# *Good Marketing to "Bad Consumers": Outlet Malls, Gray Markets, and Warehouse Sales*

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Comments Welcome

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## Abstract

*In many apparel markets, there has been an increase in the number of routes that manufacturers use to get their merchandise to consumers. Some manufacturers have opened shops in outlet malls (which are a descendent of the outlet stores that are sometimes located on the grounds of a manufacturer's factory) or actively distribute products in "consumer" trade shows. 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 the idea that a low price/low service channel may provide an advantage to firms, even in a competitive context, by allowing the manufacturer to better meet the needs of different customers.*

*The focus of our analysis is categories where the main difference between channels is the level of service provided to customers. With categories such as apparel and accessories, it is difficult if not impossible to separate service from the product itself: frequently consumers depend critically on the assistance and taste of expert salespeople.*

*In this context, the objective of the research is to provide insight about when competitive manufacturers should pursue dual distribution strategies where one of the channels is a low-service/low-price channel. Specifically, we wish to examine the relationship between the use of multiple channels and consumer heterogeneity: is the attractiveness of an alternate channel driven by a simple measure of consumer heterogeneity or is the determination of the optimal channel structure more complicated?*

*We develop an analytic modeling structure to investigate whether and under what circumstances differentiated 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). The primary retail channel is comprised of regular retail outlets, which have higher prices and better service. The alternate channel is manufacturers' outlet stores. Similar to the apparel industry, we assume that primary retailers make decisions about both retail prices and the level of in-store service to provide.*

*Before giving an overview of the results, we should emphasize that our intention is to look at a motivation for these channels that relies on the way in which they affect competition between manufacturers. Our intention is not to deny motivations that may lead to the creation of low service/low price channels such as market expansion or stochastic inventory control but to focus purely on the competitive impact of alternate 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 represented by a simple measure of heterogeneity.*

*When the primary differences between consumers are price and service sensitivity, we find that their relative importance (as measures of consumer heterogeneity) drive the optimal channel structure for manufacturers. When price sensitivity is the primary dimension of heterogeneity, implementing outlet mall distribution will have a positive effect on the profits of both manufacturers and primary retailers. The outlet mall gives primary retailers the opportunity to charge higher prices to consumers who remain in the primary channel. This outweighs the disadvantages of lost profits (on customers who switch channels) and additional costs of providing higher service.*

*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. It is interesting that even when a market is extremely heterogeneous (but mainly in terms of service sensitivity), segmentation has the potential to make things worse for both manufacturers and primary retailers by exacerbating "money-burning" service competition.*

*We also provide empirical evidence for the model's assumptions from outlet malls in the Chicago area. The data collected provides support for the idea that outlet malls are carefully stocked and designed to attract a certain type of consumer. In addition, outlet malls are located far from major shopping areas and provide less service but more attractive pricing for products than retailers in major shopping areas.*

**Key Words:** Hybrid channels, multiple channels, outlet malls, service competition, consumer trade shows, gray marketing, market segmentation.

# 1. Introduction

### 1.1 Background

*A new phenomenon in Germany is trade shows held by manufacturers of apparel and accessories oriented towards the general public. Typically, trade shows are a forum to facilitate exchange between manufacturers and retailers in the apparel business. However, in recent years, consumers have started coming to trade shows and in many cases, they purchase goods for personal consumption. Because of this trend, there are now consumer trade shows specifically designed to display and sell goods directly to the public. The president of F.J.M. Collections, a firm that markets upscale eel-skin handbags and accessories, states that trade-show venues are low on service (with little privacy in the trade-show atmosphere for shopping) and stressful (there is considerable time pressure to make a purchase decision and "move on"). In addition, the temporary aggregation of F.J.M. and its major competitors under one roof makes pricing extremely competitive (prices are at least 25 percent lower than regular prices). As a result, consumers who attend these shows are primarily interested in price and they are looking for bargains.*

*Management at F.J.M. Collections sees the trade shows as an opportunity to serve different types of consumers through two different channels. The authorized retail channel caters to consumers who are first movers, who like a high degree of service and the environment of a retail shop (for them the crowds and hassle of trade shows are anathema). In contrast, trade shows cater to consumers who are price-sensitive and are willing to tolerate the inconvenience of a trade show for the chance of a better deal. For companies selling at these trade shows, a key challenge is to convince the authorized retail channel that focusing on consumers who really value in-store service (and are willing to pay more) can be a winning combination for both channel members*[1].

The above example underlines interesting aspects of the retailing environment faced by manufacturers today. First, it highlights that fact that manufacturers will not necessarily avoid retailing situations where prices have the potential to be driven down to low levels. Trade shows are certainly a form of market segmentation but they are clearly less profitable than standard retailing.

Second, in F.J.M.'s market, service is a critical part of the sale and its importance varies across consumers. With categories such as apparel and accessories, it is difficult if not impossible to separate service from the product itself: e.g., when buying an outfit at an upscale clothing boutique such as Giorgio Armani, a consumer depends critically on the assistance and taste of experienced staff to find the "perfect outfit." Theoretically, the benefit of this assistance and taste could be obtained without buying (and the consumer could travel to a low price outlet to purchase the items in the ensemble)[2]. But this requires that the

[1] We thank Franz-Joseph Miller for sharing this information with us.
[2] In this way, service would be physically separated from the product itself.

consumer have both a precise memory for the styles and colors of items in the outfit and easy access to all the items suggested by the salesperson.

Finally, this example makes clear that the provision of service is specific to, and indeed characteristic of, the retail outlet itself. It is essentially impossible to replicate the service environment of an upscale retail clothing and accessories store at a consumer trade show, nor can one perfectly mimic a trade-show atmosphere at an authorized full-service retail store. In fact, manufacturers may have taken the “trade show” concept one step further with the manufacturers’ outlet mall.

Over the last 10 years, outlet malls, which are agglomerations of manufacturers peddling their wares directly to consumers at bargain basement prices with minimal service, have become commonplace. At the beginning of 1997, there were 325 such malls in the U.S.A. containing more than 12,000 stores with retail sales of approximately $12 billion (Prime Retail Website 1998). These malls are essentially “permanent” consumer trade shows that allow manufacturers to avoid legal restrictions that prohibit the creation of differentiated channels through wholesale pricing policy.[3]

In Table 1 below, we provide some information about outlet malls in the Chicago area. About 61% of outlet mall stores are brand-specific, so the malls are predominantly a retail vehicle to sell branded merchandise directly to consumers in a discount format.[4]

**Table 1**
**Outlet Malls in the Chicago Metropolitan Area**

| *Outlet Mall* | *Date Founded* | *Distance from N. Michigan Ave. (km.)* | *Distance from Closest Major Mall (km.)* | *Number of Stores** | *% of Stores that are Manufacturer branded* |
|---|---|---|---|---|---|
| The Original Outlet Mall, Kenosha, WI | October 1986 | 93 | 42 | 59 | 58% |
| Prime Outlets, Kenosha, WI | September 1988 | 88 | 37 | 58 | 79% |
| Gurnee Mills, Gurnee, IL | August 1991 | 73 | 22 | 146 | 49% |
| Huntley Factory Shops, Huntley, IL | August 1994 | 78 | 41 | 56 | 61% |
| Prime Outlets, Michigan City, IN | November 1987 | 97 | 68 | 108 | 70% |

SOURCE: primary data collection by the authors *Excluding food, bank, and service locations

The table shows that these malls are located in outlying areas that are about an hour’s driving distance from downtown. It is also interesting to note that the malls are in general less than ten years old, suggesting that the underlying marketplace conditions may have changed to favor them in this time period. We know that consumer trade shows are oriented toward bargain-hunters who place less value on service and the same could be said for

[3] A manufacturer cannot charge two different wholesale prices for two different distribution channels (unless justified on a basis of cost), and hope that the channel paying a higher wholesale price provides more service. This is forbidden by anti-trust law: in the US (the Sherman Act and the Robinson-Patman Act), in the EC (the EEC Treaty, Articles 85 and 86) and in Canada (the Canadian Competition Act).

[4] In the 5 Chicago outlet malls, narrowing the focus solely to apparel stores, 155 of 183 (85%) are branded outlets.

manufacturers' outlet malls. It is also useful to consider whether the recent increase in the availability of "gray market" clothing and accessories can have the same type of impact on competition. Gray-marketed goods "bypass" the regular, authorized retail channel and are sold in unauthorized retail outlets at attractive prices with minimal service. This fits the description of a dual-distribution channel strategy with two channels targeting segments with differing price and service sensitivities.

Several questions arise from consideration of these situations. First, when does it make sense for a manufacturer to pursue a multiple-channel retailing strategy (F.J.M. has adopted this strategy, but some manufacturers do not utilize alternate channels and distribute solely through primary retailers)? The literature addresses this decision from the perspective of firms with market power, but not in a market that is fiercely competitive. Second, is the decision to use multiple channels driven mainly by the degree of consumer heterogeneity or is the determinant of the optimal channel strategy more complicated than a simple measure of consumer 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 the channel to serve them.

## 1.2 Research Objective

Our primary objective is to examine the impact of institutional mechanisms such as outlet malls, consumer trade shows and gray markets in a competitive context where their primary role is to attract a segment of consumers who want low prices and are willing to accept lower levels of service. We wish to study this impact under a variety of market conditions where consumers vary in terms of their sensitivity to both price and the level of service provided by retailers.

We recognize that outlet malls, consumer trade shows and gray markets frequently play other roles: for example, outlet stores originally arose to allow manufacturers to liquidate excess inventory arising from over production. Gray marketing is commonly attributed to opportunistic behavior by agents who exploit price differences across geographic boundaries and not to the purposeful machinations of manufacturers. And trade shows can serve not only as another sales outlet, but also as promotional vehicles to stimulate visits and sales at regular retail outlets.

Nevertheless, we believe that current explanations for these retail phenomena do not provide a complete explanation for their impact on the functioning of the market. If the sole purpose of outlet malls were to sell excess inventory arising from poor demand forecasting, one would expect the outlet stores to be characterized by highly variable stock levels in terms of both the sizes and styles available at any time. Our survey finds outlet mall to be fully stocked with a variety of current and traditional apparel available in complete size ranges. It is implausible to assert that manufacturers' forecasting skills are so bad and so unerringly on the side of overproduction as to be able routinely to stock this many outlet stores. Further, industry research shows that "Irregular and damaged merchandise accounts for less than 15 percent of all outlet goods. The majority of merchandise is first-quality and in-season."[5] This suggests that more is happening in outlet malls than mere disposal of excess inventory.

## 1.3 Research Framework

We develop an analytic modeling structure to investigate whether and under what circumstances differentiated "apparel and accessories" manufacturers would choose to sell through multiple retail channels. 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 (other institutional phenomena such as consumer trade shows are also consistent with the model structure). Similar to 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 on two dimensions (price sensitivity and service sensitivity). Following Winter (1993), the F.J.M. example highlights the fact that these two attributes are negatively correlated across consumers (i.e., relative to price-sensitive consumers, consumers who are price-insensitive place a higher value on service because of its time-saving character). Foot with Stoffman (1997) further underline the negative relationship between price and in-store service:

*A young person has little money and lots of time … she checks out every store in town because every dollar saved is important and, what's more, she has plenty of time to hunt for bargains…. A middle-aged person has more money but less time…. He is not going to spend his precious time doing comparison shopping…. He may even pay extra (for service) … because the time saved is worth more than the additional cost" (p. 81).*

We use this logic in our model to assume that consumers who require high levels of service are also less price-sensitive. In this framework, the manufacturer's outlet store has the effect of removing price-sensitive consumers from the primary retail market. 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.

## 1.4 The Key Results

The primary result of the analysis 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 but on the nature of heterogeneity between consumer segments. This result is counterintuitive because we find that it is often attractive for manufacturers to serve two very heterogeneous segments of consumers through a single standardized channel. The main driver of this result is the structure of the market in which two manufacturers are both fighting for the same consumers.

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

When the primary source of consumer heterogeneity is price sensitivity and not service sensitivity, bargain-hunters are "bad for business" in primary retail channels because they create a Prisoners' Dilemma in which the primary channel is characterized by fierce price competition at both the manufacturer and retail level. In some sense, this situation can be thought of as the "Tragedy of Economics", the quintessential problem of a profit-maximizing firm in a competitive context[6]. Profit-maximizing firms are eternally searching for minute adjustments in their decisions to increase profits. As a consequence, price-setting hinges on the *marginal* consumer and when the marginal consumer is price-sensitive, firms reduce price to attract his business. This results in foregoing profits on inframarginal, less price-sensitive consumers. When bargain hunters defect to an alternate channel, only price-insensitive consumers continue to shop in the primary retail market. This reduces price competition in the primary channel and leads to increased profits for both manufacturers and authorized retailers. The value of discrimination and segmentation has been demonstrated in many economic models; however, these models invariably consider the problem of a monopolistic firm. In a competitive context, it is interesting that the strategy of segmenting a market also yields increased profit under certain conditions.

In contrast, when the primary source of consumer heterogeneity is sensitivity to service, the advantage of utilizing an alternate channel evaporates. Here, when manufacturers implement outlet store distribution, consumers who remain in the primary channel are extremely sensitive to the level of service provided. This proves to be disadvantageous for both manufacturers and primary retailers. Price competition is invariably lessened in the primary channel by adding outlet stores, but there are two negative consequences of outlet mall distribution. First, the existence of outlet stores means that a significant group of customers (the bargain hunters) are ultimately served in a low profit channel (clearly, bargain hunters pay more when their only choice is to buy in the primary channel). Second (and more importantly), when a market is very responsive to service (as the primary market will be in the presence of outlet stores), primary retailers have a tendency to "over-compete" in service. It is precisely in these conditions that bargain-hunters have positive effects on primary retail market competition, because they reduce primary retailers' tendency to "over-compete" in service. Here, manufacturers have a strong incentive to keep bargain-hunters in the primary channel and thus, they will not implement outlet store distribution. Even in conditions that might favor segmentation (consumers are extremely heterogeneous), manufacturers will choose to forego discrimination between the segments and instead treat all consumers the same.

Our model provides an explanation for the recent increase in the popularity and number of outlet malls shopping in western developed countries. In addition to the growth of malls in the U.S. (in ten years, the number of outlet malls has tripled), outlet malls have spread to Canada and are beginning to appear in Europe[7]. However, as the population ages, an increasing percentage of the population may also place value on service and quality in a

[6] We use this term loosely in the sense of the "Tragedy of the Commons" as discussed by Pigou (1932) and later by Hardin (1968).

[7] This information is taken from *Consumer Reports* 1998, *Conusmer Reports Canada* , and Beck (1997).

retail setting. Our model casts light on this change and how it should affect the attractiveness of outlet store distribution.

In what follows, we first review the relevant 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 then present some empirical evidence on outlet malls and standard full-service retailers that appears to be consistent with the model's predictions and close with a brief conclusion.

## 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. Kotler further notes that there are three advantages that firms can realize by adding channels: market expansion, lower cost selling and finding a channel that fits the needs of customers better. Our work focuses on the third motivation for adding a low-service/low-price channel, the idea that outlet malls may provide an advantage to firms by allowing the channel to better fit the needs of different customers. 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.

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 homogenous. The research acknowledges 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[8].

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 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 that value of the product package for consumers. 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 can choose whether to distribute through two different channels[9]. Its focus is first to examine the impact of direct marketing on regular retail competition and second, to examine the impact of information dissemination by a direct marketer on market outcomes.

Our work, while ostensibly an effort to provide a rationale for the creation and growth of outlet malls, will attempt to fill a gap in the literature about the nature and impact of competition between manufacturers that can distribute through hybrid channels. The motivation to distribute through hybrid channels comes from a market that is heterogeneous in terms of both price and service sensitivity.

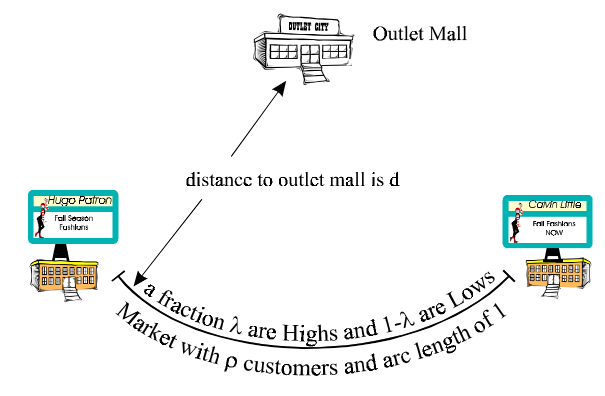
# 3. Model Structure and Solution Method

### 3.1 Structure of the Market and the Rules of the Game

To approach this problem, we use a spatial model in which the heterogeneity of consumers is captured by putting two competing primary retailers (who are exclusive distributors of the product of two manufacturers) at either end of a linear market of unit length. This is similar to Hotelling's (1929) linear city, except we assume that the line is an arc 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). Consumers are assumed to be distributed uniformly along the market with a proportion $\lambda$ of consumers being price insensitive and a proportion $(1-\lambda)$ of consumers being price sensitive (see Figure 1).

Figure 1

THE MARKET




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

[9] Both the direct marketer and the retailers obtain product at the same constant marginal cost.

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 allows us to plausibly represent a retail market structure where the outlet mall is at some distance from the standard retail market.[10] 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 assumed to be physically undifferentiated, so that there is no vertical differentiation based on product characteristics. We assume that differentiation in the market is due to locational distance between the full service retailers. In addition to pricing, the two retailers compete on the basis of the service offered along with the product (service provision is captured as a form of vertical differentiation that is created by the action of retailers). 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.

We model consumers, retailers, and manufacturers as rational and maximizing actors who make a series of decisions in a single period model. We assume that the demand for products is common knowledge and certain, 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 strong assumption that no service is provided at outlet malls to consumers. While this is not always the case, there is no doubt that outlet stores do not provide the ambiance and amenities of primary-retail shopping. These assumptions are particularly realistic in many fashion goods markets, where outlet stores are clearly characterized by a less attractive ambiance, fewer salespeople to help shoppers, and fewer mall amenities.

Consumers' decisions are assumed to be both 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:* In this stage, retailers make decisions and manufacturers too make decisions if they have decided to distribute through outlet malls. 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.[11]

## 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, which is often correlated with a high income level. The other segment, the "Lows," has a lower time cost. We assume that the total number of consumers in the

[10] Stovall (1995) notes that "the typical factory outlet center is built at least 20 miles from the nearest department and specialty store complexes." Other sources argue that the distance is closer to 60 miles on average. Outlet mall shoppers travel from 30 to 80 miles (one way) to reach an outlet mall on average.

[11] 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.

market is ρ with a fraction λ of consumers being "Highs," and a fraction 1-λ being "Lows." Because of their high time cost, Highs face a high cost of travel to shop for bargains. They also value service more than Lows, because service tends to produce value by lowering the time cost of shopping.

Consider, for example, the "personal shoppers" now available at many upscale department and specialty stores; 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 consumer the time and effort necessary to find merchandise. While there is no extra charge for using a personal shopper, consumers who do so typically pay full retail price and get well-coordinated apparel and accessories. Such consumers are prototypical "Highs"[12]. In contrast, Lows are more willing to make a trip to buy a low-priced product with little service since service is of less value to them.

The following functions describe the consumer surplus enjoyed by a High consumer, located at point x on the unit arc, and shopping at primary retailer 1 and primary retailer 2, respectively (where retailer 1 in Figure 1 is located at point 0 on the unit arc, and retailer 2 is located at point 1):

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

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

$V_H$ 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:[13]

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

where $p_{out}$ is the price at the outlet store. We assume that outlet malls are located such that when manufacturers decide to distribute there, they are close enough to the primary market such that Lows will 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=½ is the most likely to defect from the primary retail market to shop at the outlet mall. The ultimate equilibrium in this model involves both retailers providing identical service levels and charging identical prices; therefore, the High with the least surplus from shopping in the primary market is the one who must travel the furthest (which occurs at x=½). Mathematically this implies:

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

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 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 now discuss the utility functions for Lows and show how

[12] One source (Faircloth 1997) describes the personal shopping service like this: "Make an appointment, glide in, enjoy a refreshing beverage in a private room while a tireless assistant brings you endless wardrobe options, and come out two hours later with well-fitting, coordinated pieces – sans stress. Better still, there is absolutely no charge for the service. Personal shoppers will even send items to the consumer's home or office if the consumer is too busy to get to the store."

[13] Products from the manufacturers are undifferentiated at the outlet mall because there is neither service provision or 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.

these functions can be used to derive a condition which ensures that Lows will find it advantageous to shop at the outlet mall given that manufacturers decide to open outlet stores at the mall.

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:

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

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

To simplify the analysis without loss of generality, lower marginal valuation for service by Lows is captured by setting it to zero, i.e. Lows place no value on in-store service. Further, the transportation cost per unit traveled for Lows, $t_L$, is assumed to be less than $t_H$, the analogous cost for Highs, consistent with the difference in their time valuations. Finally, we assume that $V_L < V_H$. This implies that Lows place a lower overall valuation on the product than do Highs. As previously discussed, 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:

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

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, we require that $CS_{L1} < CS_{L,OUT}$. Because the ultimate equilibrium outcome in the primary market 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. Thus, all Lows will shop at the outlet mall if:

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

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 satisfied. We also discuss how the existence and size of the allowable region for 'd' is affected by the consumer level parameters[14].

We assume that consumers decide where to shop by comparing the surplus from the options that they face[15]. 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 three options. 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:

[14] The location of outlet malls is essentially exogenous: manufacturers decide whether or not to distribute through a pre-existing outlet mall. Prior to the existence of outlet malls, it follows that the locational choice made by a mall developer is somewhat complex and outside the scope of this analysis.

[15] 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.

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

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 $x_L=1/2$:

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

and $p_A$ is the retail price prevailing at the primary retail outlet when outlet store product is unavailable. This condition guarantees that all Lows will buy, even in the absence of an outlet store.

This implies that, 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 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:

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

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

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:

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

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

## 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 prior to retailers' decisions. That is, similar to McGuire and Staelin (1983), manufacturers are Stackelberg leaders relative to the primary retailers. If manufacturers operate outlet stores, it follows that their cost for supplying product to the outlet store is marginal cost. If one manufacturer decides to distribute through the outlet mall (and not the other), 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[16].

[16] 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.

When both manufacturers distribute at the outlet mall, their offerings are not differentiated either geographically or in terms of service (we assume that outlet stores do not provide service). This means 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 both 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:

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

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

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.

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

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

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-λ) 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 *manufacturers'* outlet stores, that is ones owned and operated by manufacturers themselves. These are prevalent at outlet malls, accounting for an average of 85 percent of all apparel stores in the outlet malls 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[17].

At this price level, conditions (4) and (8) must be satisfied for outlet stores to be feasible. Both (4) and (8) hold when $\frac{1}{t_H}\left( p_{1A} - p_{OUT} + \frac{t_H}{2} - \theta S_1 \right) < \frac{1}{t_L}\left( p_{1A} - p_{OUT} \right)$ .

$$\Rightarrow \left( \frac{t_H - t_L}{t_H \, t_L} \right) (p_{1A} - p_{OUT}) - \frac{1}{2} + \frac{\theta S_1}{t_H} > 0 \qquad \textbf{(19)}$$

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.

[17] 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.

Thus, in the discussion of model results below, 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 show that equation (19) is always satisfied. This ensures the existence of a 'd' (the distance of the outlet mall from the primary market) 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 without outlet stores and with outlet stores in which all Lows buy. We use these results to show the existence of regions in which outlet stores are in fact 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, it still remains to be established whether outlet malls are in fact *profitable* for the manufacturers. To simplify our analysis, we normalize the density of the market to one.

### 4.1 Characterization of Equilibrium Prices and Service with and without Outlet Stores

Equilibrium values of wholesale prices, retail prices and retail service levels for the two cases of no outlet stores and both manufacturers operating outlet stores are reported in Table 2 below, and the solution process is described in the Technical Appendix. The symmetry of the problem generates equal values of these variables for both manufacturers.

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

| | **EQUILIBRIUM OUTCOME** | |
|---|---|---|
| **VARIABLE** | **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: $\tau = \lambda t_L + (1-\lambda) t_H$ .

Before discussing the significance of the results in Table 2, we first examine the feasibility conditions for the location of the outlet mall in terms of its being able to attract all Lows without affecting the decision of Highs to remain in the primary market.

#### 4.2 Outlet Store Location: The Constraints on 'd'

At the price and service levels in Table 2, to ensure that outlet malls are feasible, we check equation (19) to ensure that it can be satisfied. 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.*

While positive, the range of 'd' does not have a simple relationship to the other parameters in the model[18]. Implicitly, we are assuming that the location decision for an outlet mall developer is made carefully, given that the outlet mall's success depends significantly 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 will later help us to explain the intuition for our profitability results. Inspection of Table 2 shows that service levels and retail prices at primary retailers are clearly higher with outlet stores than without them. This is a direct 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 the needs of both Highs and Lows. 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 when they are present in the primary retail market. But with outlet stores, only the Highs need be served in the primary retail market, and hence service and retail price levels rise. Similarly, the authorized retail margin ($p_i$-$w_i$) in the presence of outlet stores (equal to $t_H$ per unit) exceeds the margin in their absence (equal to $t_H t_L/\tau$ per unit). It is interesting that the retail margin is influenced neither by $\theta$ (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 $w_{NOUT}$ 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 relationship:* $w^*_{OUT} \gtrless w^*_{NOUT}$ as $\theta \lesseqgtr \theta_1$, where $\theta_1 = 3 \cdot \left[ \frac{t_H \tau (\tau - t_L)}{\lambda (\tau^2 - \lambda t_L^2)} \right]^{\frac{1}{2}}$ and

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

We investigate further below how this result helps explain our results on the profitability of selling through outlet stores.

One more result is helpful to understand when and why dual distribution is attractive for manufacturers.

**Lemma 2.** *If retailers could collude on the provision of service, the optimal level of service would be zero. Service levels in a competitive primary retail market without outlet stores are inefficiently high relative to the collusive level, and service levels in a competitive primary retail market in the presence of outlet stores are even*

[18] The size of this range is positively related to the service sensitivity of Highs ($\theta$) when the price sensitivity difference between segments is large (i.e. $t_H$>1.5$t_L$) and negatively related to the service sensitivity of Highs when the price sensitivity differences between segments is small.

*higher than those without outlet stores. Further, the departure from collusive service levels increases with θ, the service sensitivity of the High segment.*

Intuitively, the adoption of outlet mall distribution by manufacturers leaves only service-sensitive High consumers shopping at the primary retail stores. The more service-sensitive those Highs are, the greater are primary retailers' private incentives to provide service, exacerbating the previously noted tendency to over-invest in service.

Given these insights into pricing and service-provision incentives with and without outlet stores, we now directly compare manufacturer and primary retailer profits in the two situations in Table 3 below:

**Table 3**
**Profitability Results Under No Outlet Stores and Outlet Stores**

| | EQUILIBRIUM OUTCOME | |
|---|---|---|
| **VARIABLE** | **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, we demonstrate that there are still conditions under which dual distribution is optimal:

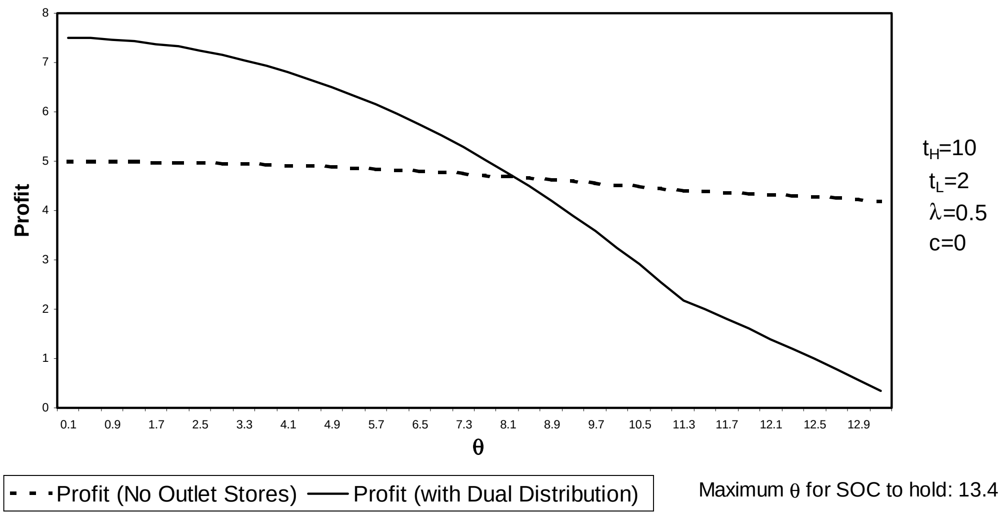
**Proposition 2.** *When* $\theta<\theta_2, where\, \theta_2=\frac{3}{\lambda}\cdot\left[\frac{\tau^2\lambda t_H-\tau t_H t_L}{\tau^2-t_L^2}\right]^{\frac{1}{2}}$ *and τ is as defined in Table 2, manufacturers have a profit incentive to sell through outlet stores as well as through primary retailers.*[19]

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 $\theta_2$ (in this example $\theta_2 \approx 8.22$), there is a switch and the profits without outlet stores are higher.

[19] $\theta_2$ 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 Mall Distribution as a Function of θ**




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

**Lemma 3.** *$\theta_1 > \theta_2$, so that wholesale prices under dual distribution exceed those under no outlet malls, whenever outlet stores are optimal for the manufacturers. However, there is also a range where outlet-store retailing is not optimal for manufacturers, even though wholesale prices under outlet-store retailing exceed those under no outlet stores.*

Proposition 2, our key result, establishes that for sufficiently low values of θ (service sensitivity for Highs), dual distribution with outlet-store retailing along with primary-store retailing can be optimal, even when it involves losing all profits on the Lows. The Lemmas augment our understanding of this result by showing that (a) wholesale prices in the presence of outlet malls exceed those without outlet malls only if service sensitivity is low enough; as service sensitivity increases, the difference between them diminishes and finally becomes negative (Lemma 1); (b) 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 (Lemma 3); and (c) the over-provision of service is worse under outlet-mall retailing than without it, and worsens for both distribution structures as service sensitivity increases (Lemma 2).

Putting these results together, we gain an understanding of when 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 from the 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. There are regions where wholesale prices with outlet stores exceed those without them, yet outlet mall distribution is not profitable for the manufacturers.

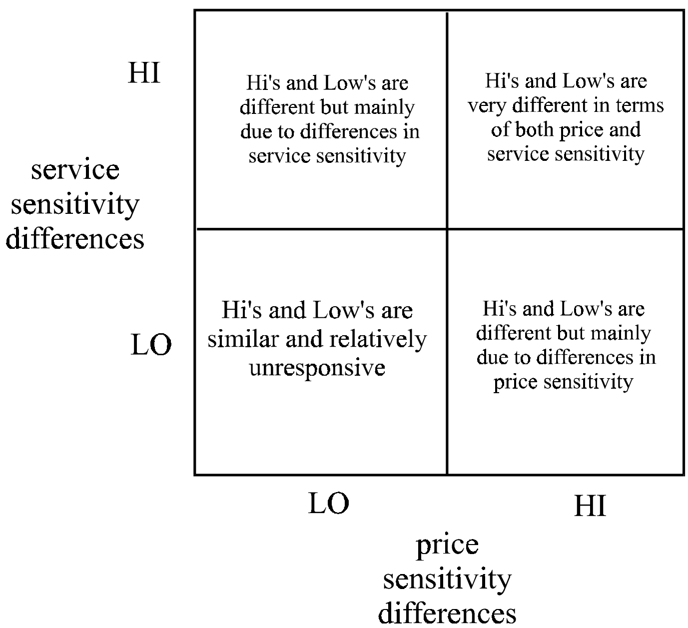
Margins alone cannot explain the switch point between dual distribution and primary market distribution. A key driver behind the attractiveness of the alternative structures is the degree of pressure on primary retailers to compete in service (for the Highs) when outlet stores exist. Returning to Lemma 2, we find that the over-provision of service is a problem under both distribution alternatives. However, the over-provision of service is worse when Lows leave the primary market to shop at outlet stores. This obtains because primary retailers focus only on Highs and competitive pressures force the primary retailers to increase service levels. The more service-sensitive are Highs (i.e. the higher is θ), the higher is the level of service and this exacerbates the problem of the over-provision of service. As equilibrium levels of service in the primary retail channel increase, the cost of providing that service also increases, putting pressure on profit margins. The optimal response at the manufacturer level is to take lower and lower wholesale margins, i.e. to lower wholesale prices. As wholesale prices drop, the profitability of dual distribution with outlet stores as a whole also falls, until for θ high enough, outlet stores are simply not worthwhile.

Thus, 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 the outlet-store channel is used in addition to traditional primary retailers revolves around the benefits of outlet stores in reducing price competition, counterbalanced by the tendency to over-compete in service provision. Further, there is the fact that outlet stores literally remove profitable sales from the Low segment; not only must the benefit of reducing price competition be stronger than the cost of over-competing in service, but it must be strong enough to overcome the incremental loss of the profits on a segment of consumers. The benefit of reducing price competition through outlet-store retailing is therefore greater, the greater is the difference in price sensitivity of Highs and Lows. Similarly, the loss that outlet stores bring through over-competition in service is the least, the smallest is the difference in service sensitivities between Highs and Lows. We intuitively summarize this result with the help of Figure 3.

**Figure 3**
**A Map of Customer Characteristics**




In the southeast quadrant of Figure 3, Lows are much more price-sensitive than Highs, but the two segments do not differ significantly in terms of service sensitivity. Our analysis indicates that this quadrant is most amenable to outlet-store retailing. Getting rid of the Lows (by 'diverting' them to outlet stores) provides significant benefit in terms of reduced price competition, while low service sensitivity (on the part of Highs) implies that the worsening of service over-competition will be less severe.

In contrast, in the northwest quadrant, Lows and Highs have very different service sensitivities, but are relatively similar in terms of price sensitivity. This is the worst combination for outlet-store retailing, because it combines the evils of over-competition in service with a relatively small benefit of reduced price competition. In the northeast and southwest quadrants, it is ambiguous whether dual distribution with primary retailers and outlet stores will be more profitable than serving all consumers through the primary retail market. In both quadrants, the conditions are such that one factor favors outlet mall distribution and the other does not, and the relative strengths of the effects determines whether outlet-mall retailing is profitable or not.

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

It is logical to suspect that primary retailers are hurt by the existence of outlet stores that offer the same merchandise and attract the Lows who would otherwise shop in the primary channel. In the context of our model, we examine whether this contention is supported and when. In particular, we wish to shed light on when the incentives for dual distribution for manufacturers and primary retailers are aligned and when they are not. This should provide insight regarding the conditions that are likely to foster harmony or conflict within primary channels.

Proposition 3 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 outlet mall stores.

**Proposition 3.** *When $\theta < \theta_3$, where $\theta_3 = \sqrt{2} \cdot \theta_2$ and $\theta_2$ is as defined in Proposition 2, primary retailers prefer a channel that includes outlet stores to one with only primary retailers.*

Since $\theta_3 > \theta_2$, the condition for primary retailers to benefit from dual distribution is strictly less binding than that for manufacturers. Thus, whenever manufacturers benefit from outlet stores, so do primary retailers. In addition, there are parametric conditions where primary retailers benefit from outlet mall distribution but manufacturers do not (i.e. when $\theta_2<\theta<\theta_3$). The basis for this unusual finding is that the margin for primary retailers is higher in the presence of outlet stores (than in their absence) and it 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 respect to 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 store distribution is $(-2\theta\lambda/3)$, while the partial derivative with no outlet stores is $(-2\theta\lambda/3)(\lambda t_L^2/\tau^2)$, and the latter is less than the former in absolute value. Thus, the primary retailers benefit more from the implementation of outlet mall distribution as θ rises than do manufacturers. Clearly, for $\theta_2<\theta<\theta_3$, manufacturers will not voluntarily set up distribution in outlet malls. A natural question in this situation is to ask what retailers might do given that they can benefit from outlet mall distribution. One option for primary retailers might be to lobby or otherwise convince manufacturers to set up outlet mall stores; however, this approach is unlikely to be successful given that manufacturers' profits drop. An alternate and more interesting option might be for primary retailers to establish outlet mall distribution themselves. While manufacturers obtain stock for their outlet mall stores at marginal cost (since the outlet mall stores are 'manufacturer' outlet stores by definition), primary retailers would have to supply their outlet mall stores at a cost of $w^*_{NOUT}$, the equilibrium wholesale price in the no-outlet-store case. We have identified areas of parameter space where it is possible for primary retailers to increase their profits through such a transfer (given $w^*_{NOUT}$). However, this observation does not affect the optimal channel policy for manufacturers. Even if the conditions are such that retailers open outlet stores when manufacturers do not, manufacturers' profits would be unchanged assuming they maintained a wholesale price of $w^*_{NOUT}$. In fact, manufacturers' profits would strictly increase were this scenario to materialize, since the optimal wholesale price would exceed $w^*_{NOUT}$.

While not the focus of this research, these findings provide a rationale for the decision (under certain conditions) of primary retailers to take segmentation into their own hands. Clearly, retailers can be motivated to serve markets through two differentiated channels (at different price and service levels) even when faced with fierce competition and identical wholesale prices for both channels. When this happens, the incentive for the manufacturers to open outlet stores is eliminated, because manufacturers benefit from both reduced price competition in the primary market and product being sold to Lows at higher prices in the outlet malls (i.e. not at marginal cost).

Given these insights, it is not surprising that outlet malls have grown rapidly with scarce opposition from primary retailers. This channel structure, when implemented, seems to be a win-win situation for both channel members.

## 4.5 Outlet Malls: An Artifact of Decentralized Primary Channels?

We assume above that primary retailers, who provide high service, are independently owned, and thus the primary retail channel is decentralized. Empirical evidence suggests that in the apparel industry, manufacturer-owned upscale boutiques in prime retail locations (like the North Michigan Avenue area in Chicago) are in fact, quite common.[20] 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 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? To address these questions, we consider the equilibrium when manufacturers have vertically integrated the primary channel.

Equilibrium values of retail prices, retail service levels, and manufacturer profits in a vertically integrated channel under no outlet stores and outlet stores are reported in Table 4. Several observations can be made when comparing these results with those of Tables 2 and 3. First, equilibrium service levels are equal across the two channel structures; however, retail prices are strictly lower in the vertically integrated structure than under decentralization. Second, the margins enjoyed by manufacturers are independent of the level of $\theta$; in the case of no outlet stores, the margin is $\frac{t_H t_L}{\tau}$, and in the case of outlet stores, it is $t_H$. These results can be used to help us to understand the implications of Proposition 4. Proposition 4 shows that vertically integrated manufacturers have *stronger* incentives to sell through outlet stores than do manufacturers operating in a decentralized channel.

[20] Some examples of manufacturer-owned stores in the North Michigan Avenue area (the prime retail space in Chicago) are 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 refers to several top fashion apparel manufacturers who sell products directly to consumers through company owned stores.

**Table 4**

**Equilibrium Outcomes with Vertically Integrated Primary Retailers**

| | EQUILIBRIUM OUTCOME | |
|---|---|---|
| **VARIABLE** | **NO OUTLET STORES** | **OUTLET STORES** |
| Authorized retail prices ($p_1$=$p_2$) | $\frac{t_H t_L}{\tau}+c$ | $t_H+c$ |
| Authorized service levels ($s_1$=$s_2$) | $\frac{\theta t_L \lambda}{6\tau}$ | $\frac{\theta\lambda}{6}$ |
| Manufacturer profit ($\Pi_{M1}$=$\Pi_{M2}$) | $\frac{t_H t_L}{2\tau}-\frac{\theta^2 t_L^2 \lambda^2}{36\tau^2}$ | $\frac{t_H\lambda}{2}-\frac{\theta^2\lambda^2}{36}$ |

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

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

Because $\theta_2$ 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 than by manufacturers whose retail outlets are decentralized. The intuition for this result obtains by remembering that a key benefit provided by outlet stores is a reduction in price competition. In a decentralized channel, the benefits of reduced price competition accrue to both primary retailers and manufacturers. In other words, the manufacturer is not the full beneficiary of outlet mall distribution in a decentralized channel: the primary retailers benefit too. In contrast, a vertically integrated manufacturer is the full beneficiary of outlet-store retailing and this explains why the "outlet store" zone is larger under vertical integration.

The perceptive reader may have noticed that the area of preference for outlet stores by vertically integrated manufacturers is identical to the area of preference for outlet stores by primary retailers in a decentralized structure. Ostensibly, this result seems unusual; however, the previously mentioned invariance of manufacturer margins to the level of θ provides us with a basis for explaining it.

Regardless of whether the channel is vertically integrated or not, the principal force driving pricing in the retail outlets of our model is the price sensitivity of consumers (i.e. $t_H$ and $t_L$). This obtains because our model reflects a highly competitive market in which all consumers buy and the only way to increase share is at the expense of the competitor. As a result, manufacturer margins in a vertically integrated channel are identical to primary retail margins when the channel is decentralized. This explains why the areas of preference for outlet stores by vertically integrated manufacturers and primary retailers (in a decentralized structure) are identical. The attractiveness of outlet-store retailing obtains from the benefit of reducing price competition at the expense of higher service competition. In some sense this represents a balancing of the added cost of service with the added margin associated with a primary market comprised solely of Highs. Because both the vertically integrated manufacturers and primary retailers consider identical margins and identical service cost functions, it follows that their preferences for outlet stores should also be identical.

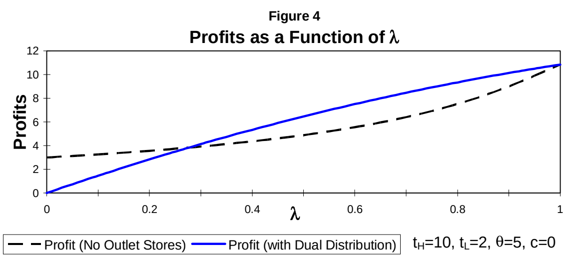
## 4.6 The Impact of the Distribution of Consumers on the Attractiveness of Outlet Stores

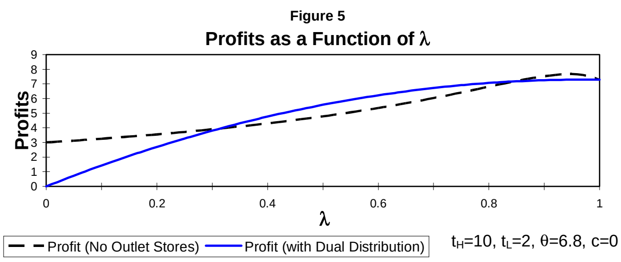
In this section, we return to the model with decentralized primary retailers and consider the effects of changes in λ (the proportion of consumers who are Highs) on the viability of outlet-store retailing. Our analysis shows that the attractiveness of outlet stores is heavily dependent on the distribution of consumers in the marketplace. However, the relationship of λ to the attractiveness of outlet stores is complex, as shown in Proposition 5:

**Proposition 5.** *When λ=0 (all consumers are Lows), dual distribution with outlet stores is strictly less profitable than selling only through primary retail channels. When λ=1 (all consumers are Highs), manufacturer profits are equal with or without outlet stores. If outlet stores are profitable for some interior value $\lambda^*$, then there exists a λ' $(0<\lambda'<\lambda^*)$ below which outlet stores are strictly less profitable than is selling through the primary market alone.*

The results concerning λ=0 and λ=1 are endpoints but they provide insight for understanding the second part of the proposition. Obviously, if all consumers are Lows (λ=0), selling at marginal cost through outlet stores is strictly less profitable than keeping Lows in the primary market at positive per-unit profits. And, if all consumers are Highs (λ=1), the outlet mall has no role to play, since no consumers will shop at outlet malls even if product is made available there. If we gradually increase the percentage of Highs from a population is made up entirely of Lows, the difference between the profits without an outlet mall and the profits with an outlet mall will get smaller. 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 (θ=5 in Figure 4 and θ =6.8 in Figure 5). We have chosen the parameters such that for some values of λ, outlet stores are advantageous (the spread between $t_H$ and $t_L$ is sufficient and θ is not too high).




As discussed, the option of outlet mall distribution becomes more attractive as λ increases from a low value. The intuition for this is that when λ is very small, the market is made up almost entirely of Lows, so manufacturers cannot afford to send them to the outlet mall. Increases in λ mean that Lows make up a smaller proportion of consumers. As a result, the lost margin associated with Lows shopping at an outlet mall is less, and the gain associated with serving increased numbers of Highs at higher prices is more attractive. In both examples shown above, 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. At first glance, this seems to go against the logic of the previous paragraph. However, if we remember that the force limiting the attractiveness of outlet-store retailing is "over-competition" in service, we can explain the reversal. The degree of "over-competition" is primarily a function of θ but referring to the values in Table 2, it is also affected by λ. When θ is sufficiently high (in the example above ≈5.9), and λ gets sufficiently close to 1, "service competition" is sufficiently intense that manufacturers prefer to keep the Lows in the primary market.

This relationship between λ and the optimal strategy with respect to outlet stores is consistent with the overall increase in the pervasiveness of outlet stores in luxury/fashion goods in western countries (as mentioned above, there are currently 325 outlet malls in operation in the United States). These countries are now faced with the aging of their populations. As noted by Foot with Stoffman (1996), "quality and service are the retail watchwords for an older population…a much larger percentage of the population than before will be of the age group that insists on quality and service" (p.87). In a market with few price-insensitive consumers, stores whose primary emphasis is price (and not service) like *Wal-Mart, Price Club* and *Home Depot* should thrive at the expense of higher-priced stores that offer more service. However, an older population will shift the focus for many products away from mass merchandisers to smaller shops that emphasize quality and personalized service. Foot with Stoffman (1996) mention that "One manufacturer who knows how to prosper in an older marketplace is Armani…Armani understands that the magic words quality and service apply just as much to clothes as any other product in the retail world of the 1990's" (p.95).

In the context of this model, this change can be reflected as an increase in $\lambda$ (or the fraction of the population that places high value on in-store service). Naturally, many manufacturers of fashion apparel primarily offer their products through smaller shops that emphasize quality and personalized service, or through their own areas in upscale department stores. However, as the market evolves, our model explains why manufacturers have significant incentives to consider the advantages of dual distribution by opening shops in outlet malls.

We next provide some evidence based on data collected at fashion-goods retailers in the Chicago metropolitan marketplace. Our objective is to present empirical evidence that is supportive of both the assumptions and predictions developed in this paper.

# 5. Empirical Evidence on Outlet Malls and Primary Retailers

### 5.1 History of Outlet Stores and Today's Outlet Malls[21]

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 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; however, 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 $12 billion in revenue from 325 outlet malls by the end of 1997. The number of outlet malls has 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. Growth has been particularly strong during the 1990's, with outlet mall sales of $6 billion in 1990, $6.3 billion in 1991, $9.9 billion in 1993, and $12 billion in 1997.

Outlet malls today offer a mix of manufacturer outlet stores, department store outlets and non-outlet service locations (such as film developing stores, for example). Table 1 reports the percentage of stores in Chicago-area outlet malls that are manufacturer-branded stores, and the data suggest that they are easily the majority of the tenants at outlet malls.

With this industry overview in mind, we now turn to a discussion of some primary data collection done in the Chicago marketplace. The data are descriptive of the outlet-mall environment in a major U.S. city, and show patterns consistent with the factors identified as important in our model.

### 5.2 Primary Data Collection: The Chicago Outlet Store Marketplace

[21] 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.

The data discussed in this section were collected in late 1998 by surveying two outlet malls (that serve the Chicago area) and corresponding "manufacturer" primary retailers in metropolitan Chicago. The survey was restricted to fashion apparel manufacturers who have outlets at either Prime Outlets in Kenosha, Wisconsin, and Gurnee Mills in Gurnee, Illinois[22]. Table 5 reports information on the 16 stores that we sampled. Seven of the 16 outlet stores are run by manufacturers that are vertically integrated into primary retailing, suggesting the importance of modeling both decentralized and vertically integrated retailing operations in primary markets.[23]

Of the 16 stores, 13 offer either only current-season or a combination of current-season and off-season merchandise. Jones New York in fact prides itself on offering current-season merchandise; the store clerks emphasize this fact to interested consumers. Outlet-store managers openly discuss the policy of their store with respect to the availability of current-season merchandise. During our survey we found that when an outlet's policy is to distribute items that have already been available for a period of time at primary retailers, the manager will frequently encourage consumers to return later when the items will become available. The manufacturers seem to purposefully plan for outlet-mall retailing and aggressively promote outlet-store goods to consumers who make the effort to come to an outlet mall.

**Table 5**

**Outlet Stores Sampled in the Chicago Area, Nov/Dec. 1998**

| Store | Vertically Integrated at Primary Outlet? | Average % Price Discount at Outlet Store(1) | Delay in Availability of Product at Outlet Store (2) |
|---|---|---|---|
| Anne Klein | No | 36% | Mixed |
| Brooks Brothers | Yes | 30% | Mixed |
| Dana Buchman | No | 0% | Delay |
| Donna Karan, DKNY | No | 5% | Mixed |
| Gap | Yes | 33% | Mixed |
| Izod | No | 26% | Mixed |
| J. Crew | Yes | 36% | Mixed |
| Jones New York | No | 9% | Current |
| Kasper | No | 20% | Current |
| Liz Claiborne | No | N/A | Delay |
| Nautica | No | 47% | Mixed |
| Osh Kosh | No | 25% | Current |
| Polo Ralph Lauren | No | 29% | Mixed |
| Tahari | No | 40% | Delay |
| Timberland | Yes | 42% | Mixed |
| Tommy Hilfiger | Yes | 20% | Mixed |

SOURCE: primary data collection by authors.

**NOTES:**

(1) This is the average % discount at the outlet mall relative to the *prevailing* price at the primary retailer.

(2) "Current" means that the merchandise in primary retailers is sold simultaneously at the outlet store. "Mixed" means that some merchandise is concurrently available in both the primary retailer and the outlet store, while other primary-retail merchandise is only available at the outlet after a delay. "Delay" means that merchandise is *only* distributed through the outlet store after a delay.

The issue of delay in product availability deserves comment here, as our model assumes that identical product is simultaneously available at both primary retailers and outlet stores. The basic idea behind the assumption of simultaneous availability of product in both

[22] Price comparison data is based on a basket of at least 3 items that were available within the same week at both the manufacturer outlet store and a primary retailer in the Chicago area.

[23] In fact, Polo Ralph Lauren distributes through both a vertically-integrated retail store and "selected" primary retailers in Chicago.

channels is that geographic differentiation of the outlet mall from the primary market is sufficient to create segmentation in the market (Lows will go the outlet malls and Highs will not). However, in certain cases, geography may be insufficient to achieve this separation (Highs might be willing to drive to the outlet mall if the latest fashions are available and the savings are high). In this situation, it is possible for manufacturers to create differentiation between the primary market and the outlet mall based on two dimensions: geography (the distance to the outlet mall) and time (a consumer needs to wait several weeks or maybe months to buy a specific item at the outlet store). Because *price insensitive* Highs are the consumers most likely to demand the latest fashions, this policy is an additional option for manufacturers to ensure "effective segmentation"[24]. Consistent with this observation, the mixed strategy (observed at 7 of the locations in the survey) suggests that time differentiation is important on items that are perceived to be "fashion statements". In these locations, "staple" items such as Ralph Lauren men's chino pants, or the Izod alligator-logo polo shirt are available concurrently at both primary retailers and outlet malls. In contrast, fashion-forward items become available at the outlet store only after a time delay.

We found that the average percentage price discount at the outlet mall across all stores was 27 percent. Some stores offered savings of more than 40% over primary retail prices; however, 3 of the 16 stores offered savings of less than 10% and this merits an explanation. Naturally, all survey data is subject to random error as primary-retailer clearance prices or promotions may create circumstances where prices at a primary retailer are temporarily lower than the prices at an outlet store. In addition, on specific items, there may be an incentive for opportunistic outlet stores to capitalize on consumers who are not well informed about prices.

We infer from the data that outlet-store prices are often close to the primary retailer's marginal cost, since the standard pricing policy in apparel is a mark up of 50 percent on retail price (i.e. 100 percent on the cost of goods sold). The manufacturer's margin on outlet-store merchandise is probably not zero, but is not large when the costs of running the outlet-store are taken into account. Similar to the F.J.M. example discussed earlier, this survey provides evidence of fierce price competition at the outlet malls.

We also make some general comments about the service environment at the outlet stores versus that of primary retail outlets. Sales clerks at outlet stores, while few in number, are pleasant and outlet stores now have dressing rooms. Nonetheless, it is up to the shopper to match items of clothing and the retail environment is much less luxurious than an upscale department store or boutique. Manufacturers want outlet store shopping to be a positive experience but there are significant differences with the service and attentiveness provided to customers at full-service primary retailers.

It is further instructive to think about the brands that are *not* offered through 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

[24] The authors have developed a model that examines the effectiveness of a dual channel strategy under competition where product is available in a low service channel after a delay. The alternate model (developed in the context of gray marketing) provides a similar rationale to the model developed in this paper for using a channel where the availability of merchandise is purposefully delayed.

only 9 operate outlet stores in the Chicago area[25]. We have not done an extensive survey of the customers of each of these stores, but many manufacturers without outlet stores (the Chanel Boutique, Giorgio Armani, Ermenegildo Zegna, and Hermes for example) are both exclusive and have a distinctly upscale cachet. It seems reasonable to assume that their clientele might consist primarily of Highs (i.e. $\lambda$ is close to 1). Our model shows that when $\lambda$ is close to 1, the motivation for outlet store distribution is lower (see Figure 5). 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. These lines are not as exclusively positioned and are more likely serving a mix of customers with a lower "$\lambda$", suggesting greater viability for outlet store distribution.

### 5.3 Summary of Empirical Evidence on Outlet Mall Retailing

The discussion above gives descriptive evidence of outlet-mall retailing and it provides three important pieces of support for the assumptions that underlie our analysis.

First, the information that we have collected shows that outlet malls are not merely a "dumping ground" for overstocks and end-of-season leftover merchandise. Instead, the data we have collected indicate that outlet-mall retailing is a purposeful alternative channel strategy to standard retailing through primary retail channels.

Second, the information available from public sources and evidence we have collected in the Chicago area clearly indicates that outlet malls are purposely located away from city centers and in most cases, a significant driving distance from primary shopping locations. There is clearly a significant "time cost" associated with making a trip to an outlet mall and this is what "insulates" primary retailers from the competitive effects of outlet malls (at least, for an important group of price insensitive customers).

Third, our survey provides strong empirical support for the lower levels of both prices and service provided at outlet malls. The prices at outlet malls are consistently lower with an average of saving on items surveyed of 27%. Even with a small sample of 16 stores, the price difference is substantial with three of the outlets offering savings of more than 40% over prices at primary retailers. It is clear that both the proximity of manufacturers' outlets stores to one another and the expectations of consumers who come to outlet malls drive the margins at outlet stores to low levels.

Industry data and observations regarding both the size and sophistication of outlet malls suggest that outlet-store retailing is here to stay. There has been tremendous growth in the number of outlet malls over the last decade and numerous manufacturers have made a significant commitment to outlet mall distribution. In addition, there is significant room for further growth as outlet malls account for only 2% of total retail sales in the U.S. and are relatively undeveloped in other countries.

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

# 6. Conclusion

To conclude our discussion we return to the questions that were suggested in the first section of our paper. First, when does it make sense for a manufacturer to pursue a multiple-channel retailing strategy? We have focussed our analysis of this question on dual distribution strategies where one of the channels is a low-service/low-price channel. Second, is the decision to use multiple channels driven mainly by the degree of consumer heterogeneity or is the determinant of the optimal channel strategy more complicated than a simple measure of consumer 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 the channel to serve them.

Before summarizing our answers to these questions, we should emphasize that our intention is to look at a motivation for these channels that relies on the way in which they affect competition between manufacturers and more specifically, competition in the primary "full service" channel. It is certainly true that many justifications can be found for the creation of low-service/low-price channels such as market expansion or stochastic inventory control. However, we wish to focus on how serving a segment of price-sensitive/service-insensitive customers through a low-service/low-price channel affects the profits of competitive manufacturers (and retailers), above and beyond these factors.

There is clearly an argument for segmented distribution that follows from trying to serve a market that is heterogeneous in terms of both service and price sensitivities. Outlet malls are a quintessential example of a low service/low service channel that appears to "attract" a specific type of consumer. In this paper, we argue that the situation might also apply to the recent phenomenon of consumer trade shows and perhaps even to gray markets. Our model suggests 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 the consumers are in this market. We contend that a fundamental difference between customers in many markets is their "cost of time" (or their opportunity 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 a 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 since these services can help consumers to complete their shopping more quickly. In contrast, a consumer with a low cost of time not is willing to pay extra for a fawning service assistant.

We find that the relative importance of price versus service sensitivity (as measures of consumer heterogeneity) drive the predictions of our model and ultimately the optimal channel structure. We find that that when price sensitivity is the primary dimension of heterogeneity in a market (and service sensitivity differences are less important), implementing outlet mall distribution has 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 switch channels) and additional costs of providing higher service. When customers with a low cost of time are more price sensitive than service sensitive, they 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 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 customers who remain with high levels of service. It is interesting that even when a market is extremely heterogeneous but mainly in terms of service sensitivity, it is disadvantageous for a manufacturers to segment their market (at least from a distribution perspective). Segmentation in this situation has the potential to worsen "money-burning" service competition by primary retailers for consumers who remain in the primary channel.

We have also analyzed several model extensions to expand our understanding of the viability and operation of outlet stores. We show that vertically integrated manufacturers (i.e. manufacturers who own the retail location in the primary market) 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 function and retail pricing.

The model also provides a compelling explanation for the growth of outlet malls on a macro level that is based on the natural evolution of an aging population. This suggests that in future research, cross-category comparisons might yield useful insights for better understanding the relationship between customer heterogeneity, a customer's "cost of time" and the incidence of dual distribution with discount outlets as well as full-service, full-price outlets.

Finally, we have focussed 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, e.g. the consumer trade shows described in the introduction or even gray markets, where authorized branded product flows through unauthorized (and usually lower-service) channels. In these institutional situations, as well as in the outlet-mall situation, other factors also play a role; but this does not negate the role of the discount channel in providing a means of balancing price and service competition.

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Technical Appendix for "Good Marketing to Bad Consumers: Outlet Malls, Gray Markets and Warehouse Sales"

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

*Solution Procedure:*

The solution procedure for both the "with outlet stores" and "no outlet stores" cases is the same, and follows 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.

We also need to verify that the second-order conditions (SOC's) hold and that the solutions are stable:

*Second-Order Conditions (SOC's), No Outlet Stores:*

The SOC's for retail price in the absence of Outlet Stores are:

$$\frac{\partial^2 \Pi_{R1}}{\partial p_1^2} = \frac{\partial^2 \Pi_{R2}}{\partial p_2^2} = -\frac{\lambda}{t_H} - \frac{(1-\lambda)}{t_L} < 0 \ , \ \frac{\partial^2 \Pi_{R1}}{\partial p_1 \partial p_2} = \frac{\partial^2 \Pi_{R2}}{\partial p_2 \partial p_1} = \frac{\lambda}{2t_H} + \frac{(1-\lambda)}{2t_L}$$

$$\det \begin{vmatrix} \frac{\partial^2 \Pi_{R1}}{\partial p_1^2} & \frac{\partial^2 \Pi_{R1}}{\partial p_1 \partial p_2} \\ \frac{\partial^2 \Pi_{R2}}{\partial p_2 \partial p_1} & \frac{\partial^2 \Pi_{R2}}{\partial p_2^2} \end{vmatrix} = \frac{3}{4}\left[\frac{\lambda}{t_H} + \frac{(1-\lambda)}{t_L}\right]^2 > 0 \ .$$

Thus, SOC's and the Routh-Herwitz conditions are met for retail prices.

The SOC for service requires that:

$$\frac{\lambda^2 t_L \theta^2 - 18 t_H \tau}{9 t_H \tau} < 0 \ \Rightarrow \theta < \frac{3}{\lambda}\left[\frac{2 t_H \tau}{t_L}\right]^{\frac{1}{2}},$$

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

Meanwhile, the SOC for wholesale price requires that:

$$\frac{3 t_H^2 \tau^2 \left(\theta^2 t_L \lambda^2 - 9 t_H \tau\right)}{t_L} < 0 \qquad \Rightarrow \theta < \frac{3}{\lambda}\left[\frac{t_H \tau}{t_L}\right]^{\frac{1}{2}} \ , \quad \text{a stricter condition.}$$

*Second-Order Conditions (SOC's) with Outlet Stores:*

The SOC's for retail price in the presence of outlet mall distribution are:

$$\frac{\partial^2 \Pi_{R1}}{\partial p_1^2} = \frac{\partial^2 \Pi_{R2}}{\partial p_2^2} = -\frac{\lambda}{t_H} < 0 \quad , \quad \frac{\partial^2 \Pi_{R1}}{\partial p_1 \partial p_2} = \frac{\partial^2 \Pi_{R2}}{\partial p_2 \partial p_1} = \frac{\lambda}{2 t_H}$$

$$\det \begin{vmatrix} \frac{\partial^2 \Pi_{R1}}{\partial p_1^2} & \frac{\partial^2 \Pi_{R1}}{\partial p_1 \partial p_2} \\ \frac{\partial^2 \Pi_{R2}}{\partial p_2 \partial p_1} & \frac{\partial^2 \Pi_{R2}}{\partial p_2^2} \end{vmatrix} = \frac{3}{4}\left[\frac{\lambda}{t_H}\right]^2 > 0 \ ,$$

thus satisfying the Routh-Herwitz conditions.

The SOC for service requires that:

$$\frac{\lambda \theta^2 - 18 t_H}{9 t_H} < 0 \qquad \Rightarrow \theta < 3\left[\frac{2 t_H}{\lambda}\right]^{\frac{1}{2}} \ .$$

Meanwhile, the SOC for wholesale price requires that $\frac{3\lambda}{\theta^2 \lambda - 9 t_H} < 0 \Rightarrow \theta < 3\left[\frac{t_H}{\lambda}\right]^{\frac{1}{2}}$, a stricter condition.

Further, note that $\theta < 3\left[\frac{t_H}{\lambda}\right]^{\frac{1}{2}}$ is a stricter constraint than the analogous one from the "no outlet stores" case, $\theta < \frac{3}{\lambda}\left[\frac{t_H \tau}{t_L}\right]^{\frac{1}{2}}$ . In the model exposition throughout the paper, we therefore impose this condition.

*Stability of the Retailer Service/Pricing Sub-Game:*

Any equilibrium solution must be stable to infinitesimal "trembles" in the choice variable by either firm[26]. This entails examining the reaction functions for service and verifying that their intersection is rationalizable in the sense of Bernheim (1984) and Pearce (1984). Using the first order conditions, the reaction functions (in terms of service) for the two service providers without outlet stores are:

*Service Provider 1*

$$s_1 = \frac{\lambda^2 t_L \theta^2}{\lambda^2 t_L \theta^2 - 18 t_H \tau} s_2 - \frac{3 t_H t_L \lambda\theta}{\lambda^2 t_L \theta^2 - 18 t_H \tau}$$

*Service Provider 2*

$$s_2 = \frac{\lambda^2 t_L \theta^2}{\lambda^2 t_L \theta^2 - 18 t_H \tau} s_1 - \frac{3 t_H t_L \lambda\theta}{\lambda^2 t_L \theta^2 - 18 t_H \tau}$$

and with outlet stores:

*Service Provider 1*

$$s_1 = \frac{\lambda\theta^2}{\lambda\theta^2 - 18 t_H} s_2 - \frac{3 t_H \lambda\theta}{\lambda\theta^2 - 18 t_H}$$

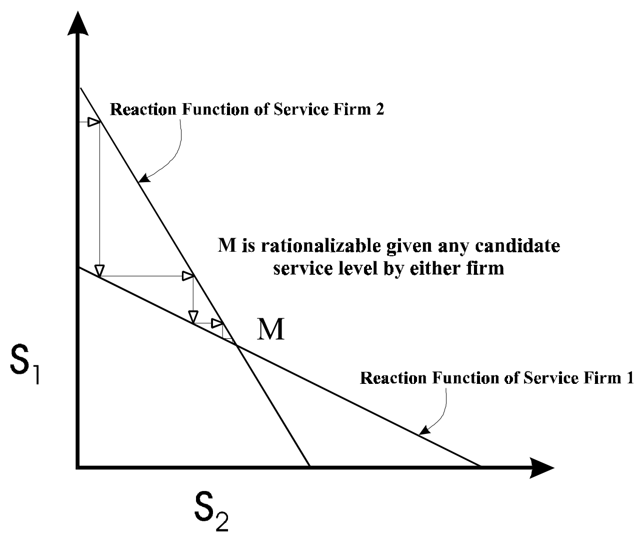
*Service Provider 2*

$$s_2 = \frac{\lambda\theta^2}{\lambda\theta^2 - 18 t_H} s_1 - \frac{3 t_H \lambda\theta}{\lambda\theta^2 - 18 t_H}$$

In both the without and with outlet store cases, a plot of the service reaction functions yields a picture similar to Figure 1. We show a case in which the Nash equilibrium at M (determined by the intersection of the reaction functions) is rationalizable.

Figure 1

**Reaction Functions of the Service Providers (in terms of Service)**




[26] The concept of Trembling Hand Perfection [Selten (1975)] is useful in this framework to avoid unstable fixed points that may occur when transportation costs are low.

In Figure 1, through an iterated elimination of strategies, the only feasible equilibrium is found at M. A necessary condition for a rationalizable equilibrium is that the reaction function of Service Provider 1 intercepts the ordinate below the intercept for the reaction function of Service Provider 2 and vice versa. In the case of no outlet stores, this is ensured when $\theta < \frac{3}{\lambda}\left(\frac{t_H \tau}{t_L}\right)^{1/2}$. When there are outlet stores, this is ensured when $\theta < 3\left(\frac{t_H}{\lambda}\right)^{1/2}$. In either case, if θ exceeds these limits, the equilibrium point M (if it exists), is not rationalizable and a corner solution results in which one firm is locked out of the market. However, the previously discussed second order conditions on manufacturer wholesale prices (which ensure concavity of the manufacturers' profit functions) rule out the values of θ associated with asymmetric equilibria (in both the absence and presence of outlet stores). Accordingly, we restrict our attention to equilibrium found by identifying the intersection of the retailer reaction functions for the balance of the analysis.

Proof of 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.**

To prove this proposition, there are 4 steps. First, show that prices at the outlet mall are marginal cost given that product is available there. Second, identify the maximum limit of $d_{MAX}$ such that Lows will be willing to make the trip to shop there. Third, identify the minimum limit for $d_{MIN}$ such that Highs will always prefer to stay in the primary retail market. Fourth, prove that the maximum limit for *d* always exceeds the minimum limit *d* given a feasible set of exogenous parameters.

*Step 1*

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 $\mu_k$, such that $lim_{k\to\infty}\,\sigma^k = \sigma$ and $\mu = lim_{k\to\infty}\,\mu^k$ 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.

In other words, using Sequential Equilibrium, a sequence of mixed strategies cannot be found that converge to the strategy combination where one manufacturer implements outlet store distribution and the other does not[27]. Only the equilibrium where both manufacturers implement outlet store distribution survives the refinement.

*Step 2*

Given step 1, when product is available at the outlet mall, the price ($p_{OUT}$) is equal to marginal cost. For Lows to make the trip to the outlet mall, equation 8 in the main text must be satisfied. Substituting the value for $p_{1A}$ from Table 2 and marginal cost for $p_{OUT}$ in equation 8, we obtain: $V_L - 4t_H + \frac{\lambda\theta^2}{3} - c < V_L - dt_L - c \;\Rightarrow\; d < \frac{4t_H}{t_L} - \frac{\lambda\theta^2}{3t_L} = d_{MAX}$ .

*Step 3*

Given step 1, when product is available at the outlet mall and using the same assumptions as in Step 2, 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 marginal cost for $p_{OUT}$ into equation 4, we obtain:

$$V_H + \frac{\theta^2\lambda}{6} - \frac{t_H}{2} - 4t_H + \frac{\lambda\theta^2}{3} - c > V_H - d\,t_H - c \;\Rightarrow$$

$$d > \frac{9}{2} - \frac{\theta^2\lambda}{2t_H} = d_{MIN} \; .$$

*Step 4*

For *d* to exist such that the conditions derived in Steps 2 and 3 are satisfied, it is necessary that $d_{MIN}<d_{MAX}$. Using steps 2 and 3 $\Rightarrow \frac{4t_H}{t_L} - \frac{\lambda\theta^2}{3t_L} > \frac{9}{2} - \frac{\lambda\theta^2}{2t_H}$.

[27] This concept also implies that even when profits in the primary market do not increase, there may be times when outlet mall distribution is an equilibrium. Strictly speaking, there is a thin band in the parameter space where "no outlet mall distribution" yields higher profit but manufacturers find themselves in a Prisoners' Dilemma where they both implement outlet mall distribution. The magnitude of this band is always small but depends on the actual location of the outlet mall. At $d_{max}$, the band disappears completely.

$\Rightarrow \lambda(3t_L - 2t_H)\theta^2 > 27t_H t_L - 24t_H^2$. 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 ∃ θ>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 ∃ θ>0 that satisfies this inequality because the numerator and the denominator of the right hand side of the inequality are negative.

**Q.E.D.**

## The Relationship of Service Sensitivity to the Width of the Allowable Zone for Outlet Malls

The width of the allowable zone for outlet stores is, in some sense, a measure of how easy it is to find a suitable location for an outlet mall. The width of the allowable zone is given by $d_{MAX}$ -$d_{MIN}$. Substituting from above:

$$d_{MAX} - d_{MIN} = \frac{1}{6t_H t_L}\left\{3t_H(8t_H - 9t_L) + \lambda\theta^2(3t_L - 2t_H)\right\}$$

$$\therefore \frac{\partial[d_{MAX} - d_{MIN}]}{\partial\theta} = \frac{\lambda\theta(3t_L - 2t_H)}{3t_H t_L} \Rightarrow \forall t_L > \frac{2}{3}t_H, \frac{\partial[d_{MAX} - d_{MIN}]}{\partial\theta} > 0 \text{ and,}$$

$$\forall t_L < \frac{2}{3}t_H, \frac{\partial[d_{MAX} - d_{MIN}]}{\partial\theta} < 0.$$

**Proof of Lemma 1.**

*Wholesale prices in the outlet stores and no-outlet store cases have the following relationship:* $w_{OUT}^* \underset{<}{\geq} w_{NOUT}^*$ as $\theta \underset{>}{\leq} \theta_1$, where $\theta_1 = 3\cdot\left[\frac{t_H\tau(\tau - t_L)}{\lambda(\tau^2 - \lambda t_L^2)}\right]^{\frac{1}{2}}$ and $\tau = \lambda t_L + (1-\lambda)t_H$. *Further, both wholesale prices are positive for this value of* $\theta$.

Using the equilibrium values in Table 2, we have that:

$$w_{OUT}^* > w_{NOUT}^* \Rightarrow 3t_H - \frac{\lambda\theta^2}{3} + c > \frac{3t_H t_L}{\tau} - \frac{\theta^2 t_L^2 \lambda^2}{3\tau^2} + c$$

$$\Rightarrow \theta^2 \cdot \frac{\lambda}{3} \cdot \left[1 - \frac{\lambda t_L^2}{\tau^2}\right] < 3t_H \cdot \left[1 - \frac{t_L}{\tau}\right] \Rightarrow \theta^2 < \frac{9t_H\tau}{\lambda} \cdot \left[\frac{\tau - t_L}{\tau^2 - \lambda t_L^2}\right],$$

which leads directly to $\theta < 3 \cdot \left[ \frac{t_H \, \tau(\tau - t_L)}{\lambda(\tau^2 - \lambda \, t_L^2)} \right]^{\frac{1}{2}} \equiv \theta_1$ . The inequality is reversed for $w_{OUT}^* < w_{NOUT}^*$.

**Q.E.D.**

**Proof of Lemma 2.**

*If retailers could collude on the provision of service, the optimal level of service would be zero. Service levels in a competitive primary retail market without outlet stores are inefficiently high relative to the collusive level, and service levels in a competitive primary retail market in the presence of outlet stores are even higher than those without outlet stores. Further, the departure from collusive service levels increases with θ, the service sensitivity of the High segment.*

The collusive solution procedure for both 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.**

*When* $\theta < \theta_2, where \theta_2 = \frac{3}{\lambda} \cdot \left[ \frac{\tau^2 \lambda t_H - \tau t_H t_L}{\tau^2 - t_L^2} \right]^{\frac{1}{2}}$ *and τ is as defined in Table 2, manufacturers have a profit incentive to sell through outlet stores as well as through primary retailers.*

Manufacturers have a profit incentive to implement outlet mall distribution when $\Pi_{M,OUT}^{*} > \Pi_{M,NOUT}^{*}$ (where the superscript asterisk denotes equilibrium). Using the values from Table 2, this implies after some algebraic manipulation that:

$3t_H\lambda - \frac{\lambda^2\theta^2}{3} - \frac{3t_H t_L}{\tau} + \frac{\theta^2 t_L^2 \lambda^2}{3\tau^2} > 0$, which can be solved for θ to produce

$$\theta < \frac{3}{\lambda}\cdot\left[\frac{\tau^2\lambda t_H - \tau t_H t_L}{\tau^2 - t_L^2}\right]^{\frac{1}{2}} \equiv \theta_3 .$$

Note that for $\theta_3$ to be real, $(\tau^2\lambda t_H - \tau t_H t_L)$ must be positive (note that $\tau^2 - t_L^2 > 0$ by the definition of $\tau = \lambda t_L + (1-\lambda)t_H$ ; a fortiori, $\tau > t_L$). Thus, for $\theta_3$ to be real, we require that

$\tau\cdot t_H\cdot(\tau\lambda - t_L) > 0 \Rightarrow \lambda(1-\lambda)t_H - (1-\lambda^2)t_L > 0 \;\Rightarrow\; t_H > \left(\frac{1+\lambda}{\lambda}\right)t_L$ , as footnote 15 asserts.

**Q.E.D.**

**Proof of Lemma 3.**

*$\theta_1 > \theta_2$ , so that outlet-mall wholesale prices exceed no-outlet-mall wholesale prices whenever outlet stores are optimal for the manufacturers. However, there is also a range where outlet-store retailing is not optimal for manufacturers, even though wholesale prices under outlet-store retailing exceed those under no outlet stores.*

Using Lemma 1, wholesale prices (in the primary market) when outlet store distribution is implemented, exceed wholesale prices in the absence of outlet store distribution for all $\theta < \theta_1$. $\theta_2 < \theta_1$ if

$$\frac{3}{\lambda}\cdot\left[\frac{\tau^2\lambda t_H - \tau t_H t_L}{\tau^2 - t_L^2}\right]^{\frac{1}{2}} < 3\cdot\left[\frac{t_H\tau(\tau - t_L)}{\lambda(\tau^2 - \lambda t_L^2)}\right]^{\frac{1}{2}} \;\Rightarrow\; \frac{\tau\lambda - t_L}{\lambda(\tau^2 - t_L^2)} < \frac{\tau - t_L}{\tau^2 - \lambda t_L^2}$$
$$\Rightarrow (1-\lambda)\tau t_L[\tau - \lambda t_L] > 0 \Rightarrow\; (1-\lambda)\tau t_L[(1-\lambda)t_H] > 0 \text{, which is true}.$$

**Q.E.D.**

**Proof of 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 ).*

Outlet store distribution is more likely to increase profits for manufacturers, the higher is $\theta_2$ as defined in Proposition 2 i.e. $\theta_2 = \frac{3}{\lambda}\cdot\left[\frac{\tau^2\lambda t_H - \tau t_H t_L}{\tau^2 - t_L^2}\right]^{\frac{1}{2}}$.

Let $t_H = \alpha\cdot t_L$, $\alpha > 1$. Then if this Proposition is to be true, $\theta_2$ should be increasing in α.

Making this substitution yields (after simplification):

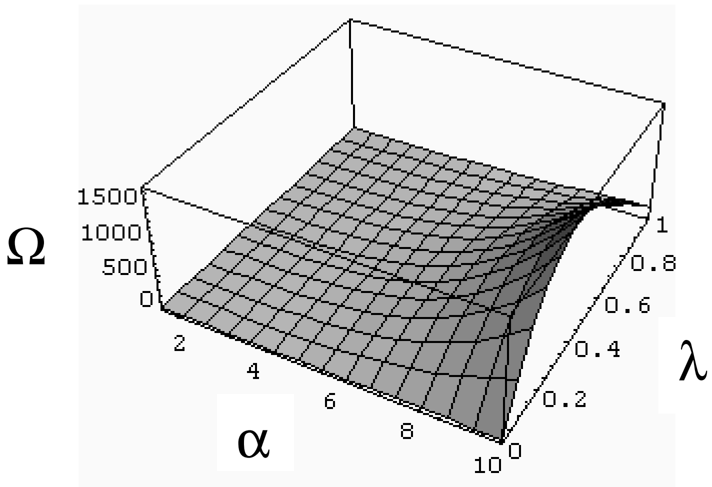
$$\theta_2 = \frac{3\sqrt{t_L}}{\lambda} \bullet \left\{ \frac{\alpha \cdot \left[\lambda(1+\lambda) + \alpha\left(1-2\lambda^2\right) - \alpha^2 \lambda(1-\lambda)\right]}{(1-\alpha) \cdot \left[1+\lambda+(1-\lambda)\alpha\right]} \right\}^{\frac{1}{2}} .$$

If the term inside the curly braces above is increasing in α, then $\theta_2$ is also increasing in α. Let the term in curly braces be denoted Z. Then:

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

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

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 $\{\alpha > 1, 0 \le \lambda \le 1\}$, it is clear by inspection that $\partial Z/\partial \alpha$ is positive. See the graph below and the accompanying table of numbers for the range $\{1 \le \alpha \le 10, 0 \le \lambda \le 1\}$.




**Values of Ω**

| | ⇐⇐ α ⇒⇒ | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| λ ⇓: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 |
| 0.1 | 2 | 4.4 | 10.6 | 25.5 | 56.2 | 111.6 | 202.7 | 342.4 | 545.3 | 828.3 |
| 0.2 | 2 | 4.8 | 14.0 | 38.0 | 88.5 | 180 | 330.1 | 559.6 | 892.4 | 1355.2 |
| 0.3 | 2 | 5.0 | 16.3 | 46.2 | 108.6 | 220.9 | 404.0 | 682.3 | 1083.8 | 1640.0 |
| 0.4 | 2 | 5.1 | 17.6 | 50.4 | 117.9 | 238 | 432.0 | 724.6 | 1144.1 | 1722.2 |
| 0.5 | 2 | 5.1 | 18 | 51.1 | 118 | 235.1 | 422 | 701.1 | 1098 | 1641.1 |
| 0.6 | 2 | 5.1 | 17.6 | 48.9 | 110.4 | 216 | 381.8 | 626.2 | 970.0 | 1436.1 |
| 0.7 | 2 | 4.9 | 16.5 | 44.2 | 96.7 | 184.4 | 319.1 | 514.2 | 784.5 | 1146.5 |
| 0.8 | 2 | 4.7 | 14.8 | 37.5 | 78.4 | 144 | 241.7 | 379.6 | 566.4 | 811.7 |
| 0.9 | 2 | 4.4 | 12.6 | 29.2 | 56.9 | 98.6 | 157.4 | 236.7 | 340.0 | 471.1 |
| 1.0 | 2 | 4 | 10 | 20 | 34 | 52 | 74 | 100 | 130 | 164 |

**Q.E.D.**

**Proof of Proposition 3.**

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

Primary retailers prefer a distribution system that includes outlet malls distribution if

$\Pi_{R,OUT}^* > \Pi_{R,NOUT}^*$ , i.e. if $\frac{t_H\lambda}{2} - \frac{\theta^2\lambda^2}{36} > \frac{t_H t_L}{2\tau} - \frac{\theta^2 t_L^2 \lambda^2}{36\tau^2}$ .

$$\Rightarrow \theta < \frac{3}{\lambda} \cdot \left[ \frac{\lambda t_H \tau^2 - t_H t_L \tau}{\tau^2 - t_L^2} \right]^{\frac{1}{2}} \cdot \sqrt{2} \Rightarrow \theta < \sqrt{2} \cdot \theta_2 \equiv \theta_3 .$$

**Q.E.D.**

**Derivation of Equilibrium Values Under Vertical Integration (i.e. Table 4)**

The solution process 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 as reported in Table 4.

**Proof of Proposition 4.**

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

For vertically-integrated manufacturers to prefer distribution which includes outlet malls, we require that $\Pi_{OUT,VI}^* > \Pi_{NOUT,VI}^*$ , where the subscript "VI" denotes "vertical integration." Using the equilibrium values from Table 4, this holds when:

$$\frac{t_H\lambda}{2} - \frac{\theta^2\lambda^2}{36} > \frac{t_H t_L}{2\tau} - \frac{\theta^2 t_L^2 \lambda^2}{36\tau^2} \Rightarrow \theta < \frac{3}{\lambda} \cdot \left[ \frac{\lambda t_H \tau^2 - t_H t_L \tau}{\tau^2 - t_L^2} \right]^{\frac{1}{2}} \cdot \sqrt{2}$$
$$\Rightarrow \theta < \sqrt{2} \cdot \theta_3 \equiv \theta_5 .$$

**Q.E.D.**

**Proof of Proposition 5.**

*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* $\lambda^*$*, then there exists a* $\lambda'$ *(*$0<\lambda'<\lambda^*$*) below which outlet stores are strictly less profitable than is selling through the primary market alone.*

When $\lambda=0$, we have from Table 3 that $\Pi_{M,NOUT}^* = \frac{3t_H t_L}{2t_H} = \frac{3}{2} t_L$ , *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:

$\Pi^*_{M,NOUT} = \frac{3t_H t_L}{2t_L} - \frac{\theta^2 t_L^2}{6t_L^2} = \frac{3}{2}t_H - \frac{\theta^2}{6}$, *and* $\Pi^*_{M,OUT} = \frac{3}{2}t_H - \frac{\theta^2}{6}$. Thus, when λ=1 (all consumers are Highs), manufacturer profits are the same whether or not they distribute product through outlet stores.

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:

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

At λ=0, $\frac{\partial Y}{\partial \lambda} = \frac{3}{2t_H} \cdot \left[ t_H (t_H - t_L) + t_L^2 \right] > 0$. Thus, although Y is clearly negative at λ=0, it is increasing at λ=0: that is, the difference between channels which include outlet mall distribution and no-outlet mall distribution is diminishing as λ rises from 0. Therefore, assuming that for some interior value, $\lambda^*$, outlet mall distribution is profitable, there must exist a critical value of λ, called λ' ($0<\lambda'<\lambda^*$) such that for all λ<λ', outlet mall distribution strictly reduces profit from what the profits that manufacturers would realize if there distribution system included only retailers in primary channels.

**Q.E.D.**

## D. Technical Appendix References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