The Competitive Effects of Consumer Boycotts

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Abstract

I introduce the possibility of consumer boycotts in a Hotelling model. The more a firm complies with consumers' wishes, the higher its marginal cost, but the lower the probability of facing a consumer boycott. I show that the threat of a consumer boycott can increase the expected profits of firms. Firms lose out when they do face a boycott, but gain even more when their competitor does, giving them more market power. The stronger a boycott will be, the more a firm will cater to consumers' wishes. Yet, the effect of more competition is ambiguous.

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1 Introduction

Firms are under increasing pressure to behave as responsible corporate citizens. The influence of non-governmental groups (NGOs) is increasing, and consumers are increasingly concerned about e.g. environmental, labor, political, ethical, and even corporate governance standards that a firm uses. When such standards do not comply with what consumers find desirable, a consumer boycott may ensue, often orchestrated by one or several NGOs. Examples abound. Shell has been a target for many years, initially for its role in South-Africa, then for its role in Nigeria. Nike has long been under pressure for its alleged use of sweat-shops in developing countries, where labor standards are reported to be dismal. Innes (2006) reports that between 1988 and 1995, over 200 firms and over a thousand products were subject to organized boycotts in the US. Consumer boycotts are almost never so destructive as to completely wipe out the sales of a company. Still, firms have to be concerned with the possibility of consumer boycotts, which may still have a non-negligible impact on the demand for their product. In this paper, I model such consumer boycotts.

I assume price competition between two firms, that are located on the extremes of a Hotelling line. Firms can choose the extent to which they comply with production methods that consumers find desirable. However, there is a trade-off. By choosing methods that are less desirable, marginal costs will be lower. Crucially, we assume that such production methods are perfectly legal. The point is, however, that consumers prefer that such methods are not being used. Therefore, the probability of a consumer boycott will be higher.

Consider for example a firm that has to decide on how much to pay its workers in some developing country. It can choose a wage rate that is so low that any consumer in its home country would find it completely unethical, although it is perfectly legal to set such a wage. The lower the wage rate this firm sets, the lower its marginal cost, but the higher the probability that some NGO or journalist will find out about its practices and convince an outraged public to start a consumer boycott. Alternatively, a firm may be able to choose the "greenness" of its production process. Producing in a more environmentally friendly manner will increase marginal costs. The more environmentally unfriendly a firm will produce, the lower its marginal cost but, again, the higher the probability that it will face a consumer boycott.

I model a boycott as a discrete decrease in the willingness-to-pay of consumers for the product of a firm. This seems an adequate simplification of reality. With a consumer boycott, consumers are less inclined to buy the product of that firm. Yet, many of them still do. In my model, firms first set marginal costs. Then, consumers may decide to boycott a firm. Once that is known, firms set prices, and consumers decide whether or not to buy.

Although this paper is presented in terms of consumer boycotts, it also applies to other cases where a firm can vary the quality of its production process in ways not readily observable to consumers. For example, a firm can save on marginal cost by compromising the safety of its product. The more it does, the higher the probability that things will go wrong and the producer has to recall its product, and/or faces costly lawsuits. Witness, for example, the huge recall of Firestone tyres on Ford SUVs in the US in 2000 (Tait, 2000), or of the Samsung Galaxy Note in 2017 (Delcourt, 2017). Although these are not consumer boycotts, they do perfectly fit my model: by choosing a lower marginal cost, a firm stands an increased probability that demand of its product will drop – albeit ex post.

The main results are the following. In the equilibrium of my model, I find that the possibility of a consumer boycott *increases* the expected profits of a firm. The intuition is as follows. When a firm faces a boycott, it is obviously hurt. But when its competitor is hit by a boycott, it benefits, since its market power now increases.[1] In fact, we have that a firm gains more when there is a boycott against its competitor, than it loses when it faces a boycott itself. In equilibrium, both firms are equally likely to face a boycott. But that implies that expected profits go up when there is the possibility of a boycott.

This does not imply, however, that boycotts are ineffective. Firms do choose higher marginal costs (and hence more desirable production methods) when they face the possibility of a boycott. Also, the marginal costs are increasing in the severity of a possible boycott. The more consumers' willingness-to-pay for a firm's product decreases in case of a consumer boycott, the higher the marginal costs that the firm will choose.

It is often argued that more competition will induce firms to lower their standards of production, compromising on safety, labor standards, environmental standards, etcetera (see e.g. Shleifer, 2004). More competition is then argued to lead to a "race to the bottom" in terms of such standards. Yet, it is not obvious a priori why that would be the case. One could argue that firms always have an incentive to try to minimize their costs, regardless of the extent of competition. The model in this paper is ideally suited to answer this question. I show that, in the context of my model, the effect of more intense competition is ambiguous. If a possible boycott will be severe, then more competition indeed implies a race to the bottom: firms will choose

[1] Indeed, after the Firestone recall in the US, the Financial Times reported that "In the replacement market for cars and vans, Michelin, like Goodyear, benefited from Firestone's tyre recall." (Mallet, 2001)

lower standards if the intensity of competition increases. But the opposite is true if a possible boycott will not be so severe. In that case, firms will choose *higher* standards if the intensity of competition increases.

This paper is not the first one to deal with the issue of consumer boycotts. Coming from a whole range of fields, there is work that studies factors that contribute to the success of a boycott (Smith, 1990), who is likely to participate in a boycott (Sen et al., 2001), why consumers would participate in one (John and Klein, 2003), and how boycotts financially affect firms that are hurt by one (Koku et al., 1997), amongst other issues. Friedman (1999) discusses many boycotts and sources for boycotts. Papers that also study the effect of environmentally aware consumers on competition between firms, include Arora and Gangopadhyay (1995) and Lutz et al. (2000).

More closely related to this paper are the following. Baron (2001) and Baron and Diermeier (2007) model consumer boycotts in the context of a game played between an NGO and a monopolist. In Daubanes and Rochet (2019), an NGO can also orchestrate a boycott against a monopolist. In Innes (2006), two firms, a large and a small one, can choose whether or not to use a green technology, and an NGO can choose whether to orchestrate against either one of them. In Heijnen and van der Made (2012) consumers use a boycott to signal their level of environmental concern vis-a-vis a polluting monopolist. In Egorov and Harstad (2017), a firm, a regulator and an activist play a war of attrition in which the regulator threatens to regulate the firm, and the activist may engage in a costly boycott to try to induce the firm to self-regulate. Peck (2017) shows that in a durable goods monopoly with uncertain demand, the monopolist may charge a low price in period 1, anticipating that consumers will boycott whenever the price exceeds a threshold. In Glazer, Kanniainen, and Poutvaara (2010), two firms can choose whether to invest in some abatement technology. A share of consumers are moralists and never buy from a non-abating firm. Yet, some non-moralists may also choose to do so, and to pose as moralists. In Broccardo, Hart and Zingales (2022), socially responsible citizens can choose between divestment, voice or boycott strategies to affect the actions of a perfectly competitive firm.

There is also empirical work studying the effects of consumer boycotts. Most focus on boycotts-by-proxy, where a firm is boycotted because of its nationality. The exception is Hendel, Lach and Spiegel (2017), who study the boycott of cottage cheese in Israel in 2011. Due to the boycott, the average price dropped by 24% overnight, while demand dcreased by 30%, to recover after 6 weeks. For other empirical work, see the references in Hendel et al. (2017).

Yet, to the best of my knowledge, there is no work that focuses on the competitive effects of consumer boycotts and, especially, the threat of such boycotts. In this paper, I fill this gap. I abstract from the way in which boycotts come about: I only assume that a firm has a higher probability of facing a boycott if it produces in a less responsible manner.

The remainder of this paper is structured as follows. I present the model in section 2. The model is solved for the case that the market is always covered in section 3. In section 4, I derive some further results for the covered-market model by choosing a specific boycott probability function. In section 5 I consider the effect of an increase in competition. Section 6 concludes.

2 The model

Absent possible boycotts, we have a standard Hotelling model.[2] Two firms, A and B, are located on a line of unit length. Firm A is located at 0, firm B is located at 1. The firms produce goods that are only differentiated by their location. Consumers are uniformly distributed on the line, have unit demand, and are willing to pay at most v for the product. Transportation costs are t per unit of distance.

If firms would completely comply with the wishes of consumers and produce in the most desirable manner possible, they would have marginal costs of $\bar{c}$. Yet, a firm can lower its marginal costs by choosing production methods that consumers view as less desirable, as I argued in the introduction.[3] If it does, it stands an increased chance of facing a consumer boycott. I thus assume that a firm can freely choose its marginal cost c_i. Yet, the lower c_i, the higher the probability that this firm faces a consumer boycott. This is due to two forces. First, the lower c_i, the more likely it is that some group or organization will find out about these practices. Second, the more blatantly a firm violates the consumer's preferred production methods, the more likely that whoever finds out about this, is able to orchestrate a consumer boycott. For simplicity, I assume that the lowest level of marginal costs that a firm can choose is zero. Hence, we have $c_i \in [0, \bar{c}]$.

In my model, the boycott technology is just a black box. I do not explicitly consider the problems NGOs may have in orchestrating a boycott, or the problems consumers may have in coordinating on a boycott. Given these problems, it seems only natural to assume that boycotts ensue in a stochastic

[2]Of course, the use of a Hotelling model is somewhat restrictive, but in this context it has many advantages over e.g. a Cournot or a Bertrand model. First, it is analytically more tractable. Second, in a Hotelling model a boycott against one firm directly benefits the other firm, which is an attractive property for our purposes.

[3]Importantly, the model thus only applies to situations where undesirable behavior affects marginal rather than fixed costs.

fashion. A firm that uses e.g. a dirty technology does not automatically induce a consumer boycott. If it is lucky, nobody will find out. And even if somebody does, she may not care enough to orchestrate a consumer boycott, or may be unsuccessful in doing so. Yet the dirtier the technology, the higher the probability that the firm will face a boycott. More specifically, we assume that firm i faces a consumer boycott with probability $\gamma(c_i)$, with $\gamma' < 0$ and $\gamma(\bar{c}) = 0$. Thus, when a firm fully complies to all standards that consumers desire, it never faces a consumer boycott.[4] If a firm does face a boycott, consumers are only willing to pay $(1 - \delta)v$ for its product, $\delta \in [0, 1]$. Hence, δ reflects the strength of the boycott. When δ is very low, consumers are not bothered very much by the firm's behavior. The higher δ, the more the firm is hurt by the boycott. One could interpret δv as the consumer's willingness to pay for sound business practices.[5]

The timing of the game is as follows. In stage 1, firms simultaneously and noncooperatively choose their marginal costs. In stage 2, boycotts are determined. In stage 3, firms compete by setting prices. I thus allow firms to set prices after they have learned whether they face a boycott. This seems natural. Price is a variable that can be changed overnight, so once a firm learns that it faces a boycott, it can still change its price. Also, when we assume that firms have to set their price before a possible boycott is in effect, then consumers may infer the level of marginal cost of this firm by observing its price, which in turn gives firms an incentive to use price as a signal. Such signaling issues would greatly complicate the analysis.

For the analysis in this paper, we will mostly assume that the market is entirely covered, in the sense that in equilibrium each consumer will always buy one unit of the product.[6] In the next section, I analyze this case. I will prove the main result: the threat of consumer boycotts benefits firms. Yet,

[4]This is only for ease of exposition. All results will go through (and, indeed, will only be stronger) when we assume that consumers do make mistakes so $\gamma(\bar{c}) > 0$.

[5]This is in line with Basu and Zarghamee (2009), who assume that consumers' willingness to pay for a good produced with child labor is αp rather than p, with $\alpha < 1$. Yet, in their model consumers can observe whether child labor is used, so boycotts do not have a stochastic element.

[6]This is more innocuous than it may seem at first sight. Consider the case of running shoes. Clearly not all consumers buy running shoes in each period. Some never buy any. Some even own multiple pairs. But the model is still consistent with a world where, at the start of a period, each consumer decides whether to buy a pair of running shoes and, if so, enters the market. The Hotelling line then reflects all consumers that have decided to enter the market in that particular period. If the decision by consumers whether to enter the market for running shoes is made before they decide whether to boycott a firm (or is not affected by such a potential boycott), the model would still apply. The size of the market may vary from period to period, but that does not affect the model (prices would not be affected and profits would just be proportional to the size of the market).

one may argue that if both firms face a consumer boycott, then total sales in the industry should decrease as well. If that is the case, then the market is not fully covered if both firms face a boycott. I analyze this scenario in Appendix A and show that also in this case, firms can benefit from the threat of a boycott, but only if the probability of a boycott is not too large.

3 Solving the model

In this section, I solve the model for the case that the market is always fully covered. The model is solved using backward induction. I start with solving stage 3 of the model, which is the competition stage. Then I solve for the choice of marginal costs.

The competition stage Consider the general case in which consumers have a willingness to pay v_A for the product of firm A, and v_B for the product of firm B. Marginal costs are c_A and c_B, respectively. Firms set prices p_A and p_B. The location of the indifferent consumer is denoted by z, given by

$$z = \frac{1}{2} + \frac{(v_A - p_A) - (v_B - p_B)}{2t}, \tag{1}$$

provided that $z \in [0, 1]$. Profits of firm A are given by $\pi_A = (p_A - c_A) z$, that of firm B by $\pi_B = (p_B - c_B)(1 - z)$. Using (1), we can derive reaction functions

$$p_i = \frac{1}{2}(t + c_i + p_j + v_i - v_j),$$

with $i, j \in \{A, B\}$ and $i \neq j$.[7] The equilibrium of this subgame then has

$$p_i^* = t + \frac{1}{3}(v_i - v_j) + \frac{1}{3}(2c_i + c_j). \tag{2}$$

For the indifferent consumer we then have

$$z^* = \frac{1}{2} + \frac{1}{6t}(v_A - c_A) - \frac{1}{6t}(v_B - c_B). \tag{3}$$

Equilibrium profits are given by

$$\pi_i = \frac{1}{18t}(3t + (v_i - c_i) - (v_j - c_j))^2. \tag{4}$$

[7] In the remainder i and j are always understood to have $i, j \in \{A, B\}$ and $i \neq j$.

Parameter restrictions For our analysis to make sense, we need some parameter restrictions to be satisfied. First, we assume that a monopolist, located in one of the two extremes of the market will always choose to serve the entire market. This assures that the market is always fully covered. It is easy to see that this requires $v_i > 2t+c_i$. Note that v_i can take on two possible values: $v_i \in \{(1-\delta)\, v, v\}$. For c_i, we have $c_i \in [0, \bar{c}]$. For the inequality to be always satisfied, we thus require $(1-\delta)\, v > 2t + \bar{c}$, or $\delta v < v - 2t - \bar{c}$.

Second, we require that both firms have a positive equilibrium market share, so $z^* \in (0,1)$. From (3), we have $z^* > 0$ if $v_A - c_A > v_B - c_B - 3t$ for all $v_A, v_B \in \{(1-\delta)\, v, v\}$ and $c_A, c_B \in [0, \bar{c}]$. This implies $(1-\delta)\, v - \bar{c} > v - 3t$, or $\delta v < 3t - \bar{c}$. This condition immediately implies $v_A - c_A < v_B - c_B + 3t$ for all $v_A, v_B \in \{(1-\delta)\, v, v\}$ and $c_A, c_B \in [0, \bar{c}]$, so $z^* < 1$. We thus require

Assumption 1 $\delta v < \min\{3t - \bar{c},\, v - 2t - \bar{c}\}$.

Note that, for this to be satisfied, we also need

Assumption 2 $\bar{c} < 3t$.

Boycotts and profits I now solve for the final stage. Depending on the outcome of the boycott stage, we have three possible scenarios: neither firm faces a boycott, both firms face one, or only one of them does. If neither firm faces a boycott, we have $v_A = v_B$. Using (4), profits of each firm then equal

$$\pi_i^{NN}(c_i, c_j) = \left(3t - (c_i - c_j)\right)^2 / 18t, \tag{5}$$

I will always use the first superscript to denote whether this firm faces a boycott, and the second superscript to denote whether its competitor does. Here, the superscript NN thus denotes that this firm does not face a boycott, and neither does the other firm. Suppose that both firms do face a boycott. We then have, again using (4), profits of each firm equal

$$\pi_i^{BB}(c_i, c_j) = \left(3t - (c_i - c_j)\right)^2 / 18t, \tag{6}$$

The superscript BB denotes that this firm faces a boycott, and the other firm also does. Note that these profits are equal to π_i^{NN}: when both firms face the same boycott and the market is covered, this does not affect competition. Sales are unaffected and so are firm profits. This is an artefact of the Hotelling model. With a fully covered market, equilibrium prices and profits are determined by the relative attractiveness of the two products, and not by their attractiveness relative to the outside option. Hence, as both products become less attractive to the same extent, the equilibrium is unaffected.[8]

In the third scenario, one firm faces a boycott, but the other does not. From (4), profits of the boycotted firm can then be written

$$\pi_i^{BN}(c_i, c_j) = (3t - \delta v - (c_i - c_j))^2 / 18t, \tag{7}$$

while profits of the firm that does not face a boycott are

$$\pi_i^{NB}(c_i, c_j) = (3t + \delta v - (c_i - c_j))^2 / 18t. \tag{8}$$

The choice of marginal costs In the first stage of the game, in which firms choose their level of marginal costs. From (5), (7), and (8) we can write

$$\begin{aligned} \pi_i^{BB}(c_i, c_j) &= \pi_i^{NN}(c_i, c_j), \\ \pi_i^{BN}(c_i, c_j) &= \pi_i^{NN}(c_i, c_j) + \frac{\delta^2 v^2 - 2\delta v\,(3t - (c_i - c_j))}{18t}, \\ \pi_i^{NB}(c_i, c_j) &= \pi_i^{NN}(c_i, c_j) + \frac{\delta^2 v^2 + 2\delta v\,(3t - (c_i - c_j))}{18t}. \end{aligned} \tag{9}$$

After marginal costs are set, firm A faces a boycott with probability $\gamma(c_A)$, and firm B with probability $\gamma(c_B)$. Firm i thus chooses c_i to maximize

$$\begin{aligned} \Pi_i &= \gamma(c_i)\,(1 - \gamma\,(c_j))\,\pi_i^{BN}(c_i, c_j) + (1 - \gamma\,(c_i))\,\gamma(c_j)\pi_i^{NB}(c_i, c_j) + \\ &\quad + (1 - \gamma\,(c_i))\,(1 - \gamma\,(c_j))\,\pi_i^{NN}(c_i, c_j) + \gamma\,(c_i)\,\gamma\,(c_j)\,\pi_i^{BB}(c_i, c_j). \end{aligned} \tag{10}$$

The first term reflects the case that i will face a boycott, and j will not. The probability of this occurring is $\gamma(c_i)\,(1 - \gamma\,(c_j))$. If it occurs, the profits of firm i equal $\pi_i^{BN}(c_i, c_j)$. Similarly, the second term reflects the case that i will not face a boycott but j will. The third term reflects the case that neither firm will face a boycott, and the fourth term the case that both will.

Using symmetry, the equilibrium necessarily has $c_A^* = c_B^*$. Denote this level of marginal cost as c^*. This implies that the equilibrium probability of a consumer boycott is also equal for both firms. Denote this probability as $\gamma^* \equiv \gamma(c^*)$. In this case, (10) simplifies to

$$\begin{aligned} \Pi_i &= \gamma^*\,(1 - \gamma^*)\left(\pi_i^{BN}(c^*, c^*) + \pi_i^{NB}(c^*, c^*)\right) \\ &\quad + (1 - \gamma^*)^2\,\pi_i^{NN}(c^*, c^*) + (\gamma^*)^2\,\pi_i^{BB}(c^*, c^*). \end{aligned}$$

[8] One could argue that it is very unlikely that two firms within one industry both face a consumer boycott, for example since an NGO would rather concentrate it efforts on orchestrating a boycott against one of the two firms involved, rather than targeting both. If the event that both firms face a boycott occurs with probability zero, then we effectively have the same model as in the main text: each firm faces a boycott with probability γ, and the probability that both firms do not face a boycott and make profits π^{NN},is $1 - 2\gamma$.

Using (9), this implies

$$\begin{aligned}\Pi_i &= \pi_i^{NN}(c^*, c^*) + 2\gamma^*(1-\gamma^*)\,\delta^2 v^2/18t \\ &= t/2 + 2\gamma^*(1-\gamma^*)\,\delta^2 v^2/18t.\end{aligned}$$

Note from (5) that, without the possibility of boycotts, any game in which firms set c simultaneously, and that yields a symmetric equilibrium $c_1^* = c_2^* \equiv \tilde{c}$, yields equilibrium profits $\pi_i^{NN}(\tilde{c}, \tilde{c}) = t/2$. Hence, we have established:

Theorem 1 *If the equilibrium has both firms facing a consumer boycott with positive probability, and the market is always fully covered, then the possibility of a consumer boycott increases the expected profits of both firms.*

Note that this result also holds if firms choose to set $c^* = \bar{c}$ but consumers make mistakes (so $\gamma(\bar{c}) > 0$). The result is counterintuitive. It can be understood as follows. In equilibrium, both firms choose the same level of marginal cost. Hence, all firms are equally likely to be hit by a consumer boycott. When the competitor is hit, then this firm benefits: the consumers' willingness to pay for the competitor's product decreases, giving this firm more market power. Of course, a firm suffers when facing a consumer boycott itself. However, the additional profit when the competitor faces a boycott, more than outweighs the loss in profit when it faces a consumer boycott itself. Intuitively, consider the extreme case in which a boycotted firm *is* wiped out of the market. The remaining firm then has a monopoly. The expected profits of being equally likely to be a monopoly or to be out of the market, are higher than the expected profit of being a duopoly for sure. In this model a firm is never entirely wiped out, but the intuition still goes through.

This does not imply, however, that boycotts are ineffective. Indeed, without the possibility of a consumer boycott, firms would simply have chosen the lowest possible level of marginal cost. As long as the equilibrium of the game described above has $c^* > 0$, we still have that the threat of a consumer boycott is effective, in the sense that the threat does induce firms to choose production methods that are more desirable for consumers than they would have chosen absent such a threat.

One may argue that our result is driven by the assumption that the market is still fully covered, even if both firms face a boycott. This implies that if both firms are found out to be producing in an unethical way, both do face a lower willingness to pay from consumers, but this does not affect their bottom line, as all consumers do still buy in equilibrium. In Appendix B we show that, even if we relax this assumption, our main result still holds.

4 Choosing a boycott probability function

In the previous section, we introduced our main result: with a positive probability of a boycott, firms are better off on average. To be able to do comparative statics, however, we need to put somewhat more structure on the boycott probability function. We do so in this section.

Consider the case in which the market is always covered. The expected profits of firm i in stage 1 are then given by (10). For ease of exposition, we drop the arguments of the profit functions and use $\gamma_i \equiv \gamma(c_i)$. Using (9), profits can be written

$$\Pi_i = \pi_i^{NN} + \frac{(\gamma_i + \gamma_j - 2\gamma_i\gamma_j)\,\delta^2 v^2 + 2\,(\gamma_j - \gamma_i)\,\delta v\,(3t - (c_i - c_j))}{18t}.$$

Using (5), the FOC is

$$-2\,(1 + \delta v \gamma_i')\,(3t - (c_i - c_j)) - 2\delta v\,(\gamma_j - \gamma_i) + \delta^2 v^2\,(1 - 2\gamma_j)\,\gamma_i' = 0, \quad (11)$$

where γ_i' denotes the first derivative of γ_i with respect to c_i. For simplicity, I assume that when a firm chooses the lowest possible marginal costs, it faces a boycott with certainty, so $\gamma(0) = 1$. Again, I assume $\gamma(\bar{c}) = 0$. If we also assume that γ is linear, the function is pinned down entirely, and we have

$$\gamma(c) = \frac{\bar{c} - c}{\bar{c}}.$$

This implies that $\gamma' = -1/\bar{c}$. For what follows, it is convenient to write $a \equiv 1/\bar{c}$, so $\gamma(c) = 1 - ac$. I will first solve firm is unconstrained maximization problem, thus without taking into account the condition that $c_i \in [0, \bar{c}]$. The FOC is

$$-2\,(1 - \delta v a)\,(3t - (c_i - c_j)) - 2\delta v\,(c_i - c_j)\,a - \delta^2 v^2 a^2\,(2c_j - \bar{c}) = 0, \quad (12)$$

Note that $\gamma_j - \gamma_i = a\,(c_i - c_j)$ and $1 - 2\gamma_j = 2ac_j - 1$, so the FOC yields the following reaction function for firm i

$$\tilde{c}_i = \tilde{R}_i\,(c_j) \equiv c_j + \frac{\delta^2 v^2 a\,(1 - 2ac_j) - 6t\,(1 - \delta v a)}{4\delta v a - 2}, \quad (13)$$

where the tilde reflects that we look at the unconstrained maximization problem. Consider the second-order condition. From (12), for profits to be maximized, we need

$$\frac{\partial^2 \Pi_i}{\partial c_i^2} = 2 - 4\delta v a < 0. \quad (14)$$

If this condition is not satisfied, the profit function is strictly convex. As a result, the firm's profit maximization problem must have a corner solution: the firm will either set $c_i = 0$ or $c_i = \bar{c}$. If the condition is satisfied, the reaction function (13) is relevant. This establishes

Lemma 1 *If (14) is satisfied, reaction curves in the unconstrained problem are linear and downward sloping. Hence, we have strategic substitutes.*

Proof. From (13), we have

$$\frac{\partial \tilde{c}_i}{\partial c_j} = 1 - \frac{2\delta^2 v^2 a^2}{4\delta v a - 2}.$$

From (14), the denominator is strictly positive. The fraction is strictly smaller than 1 if and only if $\delta va\,(2 - \delta va) > 1$. Consider the left-hand side of this inequality as a function of δva. This function has its maximum at $\delta va = 1$, where it equals 1. Hence, the inequality is never satisfied, which establishes the result. ■

Now consider the unconstrained maximization problem. When (14) is satisfied, firm i's profits are strictly concave. This implies that when the unconstrained maximization problem yields some $c_i > \bar{c}$, then firm is best reaction in the constrained problem must be to set $c_i = \bar{c}$. Similarly, the unconstrained problem yields some $c_i < 0$, then firm is best reaction in the constrained problem must be to set $c_i = 0$. The reaction function in the constrained problem is then given by

$$c_i = R_i(c_j) \equiv \min\left\{\max\{0, \tilde{R}_i(c_j)\}, \bar{c}\right\}. \tag{15}$$

I now solve for the Nash equilibrium in the unconstrained problem, again assuming that (14) is satisfied. Imposing symmetry to (13) and using $a = 1/\bar{c}$, we have

$$\tilde{c}^* = \frac{1}{2}\bar{c} + \frac{3t\bar{c}\,(\delta v - \bar{c})}{\delta^2 v^2}. \tag{16}$$

Now consider the solution in the constrained problem. Suppose that $\tilde{c}^* > \bar{c}$. In the constrained problem, it is then an equilibrium for both firms to set $c_i = \bar{c}$. This can be seen as follows. For firm i, the best reply to $\bar{c}$ in the unconstrained problem is to set $\tilde{R}_i(\bar{c})$. But, since $\tilde{R}_i$ is downward sloping, we have $\tilde{R}_i(\bar{c}) > \tilde{R}_i(\tilde{c}^*) = \tilde{c}^* > \bar{c}$. Hence, from (15), $R_i(\bar{c}) = \bar{c}$. so $(c_A, c_B) = (\bar{c}, \bar{c})$ is a Nash equilibrium. With $\tilde{R}_i$ linear and downward sloping, this equilibrium is unique. Now consider the case where $\tilde{c}^* < 0$. In the constrained problem, it is then an equilibrium for both firms to set $c_i = 0$. This can be seen as follows. For firm i, the best reply to 0 in the unconstrained problem is then to set

$\tilde{R}_i(0)$. But, since $\tilde{R}_i$ is downward sloping, we have $\tilde{R}_i(0) < \tilde{R}_i(\tilde{c}^*) = \tilde{c}^* < 0$. Hence, from (15), $R_i(\bar{c}) = 0$, so $(c_A, c_B) = (0, 0)$ is a Nash equilibrium. With $\tilde{R}_i$ linear and downward sloping, this equilibrium is unique.

We have thus established

Theorem 2 *With $\gamma(c) = (\bar{c} - c)/\bar{c}$ and $4\delta v > 2\bar{c}$, the Nash equilibrium has*

$$c^* = \min\left\{\max\left\{0, \frac{1}{2}\bar{c} + \frac{3t\bar{c}\,(\delta v - \bar{c})}{\delta^2 v^2}\right\}, \bar{c}\right\}, \tag{17}$$

Yet, the above result does not yet specify exactly when we have a corner solution, and when may have an internal solution c^*. In what follows, I will consider c^* as a function of δv, which is the intensity of the boycott. I will derive how the equilibrium value of marginal costs c^* is affected by a change in the severity of a boycott δv. First, I derive a number of lemmas. Unless noted otherwise, all proofs are in Appendix A. We have:

Lemma 2 *c^* is nondecreasing in δv.*

This is an intuitive result: as the severity of the boycott increases, firms comply (weakly) more with the wishes of consumers. The following lemma gives the conditions for an effective boycott, that is, to have $c^* > 0$:

Lemma 3 *For an effective boycott in a duopoly, we need:*

$$\begin{aligned} 3t &< \left(1 + \frac{1}{3}\sqrt{6}\right)\bar{c} \\ \bar{c} - t - \sqrt{3t\,(3t + 2\bar{c})} &< v < \bar{c} - t + \sqrt{3t\,(3t + 2\bar{c})}. \end{aligned}$$

If these conditions are violated, there is no feasible value of δv for which the boycott is effective, both firms are always active and the market is always fully covered.

If the first condition in Lemma 3 is violated, we would have $c^* = 0$ for all δv such that both firms have a positive equilibrium market share. If the second is violated, we would have $c^* = 0$ for all δv such that the market is always fully covered.

Also:

Lemma 4 *The level $c^* = \bar{c}$ is reached only if $\delta v > 3t - \sqrt{3t\,(3t - 2\bar{c})}$.*

If the condition in this Lemma is satisfied, any boycott is so severe (and hence δv is so high) that firms would rather behave in the most responsible manner possible. Combining the results above, we have:

Theorem 3 *Assume*

$$\begin{aligned} 3t &> \left(1+\frac{1}{3}\sqrt{6}\right)\bar{c} \\ v &> \bar{c}-t+\sqrt{3t\left(3t+2\bar{c}\right)}. \end{aligned}$$

Then equilibrium marginal cost c^* is a continuous function with $c^* = 0$ for δ smaller than some δ^*, and either

1. *c^* strictly increasing for all $\delta > \delta^*$, or*
2. *there is some δ^{**} such that c^* strictly increasing for all $\delta \in (\delta^*, \delta^{**})$ and $c^* = \bar{c}$ for $\delta \geq \delta^{**}$*

As a numerical example, assume $v = 1$ and $\bar{c} = t = \frac{1}{5}$. It can be verified that this satisfies Assumption 1. We now have

$$c^* = \min\left\{\max\left\{\frac{1}{10}+\frac{\frac{3}{25}\left(x-\frac{1}{5}\right)}{x^2}, 0\right\}, \frac{1}{5}\right\}.$$

Of course, it is important to know to what extent the results derived above hinge on the boycott probability function that I chose. I also analyzed a more general model, in which the probability of a boycott is given by

$$\gamma = \gamma_0\left(\frac{\bar{c}-c}{\bar{c}}\right).$$

Note that when $\gamma_0 = 1$, this is the same specification as above. The parameter γ_0 reflects the probability of a boycott when a firm chooses the lowest possible level of marginal costs. Qualitatively, however, this specification yields the same results as presented above. Details are available upon request.

5 The effect of more competition

5.1 Introduction

Consider the effect of an increase in competition on the equilibrium of the model. As mentioned in the introduction, it is often argued that more competition will lead to a "race to the bottom": more competition then leads to a decrease in e.g. the environmental and labor standards that firms use (Shleifer, 2004). I study this issues in two ways. First, I analyze a monopoly model, and compare the outcome to the duopoly model described above. Second, I study an increase in competition in the duopoly model by decreasing t: as transportation costs decrease, products become closer substitutes, and the market becomes more competitive. Throughout this section, I maintain the assumption that the market is always fully covered.

5.2 Monopoly versus duopoly

Consider now the case that the two products are sold by a monopolist that maximizes the profits obtained from those two products.[9] Given the assumptions we made, the monopolist will always set a price such that everyone is willing to buy the product. This implies $p_i = v_i - \frac{1}{2}t$. The profits of a monopolist when there is no boycott thus equal

$$\pi_m^N(c_i) = v - \frac{1}{2}t - c_i.$$

We assume that consumers are aware that both products are owned by the same monopolist and hence organize a boycott against both products should one occur. The profits with a boycott equal

$$\pi_m^N(c_i) = (1-\delta)\,v - \frac{1}{2}t - c_i.$$

Denoting the probability of a boycott as $\gamma(c_i)$, expected profits equal

$$\begin{aligned}\Pi_m(c_i) &= \gamma(c_i)\left((1-\delta)\,v - \frac{1}{2}t - c_i\right) + (1-\gamma(c_i))\left(v - \frac{1}{2}t - c_i\right) \\ &= (1-\gamma(c_i)\delta)\,v - \frac{1}{2}t - c_i.\end{aligned}$$

Hence expected monopoly profits always decrease with the possibility of a boycott. This is different from what we had in the duopoly case. There, the threat of a consumer boycott increases expected profits since a firm benefits if its competitor faces a boycott. Here, that is obviously not the case, as there are no competitors. Therefore, the threat of a boycott unambiguously makes the firm worse off. Taking the derivative with respect to c_i yields

$$\frac{\partial \Pi_m}{\partial c_i} = -\gamma' \delta v - 1.$$

With the same specification as in the duopoly model, we have $\gamma' = -1/\bar{c}$, so

$$\frac{\partial \Pi_m}{\partial c_i} = \frac{\delta v}{\bar{c}} - 1.$$

The monopolist will always choose a corner solution. It will set $c = 0$ if $\delta v < \bar{c}$, and $c = \bar{c}$ if $\delta v > \bar{c}$. Note that, when $\delta v = \bar{c}$, the duopoly will set $c^* = \frac{1}{2}\bar{c}$. We thus have

[9] An alternative would be a monopolist that only sells one of the products, sat the one located at 0. In that case, the monopolist would charge a price $p_i = v_i - t$, and the rest of the analysis would change accordingly, without affecting the qualitative results. Thanks to an anonymous referee for pointing out that the analysis that is now in the main text is the more sensible one.

Theorem 4 *If a possible boycott is sufficiently severe ($\delta v > \bar{c}$), then a duopolist will choose weakly lower marginal costs than a monopolist. In that sense, an increase in competition then leads to a race to the bottom. Yet, when a possible boycott is not so severe ($\delta v < \bar{c}$), the opposite is true, and a duopolist chooses weakly higher marginal costs.*

The intuition is as follows. Note that in equilibrium a monopolist always has demand equal to 1. Hence, it will try to produce as efficiently as possible. An increase in marginal costs of ε has a direct effect on total costs of ε. Yet, it also leads to an indirect cost saving due to a lower probability of a consumer boycott. That probability decreases by $1/\bar{c}$, while the costs of a boycott to the monopolist are δv Hence the indirect cost savings due to an increase in marginal costs by ε equal $\varepsilon\delta v/\bar{c}$. The monopolist will choose marginal costs to minimize its effective costs. Hence, it will set marginal costs as high as possible if $\delta v/\bar{c} > 1$, and as low as possible if $\delta v/\bar{c} < 1$. For a duopolist, there are also competitive effects of its choice of marginal costs. For that reason, a duopolist is inclined to make less extreme choices. That implies that a monopolist will choose lower marginal costs if δv is high, but higher marginal costs if δv is low.

5.3 A more competitive duopoly

I now model an increase in competition as a decrease in transportation costs t in the duopoly model. Again, I use the same specification for the boycott probability function. From (16), we have

$$\frac{\partial c^*}{\partial t} = \frac{3\bar{c}\,(\delta v - \bar{c})}{\delta^2 v^2},$$

This is positive if

$$\delta v - \bar{c} > 0.$$

As an increase in competition implies a decrease in t, we have established

Theorem 5 *If a possible boycott is sufficiently severe ($\delta v > \bar{c}$), then an increase in competition leads to weakly lower marginal costs in equilibrium. In that sense, an increase in competition then leads to a race to the bottom. Yet, when a possible boycott is not so severe ($\delta v < \bar{c}$), the opposite is true, and an increase in competition leads to weakly higher marginal costs in equilibrium.*

Note that this is the exact same result as in the previous subsection. The intuition is largely similar as well. In their choice of marginal costs, duopolists not only face a cost effect, but also a competition effect. As competition decreases, firms gain more market power, the cost effect becomes more important, and a firm's behavior is closer to that of a real monopolist. Hence the comparative statics are the same as in the previous theorem.

Hence, the common belief that an increase in competition will lead firms to compromise more on e.g. safety and production standards, is not always true in this model. When the punishment when being found out is relatively low, then more competition actually induces firms to behave more responsibly. When that punishment is relatively high, more competition induces firms to behave less responsibly.

6 Conclusion

In this paper, I presented a model for consumer boycotts. Firms can choose to which extent they want to comply with consumers' wishes with respect to their production process. The trade-off involved is that the more a firm decides to comply with consumers' wishes, the higher are its marginal cost, but the lower is the probability of facing a consumer boycott. Such a boycott was modelled as a discrete decrease in consumers' willingness to pay for the firm's product. In my model, consumer boycotts does hurt a firm's sales, but never reduces them to zero.

I showed that, in equilibrium, the threat of a consumer boycott increases the expected profits of firms, provided that the market is always covered or the probability of a boycott is not too large. Firms lose out when they do face a boycott, but they gain even more when their competitor does, since this gives them more market power. I also showed that the stronger a boycott will be, the more a firm will cater to the consumer's wishes. Yet, the effect of a change in the level of competition is ambiguous. Different from what is often argued, an increase in competition may also induce firms to behave in a more responsible manner.

Consumers and NGOs often seem to target a consumer boycott at the largest firm in the industry (see e.g. Innes 2006). In this paper, I did not take explicitly take that into account. Note however that, in my model, a firm that chooses lower marginal costs ceteris paribus has higher sales in equilibrium, and is also more likely to face a boycott. This does imply a positive correlation between firm size and the probability of facing a boycott. In future work, I plan to address the question how firms are affected if NGOs explicitly target the largest firm in the industry.

Appendix A: Proofs

Preliminaries. In this Appendix, I will prove some of the Lemma's in the main text. In order to do so, we first need the following:

Lemma 5 *For δv slightly above $\frac{1}{2}\bar{c}$, we still have $c^* = 0$.*

Plugging δv into (17) yields $\tilde{c}^* = -6t$, so indeed $c^* = 0$.

Proof of Lemma 2. Note

$$\frac{\partial \tilde{c}^*}{\partial(\delta v)} = -3t\bar{c}\frac{\delta v - 2\bar{c}}{(\delta v)^3}.$$

This is decreasing for δv when $\delta v > 2\bar{c}$. I will show that this condition is never satisfied if $\tilde{c}^* \leq \bar{c}$. Combined with lemma 5, this is sufficient to establish the result. From (16), we have that $\tilde{c}^* \leq \bar{c}$ if and only if $6t(\delta v - c) + \delta^2 v^2 \geq 0$. This is the case if $\delta v \leq 3t - \sqrt{3t\left(3t - 2\bar{c}\right)}$ or $\delta v \geq 3t + \sqrt{3t\left(3t - 2\bar{c}\right)}$. The second condition can never be satisfied, since Assumption 1 requires $\delta v < 3t - c$. For the first condition to be satisfied, while also having $\delta v > 2\bar{c}$, it is necessary to have $2\bar{c} > 3t - \sqrt{3t\left(3t - 2\bar{c}\right)}$. This implies $3t - 2\bar{c} > 3t - \sqrt{3t\left(3t - 2\bar{c}\right)}$, which is never satisfied.

Proof of Lemma 3. From (17) we have that $\tilde{c}^* > 0$ if and only if $6t(\delta v - c) > \delta^2 v^2$, which requires

$$\delta v > -3t + \sqrt{3t(3t + 2\bar{c})}. \tag{18}$$

A boycott can never be effective if this condition is never satisfied, i.e. if it requires Assumption 1 to be violated. The condition $\delta v < 3t - \bar{c}$ in Assumption 1 (which assures that the market is always fully covered) is always violated if

$$-3t + \sqrt{3t\left(3t + 2\bar{c}\right)} > 3t - \bar{c}$$

or, using Corollary 1, if $3t\left(3t + 2\bar{c}\right) > \left(6t - \bar{c}\right)^2$. This is the case if

$$\left(1 - \frac{1}{3}\sqrt{6}\right)\bar{c} < 3t < \left(1 + \frac{1}{3}\sqrt{6}\right)\bar{c}.$$

The first inequality is always satisfied, since $3t > \bar{c}$.

The condition $\delta v < v - 2t - \bar{c}$ in Assumption 1 (which assures that both firms have positive market share in any equilibrium) is always violated if

$$-3t + \sqrt{3t\left(3t + 2c\right)} > v - 2t - \bar{c}$$

or $3t\,(3t+2c) > (v+t-\bar{c})^2$, which is satisfied if

$$-t+\bar{c}-\sqrt{3t\,(3t+2\bar{c})} < v < -t+\bar{c}+\sqrt{3t\,(3t+2\bar{c})}.$$

This establishes the Lemma.

Proof of Lemma 4. This follows directly from the proof of Lemma 2.

Appendix B: Solving for an uncovered market

In the main text, I analyzed the case in which the entire market is always covered. One implication of that assumption is that, if both firms face a boycott, total sales are unaffected. Under some circumstances this may be the natural assumption to make. For example, consumers may simply need to buy the product at hand, and may not be willing to forgo the product altogether. Alternatively, it may be the case that consumers are willing to punish firms that are perceived to behave worse than their competitors do, while profits are largely unaffected if both firms are perceived to behave equally badly.

Yet, we may also have cases in which industry sales *are* affected if both duopolists face a boycott. In this section, I consider that case. We thus assume that the market is fully covered if at most 1 firm faces a boycott, but that that is no longer the case if both firms face one. We then have the following result:

Theorem 6 *Suppose that $2t+c<v<4t$ and $v-t<\delta v<3t$. This implies that the market is fully covered if at most one firm faces a boycott, but it is not fully covered if both firms face one. If the equilibrium has both firms facing a consumer boycott with positive probability, then the possibility of a consumer boycott increases the expected profits of both firms, provided that the probability of a boycott is not too large. A sufficient condition is that*

$$\gamma(0) < \frac{\frac{1}{9}\delta^2 v^2}{\frac{1}{9}\delta^2 v^2 + \frac{1}{2}t^2 - \frac{1}{4}\left((1-\delta)\,v-\bar{c}\right)^2}.$$

Proof. Consider a firm that is facing a boycott. For the sake of argument, suppose that this firm is a monopolist. It will then set a price to maximize $(p-c)\left((1-\delta)\,v-p\right)/t$, where $\left((1-\delta)\,v-p\right)/t$ are total sales under the assumption that this firm will not find it profitable to serve the entire market. Maximizing with respect to p yields $p^* = \frac{1}{2}\left(c+(1-\delta)\,v\right)$, which implies total sales of $((1-\delta)v-c)/2t$. A sufficient condition to have the market not be covered if both firms face a boycott, thus is

$$((1-\delta)v-c)/2t<\frac{1}{2}.$$

Sufficient for this to hold for all possible choices of c is

$$\delta v>v-t. \tag{19}$$

From the analysis in the previous section, we have that the market is covered absent any boycotts if $v>2t+\bar{c}$. Consider the case in which only one firm faces a boycott. Suppose A is being boycotted against and B is not, so $v_A=(1-\delta)v$ and $v_B=v$. Again, we impose symmetry in the cost-setting stage, which implies from (3)

$$z^*=\frac{1}{2}-\frac{v\delta}{6t}.$$

We require this to be positive, hence $\delta v<3t$. Combining inequalities, we thus need $v-t<\delta v<3t$. This condition is feasible if $v-t<3t$, so if $v<4t$.

In this set-up, we have the following profit functions:

$$\begin{aligned}
\pi_i^{NN} &= \frac{1}{2}t\\
\pi_i^{BB} &= \frac{1}{4}((1-\delta)v-c_i)^2/t\\
\pi_i^{BN} &= (3t-\delta v-(c_i-c_j))^2/18t\\
\pi_i^{NB} &= (3t+\delta v-(c_i-c_j))^2/18t
\end{aligned}$$

Imposing symmetry for marginal costs, we obtain expected profits:

$$\begin{aligned}
\Pi &= \gamma^2\left(\frac{1}{4}((1-\delta)v-c)^2/t\right)+\gamma(1-\gamma)\left((3t-\delta v)^2/18t\right)+(1-\gamma)^2\left(\frac{1}{2}t\right)+\\
&\quad +(1-\gamma)\gamma\left((3t+\delta v)^2/18t\right)\\
&= \gamma^2\left(\frac{1}{4}((1-\delta)v-c)^2/t\right)+\gamma(1-\gamma)\left(18t^2+2v^2\delta^2\right)/18t+(1-\gamma)^2\left(\frac{1}{2}t\right).
\end{aligned}$$

This is higher than marginal costs without the threat of boycotts if

$$\gamma^2\left(\frac{1}{4}((1-\delta)v-c)^2/t\right)+\gamma(1-\gamma)t+\gamma(1-\gamma)v^2\delta^2/9t+\frac{1}{2}\gamma t(\gamma-2)>0,$$

so

$$\gamma^2\left(\frac{1}{4}((1-\delta)v-c)^2-\frac{1}{2}t^2-\frac{1}{9}\delta^2v^2\right)+\gamma\frac{1}{9}\delta^2v^2>0.$$

From (19), we have $(1-\delta)\,v < t$. This implies $\frac{1}{4}\left((1-\delta)\,v - c\right)^2 < \frac{1}{2}t^2$. Hence the inequality above is satisfied if $\gamma(c) > 0$ and

$$\gamma(c) < \frac{\frac{1}{9}\delta^2 v^2}{\frac{1}{9}\delta^2 v^2 + \frac{1}{2}t^2 - \frac{1}{4}\left((1-\delta)\,v - c\right)^2}.$$

The right-hand side is decreasing in c. Thus, sufficient for the condition to always hold is the condition stated in the theorem. ■

Theorem 2 shows that our result that expected profits increase with the threat of a boycott, does not hinge on the assumption that the market is always covered.[10] But, compared to the case in the previous section, firms are now hurt more if they both face a boycott. That implies that they only benefit from the threat of a boycott if the probability of both facing a boycott is not too high, which implies that γ should not be too high.

In the next session, for analytical convenience, I restore the assumption that the market is always covered. I impose a specific functional form for the boycott probability function $\gamma(c)$. Doing so allows me to illustrate the analysis above, and to do some comparative statics analyses.

References

Arora, S. and Gangopadhyay, S. (1995). Toward a theoretical model of voluntary overcompliance. *Journal of Economic Behavior and Organization*, **28**, 289–309.

Baron, D. P. (2003). Private politics. *Journal of Economics and Management Strategy*, **12**, 31–66.

— and Diermeier, D. (2007). Strategic activism and nonmarket strategy. *Journal of Economics & Management Strategy*, **16** (3), 599–634.

Basu, K. and Zarghamee, H. (2009). Is product boycott a good idea for controlling child labor? a theoretical investigation. *Journal of Development Economics*, **88**, 217–220.

Broccardo, E., Hart, O. D. and Zingales, L. (1994). *Exit vs. Voice.* Discussion Paper 1061, Harvard Law School John M. Olin Center, Stockholm.

[10]Indeed, it is easy to show that the threat of a boycott also makes firms better off in the case that a firm is wiped off the market when it faces a boycott (so $\delta = 1$), provided that v is high enough.

DAUBANES, J. and ROCHET, J.-C. (2019). The rise of NGO activism. *American Economic Journal: Economic Policy*, **11** (4), 183–212.

DELCOURT, J. (2017). Samsung galaxy note 7 recall: Here's what happens now. *https://www.cnet.com/news/samsung-galaxy-note-7-return-exchange-faq/*.

EGOROV, G. and HARSTAD, B. (2017). Private Politics and Public Regulation. *The Review of Economic Studies*, **84** (4), 1652–1682.

FRIEDMAN, M. (1999). *Consumer Boycotts: Effecting Change Through the Marketplace and the Media*. Routledge.

GLAZER, A., KANNIAINEN, V. and POUTVAARA, P. (2010). Firms' ethics, consumer boycotts, and signalling. *European Journal of Political Economy*, **26** (3), 340–350.

HEIJNEN, P. and VAN DER MADE, A. (2012). A signaling theory of consumer boycotts. *Journal of Environmental Economics and Management*, **63**, 404–418.

HENDEL, I., LACH, S. and SPIEGEL, Y. (2017). Consumers' activism: the cottage cheese boycott. *The RAND Journal of Economics*, **48** (4), 972–1003.

INNES, R. (2006). A theory of consumer boycotts under symmetric information and imperfect competition. *Economic Journal*, **116** (511), 355–381.

JOHN, A. and KLEIN, J. (2003). The boycott puzzle: Consumer motivations for purchase sacrifice. *Management Science*, **49** (9), 1196–1209.

KOKU, P., AKHIGBE, A. and SPRINGER, T. (1997). The financial impact of boycotts and threats of boycott. *Journal of Business Research*, **40**, 15–20.

LUTZ, S., LYON, T. P. and MAXWELL, J. W. (2000). Quality leadership when regulatory standards are forthcoming. *Journal of Industrial Economics*, **68** (3), 331–348.

MALLET, V. (2000). Us sales fall hits michelin. *Financial Times*, **April 26**, 32.

PECK, J. (2017). Temporary boycotts as self-fulfilling disruptions of markets. *Journal of Economic Theory*, **169**, 1–12.

SEN, S., GURHAN-CANLI, Z. and MORWITZ, V. (2001). Withholding consumption: A social dilemma perspective on consumer boycotts. *Journal of Consumer Research*, **28**, 399–417.

SHLEIFER, A. (2004). Does competition destroy ethical behavior? *American Economic Review*, **94** (2), 414–418.

TAIT, N. (2000). Bridgestone to recall us tyres linked to deaths. *Financial Times*, **August 10**, 1.