be

true (consistent with Bayes' rule), then 'no outlet store' is strictly dominated for manufacturer j. Manufacturer j will obtain strictly greater payoff by implementing outlet store distribution because some positive percent of the time (when manufacturer i does not have an outlet store), manufacturer j will make positive profit at the outlet store. As long as manufacturer i's strategy is mixed over (no outlet store, outlet store), this is always true for manufacturer j. Thus, only the equilibrium where both manufacturers implement outlet store distribution survives the refinement.

Thus, when product is available at the outlet mall, the price (p_{OUT}) is equal to marginal cost. For Lows to shop at the outlet mall, equation 8 in the main text must be satisfied. Substituting the values for p_{1A} (Table 2) and p_{OUT} (marginal cost) in equation 8, we obtain an expression for d_{MAX} , the maximum distance to the outlet mall that still attracts all Lows:

$$d < \frac{4t_H}{t_L} - \frac{\lambda\theta^2}{3t_L} = d_{MAX}. \text{ Further, for Highs to remain in the primary market, equation 4 must be}$$

satisfied. Substituting the values for p_{1A} and S_1 (from Table 2) and p_{OUT} (marginal cost) into equation 4, we obtain an expression for d_{MIN} , the minimum distance to the outlet mall that deters all Highs: $d > \frac{9}{2} - \frac{\theta^2\lambda}{2t_H} = d_{MIN}.$

Finally, for a range of d to exist such that the conditions derived above are both satisfied, it is necessary that $d_{MIN} < d_{MAX}$. Using steps 2 and 3 we get: $\frac{4t_H}{t_L} - \frac{\lambda\theta^2}{3t_L} > \frac{9}{2} - \frac{\lambda\theta^2}{2t_H}$

$\Rightarrow \lambda(3t_L - 2t_H)\theta^2 > 27t_H t_L - 24t_H^2.$ This inequality must be analyzed separately in three

regions. When $t_L > 8t_H/9$, a range for d exists when $\theta^2 > \frac{27t_H t_L - 24t_H^2}{\lambda(3t_L - 2t_H)}.$ In this case, the right-

hand side of the inequality is positive, and $\exists \theta > 0$ large enough to satisfy this inequality. When $2t_H/3 < t_L < 8t_H/9$, a range for d exists again when $\theta^2 > \frac{27t_H t_L - 24t_H^2}{\lambda(3t_L - 2t_H)},$ but now the inequality is

trivially satisfied because the right-hand side is negative. Finally, when $t_L < 2t_H/3$, a range for d exists when $\theta^2 < \frac{27t_H t_L - 24t_H^2}{\lambda(3t_L - 2t_H)},$ and $\exists \theta > 0$ that satisfies this inequality because the numerator and

the denominator of the right hand side of the inequality are negative.

Q.E.D.

Proof of Lemma 1. This can be straightforwardly derived using the equilibrium values in Table 2.

Q.E.D.

Proof of Lemma 2. The collusive solution procedure for the outlet store (OUT) and no-outlet stores (NOUT) cases is the same, and is as follows:

- Primary retailer i maximizes its profits with respect to retail price p_i ; the Nash solution concept produces functions $p_i(S_i, S_j, w_i, w_j; \lambda, \theta, t_L, t_H)$

- These best-response functions are substituted back into the primary retailers' profit equations, and service levels, S_i , are chosen to maximize *joint* (i.e. the sum of retailer 1's and retailer 2's) profits. The result are functions $S_i(w_i, w_j; \lambda, \theta, t_L, t_H)$
- These functions for primary retail prices and retail service levels are substituted into the manufacturers' profit functions, and manufacturer i maximizes its profit in a Nash fashion with respect to w_i . Solving the two manufacturers' first-order conditions simultaneously produces equilibrium wholesale prices of the form

$$w_1^* = w_2^* = w_i^*(\lambda, \theta, t_L, t_H, c)$$
- This equilibrium wholesale price is then substituted back into the best-response functions for retail service and primary retail price (knowing already that the equilibrium price at the outlet mall $p_{OUT}^* = c$) to produce equilibrium reduced-form expressions for these as well as for manufacturer and primary retailer profits.

With outlet mall distribution, equilibrium service levels as functions of w_i and w_j are:

$S_i(w_i, w_j; \lambda, \theta, t_L, t_H)$ where $S_i = \frac{\lambda\theta(w_i - w_j)}{2\lambda\theta^2 - 9t_H}$, and without outlet mall distribution, the equilibrium

service levels are: $S_i(w_i, w_j; \lambda, \theta, t_L, t_H)$ where $S_i = \frac{\lambda\theta\tau(w_i - w_j)}{2\lambda^2\theta^2 t_L - 9t_H\tau}$. Since in both situations in

equilibrium, $w_i = w_j$, equilibrium values of service are indeed zero when collusion on service is possible. Simple algebraic comparison of optimal levels of service in the collusive case with those in the outlet mall and no-outlet mall case (without collusion) completes the proof.

Q.E.D.

Proof of Proposition 2. This can be straightforwardly derived using the equilibrium values in Table 2.

Q.E.D.

Proof of Lemma 3. This can be straightforwardly shown through algebraic manipulation of the values of θ_1 , θ_2 , and wholesale prices.

Q.E.D.

Proof of Lemma 4. Outlet store distribution is more likely to increase profits for manufacturers, the higher is θ_2 as defined in Proposition 2. Let $t_H = \alpha \cdot t_L$, $\alpha > 1$. Then if this Lemma is to be true, θ_2 should be increasing in α . Making this substitution yields (after

simplification): $\theta_2 = \frac{3\sqrt{t_L}}{\lambda} \cdot \left\{ \frac{\alpha \cdot [\lambda(I+\lambda) + \alpha(I-2\lambda^2) - \alpha^2 \lambda(I-\lambda)]}{(I-\alpha)[I+\lambda+(I-\lambda)\alpha]} \right\}^{\frac{1}{2}}$. If the term inside the curly braces

above is increasing in α , then θ_3 is also increasing in α . Let the term in curly braces be denoted

Z. Then: $\frac{\partial Z}{\partial \alpha} = \left[\frac{1}{(1-\alpha)^2 [1+\alpha+\lambda(1-\alpha)]^2} \right] \cdot [\Omega]$, where

$$\Omega = \alpha^4(1-\lambda)^2 \lambda + 4\alpha^3(1-\lambda)\lambda^2 - 2\alpha^2(2-3\lambda^2)\lambda + 2\alpha(1+\lambda-2\lambda^2-2\lambda^3) + \lambda(1+\lambda)^2.$$

The first term in $\partial Z/\partial \alpha$ is clearly positive. Thus, if Ω is positive, $\partial Z/\partial \alpha$ is also positive. Recall that $\alpha > 1$ and $\lambda \in [0, 1]$. By sampling the space in the region $\{\alpha > 1, 0 \leq \lambda \leq 1\}$, it is clear by inspection that $\partial Z/\partial \alpha$ is positive.

Q.E.D.

Proof of Proposition 3. When $\lambda=0$, we have from Table 3 that

$$\Pi_{M,NOUT}^* = \frac{3t_H t_L}{2t_H} = \frac{3}{2}t_L, \text{ and } \Pi_{M,OUT}^* = 0.$$

Thus, outlet mall distribution is strictly less profitable than the no-outlet mall distribution when $\lambda=0$ (all consumers are Lows). When $\lambda=1$, we have from Table 3 that: $\Pi_{M,NOUT}^* = \Pi_{M,OUT}^* = \frac{3}{2}t_H - \frac{\theta^2}{6}$.

Now, consider a set of parameter values for which outlet mall distribution is profitable, i.e., $\Pi_{M,OUT}^* > \Pi_{M,NOUT}^*$. Let $(\Pi_{M,OUT}^* - \Pi_{M,NOUT}^*) \equiv Y$. Then:

$$\frac{\partial Y}{\partial \lambda} = \frac{1}{2} \left\{ 3t_H - \frac{2\lambda\theta^2}{3} + \frac{3t_H t_L (t_L - t_H)}{\tau^2} + \frac{2\theta^2 t_L^2 \lambda}{3\tau^2} - \frac{2\theta^2 t_L^2 \lambda^2 (t_L - t_H)}{3\tau^3} \right\}.$$

At $\lambda=0$, $\frac{\partial Y}{\partial \lambda} = \frac{3}{2t_H} [t_H (t_H - t_L) + t_L^2] > 0$. Thus, although Y is clearly negative at $\lambda=0$, it is

increasing at $\lambda=0$: that is, the difference between channels that include outlet mall distribution and no-outlet mall distribution is diminishing as λ rises from 0. Therefore, assuming that for some interior value, λ^* , outlet mall distribution is profitable, there must exist a critical value of λ , called λ' ($0 < \lambda' < \lambda^*$) such that for all $\lambda < \lambda'$, outlet mall distribution strictly reduces profit from the profits that manufacturers would realize if the distribution system includes only primary retailers.

Q.E.D.

Proof of Proposition 4. The solution process under vertical integration exactly parallels the steps laid out above in the derivation of equilibrium values with decentralized channels, except that now, the vertically integrated manufacturer maximizes the sum of primary retailer and manufacturer profits (e.g., equation (11) plus equation (15) in the case of no outlet mall distribution; equation (13) plus equation (17) when outlet mall distribution is implemented). The two vertically-integrated manufacturers act as Nash competitors at each stage of the game. The

results are: $\Pi_{OUT,VI}^* = \frac{t_H \lambda}{2} - \frac{\theta^2 \lambda^2}{36}$ and $\Pi_{NOUT,VI}^* = \frac{t_H t_L}{2\tau} - \frac{\theta^2 t_L^2 \lambda^2}{36\tau^2}$. For vertically-integrated

manufacturers to prefer dual distribution including outlet malls, we require that $\Pi_{OUT,VI}^* > \Pi_{NOUT,VI}^*$. Algebraic manipulation yields: $\theta < \sqrt{2} \cdot \theta_3 \equiv \theta_5$.

Q.E.D.

Proof of Proposition 5. This can be straightforwardly derived by evaluating the inequality $\Pi_{R,OUT}^* > \Pi_{R,NOUT}^*$, using the values in Table 3.

Q.E.D.

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