# Return Policies and the Optimal Level of "Hassle"

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Return policies vary significantly across retailers; some offer very generous return policies, while others impose many restrictions on returns. We employ an analytical model to help identify potential causes for variation among retailers' return policies. A retailer is more likely to offer a low-hassle return policy when: 1) its products' benefits cannot be consumed in a short period of time; 2) its product line offers opportunities for cross-selling; and 3) it can obtain a high salvage value for returned merchandise. Data collected from a variety of retail stores gives support to our theoretical predictions. © 1998 Elsevier Science Inc.

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> *"Once you have their money, you never give it back."* - First Ferengi Rule of Acquisition (From Star Trek: Deep Space Nine, episode "The Nagus")
> *"If they want their money back, give it to them."* - First Ferengi Rule of Acquisition (Revised)† (From the Star Trek: Deep Space Nine, episode "The Prophet Motive")

## I. Introduction

Return policies which allow consumers to easily return products for a refund are commonly offered by retailers [Schmidt and Kernan (1985); Hart (1988); Davis et al. (1985); Moorthy and Srinivasan (1995)]. However, recently, retailers have begun to scale back generous return policies in favor of more restrictive ones. Longo (1995) has noted that:

> The easy, flexible return policies you've come to expect are quietly vanishing at many chain stores that sell home electronics, including Wal-Mart, Target, Best Buy, and Circuit City. Those retailers and others are cracking down on what they say are excessive home-electronics returns. So find out before you buy

**Table 1.** Relative Frequencies of Different Refund Policies by Store Type

| | Cash Back | | |
| --- | --- | --- | --- |
| Store Type | No Restrictions[a] | With Restrictions | Store Credit Only |
| Department store chain ($n = 10$) | 60% | 40% | 0% |
| Specialty store chain ($N = 60$) | 39% | 44% | 16% |
| Single outlet specialty stores ($N = 61$) | 19% | 37% | 44% |

[a] May or may not require a receipt.

a VCR, TV, computer or other high-tech item whether return policies where you shop have changed (Longo 1995, p. 103).

Customer abuse and a harder line by manufacturers on returns were cited as the main reasons for tighter restrictions.

These actions are not limited to the sales of home electronics. Recently, we conducted a survey of 133 stores in the Sacramento, California area. The survey shows that return policies vary significantly across different types of retailers. As shown in Table 1, some of the retailers surveyed (most often department stores) offered low-hassle return policies. Other retailers offered refunds with restrictions. These included strict time limits for returns, return of the original packaging materials, and acceptance of only those products which showed no visible signs of use. Finally, some retailers (most often single outlet stores) offered only store credit for returns, which is obviously inferior to a cash-back return, as it restricts consumers to redeeming the refund on other merchandise carried by the retailer.

Why do some retailers offer a low-hassle return policy, while others impose many restrictions? Under what circumstances should a retailer offer a low-hassle return policy? This paper provides insights to these questions by explicitly considering the optimal level of hassle with a return policy when a retailer faces opportunistic returns such as those mentioned by Longo (1995).

Earlier research has focused on product *warranties* by manufacturers to assure good product performance. Such policies usually promise to fix or replace defective products [Grossman (1981); Padmanabhan and Rao (1993); Menezes and Currim (1992); Lutz (1989); Mann and Wissink (1988, 1990)]. Return policies may also provide a way for a manufacturer or a retailer to vouch for product quality when customers cannot verify quality prior to purchase [Welling (1989); Moorthy and Srinivasan (1995); Shieh (1996)]. Mann and Wissink (1988), Lutz (1989), and Welling (1989) showed that when unverifiable consumer effort is required to maintain the product's performance, the optimal policy is to refund only part of the purchase price. However, when the primary purpose of the warranty is quality signaling in the absence of consumer moral hazard in product maintenance, full refunds tend to be optimal [Moorthy and Srinivasan (1995); Sheih (1996)].

More recently, researchers have explicitly considered money-back guarantee policies under which consumers are allowed to return merchandise for a full refund for any reason, *even if the product or service fully performs its intended functions*. In contrast to a manufacturer's warranty, which allows returns if the product is defective, a refund policy allows a consumer to obtain a refund, even if the product or service fully performs its intended functions. When such a policy is offered, consumers may have an incentive to

purchase merchandise, use it and return it, even if they are satisfied with the product [Longo (1995); Neuborne (1996)]. We refer to this behavior as *moral hazard in consumption*, as opposed to the typical use of the term "moral hazard" in the product warranty literature, which describes a consumer's incentive to under-maintain products which are covered under warranty.

Davis et al. (1995) modeled this "moral hazard in consumption" behavior. They showed that offering a full refund of the purchase price to consumers who claimed to be dissatisfied can be more profitable than selling the product, as is, if a seller has more ability to salvage an unsatisfactory product than the buyers. They treated the refund decision as dichotomous: whether or not to offer a full refund. They did not consider the possibility of imposing costs or hassles on consumers who return merchandise. The profitability of this practice is a key theme of this paper.

There is a variety of ways a seller can increase the consumer's cost of returning merchandise. As mentioned above, these might include refusal of items which are returned without receipts, original packaging, instructions, or accessories, time limits on returns, or disallowing returns of opened merchandise.

An alternate approach to control for "moral hazard in consumption" would be to offer a partial refund or charge a restocking fee. Hess et al. (1996) observed that catalog marketers use a pricing scheme in which they charge a separate shipping and handling fee which is not refundable when a product is returned. This amounts to a partial refund because the full cost to the consumer is the purchase price plus the shipping and handling fee. These approaches differ from hassles in that they effectively involve a payment by consumers to the seller to accept returned merchandise. In contrast, hassles are costs imposed on consumers which do not involve cash transfers back to the sellers.

Unfortunately, there has been almost no empirical research to test these differing theories. This paper narrows this gap by presenting an empirical study of return policies offered by 133 retailers. Of these, we found that none had a partial refund policy. It seems that empirically, the retail practice of offering a partial refund or charging a restocking fee is uncommon (aside from mail-order sellers). Instead, the most common way of controlling for excessive returns is imposing some hassles or restrictions on consumers who wish to return merchandise.

What are the advantages of imposing hassles as opposed to offering a partial refund? First, partial refunds impose a monetary cost which is readily noticeable and measurable by consumers. In contrast, the cost associated with hassles is more difficult to quantify and is therefore likely to be less negatively perceived by consumers. Further, consumers may view partial refunds as unfair because the store keeps the non-refundable portion. Moreover, under a partial refund, stores cannot advertise that they have a 100% money-back policy, which may have a negative impact on the seller's image and consumer loyalty [Schmidt and Kernan (1985); Hart (1988)]. In contrast, sellers can impose other costs which make returns less attractive, yet still claim that they have a 100% money-back refund policy.

Clearly, the evidence above indicates that most traditional retail stores offer full refund return policies with some degree of hassle on returns. Therefore, we will focus on this type of policy in our model. In Section II, we introduce a model which explicitly deals with the level of hassle that should be imposed with a full refund when consumers behave opportunistically. In Section III, we find that the profit-maximizing refund policy consisting of the optimal levels of hassle and price levels. In Section IV, we derive hypotheses concerning the circumstances under which low-hassle returns will exist. The model

predicts that retailers are more likely to offer a low-hassle return policy when: 1) they sell products with benefits which cannot be consumed in a short period of time; 2) their product line offers opportunities for cross-selling; and 3) they can obtain a high salvage value for returned merchandise. We test these hypotheses with survey data in Section V. The paper concludes with a summary of the model's key findings, a discussion of related issues, and suggestions for future research.

## II. The Model

### The Retailer

We will consider a monopolistic retailer who offers a full refund, and derive the optimal return policy consisting of the level of price and hassle which should be offered with the refund (the optimal return policy).[1] The return policy is advantageous to consumers who are uncertain whether a purchased product will fit their needs. The retailer, on the other hand, can profit from such a policy if it has an advantage over consumers in salvaging a returned product, or if it can sell other merchandise when consumers return unsatisfactory products.

The return policy is characterized by a set of restrictions imposed on consumers who return the product after a given trial period. To measure the negative impact of these restrictions on the consumer's refund value, a *hassle* index, $H$, is used (we will later introduce a measure for this index in the empirical section).

To simplify the analysis, we will consider a product that is typical of the entire product mix sold by the retailer. The retailer purchases this product at a wholesale price, $W$, and sells the product for a retail price, $P$. Retailers receive a salvage value, $S$, when a product is returned. This value reflects the retailer's ability to resell the product or obtain credit from its suppliers.

We assume that the retailer also has opportunities for cross-selling other products to consumers who return a previously-purchased product to the store. These opportunities arise because a trip to return merchandise was not originally planned and this additional trip provides an occasion for consumers to make additional impulse purchases [Hess and Gerstner (1987)]. The expected profit margin from cross-selling per product return is denoted by $M$. This *cross-selling margin* is likely to be greater when the store is large and offers a wide variety of products. We will now formalize the retailer's profit maximization problem as a function of $P$ and $H$.

### Consumers

Each consumer plans to purchase the representative product. Prior to purchase, consumers are uncertain about the product's fit with their tastes. We model this uncertainty by assuming that a representative consumer is facing a distribution of potential values which she might obtain after product trial. Let $V$ be a random variable which represents the consumer's potential value from the product. Consumers know the distribution of $V$, but no individual knows the exact value she will receive until she buys the product and tries

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[1] A monopolistic framework allows us to isolate the incentive to provide full refund to unsatisfied consumers even in the absence of competitive pressure to do so, and it can be applied to a retail store which has a unique appeal because of a location advantage or a differentiated selection of merchandise.
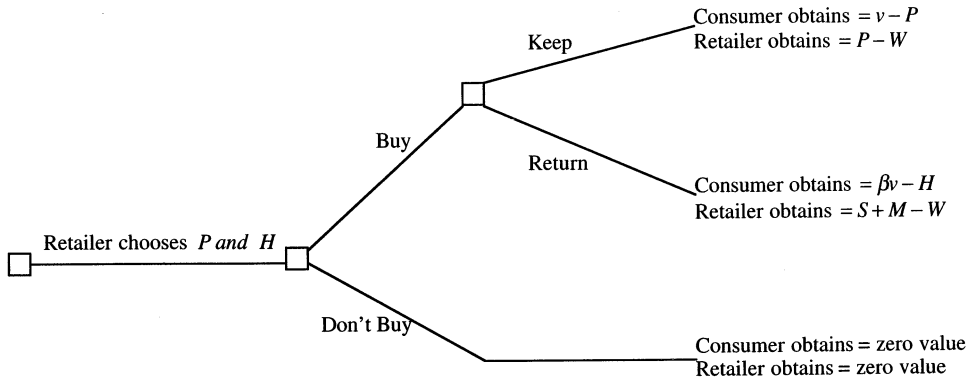
**Figure 1.** The sequence of decisions and payoffs.

it. Let $F(V)$ be the cumulative distribution of $V$, and let $f(V)$ be the corresponding density function. Prior to purchase, the consumer's expected value from consuming the product over its useful life is:

$$E[V] = \int_{-\infty}^{\infty} V f(V) dV.$$

Once the product is purchased and tried, the consumer observes the value she will receive during the product's lifetime, which we will denote by $v$. During trial, she receives a portion, $\beta$, from the lifetime value of the product. The realized *trial value* to the consumer is $\beta v$. If the consumer decides to keep the product after the trial period, she will obtain a *residual consumption value* of $(1 - \beta)v$.[2]

If a consumer returns the product, the purchased price is refunded. However, the value of this refund to the consumer is reduced by the dollar value of the hassles incurred in claiming the refund.[3] Consumers make buying and product return decisions to maximize their expected surplus (i.e., product value less all expenses involved).

## III. Optimal Return Policy

The sequence of events in this market is described in Figure 1. The retailer chooses the price, $P$, and the level of hassle, $H$, to maximize its expected profits given the expected behavior by consumers. Given the retailer's decisions, consumers decide whether or not to purchase the product. If they purchase the product, consumers observe how well the product fits their tastes and decide whether to keep the product or return it to the retailer

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[2] The trial value can be modeled in the framework of a durable good product which is consumed at a constant rate per period. Let $u$ be the value per period obtained by a given consumer. This value is discovered during the trial period $T$. Assume for simplicity that the value from the durable good is discounted from now to infinity at an interest rate of $r$. The total value, $v$, the consumer will receive if she keeps the product can be composed of the value that she gets during the trial period plus the value she gets after the trial period: $v = \int_O^T u e^{-rt} dt + \int_T^{\infty} u e^{-rt} dt = 1 - e^{-rT}/r\, u + e^{-rT}/r\, u$. The transition from this model to the model above is obtained by defining $\beta = 1 - e^{-rT}$ and $v = u/4$.

[3] Returning a product to a store is costly even without the store's hassle costs. To simplify the model, we normalized the dollar value of any costs of returning the product other than those imposed by the retailer to be equal to zero.

for a refund. When maximizing profit, the retailer considers the consumers' decisions which are based on the surplus they expect to receive from a purchase. The expected surplus is influenced by the price, the likelihood that consumers will return the product, and the level of hassle associated with claiming a refund.[4]

*The Consumer's Return Decision.* A random consumer will return the product if the realized residual consumption value after trial, $(1 - \beta)\nu$, is less than or equal to consumer's value from claiming the refund: the refunded price minus the hassle involved, $P - H$. Therefore, the condition under which a random consumer will return the product is:

$$\nu \leq \frac{P - H}{1 - \beta}. \tag{1}$$

Given the distribution, $F(V)$, the probability that a consumer will return the product is:

$$F\left[\frac{P - H}{1 - \beta}\right]. \tag{2}$$

Note that the probability of a return increases when the price increases and the level of hassle decreases. It follows that the probability that a consumer will keep the product is:

$$1 - F\left[\frac{P - H}{1 - \beta}\right]. \tag{3}$$

*The Consumer's Purchase Decision.* A random consumer will purchase the product if her expected consumer surplus from purchase is non-negative. Before purchase, a consumer knows that she might find the product to be a poor fit and return it. In this case, she will obtain a value from trial but also will incur the return hassle. Let $E[V|R]$ denote the expected product value conditional on returning the product. The expected consumer surplus conditional on returning the product is therefore the expected trial value conditional on returning the product, $\beta E[V|R]$, less the cost of the hassle imposed on returns by the retailer.

$$\beta E[V|R] - H. \tag{4}$$

Conversely, a consumer knows prior to purchase that she might find the product to be a good fit with her tastes and decide to keep the product. In this case, she will obtain the product value over its lifetime and pay the price. Let $E[V|K]$ denote the expected product value conditional on keeping the product. The expected surplus of a consumer who decides to keep the product is equal to the expected product value conditional on keeping the product, $E[V|R]$, less the price.

$$E[V|K] - P. \tag{5}$$

The consumer's expected surplus, $E[U]$, before purchase is given by:

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[4] For simplicity, we assume, as is common in economics, that the seller does not face liquidity constraints. This assumption might be limiting for small "mom and pop" stores because money-back policies may create a liquidity problem for them.

Expected Surplus = Probability of a return

× Expected surplus conditional on returning the product

+ Probability of keeping the product

× Expected surplus conditional on keeping the product,

which for given values of $P$ and $H$ is equal to:

$$E[U(H, P)] = F\left[\frac{P - H}{1 - \beta}\right] (\beta E[V|R] - H) + \left(1 - F\left[\frac{P - H}{1 - \beta}\right]\right)(E[V|K] - P).$$
(6)

Because all consumers have the same *à priori* expectations in this model, they all have the same expected surplus and make the same decision regarding purchase. Therefore, to ensure sales, the retailer must choose a price and level of hassle which will provide a random consumer with a non-negative expected surplus.

*The Profit-Maximizing Return Policy:* The retailer chooses the levels of hassle and price which will yield the highest profit. A consumer will keep the product with a probability given by equation (3), in which case the retailer obtains a margin of $P - W$. The probability the consumer will return the product is given in equation (2), in which case the retailer obtains a margin of $S - W$, plus an expected contribution from cross-selling, $M$. Therefore the retailer's expected profit is:

$$\Pi(H, P) = \left(1 - F\left[\frac{P - H}{1 - \beta}\right]\right)(P - W) + F\left[\frac{P - H}{1 - \beta}\right](S - W + M).$$
(7)

The retailer will choose the combination of price and hassle which maximizes the expected profit subject to the *buying constraint* which requires that equation (6) is non-negative. The profit-maximizing policy can be found using the Lagrangian optimization method. In the next section, we will analyze the case in which $F(V)$ is represented by a uniform distribution, which allows us to obtain closed-form solutions and more easily interpret theoretical predictions for empirical testing.

## IV. Sensitivity Analysis with a Uniform Distribution

Assuming that $F(V)$ is uniform over the interval [0, 1], we show in the Appendix that for an interior solution, the profit-maximizing hassle and price are given by the expressions:

$$H^* = \frac{1}{9}\left[1 + 2\beta + 3(M + S) - 2\sqrt{\overline{Z}}\right];$$
(8)

$$P^* = \frac{1}{9}\left[4 - \beta + 3(M + S) + \sqrt{\overline{Z}}\right],$$
(9)

**Table 2.** Predicted Sensitivity of Hassle and Price to Exogenous Parameters

| Optimal Policy Parameter | Exogenous Parameter | | |
|---|---|---|---|
| | Trial Value ($\beta$) | Cross-Selling Margin ($M$) | Salvage Value ($S$) |
| Hassle ($H^*$) | + | − | − |
| Price ($P^*$) | − | + | + |

where $Z$ is equal to $(1 - \beta)[6(M + S) - (2 + \beta)]$. The optimal hassle will be positive only if the combination of salvage value ($S$) and cross-selling margin ($M$) are sufficiently large relative to the consumer trial usage rate ($\beta$) so that $6(M + S) \geq (2 + \beta)$ is satisfied.[5]

Taking partial derivatives with respect to the exogenous variables $M$, $S$, and $\beta$, we found how the optimal values of price and hassle vary with these exogenous parameters (the Appendix gives the derivations). The directions of the predicted variations for internal solutions are given in Table 2.

*Impact of the Trial Value Parameter.* Table 2 indicates that the optimal hassle will increase and the optimal price will decrease as the fraction of the product's value consumed during trial, $\beta$, increases. When $\beta$ is larger, consumers obtain a greater fraction of the product's benefits during trial, the remaining benefits from keeping the product are smaller, and they are more motivated to return the product. To discourage excessive returns, the retailer will raise the hassle associated with its return policy. The price level should be lower because increased hassle reduces the consumer's expected value from purchasing the product. The lower price also discourages returns because the consumer's expected value from returning a product is reduced.

*Impact of Cross-Selling and Salvage Value.* Table 2 suggests that the optimal hassle should decrease and the optimal price should increase when the cross-selling margin ($M$) and salvage value ($S$) increase. If the potential contribution from cross-selling and the retailer's salvage value are larger, the cost to the retailer from accepting returned merchandise is relatively smaller. In such a case, the retailer will have less incentive to discourage returns, and will choose to impose less hassle on consumers who return merchandise. Why will the retailer charge a higher price? First, by providing a return policy with less hassle, the retailer is providing more value to consumers which can be captured through a higher price. Second, when the price is higher, consumers have a greater incentive to return the product, and returns are more profitable.

The comparative statics summarized in Table 2 suggests three hypotheses:

Retailers are more likely to have a low-hassle return policy and a high price level when:

$H_1$: *Consumers cannot receive most of the benefits from their products during a short period of time*;

$H_2$: *They have substantial opportunities for cross-selling*; *and*

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[5] There are two possible corner solutions: the retailer offers a hassle-free return policy ($H^*$ equals zero) or the retailer refuses to offer refunds altogether. A hassle-free refund policy may prevail if $M$ and $S$ are very large relative to $\beta$. At the other extreme, a retailer may decide to not offer refunds at all. This policy will be sensible if $\beta$ is very large relative to $M$ and $S$.

$H_3$: *They carry products for which they have a high salvage value.*

In the next section, we will describe the data and measures used to test these hypotheses.

## V. Empirical Findings

### Data and Measures

To test the three hypotheses, we collected data and constructed measures of $H$, $P$, $\beta$, $M$ and $S$. The data were obtained through surveys of retailers in the Sacramento, California area. Specifically we obtained information concerning type of refund policies (cash-back or store credit), price levels relative to competitors, store characteristics, types and breadth of merchandise offered, and the means by which retailers salvage returns.

We sampled retailers which were located in shopping centers and free-standing outlets. The shopping centers were selected at random from a list of all malls satisfying the following restrictions: they contained more than 40 stores and they were within a 20-mile radius of the University of California at Davis. Interviewers were assigned to nine shopping centers satisfying the stated criteria. Within each center, interviewers sampled stores by selecting every third door, counting from the left of the entrance, to a maximum of 20 stores in that shopping center. Doors were counted instead of stores in order to weight larger stores (with more doors) proportionate to their size.[6]

A different sample of free-standing stores was used to ensure that we had representation of a large variety of stores. They were selected by randomly sampling from a set of stores compiled from the Yellow Pages which also satisfied the travel constraint mentioned above. Surveys were conducted during Spring and Summer to avoid the large returns and clearance sales held after Christmas. Of the 143 stores contacted in both phases of the sampling, 10 refused to cooperate. (The most common reason for refusal was a policy of never divulging operating information.) Thus, 133 surveys were completed and analyzed.[7]

Upon entering a store, interviewers first observed the type and breadth of goods sold by the store and the posted return policy.[8] They then introduced themselves to the manager and elicited estimates of price level relative to competing stores, and how returns are handled. The specific measures we used are described next.

*Hassle (H).* To develop a measure of hassle, we observed five variables, $h_1$–$h_5$, which affect the value of a return policy to consumers. Each of the variables took a value of 1 if the retailer's policy reduced the consumer's value relative to a no-hassle return policy, and 0 otherwise:

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[6] Due to location and variations in product lines, most of the stores in our sample are likely to possess some degree of market power. Therefore, we expect that the monopoly model in Section II should be useful in predicting the behavior of their product precludes a return policy.

[7] The final distribution of stores contained 26% women's clothing stores, 12% men's clothing stores, 11% shoe stores, 14% CD, tape, or videocassettes, 5% books, and less than 5% in: drug stores, furniture, computer software, jewelry, and opticians. Note that in Table 1 we reported only 131 observations because two stores had missing data. Our sample is not representative of all types of stores because the locations we sampled did not include category-killer stores such as Home Depot and Toys R Us.

[8] If a department store was selected, the interviewer elicited the policy for the specific department located at the selected door.

1. Store exchange only ($h_1 = 1$) vs. cash refunds offered ($h_1 = 0$);
2. Receipt required for returns ($h_2 = 1$) vs. not required ($h_2 = 0$);
3. Need original box or packaging material ($h_3 = 1$) vs. not required ($h_3 = 0$);
4. Must show no visible signs of use or wear ($h_4 = 1$) vs. not required ($h_4 = 0$);
5. Time limit for returns ($h_5 = 1$) vs. no time limit ($h_5 = 0$).

For example, if a store offered a cash refund with receipt, but allowed exchange only with no receipt, it was coded as $h_1 = 0$, $h_2 = 1$. If it also required goods to be unopened (as with many CD stores), then $h_3 = 1$. These five variables, $h_1$–$h_5$, were summed to get an index of total hassle for returns (*HASSLE*). Of the retailers surveyed, less than 10% of the stores received a zero rating on all five measures and no retailers had a policy of "all sales final" for regularly stocked merchandise.[9]

*Relative Price Level (P).* To obtain a measure of relative price level, managers were asked the following question: "Relative to your competitors, would you say your prices are: Above Average ($p = 3$), About Average ($p = 2$), or Below Average ($p = 1$)." The response to this question was used as the price index (*RELPRICE*). Relative price was collected instead of absolute price because our interest was to compare across different product categories and price levels. Buzzell and Gale (1987) used a similar question to survey managers' perceptions about relative prices in a competitive environment.[10]

*Trial-Value Fraction (β).* As discussed in Longo (1995), some products can be quickly consumed or copied before the return period expires, which means that their $\beta$ value is likely to be large. Some products which are likely to have high $\beta$ are CDs, videos, books, and computer software. We coded the index *BETA* as equal to 1 for stores that specialized in selling these products. For other stores, the index was set equal to 0.

*Cross-Selling Margin (M).* Stores which are large and sell a large variety of products have more opportunities to cross-sell relative to stores which do not, and therefore their expected margin from cross-selling is likely to be larger. To develop measures of these opportunities, we determined surrogates for variety and size. In our store surveys, we observed that department stores offered a wide variety of merchandise when compared to specialty stores. Further, we could not directly measure the store size of most of the stores surveyed. Because stores that were part of a chain tended to be larger than "mom and pop" stores, we used a dummy variable to capture whether the store was part of a chain as a surrogate for size. The cross-selling index (*CROSSELL*) was formed as the sum of the following two (standardized) scores: 1) the variety of merchandise sold by the store ($m_1 = 3$ if department store; $m_1 = 1$ if a specialty stores; $m_1 = 2$ if intermediate, such as a variety store), and 2) whether the store was part of a chain ($m_2 = 1$) or not ($m_2 = 0$).

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[9] This finding suggests that the conditions which would result in a corner resolution (no-hassles or selling as-is) do not hold for most retailers. Thus, the three hypotheses above, which are based on the internal solution, seem appropriate for empirical testing.

[10] The advantage of using managers' perceptions is that competitors need not be located and surveyed directly. The disadvantage is that the ratings may be biased because managers prefer to say their prices beat competitors. However, even with a constant bias in the ratings, the stores would retain their relative positions with respect to price.

**Table 3.** OLS Estimates of *HASSLE* and *RELPRICE* Equations

| | Parameter | | | |
|---|---|---|---|---|
| Policy Parameter | BETA ($\beta$) | CROSSELL (*M*) | SALVAGE (*S*) | $R^2$ |
| HASSLE (*H*) | .34 | −.22 | −.05 | 0.12 |
| | (1.70)* | (−3.56)*** | (−0.64) | (*F* =5.55)*** |
| RELPRICE (*P*) | −.21 | .03 | .13 | 0.07 |
| | (−1.64) | (0.64) | (2.45)** | (*F* =2.89)** |

$* p < .10; ** p < .05; *** p < .01.$

*Retailer's Salvage Value (S).* Finally, to find a measure for a retailer's salvage value, managers were asked about the return policy of their manufacturers and about their ability to resell returned merchandise at their stores. First, salvage value was coded high ($s_1 = 3$) if the manufacturers would typically take back returned goods, low ($s_1 = 1$) if they typically would not take them back, and intermediate ($s_1 = 2$) if they typically imposed restrictions on returns or offered partial refunds. Second, salvage through direct retail action was coded high ($S_2 = 3$) if retailers could repackage returned merchandise and return it to the shelf, and low ($s_2 = 1$) otherwise. The salvage index (*SALVAGE*) was the sum of these two (standardized) variables.

## Estimation Method and Results

To test the three hypotheses derived in the previous section, we used regression analysis. Equations (8) and (9) suggest that linear functional forms would allow a reasonable approximation of the relationships between the dependent variables hassle and price and the independent variables $\beta$, *M*, and *S*. Hence, the estimated equations were:

$$HASSLE = a_{11} + b_{11} BETA + b_{12} CROSSELL + b_{13} SALVAGE + \varepsilon_1, \text{ and}$$

$$RELPRICE = a_{21} + b_{21} BETA + b_{22} CROSSELL B_{23} SALVAGE + \varepsilon_2,$$

where $\varepsilon_i$ are error terms.

We estimated each equation separately, using an ordinary least squares (OLS) procedure because the residuals were only slightly correlated ($r = -.03$). The results are summarized in Table 3. Note that the signs of the regression coefficients are all consistent with the hypothesized relationships described in Table 2. In addition, each of the independent variables is statistically significant for at least one of the dependent variables. Finally, the last column shows that both of the equations explain a statistically significant amount of the variance in the dependent variables. The $R^2$ values we obtained are not uncommon for cross-sectional data of the type used here. The model seems to provide a better explanation for the variation in hassle than it does variations in price. This result is not surprising because the relative price level is likely to have been influenced by a number of factors, such as relative quality, which were not included in the model. Furthermore, managers of high-priced stores may have hesitated to report their prices as relatively high, which might have reduced the variation in price. As a result, the explanatory power of the price equation may have been reduced.

Overall, the empirical estimates helped to explain the variation in return policies across retailers.

## VI. Conclusion

Our model predicted that a retailer is more likely to offer a low-hassle return policy when: 1) its products' benefits cannot be consumed during a short period of time; 2) its products provide opportunities for cross-selling; and 3) it can obtain a high salvage value for returned merchandise. The empirical study presented supports these hypotheses. The model also suggests that perhaps stores can better manage their return policy by having different policies for different products—a more restrictive policy for products which have large potential for moral-hazard (e.g., CDs), and a less restrictive policy for products which this potential is small (e.g., calendars). Our observations suggest that, currently, most stores do not have product-by-product policies. However, they often exclude or have especially restrictive policies on CDs, video tapes, and software, all products for which consumers can extract all benefits in a short time by making copies before returning them to the stores.

We believe that the main assumptions that drove the model are: 1) the consumer uncertainty and heterogeneity with respect to the utility obtained after product trial; 2) the ability of the retailer to capture additional value when the product is returned, through either salvage or cross-selling; and 3) the ability of the seller to impose hassle on consumers who return products. Under these conditions, a refund policy with hassle is likely to be profitable.

In the process of making the model easy to interpret and evaluate, we excluded a number of factors which a retailer should consider when designing a refund policy.

*Hassle as a Single Dimensioned Variable.* Our model focused on the *level* of hassle rather than the *type* of hassle to be used. In this model, we combined several different types of conditions on returns into a single-dimensioned index of hassle. Such a single measure may be useful for an overall assessment of hassle. However, refund policies should also be optimized by choosing specific conditions to be used. The type of hassle chosen may both influence and be influenced by other variables in the model. To illustrate this point, consider the following three examples.

First, the length of the period over which returns are allowed may have a direct impact on the fraction of the product's value a consumer can obtain during trial ($\beta$ in the model). Shortening the return period may reduce the relative value a consumer obtains by using and returning a satisfactory product. However, the short trial period may limit the consumer's ability to determine the product's fit with their tastes as they learn appropriate uses for the product.

A second example is a policy which allows store credit only. In addition to reducing the value of the refund to consumers, such a policy forces them to make other purchases from the store to obtain the full value of the refund. Because consumers will often spend more than the original purchase price in redeeming their store credit, the policy will increase the seller's gain from cross-selling ($M$ in the model).

Third, consider a situation in which the retailer may impose several restrictions on refunds that may influence its salvage value ($S$ in the model). For example, a retailer may require that a returned product be in resellable condition. If the product can be resold, then the retailer receives a salvage value equal to the product's wholesale price. Similarly, a policy of charging a restocking fee or offering only a partial refund allows the retailer to increase the revenue it receives from returned merchandise.

*Hassle and Transaction Costs.* In the model, we normalized the transaction costs associated with returning merchandise to zero. If many consumers have high transaction costs of returning merchandise, the optimal level of hassle on returns should be adjusted downward, or else the return policy will lose its value to consumers. To optimize hassle, it would be helpful to estimate the disutilities created by the different types of hassles associated with returning a product, and to examine the impact of different types of restrictions on returns. Such estimates would allow managers to evaluate the trade-offs between different types of hassles and the prices which can be charged. To optimize the types of hassles imposed, it is important to obtain more precise measures of the disutility of each type of hassle. It may be possible to estimate these disutilities using a conjoint analysis or a related methodology. This would be a valuable direction for future research.

*Strategic Roles of Return Policies.* This model did not consider the impact of competition on the design of the return policy. Sellers facing heterogeneous consumers may be able to use return policies as a basis for differentiating themselves from competitors. Consumers who are less informed or risk averse are likely to place a great value on a generous return policy. Some retailers may target these consumers by offering generous return policies with higher prices. Other retailers may target experienced consumers by offering less generous return policies and lower prices. This practice appears to be occurring in the retail market for personal computers. Mail-order suppliers offer personal computers at low prices but consumers who wish to return the product often must go through considerable hassle and pay shipping and handling charges. In contrast, local retail outlets have more generous return policies, but charge higher prices [Wildstrom (1995)].

*Refund Policies in the Channel Relationship.* In focusing on retailer behavior, our model took the wholesale price and salvage value as given. These values will be influenced by the manufacturer's pricing and return policy. Manufacturers may be able to use their own return policies to induce retailers to offer more generous refund policies. A model similar to the one presented here may be useful in describing the relationship between the manufacturer of a new product and retailers. A retailer may be uncertain as to whether a new product will fit with the rest of its product line and its consumers. A manufacturer may offer a generous return policy to mitigate the risk to the retailer [Padmanabhan and Png (1994)]. Focusing on channel inter-relationships with respect to return policies would be a worthwhile project for future research decisions.

The subject of return policies has received little attention in the marketing literature. A return policy is one element of a bundle of services that may be provided by retailers. Whereas some authors seem to suggest that sellers should maximize the level of service they provide [e.g., Davidow and Uttal (1990)], our analysis provides a rationale for why retailers such as Best Buy and Target are moving toward *optimizing* rather than *maximizing* their service level when designing return policies. We hope that this work will stimulate more research in this area.

## Appendix

### Deriving the Optimal Price and Hassle using the Uniform Distribution

Assuming that $V$ is distributed uniformly over the interval $[0, 1]$ we get the following:

$$\text{Probability of a return} = F\left[(P - H)/(1 - \beta)\right] = \frac{(P - H)}{(1 - \beta)}.$$

$$\text{Probability of keeping the product} = 1 - F\left[(P - H)/(1 - \beta)\right] = 1 - \frac{(P - H)}{(1 - \beta)}.$$

$$\text{Expected surplus from a return} = \beta E[V|R] - H = \left(\frac{\beta(P - H)}{2(1 - \beta)} - H\right).$$

$$\text{Expected surplus from keeping} = E[V|K] - P = \left(\frac{(1 - \beta) + P - H}{2(1 - \beta)} - P\right).$$

Consumer expected surplus (also shown in equation (6)) becomes:

$$E[U(P,H)] = \frac{(P - H)}{(1 - \beta)}\left(\frac{\beta(P - H)}{2(1 - \beta)} - H\right)$$

$$+ \left[1 - \frac{(P - H)}{(1 - \beta)}\right]\left(\frac{(1 - \beta) + P - H}{2(1 - \beta)} - P\right).$$

The retailer's expected profit (3) becomes:

$$E[\textstyle\prod(P, H)] = \left[1 - \frac{(P - H)}{(1 - \beta)}\right](P - W) + \frac{(P - H)}{(1 - \beta)}(S - W + M).$$

The seller chooses $P$, $H$, to maximize the profit function subject to the constraint that the consumer expected surplus ($E[U(P, H)]$) is non-negative. To find an interior solution for the profit-maximizing retail price and return hassle, we differentiate the Lagrangian function, £, with respect to $P$, $H$, and $\lambda$, setting the derivatives equal to zero and checking the second order conditions.

$$£ = (1 - Pr_R)(P - W) + Pr_R(S - W + M) + \lambda\left[Pr_R\left(\frac{\beta(P - H - T)}{2(1 - \beta)} - H - T\right)\right.$$

$$\left. + (1 - Pr_R)\left(\frac{(1 - \beta) + P - H - T}{2(1 - \beta)} - P\right)\right].$$

Doing so yields the profit-maximizing price and hassle levels given in the expressions (8) and (9). The shadow price of the constraint $\lambda$:

$$\lambda* = \frac{2}{3} - \frac{\sqrt{Z}}{3(1 - \beta)},$$

where $Z$ is equal to $(1 - \beta)[6(M + S) - (2 + \beta)]$. For a refund policy to be profitable, $Z$ must be positive.

### Sensitivity Analysis

The signs of the sensitive analysis in Table 2 above were derived as follows:

We can assess the impact of the modeled parameters on the profit-maximizing level of hassle. Differentiating equation (8) with respect to $M$ and $S$, each, yields:

$$\frac{\partial H^*}{\partial M} = \frac{\partial H^*}{\partial S} = \frac{1}{3} - \frac{2(1 - \beta)}{3\sqrt{Z}},$$

which is always negative when $\lambda^*$ is positive (i.e., the purchase constraint is binding). Thus, hassle will decrease as the cross-selling margin or salvage value increases.

Finally, taking the derivative of equation (8) with respect to $\beta$, we get:

$$\frac{\partial H^*}{\partial \beta} = \frac{1}{9}\left[2 + \frac{6(M + S) - (1 + 2\beta)}{Z}\right],$$

which is positive when $Z$ is non-negative. This means that the optimal level of hassle will increase as the fraction of product benefits which can be used during trial increases.

We can also determine the impact of the modeled parameters on the profit-maximizing price. Differentiating equation (9) with respect to $M$ and $S$, each, yields:

$$\frac{\partial P^*}{\partial M} = \partial P \div \partial S = \frac{1}{3} - \frac{(1 - \beta)}{3\sqrt{Z}}.$$

Clearly this derivative is always positive. This means that the retail price should increase as the retailer's salvage value or the margin from cross-selling increases.

Differentiating equation (9) with respect to $\beta$,

$$\frac{\partial P^*}{\partial \beta} = -\frac{1}{9}\left[1 + \frac{6(M + S) - (1 + 2\beta)}{\sqrt{Z}}\right],$$

which is always negative when $Z$ is non-negative. This result means that the retail price should decrease as the fraction of the product's benefits used by consumers during trial increases.

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