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Money-Back Guarantees: Helping the Low-Quality Retailer

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Existing literature, based on signaling theory, suggests that money-back guarantees (MBGs) will be utilized by high-quality firms, where high quality is defined as a low likelihood of product return. However, in today's world, MBGs are ubiquitous among major retailers, even when the likelihood of product return varies greatly between them. To understand this phenomenon, we explore a competitive environment between high- and low-quality retailers where consumers are fully informed and risk neutral, and retailers realize a salvage value for returned products. When MBGs are profitable, under continuous demand it is Nash equilibrium for both retailers to offer MBGs, and the low-quality retailer gains while the high-quality retailer loses relative to when MBGs are not offered. In contrast, if demand is lumpy, retailers can act monopolistically over their respective market segments, allowing both retailers to gain from MBGs, although the low-quality retailer still gains more.

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1. Introduction

An astounding $100 billion in sales are returned to U.S. retailers and producers annually (Guide et al. 2006). An average of 6% of total U.S. retail sales sold in brick-and-mortar are returned (Guide et al. 2006), but this return rate doubles to 12% when sold by Internet or catalog (Dowling 1999). For apparel items, return rates are around 20% and 40% for brick-and-mortar and direct sales, respectively (Vande Vate and Bedir 2005, Mostard et al. 2005). Thus, the return rates for direct sales are generally double those of brick-and-mortar.

Does the large difference in return rates between these two channels affect their offer of money-back guarantees (MBGs)? To explore this, we identify the top 10 online clothing retailers from the Top 500 List on the Internet Retailer website (http://www.internetretailer.com/top500/list/) together with the brick-and-mortar retailers on the list that had equivalent or higher direct sales.[1] Table 1 indicates the MBG policies of the sample retailers. All of them offer MBGs for clothing, and the minimal MBG duration in the sample is 30 days.

[1] Because we address an environment in which consumers know the retailers well (full information), we confine our sample to include only the top 10 direct retailers (online, catalog, or home (TV)), together with the brick-and-mortar retailers on the list that have equal or higher direct sales. Of course, the brick-and-mortar retailers are much larger than the direct retailers when in-store sales are included.

Mostard et al. (2005) found that the bulk of returns for catalog sales are made in the second and third weeks after product receipt. Given this, because all retailers in our sample offer at least a 30-day full refund, we may conclude that MBGs are ubiquitous across major retailers. That is, major retailers offer MBGs whether they have high or low return rates.

The existing literature suggests that we can expect MBGs to be offered only by firms for which the probability of product return is low. Moorthy and Srinivasan (1995) use a signaling framework to show how MBGs can be offered by high-quality firms to signal product quality (where quality is defined in terms of the likelihood of product return) to uninformed consumers. The low-quality firm does not offer an MBG because the costs of handling and reimbursing a large number of returns is high. This literature cannot explain why all major retailers offer MBGs, even when the likelihood of product return is high, as in the case of direct sales.

As noted by Moorthy and Srinivasan (1995) and others, MBGs can be particularly relevant for experience goods, where, independent of quality, consumers must use products to learn if the product fits their own idiosyncratic needs. Because product testing before purchase is inherently limited, personal fit uncertainty remains at the time of purchase, and uncertainty grows when buying by catalog or Internet. Research based on monopolistic models reveal that MBGs can help retailers better satisfy consumer needs and indicate policy implications for offering

Table 1 MBG Policies for Major Direct and Brick-and-Mortar Retailers

Store type	Direct	Brick-and-mortar
Sample total	10	16
MBGs offered	All	All
Duration at least 30 days	All	All

MBGs (e.g., Heiman et al. 2002, Davis et al. 1995). Although providing some intuition for MBG ubiquity, these monopolistic settings do not provide insights into which type of retailer gains or loses from offering MBGs.

In summary, the signaling model of Moorthy and Srinivasan (1995) represents the sole comparative analysis of MBG use between high- and low-quality firms, leaving us with the theoretical conclusion that high-quality firms prefer MBGs, whereas low-quality firms do not. There is therefore a need to explain the ubiquity of MBGs among the major retailers in a competitive environment, even when there are large differences in return probabilities.

2. Monopoly Retailer Model

This section derives the basic results of Davis et al. (1995) for monopolies. Risk-neutral consumers are identical in their likelihood of satisfaction from a purchase, γ, but heterogeneous in product valuation when satisfied, W, which is uniformly distributed between 0 and 1. When not satisfied, the product is worth zero. Without MBG, consumer expected net benefit is: $NB^N = \gamma W - P^N$, where P is price and the superscript indicates an MBG (G) or no MBG (N). Profits are $\pi^N = D^N \cdot (P^N - C)$, with demand $D^N = 1 - W_L^N$, and the lower threshold for buying $W_L^N = P^N/\gamma$. Optimal profits without MBG can be shown to be: $\pi^N = (\gamma - C)^2/(4\gamma)$.

With MBG, $NB^G = \gamma(W - P^G) - (1-\gamma)t$, where consumers incur transactions costs t for returns. Profits are $\pi^G = D^G \cdot (\gamma P^G - C + (1-\gamma)(S-T))$, where S and T are the retailer's salvage value[2] and transactions costs for returns, and the lower threshold for buying becomes $W_L^G = P^G + ((1-\gamma)/\gamma)t$. Optimal profits can be shown to be

$$\pi^G = \frac{1}{4\gamma}[\gamma - C + (1-\gamma)(S-T-t)]^2.$$

Consistent with Davis et al. (1995), a monopolist can increase profits with an MBG only if $(S - T - t > 0)$, reflecting the increased efficiency realized from transferring the product to the party that has a greater use for it (here the retailer). With fully informed and risk-neutral customers, transferring the risk of a bad fit to the retailer is pointless unless the returned product has a salvage value to the retailer that more than offsets the cumulative transactions costs of realizing the return.

[2] A survey of retailers and wholesalers found that a majority recovered over 75% of the product costs through returns (Stock and Mulki 2009), which implies salvage value for returns.

3. Duopoly Retailers with Different Qualities

Consider two retailers of high (γ_H) and low (γ_L) qualities (hereafter retailers H and L), with $C_H \geq C_L$ marginal costs per sale for an otherwise identical product. Without MBGs, the net benefits for buying from retailer i are $NB_i^N = \gamma_i W - P_i^N$. Setting $NB_H^N = NB_L^N$ yields an upper threshold $W_U^N = (1/(\gamma_h - \gamma_l))[P_H^N - P_L^N]$, above which consumers buy from the retailer H. Setting $NB_L^N = 0$ yields $W_L^N = P_L^N/\gamma_L$. Consumers between $W_L^N < W < W_U^N$ buy from retailer L. Those with lower valuations do not buy at all.

Demand is $D_H^N = 1 - W_U^N$; $D_L^N = W_U^N - W_L^N$, and profits are $\pi_i^N = D_i^N \cdot (P_i^N - C_i)$. As in the pricing equilibrium of Moorthy (1998), we simultaneously solve the optimality conditions of the two retailers. Equilibrium prices and profits without MBG can be shown to be

$$\begin{aligned} P_H^N &= \frac{1}{a}[2\gamma_H(\gamma_H - \gamma_L) + 2\gamma_H C_H + \gamma_H C_L], \\ P_L^N &= \frac{1}{a}[\gamma_L(\gamma_H - \gamma_L) + \gamma_L C_H + 2\gamma_H C_L]; \end{aligned} \tag{1a}$$

$$\begin{aligned} \pi_H^N &= \frac{1}{(\gamma_H - \gamma_L)a^2}[2\gamma_H(\gamma_H - \gamma_L) \\ &\qquad - (2\gamma_H - \gamma_L)C_H + \gamma_H C_L]^2, \\ \pi_L^N &= \frac{\gamma_H}{\gamma_L(\gamma_H - \gamma_L)a^2}[\gamma_L(\gamma_H - \gamma_L) \\ &\qquad + \gamma_L C_H - (2\gamma_H - \gamma_L)C_L]^2, \end{aligned} \tag{1b}$$

where $a = 4\gamma_H - \gamma_L$.

With MBGs, the expected value for consumers buying from retailer i becomes $NB_i^G = \gamma_i(W - P_i^G) - (1 - \gamma_i)t$. The new thresholds for buying from the retailers are $W_U^G = (1/(\gamma_h - \gamma_l))[\gamma_H P_H^G - \gamma_L P_L^G] - t$ and $W_L^G = P_L^G + ((1 - \gamma_L)/\gamma_L)t$. Profits can be expressed as $\pi_i^N = D_i^N \cdot (\gamma P_i^G - C_i + (1-\gamma_i)(S-T))$. Equilibrium profits with MBG can be shown to be

$$\begin{aligned} P_H^G &= \frac{1}{\gamma_H a}[2\gamma_H(\gamma_H - \gamma_L) + 2\gamma_H C_H \\ &\qquad + \gamma_H C_L + (\gamma_H - \gamma_L)(2\gamma_H - 1)t \\ &\qquad - \gamma_H(3 - 2\gamma_H - \gamma_L)(S-T)], \\ P_L^G &= \frac{1}{\gamma_L a}[\gamma_L(\gamma_H - \gamma_L) + \gamma_L C_H + 2\gamma_H C_L \\ &\qquad - (2-\gamma_L)(\gamma_H - \gamma_L)t \\ &\qquad - (2\gamma_H - 3\gamma_H\gamma_L + \gamma_L)(S-T)]; \end{aligned} \tag{2a}$$

$$\pi_H^G = \frac{1}{(\gamma_H-\gamma_L)a^2}\big[2\gamma_H(\gamma_H-\gamma_L) - (2\gamma_H-\gamma_L)C_H+\gamma_H C_L - (2\gamma_H-1)(\gamma_H-\gamma_L)(S-T-t)\big]^2, \tag{2b}$$
$$\pi_L^G = \frac{\gamma_H}{\gamma_L(\gamma_H-\gamma_L)a^2}\big[\gamma_L(\gamma_H-\gamma_L) + \gamma_L C_H-(2\gamma_H-\gamma_L)C_L + (2-\gamma_L)(\gamma_H-\gamma_L)(S-T-t)\big]^2.$$

As long as $\gamma_H > 0.5$ (the literature indicates that γ_H is above 0.8), we can verify the following:

Proposition 1. *When product valuation is uniformly distributed and* $(S-T-t>0)$,
(i) *duopoly profits increase with MBGs;*
(ii) *retailer L increases profits while retailer H decreases profits relative to when neither offers an MBG;*
(iii) *the above equilibrium is Nash.*

The condition for retailer L to gain while retailer H loses from MBGs is identical to the profitability condition for MBGs under monopoly, $(S-T-t>0)$. This holds even when the marginal costs for the two retailers are identical. Given the common assertion in the literature that firms can increase profits through MBGs (e.g., Davis et al. 1995), it is interesting that in a competitive environment, a retailer may lose profits with MBGs. Furthermore, given that the signaling literature has identified the high-quality firm as the one benefitting from an MBG, it is interesting that the primary beneficiary under full information is the low-quality retailer.

The increased profits for the low-quality retailer is driven by an increase in demand for its products. It can be shown that the lower threshold for buying from the low-quality retailer, W_L, decreases under MBG, while the upper threshold that separates the buyers for the two firms, W_U, increases. Thus, the MBG allows the low-quality retailer to increase market share by both expanding to new, lower-value customers who were otherwise uninterested, and simultaneously drawing higher value customers away from the high-quality retailer. Prices also adjust, although we cannot definitively say in which retailer prices increase more under MBG. Although the base factors that make up price increase proportionally more for the low-quality retailer under MBG, this price must be adjusted downward in proportion to customer return costs. In contrast, the high-quality retailer's MBG prices adjust upward with customer return costs, indicating that customer return costs create a barrier between the low- and high-quality retailers' offers, making it harder for the low-quality retailer to match the higher-quality retailer's offer.

The intuition for these results can be seen by considering a vertical (quality) differentiation framework in which the net effect of offering an MBG is to reduce the quality differentiation between the two firms. The effective willingness-to-pay (WTP) for a specific retailer j is $WTP_j^N = \gamma_j W$ without MBG and $WTP_j^G = (\gamma_j W-(1-\gamma_j)t)/\gamma_j$ with MBG. The net differentiation benefits enjoyed by the high-quality retailer under the two scenarios are

$$\text{No MBG:}\quad \Delta WTP^N = (\gamma_H-\gamma_L)W;$$
$$\text{With MBG:}\quad \Delta WTP^G = \frac{(\gamma_H-\gamma_L)t}{\gamma_H\gamma_L}. \tag{3}$$

That is, the high-quality retailer's differentiation benefits decline under MBG as long as $\gamma_H\gamma_L W > t$, which holds because MBGs are offered in equilibrium only when $(S-T-t>0)$. Retailer H has larger profits than does retailer L, but this profit difference declines as the MBG allows retailer L to become more similar to retailer H.

These results also contrast to standard-quality differentiation results. Typically, as firms become more similar in quality, duopoly profits decline, and both firms experience profit loss, although the rate of decline in profit is larger for the high-quality firm. Of course, with no quality differentiation, both firms make zero profit. However, the marginal effect of MBG alone (i.e., disregarding the competitive effect) is to increase the WTP for both the high- and low-quality retailers. Thus, for the low-quality retailer, the MBG has positive marginal and competitive effects (by reducing quality disadvantage). In contrast, for the high-quality firm, the negative competitive effect (by reducing quality advantage) more than offsets the positive marginal effect of MBG.

4. Effect of MBG Under Lumpy Demand

We now consider the case of lumpy demand where consumers are of two types, W_H and W_L, each representing one unit of demand. We assume that neither retailer has the quality–cost combination to capture the entire market, thus leaving a segmented market in which the high (low) value consumer buys from the high- (low)-quality retailer. Retailers behave monopolistically in that whereas retailer L sets its price at the profit-maximizing monopoly level for its segment, retailer H must price below its monopoly level to not lose its customers to its rival. Without MBG, equilibrium profits can be shown to be:

$$\pi_L^N = \gamma_L W_L - C_L,$$
$$\pi_H^N = \gamma_H W_H - \gamma_L(W_H-W_L) - C_H. \tag{4}$$

With MBG, equilibrium profits can be shown to be:

$$\pi_L^G = \big[\gamma_L W_L - C_L + (1-\gamma_L)(S-T-t)\big],$$
$$\pi_H^G = \gamma_H W_H - \gamma_L(W_H-W_L) - C_H + (1-\gamma_H)(S-T-t). \tag{5}$$

Proposition 2. *Under lumpy demand and heterogeneous product valuation, both retailers gain from offering MBG.*

With lumpy demand, monopolistic behavior allows both retailers to gain from MBG, although the gain is higher for retailer L. Retailer L no longer steals some of retailer H's customers, as it does under continuous demand.

5. Conclusions

This analysis reveals some of the challenges that traditional brick-and-mortar retailers face in offering MBGs in light of the steady growth of online competition. In a model of retail competition where consumers are fully informed and salvage values for returned products are accounted for, the model with uniform distribution reveals that if an MBG is offered, both retailers will offer them, as is commonly observed in reality. However, in contrast to the assurance in the literature that firms can gain from MBGs, the high-quality retailer loses, whereas the low-quality retailer gains from adopting MBGs. In contrast, under lumpy demand, retailers can behave monopolistically over their own market segments, so both retailers gain from offering an MBG, although this gain is higher for the low-quality firm.

Our use of the uniform distribution captures an important aspect of continuous demand and reality: the strong competitive interactions that reduce prices and profits. To this extent, we believe that other continuous-demand specifications will have little effect on our results.

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References

Davis, S., E. Gerstner, M. Hagerty. 1995. Money back guarantees in retailing: Matching products to consumer tastes. *J. Retailing* **71**(1) 7–22.

Dowling, M. 1999. Getting less in return. *Catalog Age* **16**(4) 1, 18.

Guide, D., Jr., G. Souza, L. Van Wassenhove, J. Blackburn. 2006. Time value of commercial product returns. *Management Sci.* **52**(8) 1200–1214.

Heiman, A., B. McWilliams, J. Zhao, D. Zilberman. 2002. Valuation and management of money-back guarantee options. *J. Retailing* **78**(3) 193–205.

Moorthy, S. 1988. Product and price competition in a duopoly. *Marketing Sci.* **7**(2) 141–168.

Moorthy, S., K. Srinivasan. 1995. Signaling quality with a money-back guarantee: The role of transaction costs. *Marketing Sci.* **14**(4) 442–466.

Mostard, J., R. de Koster, R. Teunter. 2005. The distribution-free newsboy problem with resalable returns. *Internat. J. Production Econom.* **97**(3) 329–342.

Stock, J. R., J. P. Mulki. 2009. Product returns processing: An examination of practices of manufacturers, wholesalers/distributors, and retailers. *J. Bus. Logist.* **30**(1) 33–62.

Vande Vate, J., G. Bedir. 2005. Many happy returns! *Frontline Solutions Magazine* (March 1), http://www.chromatographyonline.com/lcgc/Columns/Many-Happy-Returns/ArticleStandard/Article/detail/153267.