No Shirt, No Shoes, No Service*

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Abstract

I show why firms might benefit from some of their consumers disappearing (whether due to a successful demarketing campaign or a better outside option, such as a new entrant), and why a firm might unilaterally forbid a group of consumers from patronizing the firm. I examine two firms competing for two consumer segments which differ in their demand elasticity. I find that if the more elastic segment is relatively small or if the segments are sufficiently different in their elasticities, then both firms might benefit from some of the more elastic consumers disappearing. Moreover, each firm (but not both at the same time) might have an incentive to unilaterally stop serving the more elastic segment, and turn those consumers away.

1 Introduction

Some firms artificially restrict a group of shoppers from buying their products. 'No shirt, no shoes, no service' is a common sign at convenience stores, shopping malls routinely employ various tactics of keeping teenagers away, some movie theaters kick out texting consumers, various brands disassociate themselves from a class of paying consumers – whether through deliberate public messages by executives (Cristal Champagne) or by repeated action by lower level employees (Denny's) – and suffer a backlash from those consumers (see The Sunday Times (2006) and Harris, Henderson, and Williams 2005).

It is easy to attribute these actions to a negative externality: the firm's other consumers not buying products due to the fact that this particular segment patronizes the firm. However, in that case all of the firms in the industry would be engaging in the same behavior, which is not the case in most of the examples above, and it would leave unexplained the behavior by firms in similar industries, but not engaging in the same practices (for example, Cadillac, which actively embraces the same consumers that Cristal appears to reject, see The Automotive News 2004).

I examine this issue in an analytical model, **without** assuming any cross-consumer externalities. I assume that there are two segments of consumers with different cross-elasticities. I show that firms

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in an industry might benefit if the more elastic segment shrinks, or in other words some of those consumers disappear. I am agnostic about how the consumers disappear – whether via a successful de-marketing campaign by the industry participants, or because of a new entrant which appeals to this particular consumer segment.[1] Moreover, I show that each firm might have a unilateral incentive to drop a consumer segment altogether.

Competing firms cannot price discriminate between the two segments, and thus a sizable more elastic segment makes firms more competitive. This hurts the firms' margins, and thus an exogenous reduction of the size of the elastic segment has two effects on the firms' bottom line: lower demand and higher equilibrium margin. When one of the consumer segments is sufficiently elastic relative to the other one, the firms make more on the margin increase than they lose on the demand reduction, and thus this exogenous consumer loss is beneficial to both firms.

Moreover, a firm (even when the firms are ex-ante symmetric) might have an incentive to leave the highly elastic submarket completely – for example, by publicly forbidding the highly elastic consumers to shop at their stores, or by making enough negative statements to effectively accomplish the same goal. The firms start competing only in the relatively inelastic market, driving the margins higher. Moreover, the competitor has an entire segment all to herself, and thus becomes even softer in terms of price competition, driving the margins even higher, and leaving more of the less elastic consumers to the firm.[2] The firm's competitor is much better off because she receives all the benefits of higher margins, together with higher volume due to the entire higher elasticity segment, thus both firms would rather wait for the competitor to leave the highly elastic market. I do not model the timing game, and thus there are three potential equilibria: either one of the firms leaves the highly elastic market, and the other one does not; or both firms might end up serving both markets.

Several papers show results similar to my first finding (firms benefiting from an exogenous reduction in the size of the more elastic segment) in other contexts. Coughlan and Soberman (2005) show that retailers might benefit when manufacturers start serving consumers through an outlet channel as well. The outlet channel steals the more elastic consumers from both retailers, and thus the retailers do not have as much of an incentive to be competitive.[3] Similarly, Ishibashi and Matsushima (2009) show that if entrants steal the whole elastic segment from incumbents, it might result in higher profits for the incumbents, assuming that the entrants do not steal any less elastic consumers and that the more elastic market becomes perfectly competitive.[4] My result of

[1] See Miklos-Thal and Zhang (2011) for other reasons why firms would want to engage in de-marketing.

[2] Most of the qualitative results of the model would go through in the loyal-switcher setup of Narasimhan (1988), except for this effect. In the setup of Narasimhan (1988), a firm is always indifferent between leaving the switcher segment to the competitor while concentrating on its loyal consumers and competing in the switcher segment.

[3] Coughlan and Soberman (2005) also model the manufacturer-retailers interaction, and assume that consumers have different service needs. Kumar and Ruan (2006) similarly show that a retailer might benefit from the manufacturer opening up an internet channel (effectively a competition to the retailer); however this is solely in the cases when the manufacturer lowers the wholesale price to the retailer.

[4] Ishibashi and Matsushima (2009) show the finding for both quantity and price competition, while I concentrate on price. Pazgal and Soberman (2011) show that the results of Ishibashi and Matsushima (2009) hold up with an endogenous location choice, when the entrant might act as a buffer between the incumbents.

both firms potentially benefiting from some of the more elastic consumers disappearing is related to the results of both of these papers, except that I do not assume a particular reason for consumers disappearing. Also, while in Ishibashi and Matsushima (2009) it is an all or nothing proposition, either the entire more elastic segment is lost to both firm or none of it is lost to either one, I show that even in the symmetric version of my model it is a continuous phenomenon – even some of the more elastic consumers disappearing might be beneficial. Azar (2011) also shows that competitor firms might benefit from having less of a given consumer segment, in a multiproduct competition context. I show that the multiproduct competition is not necessary to achieve this result, and I outline the intuition and the parameter values for which this occurs.[5]

Alexandrov (2011) and Shulman (2011) both show that competitive firms might be worse off due to seemingly beneficial consumer behavior (self-control problems and unawareness of add-on fees); similarly to Cabral and Villas-Boas (2005), who show that seeming beneficial technological improvements (like economies of scale and learning) might lead to a prisoner's dilemma situation where firms derive lower profits due to the availability of the technology. I extend this logic even further in the present work: the mere existence of a consumer segment might lead to this type of an effect. Subramanian, Raju, and Zhang (2011) show that having some lower value customers might benefit a firm because a competitor is likely to poach its customers. I do not consider segments which different in serving costs, and while it is a deterrent from losing more elastic consumers (assuming they have higher costs of serving), the qualitative results of my model should still hold up.

2 Effects of exogenous changes

There are two symmetric firms, and two segments of consumers. Each consumer segment is spread uniformly on a Hotelling unit interval. The firms are located at the endpoint of each segment, and cannot price discriminate between the segments. Each firm's marginal cost is normalized to 0. I refer to the firm located at 0 as Firm 0, and to the firm located at 1 as Firm 1. Each segment has a linear travel cost,[6] one segment has a travel cost of t_H, and the other one of t_L, where $t_H \geq t_L$. I refer to the segment with a higher travel cost as the less elastic, or relatively inelastic segment throughout the paper. Without loss of generality, the mass of the less elastic segment is 1, and the mass of the more elastic segment is α. Both segments have the same reservation utility of R. It does not have to be the same for both segments for the results in the paper to hold.

I assume that $R \geq \frac{3}{2}t_H$. This is to ensure that if only the less elastic segment is present, the

[5] In the industrial organization literature in economics the question of competing in two segments (or, effectively, infinitely many segments as in Chen and Riordan 2008) simultaneously was raised before. However, the focus of those papers is showing that a more competitive industry structure might result in higher prices, making the question relevant for the antitrust authorities. The price increase results from the best-reply price function discontinuity which occurs when a firm leaves a segment with a lower elasticity. For more examples from the economic literature, see Rosenthal (1980) and Inderst (2002). Price increasing competition can arise in other contexts, besides competition on two segments, see Kuksov and Xie (2011) showing that it might occur due to competition in a status goods market.

[6] Since there is no product repositioning, and no consumer welfare calculations, the qualitative results should also hold with nonlinear travel cost.

firms actually compete as opposed to being local monopolies.

Suppose both firms are active in both markets. Then, following standard Hotelling calculations, the firm which is located at 0 has a demand of

$$D_0 = \frac{1}{2} + \frac{p_1 - p_0}{2t_H} + \alpha\left(\frac{1}{2} + \frac{p_1 - p_0}{2t_L}\right), \tag{1}$$

where p_i is the price of firm i.

Proposition 1 *In a symmetric equilibrium, firms charge*

$$p^*_{sym} = \frac{1+\alpha}{\frac{1}{t_H} + \frac{\alpha}{t_L}}. \tag{2}$$

Proof.

$$\frac{\partial \Pi_0}{\partial p_0} = \frac{1}{2} + \frac{p_1 - 2p_0}{2t_H} + \alpha\left(\frac{1}{2} + \frac{p_1 - 2p_0}{2t_L}\right), \tag{3}$$

thus the first order condition results in

$$2p_0 - p_1 = \frac{1+\alpha}{\frac{1}{t_H} + \frac{\alpha}{t_L}}, \tag{4}$$

and it is clear that the second order condition is satisfied. Imposing symmetry (or solving for the other firm's best reply function) results in the expression in the proposition. ■

Corollary 1 *The equilibrium price increases when firms become more differentiated on either segment, and it decreases when the more elastic segment is larger* $\left(\frac{\partial p^*}{\partial t_H} > 0, \frac{\partial p^*}{\partial t_L} > 0, \frac{\partial p^*}{\partial \alpha} < 0\right)$.

The corollary above shows that the expected comparative statics hold. As in the standard Hotelling, more differentiation implies higher prices and margins. The existence of the more elastic segment brings down the equilibrium price, and it does so in a continuous way: if the more elastic segment becomes smaller in size, then the price increases.

The firms split the market equally in equilibrium, so each firm gets $\frac{1+\alpha}{2}$ consumers, resulting in the equilibrium profit of

$$\Pi^*_{sym} = \frac{(1+\alpha)^2}{2} \frac{1}{\frac{1}{t_H} + \frac{\alpha}{t_L}} \tag{5}$$

per firm. The comparative statics with respect to differentiation are the same for profit as they are for price, since the equilibrium demand stays constant.

Corollary 2 *In equilibrium, the firms benefit from some of the more elastic consumers disappearing if the firms are much more differentiated on one segment than they are on the other (equivalently, if one of the segments is much more elastic than the other), or if the more elastic segment's size is relatively small* $\left(\frac{\partial \Pi^*}{\partial \alpha} < 0 \text{ iff } 2 < (1-\alpha)\frac{t_H}{t_L}\right)$.

Proof. One can show that

$$\frac{\partial \Pi^*}{\partial \alpha} = \frac{p^*}{\frac{1}{t_H} + \frac{\alpha}{t_L}} \left(\frac{2}{t_H} + \frac{1-\alpha}{t_L} \right), \tag{6}$$

which has the same sign as the expression in the parentheses, and results in the condition stated in the corollary. ■

To put the findings of Ishibashi and Matsushima (2009) in my context, their main result is that, effectively, the firms might be better off if there is no more elastic segment, or in other words $\alpha = 0$.

3 Leaving a segment unilaterally

The fact that firms face lower margins with the more elastic segment present leaves a possibility that a firm might be better off quitting the more elastic segment and leaving it to the rival. The firms become less competitive, and the rival becomes even less competitive due to an uncontested segment of consumers. The rival is clearly better off if the firm leaves a segment uncontested, but it's not clear whether it's worth it for a firm to leave the segment. The trade-off is between higher margins, but a lower volume.

I keep the model from the previous section, and examine when a firm has an incentive to unilaterally deviate from the symmetric equilibrium from the previous section, and leave the more elastic segment. For convenience, I assume that $\alpha \leq 1.5$, in other words the more elastic segment is not more than one and half times the size of the less elastic segment.

If the consumer reservation utility, R, does not bind, then it turns out that with linear travel cost a firm *always* has an incentive to leave unilaterally, because regardless of the size of the more elastic segment, and the difference in elasticities, the firm will more than make up for it by charging a higher margin in the inelastic segment. The only question becomes which firm actually leaves, because both of them leaving the more elastic segment is not an equilibrium. This requires exceedingly high mark-ups in the less elastic market, it is unrealistic, and thus I assume that the reservation utility binds.

There are two ways that the reservation utility might bind. It can bind either in the more elastic market, or in the less elastic market. In the less elastic market, both firms are active, and thus the marginal consumer between the firms is the consumer getting the least utility. By definition, the consumer derives the same utility regardless of which firm he patronizes. If Firm 0 left the more elastic segment, suppose the marginal consumer patronizes the other firm, Firm 1. Then, his utility is $R - t_H d' - p_1$, where d' is the consumer's distance from Firm 1, which from previous subsection we know is $d' = \left(\frac{1}{2} - \frac{\alpha}{3}\right)$.

The consumer with the least utility in the other submarket, is the consumer at 0, the one farthest away from Firm 1, the only firm active in that market. That consumer's utility from buying from Firm 1 is $R - t_L - p_1$. Thus, which market binds depends on whether $t_L > t_H d'$. Considering that the inequality holds if the segments are close in elasticity, or if the more elastic

segment is large,[7] I will assume from now on that the reservation utility binds in the more elastic market. The other case results in similar qualitative results.

Proposition 2 *Suppose that Firm* 0 *stops serving the more elastic segment. Then the firms charge the following prices in equilibrium:*

$$p_0^* = \frac{R + t_H - t_L}{2}, \tag{7a}$$

$$p_1^* = R - t_L. \tag{7b}$$

Proof. Since the reservation utility binds in the more elastic segment, and assuming that Firm 1 still wants to serve every consumer in that segment, Firm 1 has to charge the price in the proposition, or in other words the highest price that the consumer at 0 in the more elastic segment can afford. Plugging that into the best-reply function of Firm 0 (the standard Hotelling $p_0^* = \frac{t_H + p_1}{2}$) results in the other expression in the proposition. ■

It is easy to calculate that the equilibrium demand of Firm 0 is $D_0 = \frac{1}{2} + \frac{R - t_H + t_L}{4t_H}$, and that the equilibrium profit of Firm 0 is

$$\Pi_0 = \frac{1}{4}(R + t_H - t_L)(R + t_H + t_L). \tag{8}$$

Proposition 3 *Firm* 0 *stops serving the more elastic segment if and only if the consumer reservation utility is sufficiently high, the size of the more elastic segment is sufficiently small, or if the firms are not sufficiently differentiated in the more elastic segment (equivalently, if one of the segments is sufficiently more elastic than the other).*[8]

Proof. One needs to compare the profit of Firm 0 when it unilaterally stops serving the more elastic segment (8), and when both firms serve both segments (5), resulting in the expression in the footnote of the proposition. Sufficiently high R or a sufficiently low R and high t_L result in the inequality either holding or not. The rest of the statements are derived from examining the inequality; and noting that the profit in the case that Firm 0 stops serving the more elastic subsegment does not depend on α, and that the assumption that the reservation utility binds in the more elastic segment ensures that $\frac{\partial \Pi^*}{\partial \alpha} > 0$. ■

Three equilibria are possible: either firm unilaterally stopping to serve the more elastic segment, OR both firms serving both segments. Both firms serve both segments if the segments are relatively close in size, or if the more elastic segment is sufficiently large, or if the reservation utility of consumers is low (so there is not as much of a margin increase if one of the firms leaves the more elastic segment).

[7] Exactly the cases when the equilibrium price increases by a particularly large amount if the reservation utility does not bind.

[8] Firm 0 stops serving the more elastic segment iff $2(1+\alpha)^2 < \left(\frac{1}{t_H} + \frac{\alpha}{t_L}\right)((R + t_H)^2 - t_L^2)$.

4 Conclusion

Summary.

Testable Predictions.

Managerial Implications.

References

[1] Alexandrov, Alexei, 2011, 'Competing for consumers with self-control problems,' working paper.

[2] Azar, Ofer H., 2011, 'Can more consumers lead to lower profits? A model of multi-product competition,' *Journal of Economic Behavior and Organization*, **76**, 184–195.

[3] Cabral, Luis M. B. and Miguel Villas-Boas, 2005, 'Bertrand Supertraps,' *Management Science*, **51(4)**, 599-613.

[4] Chen, Yongmin and Michael H. Riordan, 2008, 'Price-increasing competition', *Rand Journal of Economics*, **39(4)**, 1042-1058.

[5] Coughlan, Anne T. and David A. Soberman, 2005, 'Strategic segmentation using outlet malls,' *International Journal of Research in Marketing*, **22**, 61–86.

[6] Inderst, Roman, 2002, 'Why competition may drive up prices,' *Journal of Economic Behavior and Organization*, **47**, 451–462.

[7] Ishibashi, Ikuo and Noriaki Matsushima, 2009, 'The Existence of Low-End Firms May Help High-End Firms,' *Marketing Science*, **28(1)**, 136–147.

[8] Harris, Anne-Marie G.; Henderson, Geraldine R.; and Jerome D. Williams, 2005, 'Courting Customers: Assessing Consumer Racial Profiling and Other Marketplace Discrimination,' *Journal of Public Policy & Marketing*, **24(1)**, 163–171.

[9] Kuksov, Dmitri and Ying Xie, 2011, 'Competition in a Status Good Market,' working paper.

[10] Kumar, Nanda and Ranran Ruan, 2006, 'On manufacturers complementing the traditional retail channel with a direct online channel,' *Quantitative Marketing and Economics*, **4**, 289–323.

[11] Miklos-Thal, Jeanine and Juanjuan Zhang, 2011, 'Strategic Demarketing,' working paper.

[12] Narasimhan, Chakravarthi, 1988, 'Competitive Promotional Strategies,' *Journal of Business*, **61(4)**, 427–449.

[13] Pazgal, Amit I. and David A. Soberman, 2011, 'The Benefit of Increased Competition,' *presented at the Marketing Science conference in Houston, June 2011.*

[14] Rosenthal, Robert W., 1980, 'A Model in which an Increase in the Number of Sellers Leads to a Higher Price,' *Econometrica*, **48(6)**, 1575–1579.

[15] Shulman, Jeffrey D., 2011, 'The Impact of Hidden Add-On Fees and Consumer Bounded Rationality,' working paper.

[16] Subramanian, Upender; Jagmohan S. Raju; and Z. John Zhang, 2011, 'The Strategic Value of High-Cost Customers,' working paper.

[17] The Automotive News, March 1st 2004, 'Automakers find hip-hop brings bling to bottom line. Marketers court young, edgy crowd.'

[18] The Sunday Times, July 9th 2006, 'Bubbly bursts as bling crowd desert Cristal over 'racism."