

Communication

On Adverse Effects of Consumers' Attaching Greater Importance to Firms' Ethical Conduct

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Received: 28 July 2017; Accepted: 6 September 2017; Published: 14 September 2017

Abstract: Consumers increasingly care about firms' ethical conduct (e.g., labor and environmental practices) when making their consumption choices. This note presents a simple framework to highlight the possibility that this development may induce a *less* desirable production technology choice and bring about *lower* market transparency. When faced with consumers' greater moral concerns, more firms may choose an undesirable mode of production and shroud information about it.

Keywords: consumer choice; technology choice; moral conduct; external harm

1. Introduction

Consumers increasingly care about firms' ethical conduct when making their consumption choices. Firm conduct particularly relevant to consumers includes firms' environmental and labor practices (e.g., [1,2]). For example, the utilization of labor by many firms operating in the textile industry in Asia does not live up to Western ethical standards (though it may be in compliance with legal standards in the countries in question), possibly provoking consumer boycotts and the like.¹ As another example, the importance of *green consumers* has led to a widespread use of eco-labeling in many countries. By handing out an eco-label, a third party certifies that the firm in question obeys the specific environmental standards that the third party stands for (e.g., [3,4]). The according literature deals with firms having selected *good* technologies and seeking to credibly reveal their type to consumers, because this information can serve as a competitive advantage. In contrast, we are interested in firms possibly selecting *bad* technologies and seeking to limit information about their choice, because it is better profit-wise for these firms to be pooled with other firm types.

Specifically, this note explores a setup in which a firm chooses between a *good* and a *bad* technology before deciding whether or not to conceal its choice from consumers. In reality, there are several avenues that firms may choose to make it difficult for consumers to infer their conduct. For instance, firms may choose to set-up or source from legal entities in foreign countries as their contractual input suppliers (thereby outsourcing morally questionable practices to a supplier network that is intransparent for the single consumer). According to an article by Mark Graham in *The Guardian* published in 2010, [5], the associated detachment of the material goods from the information about how they are produced allows firms to *conceal* their production practices. It appears that Apple can

¹ Michael Hobbes ([6]) reports about how consumers responded to reports about firms' overseas operations and the extent to which these reactions have led to improvements in the working conditions.

serve as a case-in-point. It was argued, for example, that Apple sources from suppliers with very questionable practices and tries to hide detailed information about its supply chain.² Moreover, firms may attach greater importance to monitoring that employees keep information about production practices confidential. For example, factory campuses where Apple products are produced (i) are gated off and do not allow entry to the public, (ii) feature security guards to prevent trespassing, and (iii) require factory workers to sign confidentiality agreements and live in dormitories within the factory campuses (e.g., [7]). Furthermore, firms may try to inconspicuously interfere with the work of NGOs trying to collect information about firm conduct.³

1.1. Key Result

Consumers caring *more* about firm conduct can under certain circumstances induce a *less* desirable technology choice and a *lower* market transparency about production modes. Our key finding is the result of analyzing a very simple model in which a monopolistic firm chooses to adopt one of two technologies and whether or not to conceal its technology choice from morally conscious consumers. We derive the counterintuitive result subject to two key assumptions: First, some firms use the desirable technology even without being able to verify their technology to consumers, implying that the conduct of firms without certified production technologies is on average reasonably good. Second, the profit function of the firm must be strictly concave in the consumers' consciousness, signifying diminishing returns to ethical conduct in terms of profits.

1.2. Related Literature

This note contributes to the literature by highlighting potentially adverse consequences (in terms of technologies adopted and information about modes of production available) resulting from consumers' increased care about firm conduct. We allow for the option of concealing one's technology choice from interested agents—an *adverse* act that was (to the best of our knowledge) not previously considered in the related literature.

The idea that consumers care about the environmental footprint of the firm's production or product is well-established in environmental economics. Tietenberg ([8]) considers the use of information as "the third wave" of pollution control (after legal regulation as the first wave and market-based instruments as the second wave). In this line of research, Eriksson ([9]), for example, is interested in whether or not green consumerism can actually replace regulation. Similar to our approach, Doni and Ricchiuti ([10]) point out that very high consumer consciousness need not serve welfare. However, in their setup, this results from the possibility of an overprovision of environmental quality. In much of this literature, the firms' environmental quality is common knowledge (in contrast to our assumption about the possibility of concealment). Sengupta ([11]) presents a paper in which consumers' information about the actual production technology of firms is imperfect, thereby explicitly acknowledging the facts about global supply chains, for example, that we also rely upon for our motivation. The author is concerned with the desirability of mandatory disclosure when duopolists both know about the environmental consciousness of consumers and are subject to strict environmental liability. Our setup is much simpler and abstracts from competition or institutions such as liability. The interaction of competition and environmental consciousness has been considered in a number of papers, often using a vertical product differentiation setup (e.g., [1,12]).⁴ Our research is also related to contributions in the law and economics literature about the comparison of mandatory and voluntary disclosure rules ([13,14]) and about the voluntary sharing of information prior to trial [15].

² See, for instance [16]. Charles Duhigg and David Barboza ([17]) quote a representative of Business for Social Responsibility as saying that Apple is not interested in pre-empting problems but only in avoiding embarrassments.

³ For example, Heather White ([18]) reports that many advocacy groups nowadays sign confidentiality agreements or accept money from previously targeted corporations to monitor *improvements* being made.

⁴ We will comment on possible effects for our analysis flowing from competition between firms below.

In addition, in the management literature, corporate social responsibility has also received a great deal of attention (e.g., [19]). Finally, whereas our paper is concerned with the concealment of information, there is of course literature addressing outright dishonesty in other domains (e.g., [20] in the domain of advertising).

The rest of the paper is structured as follows. Section 2 lays out the simple model, the brief analysis of which is presented in Section 3. Section 4 concludes.

2. The Model

Assume that a monopolistic firm can choose from two production technologies: a “good” one indexed by a responsibility parameter r^G and a “bad” one indexed by a responsibility parameter r^B , where $r^G > 0 \geq r^B$.⁵ The bad technology is available at no cost. The firm’s fixed cost from adopting the good technology is a random variable c , with $c \in [0, C]$ according to the cumulative distribution function $F(c)$ (as is assumed in, e.g., [21]). There is a probability $\alpha > 0$ that the firm will adopt the good technology out of its own moral concerns as long as the adoption costs are less than $m < C$ (this is similar to, e.g., [22]).

Consumers care about the firm’s production technology; the extent of caring is represented by a weight $\gamma \geq 0$. We assume that the firm chooses profit-maximizing behavior given the consumers’ beliefs about technology and their extent of caring, and represent parameterized maximal firm profits by $\pi(R)$ with $R = \gamma r$, assuming that $\pi'(R) > 0$.⁶ How marginal profits change with the level of R will depend on the specifics of the setup considered. Assume, for instance, that a monopolist with marginal production costs set equal to zero faces a demand $q(p; R) = a(R) - p$, where the consumers’ beliefs about the firm’s conduct influences the prohibitive price a . The monopolist sets profit-maximizing prices $p_m(R) = \frac{a(R)}{2b}$, yielding maximal profits $\pi_m(R) = \frac{a(R)^2}{4b}$. We find that $\pi_m'' > (<) 0$ follows from $a'' > (<) - (a')^2/a$. Thus, firm profits may be either concave or convex in the level of R .

Although consumers care about the firm’s mode of production, they may not be able to observe it. In this case, they make a rational (Bayesian) inference about it. We assume that the firm cannot credibly establish its mode of production with probability $k > 0$, and that it can choose to conceal it in the state that occurs with probability $1 - k$ (i.e., when it could establish it in principle).⁷ All firm types whose technology cannot be observed by consumers form the set denoted N . The expected value of responsibility for any firm from this set will be denoted by $E[r|N]$. As a result, any firm in the set N will earn profits $\pi(\gamma E[r|N])$.

The timing of the model is such that nature first draws the firm’s level of adoption cost, the firm’s type with respect to whether the firm will adopt the good technology out of moral concerns, and whether or not it can credibly inform consumers about its mode of production. Next, the firm chooses between adopting the good technology and adopting the bad one, and whether or not to conceal its choice from consumers. Consumers next make their consumption choices. When consumers cannot observe the firm’s technology, they use their beliefs about the firm’s conduct.⁸

3. The Analysis

There are three different profit levels in our framework. A firm who cannot or does not want to make its type known earns $\pi(\gamma E[r|N])$. A firm whose technology is observed earns either $\pi(\gamma r^G) - c$

⁵ We use the labels “good” and “bad” technologies as placeholders that may stand for green and brown technologies in the environmental context or humane and inhumane modes of production in the working conditions context.

⁶ It is standard to assume that the product of the consumer’s consciousness parameter and some attribute of firm conduct influences firm profits. For example, in [10,23], it is the consumer’s weight on green features times the firm’s emission abatement level.

⁷ The assumption that some agents cannot establish their type is also used in [15], for example.

⁸ We assume that the technology is irrelevant for the level of unit production costs, thus isolating the cost distinction in the adoption cost which are positive only for the good technology. The irrelevance for unit production costs also signifies that consumers cannot infer the technology actually used from the price level when their supplier is in set N .

(when the firm adopts the good technology) or $\pi(\gamma r^B)$ (when the firm adopts the bad technology). Since $\pi(\gamma E[r|N]) \geq \pi(\gamma r^B)$, all firms who ultimately choose the bad technology will conceal this fact. For firms whose type can principally be observed, the choice is thus between (i) adopting the good technology and (ii) adopting the bad technology while concealing this fact from consumers.

A firm whose technology cannot be credibly revealed to consumers for exogenous reasons may be a firm who adopted the good technology out of its own moral concerns or a firm who picked the bad technology. The probability that a firm adopted the good technology out of its own moral concerns amounts to $\alpha F(m)$. As a result, a firm whose type cannot be observed for exogenous reasons has an expected type of

$$\bar{r} = \alpha F(m)r^G + (1 - \alpha F(m))r^B > r^B. \quad (1)$$

A firm that can principally establish the technology in use may nevertheless choose to conceal it. We assume that there is a level of the fixed adoption cost $c_A \in [0, C]$ that leads to

$$\pi(\gamma r^G) - c_A = \pi(\gamma E[r|N]); \quad (2)$$

that is, that induces indifference on the part of the firm with this level of adoption cost between the option of adopting the good technology and the alternative of adopting the bad technology and concealing this fact. A firm with adoption costs $c > c_A$ will conceal its type such that consumers' inference about the firm's technology leads to the consumers' belief

$$E[r|N] = \frac{k\bar{r} + (1-k)(1-F(c_A))r^B}{k + (1-k)(1-F(c_A))}, \quad (3)$$

with the intuitive association regarding how the belief changes with the level of the fixed adoption costs of the indifferent firm

$$\frac{dE[r|N]}{dc_A} = \frac{f(c_A)k(1-k)(\bar{r} - r^B)}{(k + (1-k)(1-F(c_A)))^2} > 0. \quad (4)$$

The higher the critical level of adoption costs c_A , the more likely it is that a firm in set N did not actively choose to conceal its technology, and therefore a higher weight is attached to the expected technology \bar{r} instead of r^B . Equations (2) and (3) together establish the equilibrium values of $E[r|N]$ and c_A .

We now turn to our central interest—that is, the impact of an increase in consumers' caring for firm conduct (as represented by an increase in the level of γ). Our key research question is whether greater environmental consciousness of consumers may induce the firm to adopt the bad technology and conceal this fact instead of adopting the good technology. In order to investigate this issue, we return to condition (2).

To sharpen our intuition before we consider the details, note that a marginal increase in γ means a greater influence of consumers' caring on firm profits. For the marginal firm with $c = c_A$, adopting r^B and concealing the technology means relatively lower consumers' beliefs when compared to adopting the good technology (since $E[r|N] < r^G$), but also the saving of fixed adoption cost. The difference in consumers' beliefs ($\gamma(r^G - E[r|N])$) is more pronounced in terms of its influence on the level of R at a higher level of γ . However, for the firm's choice between whether or not to adopt the good technology, it is key whether the influence of R on the firm's profits becomes more or less important (i.e., whether marginal profits from a higher level of r —namely, $\pi' dR/dr$ —are increasing or decreasing with R). This results from the fact that the firm has to compare the change in profits from implementing r^G instead of $E[r|N]$ at higher levels of R due to the increase in γ .

To be precise, taking account of (3), the total differential of (2) is

$$\left[\pi'(\gamma r^G)r^G - \pi'(\gamma E[r|N])E[r|N] \right] d\gamma - \left[1 + \pi'(\gamma E[r|N])\gamma \frac{dE[r|N]}{dc_A} \right] dc_A = 0. \quad (5)$$

Since $\pi'(\gamma E[r|N]) \times dE[r|N]/dc_A > 0$, we thus obtain $dc_A/d\gamma < (>) 0$ when

$$\pi'(\gamma r^G)r^G < (>) \pi'(\gamma E[r|N])E[r|N], \quad (6)$$

or, stated alternatively as

$$\frac{E[r|N]}{r^G} > (<) \frac{\pi'(\gamma r^G)}{\pi'(\gamma E[r|N])}. \quad (7)$$

Consumers' greater consciousness induces a greater utilization of the bad technology when $dc_A/d\gamma < 0$. It is clear from (6) that $E[r|N] > 0$ is a necessary condition for this possibility to arise. In other words, consumers must think that silent firms are on average responsible firms (such that the profit of firms in set N is increasing in γ). In our setup, it is not necessarily true that $E[r|N] > 0$ holds, because the use of the bad technology is associated with $r^B < 0$. In addition, $E[r|N]$ is bounded from above by \bar{r} . Assumptions about both the probability of the occurrence of moral concerns in firms (i.e., the level of α) and the extent to which they are important (i.e., the level of m), and about the probability that a firm cannot credibly transmit information about the technology (i.e., the level of k) are key influences on the level of $E[r|N]$. When both $\alpha F(m)$ and k are sufficiently high, the condition $E[r|N] > 0$ will be obtained.⁹ Moreover, an additional necessary condition for the counterintuitive result of greater consumer caring inducing a lower threshold c_A is that firm profits must be concave in the level of R . This effects that $\pi'(\gamma E[r|N]) > \pi'(\gamma r^G)$ applies. In (7), strict concavity ensures that the right-hand side is less than one. Finally, condition (7) makes it clear that the concavity of π must be strong enough to outweigh the fact that $E[r|N] < r^G$. In contrast, strict convexity of the profit function suffices to unambiguously deliver the opposite prediction; that is, the intuitive prediction saying that greater consciousness leads to better technology choices and more transparency.

We summarize our key result as follows:

Result:

(i) If condition (7) holds (which necessitates $\pi''(R) < 0$ and $E[r|N] > 0$), then a marginal increase in consumers' caring about firm conduct induces less desirable technology choices and lower market transparency (by lowering the level of c_A); (ii) If either $\pi''(R) > 0$ applies or $\alpha F(m)$ and/or k are relatively low (implying $E[r|N] < 0$), then condition (7) cannot hold and a marginal increase in consumers' caring about firm conduct induces a more desirable technology choice and higher market transparency (by increasing the level of c_A).

Let us briefly consider a very simple example only to illustrate the mentioned possibility of $dc_A/d\gamma < 0$. Assume that the firm faces one consumer who buys at most one unit of the product and whose willingness to pay amounts to $p = d + 2\gamma r - (\gamma r)^2$, where $\gamma r < 1$. Maximal profits $\pi(\gamma r)$ are equal to the consumer's willingness to pay minus production costs. The quadratic specification of the consumer's willingness to pay implies a strictly concave profit function. In this case, assuming $r^G = 0.9$, $r^B = -0.1$, $k = \alpha F(m) = 1/2$, and $F(c) = c$, we find that indeed $dc_A/d\gamma < 0$ for $\gamma > 0.870$, whereas $dc_A/d\gamma > 0$ for $\gamma < 0.870$.

4. Conclusions

More and more consumers attach greater importance to the social footprint of the firms that they patronize. The potentially desirable effects of this development have extensively been considered in the literature. In this note, we emphasize that there may also be adverse effects of consumers' attaching greater importance to firm conduct. Within our stylized model, it may occur that firms choose a less

⁹ Knowing that $E[r|N] > 0$ is necessary to obtain our counterintuitive result has an interesting implication—namely, the effect of greater consumer consciousness must be such that overall profits in the industry increase. If we were to assume that greater caring by consumers only alters competition between firms in the industry by redistributing fixed total demand, the counterintuitive result cannot be obtained in our setup.

desirable technology and create lower market transparency in response to an increase in consumer consciousness. Obviously, we do not argue that this is the only effect from this development, nor that it is a dominating influence, but mainly want to highlight that firms—under specific circumstances—may respond to this development in ways that at least dampen the anticipated positive effects of consumers' greater caring about firm conduct.

Acknowledgments: We are very grateful for the helpful comments received from two anonymous reviewers.

Author Contributions: Florian Baumann and Tim Friehe contributed equally to the design and analysis of the model. Revisions were dealt with equally by Florian Baumann and Tim Friehe.

Conflicts of Interest: The authors declare no conflict of interest.

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