Price Discrimination through Corporate Social Responsibility

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Abstract

A common form of Corporate Social Responsibility (CSR) by firms is to agree to donate a fixed portion of private good revenues to a charitable cause. In this paper we explore a new rationale for such CSR. We argue that linking private good purchase with charitable donations allows the firm to price discriminate between altruistic consumers who wish to make charitable donations out of their income and non-altruistic consumers who do not place any value on such donations. The disparity in altruistic propensities translates into a difference in private good value and thus limits the firm’s ability to extract consumer surplus in the private good market. Linking private good sales to charity brings down the variation in private good value and enables the firm to appropriate greater surplus. We also show that when advertising the linked good increases the visibility of charitable donations made through its purchase and if altruistic consumers care about exhibiting their altruistic acts, linked donations crowd out direct donations for these consumers. However, since the linked good brings in new donations from non-altruistic consumers who never donate out of their income, it is possible for CSR to increase aggregate charitable donations.

Keywords: Corporate Social Responsibility, Price Discrimination, Advertising.

JEL Classification Codes: M14, M3, D64, L11, L21.

1 Introduction

There is now a well-established literature on why individuals donate to charity. One of the earliest arguments proposed by Andreoni (1990) suggests that individuals receive a “warm glow” from donating, i.e. altruistic acts make individuals feel good and hence directly affect their utility from

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donating to charity. There have been other models that have attributed indirect material incentives for individual donations. For example, people are more prone to donate to charities if contributions are tax-deductible (Auten et al., 2002). Glazer and Konrad (1998) argue that charitable donations allow donors to signal their wealth status. Harbaugh (1998 a, b) suggests that donations that are made public have a “prestige” value to donors.

In the last few decades, the focus of the literature has moved to explaining why firms donate to charity. This has occurred as a growing number of corporations and businesses have started to engage in Corporate Social Responsibility (CSR), where firms, typically in partnership with an NGO, participate in socially desirable activities that sometimes appear to be outside of direct profit concerns. Many motives have been examined for understanding why firms engage in CSR and how it can be consistent with profit maximization. Baron (2001) distinguishes between “strategic CSR” where firms choose CSR in order to increase profits, for example by attracting more socially responsible consumers, and CSR driven by altruistic firms. Bagnoli and Watts (2003) use Baron’s idea of strategic CSR to look at the competitive aspects of CSR by firms. In their model firms compete for socially responsible consumers by linking the sales of their product to public good contributions. Ghosh and Shankar (2013) look at the role of the firm in publicizing consumer altruism by advertising the product and the associated charitable donations. Elfenbein et al. (2012) develop a model where CSR allows firms to signal private good quality when it is unobservable even after consumption. Benabou and Tirole (2003) provide a descriptive analysis of various motivations that lead certain firms to engage in CSR ranging from strategic motives to philanthropic ideals shared by the company’s management.

In this paper we propose a different explanation for why cause-related marketing exists. We argue that, CRM provides a mechanism for the firm to price discriminate between altruistic consumers who value donations to the charitable cause and non-altruistic consumers who do not make such donations. Since altruistic consumers are willing to donate a part of their income to charity, they have less residual income available to spend on the private good compared to non-altruistic consumers. As a result, they have a lower willingness to pay for the private good relative to non-altruistic consumers. Linking charitable donations to private good purchase, then, helps the firm to discount the effective price paid by the former while maintaining a high price for the latter. Thus CRM for the linked good becomes a way of implicitly price discriminating between the two consumer groups.

Further, we also use our analyses to predict how total charitable contributions change in the
presence of linked markets relative to levels that would emerge in the standard voluntary contributions framework where individuals directly donate out of their income. Many social activists have criticized CSR by private companies for squandering money on publicity and advertising, improving their bottom-line and brand but having a negative impact on the social cause it claims to promote.\footnote{http://thinkbeforeyoupink.org/before-you-buy/} We show that when altruistic consumers care about exhibiting their altruism, and firms publicize their donations by advertising the charity-linked good, direct donations from altruistic consumers are crowded out by the linked good market and total donations from this group fall. However, the linked good also forces non-altruistic consumers to donate through their purchase. Since this consumer group would not have made any donations in the absence of the linked good, CRM can increase aggregate donations by bringing in new donations. In general, it is possible for total charitable donations to increase or decrease based on the proportion of altruistic consumers and the level of advertising undertaken for the linked good. Thus our model has implications for when and how NGOs seeking to raise donations can partner with a profit-maximizing firm through CSR.

Specifically, we consider a model where the market comprises of both altruistic as well as non-altruistic consumers. Non-altruistic consumers have no preference for donations, direct or indirect, and care only about private good consumption while altruistic consumers derive a benefit from direct and indirect donations to a charitable cause. Moreover, altruistic consumers care about exhibiting their altruism. The firm makes this possible by investing in advertising its linked product. In the absence of CSR, non-altruistic consumers have a higher willingness to pay for the private good. If the seller cannot price-discriminate between these two groups, then private good price in equilibrium is lower than the price needed to maximize profits over the non-altruistic group. In other words, the seller has to subsidize non-altruistic consumers in order to include altruistic consumers in the market. When the seller provides the linked good, the proportion of price contributed to charity by the firm provides an additional instrument (other than price) to improve profits over the non-altruistic group, while still keeping the effective price to the altruistic consumer (i.e. the price net of charitable donations) low. Since this enables the seller to extract additional surplus through price-discrimination, it is now possible for the seller to enhance his profits even without cutting into total charitable contributions. We show that whether profits and donations can simultaneously increase with CSR when there is a small proportion of altruistic consumers and advertising for the linked good is not too high.
The literature that has looked at the motives and profitability of CSR is vast.\footnote{See Kitzmueller and Shimshack (2012) for a comprehensive survey of the current research on CSR.} However, only a few papers have examined its effects on public good provision relative to private provision directly by individuals. Even the existing models that do compare CSR with individual social responsibility predict a crowding out of individual donations by CSR. Besley and Ghatak (2007) show that CSR will exactly replicate the second best equilibrium levels of public good supply that arise from government provision. Hence they conclude that CSR is useful only when the government is unable to provide the public good. Pecorino (2016), shows that when firms donate a portion of their profits to a public good that consumers care about, overall contributions may increase beyond what a voluntary contribution would generate. Nevertheless, his analyzes also predicts a perfect crowding out of voluntary contributions when consumers can choose between donating individually or donating through the firm. Shankar and Ghosh (2013) also predict an overall reduction in donations when firms sell a charity-linked good. As in that paper, our current analysis also uses exhibition utility as the underlying mechanism driving the demand for the linked good from altruistic consumers. Yet we find that despite a crowding out of direct donations from altruistic consumers, new donations from non-altruistic consumers can enhance overall public good provision.

Kotchen (2006) consider CSR in the form of “green markets” as the technology that allows the joint production of a private and a public good. Similar to us, he finds that total public good provision can increase in green markets beyond what we would see solely with private provision through individuals. His paper, however, presumes the profitability of green markets from the sellers’ side. In contrast we show the potential for a trade-off between profits and public good contributions. In other words, in our model, it is possible that CSR is not profitable and hence not undertaken by the firm or conversely that it is profitable and yet lowers overall donations to the NGO.

The rest of the paper is structured as follows. In Section 2 we lay out the general model. In Section 3 we describe the demand for the linked good and its impact on seller revenues and charitable donations. Section 4 the equilibrium level of CSR chosen by the firm and we compare the total charitable donations with and without CSR. Section 5 concludes.
2 Model

We consider a model where $N$ consumers decide how to divide their income, $I > 0$, between the consumption of a private good, $x$, charitable contributions, $g$, and a numeraire good $m$. There is a monopolist firm selling the private good of value $v > 0$ to consumers at price $p$. Consumers vary in their value of the private good and this heterogeneity is captured by $\theta_i \sim U [0, 1]$.

The firm can “link” private good sales to charitable contributions by choosing to donate $\alpha \in [0, 1]$ of the private good price to charity. Such a linked good is associated with a level of publicity denoted by $\sigma > 0$ which reflects how visible consumers’ charitable contributions are through their purchase of the linked good. Companies usually undertake extensive marketing campaigns to advertise their participation in a charitable cause. This makes their product an effective symbol of participation in that cause for any consumer who buys their product. $\sigma$ can thus be thought of as the level of advertising associated with the linked good.

There are two groups of consumers - altruistic (denoted by group $A$) who make up a proportion $\mu$ of the consumers; and non-altruistic (denoted by group $NA$) who make up the remaining $1 - \mu$.

Group $A$ derives a “warm glow” utility of $\lambda g$ from contributing $g$ to charity. These consumers’ value for the linked good arises from two factors - 1) the intrinsic value of the private good, $v$, and 2) the exhibition utility from “showing-off” contributions made through the purchase of the private good denoted by the function $E (\alpha, \sigma)$. We make some standard assumptions on the monotonicity and concavity of the exhibition utility function; $E_\alpha \geq 0$ and $E_{\alpha\alpha} \leq 0$, $E_\sigma > 0$, $E_{\sigma\sigma} \leq 0$, $E (0, \sigma) = E (\alpha, 0) = 0$ and $E_\alpha (\alpha, 0) = 0$. Also $E_{\sigma \alpha} > 0$, i.e. the exhibition utility becomes more sensitive to $\alpha$ at higher levels of publicity.

Consumer $i$ in group $A$ then maximizes the following quasi-linear utility function

$$
\max_{x_i \in \{0, 1\}, g_i^d \geq 0, m_i \geq 0} U^A (x_i; g_i^d, m_i) = m_i + \lambda g_i + \theta_i (v + E (\alpha, \sigma)) x_i
$$

s.t. $m_i + g_i^d + px_i \leq I$,

$$
g_i = g_i^d + \alpha px_i,
$$

where $x_i \in \{0, 1\}$ represents the consumer’s binary decision to purchase the private good or not; $g_i = g_i^d + \alpha px_i$ is the total charitable contribution from these consumers which is the sum of direct contributions, $g_i^d$ out of their income and linked contributions through their private good purchase given by $\alpha px_i$. We assume that $\lambda I < v < 2I$ to ensure that there is always positive demand for the private good and that there is a positive level of direct donations in the absence of linking. Also
\( \lambda > 1 \) ensures that altruistic consumers always make a positive contribution to charitable donations (either directly or through the linked good purchase). In fact, they contribute all of their residual income to charity and hence do not spend any income on numeraire consumption.

Consumers in group \( NA \) derive no utility from charitable donations and they only care about private good consumption for its intrinsic value \( v \). Hence their utility maximization solves

\[
\max_{x_i \in \{0,1\}, m_i \geq 0} U^{NA}(x_i, m_i) = m_i + \theta_i v x_i
\]

\[ s.t. \ m_i + px_i \leq I. \]

The timing of the game is as follows. The seller chooses a price \( p \in [0, I] \) and \( \alpha \in [0, 1] \) based on \( \sigma \). After observing \( \sigma, p \) and \( \alpha \), consumers make their purchase and contribution decisions.

### 3 Private Good Demand and Price Equilibrium

First let us begin by looking at consumer demand for the private good when \( \alpha = 0 \), i.e. when the seller does not link private good sales to charity. In this case, at a given price for both groups, consumers with higher \( \theta \) have a greater incentive to buy the private good. Thus there is a cut-off level of \( \theta \) above which consumers buy the private good. For group \( A \) consumers, utility from buying the private good at \( p \leq I \) is \( \lambda (I - p) + \theta_i v \). If they do not buy the private good they donate all their income to charity and hence get a utility of \( \lambda I \). Setting the two equal, we obtain their threshold for private good consumption as \( \theta^{A}_0 = \frac{\lambda p}{v} \).

Similarly, for group \( NA \) we set the utility from private good purchase (which is \( I - p + \theta_i v \)) equal to their utility from spending all their income on the numeraire \( (I) \) to get \( \theta^{NA}_0 = \xi \). Note that \( \theta^{A}_0 > \theta^{NA}_0 \), i.e. at any given price there is greater demand for the private good from the non-altruistic consumers than from the altruistic group. The total aggregate demand for the private good is then \( D_0(p) = N \{ \mu (1 - \theta^{A}_0) + (1 - \mu) (1 - \theta^{NA}_0) \} \). Thus profits to the seller are

\[
\pi_0(p) = D_0(p) p.
\]

Total charitable donations \((G_0)\), all of which are direct donations \((G_0^d)\) from altruistic consumers out of their residual income are

\[
G_0 = G_0^d = N \mu (I - (1 - \theta^{A}_0) p_0).
\]

Proposition 1 describes the price equilibrium in the absence of linking.
Proposition 1 If $\alpha = 0$, the profit maximizing price for the private good is $p_0^* = \frac{\varphi}{2\mu \lambda + 1 - \mu}$; demand is $D_0^* = \frac{N}{2}$; equilibrium profit is $\pi_0^* = \frac{N}{2} \frac{\varphi}{2\mu \lambda + 1 - \mu}$; and total charitable donations are $G_0^* = N \left[ \mu I - \left( 1 - \frac{\lambda \varphi}{2\mu \lambda + 1 - \mu} \right) \frac{\varphi}{2\mu \lambda + 1 - \mu} \right]$. Observe that the seller’s equilibrium price, $p_0^*$, lies between the prices she would have chosen for the two groups separately if she could have price discriminated between them. So, if $\mu = 0$, so that all consumers were non-altruistic, then the price is $p_0^{N,A*} = \frac{\varphi}{2}$. While if $\mu = 1$ and all consumers were altruistic, then consumers pay $p_0^{A*} = \frac{\varphi}{2} < p_0^{N,A*}$. For $\mu \in (0,1)$, the equilibrium price $p_0^* \in \left( \frac{\varphi}{2\lambda}, \frac{\varphi}{2} \right)$. Thus the seller has to subsidize non-altruistic consumers in order to include altruistic consumers in the private good market.

Now suppose the seller promises to donate $\alpha > 0$ of the private good price to charity. Since non-altruistic consumers do not care about charitable donations, their demand is unaffected by this linking. However, altruistic consumers now receive greater value from the private good purchase. Linked donations are publicly observable and hence allow altruistic consumers who purchase the private good to exhibit their altruism. Specifically, their total value for the private good is now $\lambda \varphi + \varphi + E(\alpha, \sigma) x_i$. Their consumption threshold hence falls to $\theta^A = \frac{\lambda (1 - \alpha) \varphi}{\varphi + E(\alpha, \sigma)} < \theta_0^A$. Total demand is now $D(p, \alpha) = N \left\{ \mu \left( 1 - \theta^A \right) + (1 - \mu) \left( 1 - \theta^{N,A} \right) \right\}$. Profit at price $p$ and contribution fraction $\alpha$ is

$$\pi^I (p, \alpha) = D(p, \alpha) p (1 - \alpha).$$

Direct donations from altruistic consumers are

$$G^d (p, \alpha) = \mu \left[ I - (1 - \theta^A) p \right],$$

and linked donations through the sales of the private good are $N \left[ D(p, \alpha) \alpha \varphi \right]$. Thus total donations are

$$G^l (p, \alpha) = G^d (p, \alpha) + ND(p, \alpha) \alpha \varphi.$$

To begin, let us take $\alpha$ as fixed and derive the price equilibrium for the linked good. This is described in the following proposition.

Proposition 2 For every $\mu > 1 - \frac{\varphi}{2\lambda}$, there exists $\alpha^I \in (0,1)$ such that the price equilibrium for the linked good is as follows:

a) If $\mu \leq 1 - \frac{\varphi}{2\lambda}$, or $0 \leq \alpha \leq \alpha^I$, equilibrium price is $p_0^* \leq p^* \leq I$; demand and $D_0^* = \frac{N}{2}$.

b) If $\mu > 1 - \frac{\varphi}{2\lambda}$ and $\alpha > \alpha^I$, then $p^* = I$ and $D_0^* = N \left\{ \mu \left( 1 - \theta^{N,A*} \right) + (1 - \mu) \left( 1 - \theta^{N,A*} \right) \right\}$. 

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From Proposition 2, we see that if $\mu$ is low or $\alpha$ is low, there is an interior equilibrium in price and $\alpha$ does not affect demand. However, as part b) shows the seller extracts all consumer income, $I$, through the private good price if there are a large number of altruistic consumers and if $\alpha$ is high. In every case the price for the linked good is higher than the price when sales are not linked to charity.\footnote{This is consistent with empirical evidence on the price of charity-linked products. See Elfenbein and McManus (2010).}

Let us now look at how profits and total contributions are affected as a result of linking. We define revenues from the linked good in equilibrium as $R^* (\alpha)$, i.e., $R^* (\alpha) = D(p^*, \alpha) p^*$. The seller, however, now incurs a cost of selling the linked good since she has to donate $\alpha$ portion of the revenues to charity. Thus profits from the linked good are $\pi^* (\alpha) = (1 - \alpha) R^* (\alpha)$. Similarly, we denote direct donations at the equilibrium as $G^{ds} (\alpha) = G^d (p^*, \alpha)$. As long as $\alpha > 0$, there is a positive level of linked donations made through private good purchase. These indirect donations exactly correspond to the donations made out of the seller’s revenue. Thus total contributions are $G^{ds} (\alpha) = G^{ds} (\alpha) + \alpha R^* (\alpha)$.

Note that when $\alpha = 0$, $\pi^* (0) = R^* (0) = \pi_0^*$ and $G^{ds} (0) = G^{ds} (0) = G_0^*$. Lemma 1 below shows the effects of linking on the firm’s revenues and on direct donations ($G^d$) from altruistic consumers.

**Lemma 1** For $0 < \mu \leq 1$ and $\sigma > 0$,

a) $R^* (\alpha) \geq \pi_0^*$ with strict inequality when $\alpha > 0$.

b) $G^{ds} (\alpha) \leq G_0^{ds}$ with strict inequality when $\alpha > 0$.

Lemma 1 a) shows that the seller’s revenues are higher for $\alpha > 0$. This occurs due to two factors. First among altruistic consumers, exhibition utility from publicizing $\alpha$, $E (\alpha, \sigma) > 0$. This improves their value for the private good, and hence for any given price there is greater demand from group $A$ consumers. The increase in revenue from this source arises due to a positive level of publicity associated with the linked good, i.e. for $\sigma > 0$. Moreover, this source of revenue does not depend on the presence of non-altruistic consumers in the market; in other words, even if $\mu = 1$, as long as $\sigma > 0$, revenues from the linked good are higher.

Second, even without this exhibition utility, as long as $\mu < 1$ and there is a positive fraction of group $NA$ consumers in the market, a positive $\alpha$, allows the seller to price more optimally over the two consumer groups. To understand this effect let us look at what happens when $\mu < 1$ and
$\sigma = 0$, so that $E(\alpha, \sigma) = 0$. Then the consumption threshold for group $A$ which is now $\theta^A = \frac{(1-\alpha)p}{\nu}$ depends on the effective private good price, $(1-\alpha)p$, rather than on the actual price, $p$. Since $(1-\alpha)p < p$ for $\alpha > 0$, the seller is effectively subsidizing the price to group $A$ while charging a higher price to group $A$. Thus linking the good to charitable donations acts as a tool for price discriminating between the two consumer groups.

While revenues are higher with a positive $\alpha$, profits need not be since the higher revenues need to offset the cost of donations made out of those revenues, i.e. although it may be that $R^*(\alpha) > R^*(0)$, it is possible that $(1-\alpha)R^*(\alpha) < R^*(0)$ so that overall, linking sales to charitable donations is not profitable for the seller.

Next, looking at the effect on charitable donations, it is straightforward to see that the linked good lowers direct donations for altruistic consumers as Lemma 1 b) shows. Since consumers pay a higher price for the linked good, their residual income left for making direct donations is now smaller. However, there is now an additional source of donations which is the linked donation through private good purchase. These linked donations come from both altruistic and non-altruistic consumers. If the linked donations offset the reduction in direct donations it is possible for total charitable contributions to increase with linking. In fact, since $G^d*(\alpha) = G^d*(\alpha) + \alpha R^*(\alpha)$ and $R^*(\alpha) \geq R^*(0)$, it is possible for both profits and charitable contributions to increase with linking.

4 Linked Good: Profits and Contributions

In this section we examine whether profitability in the linked good market can be compatible with an increase in aggregate donations. We first describe the conditions under which the firm finds it profitable to sell the linked good and then outline the conditions where total donations increase when the linked good is profitable.

4.1 Equilibrium Price and Donation Percentage

The profitability of linking charity to private good sales depends on the proportion of altruistic consumers and the level of publicity associated with the linked good. Proposition 3 describes this equilibrium.

**Proposition 3** There exists $\bar{\sigma} > 0$ such that it is profitable to sell the linked good if and only if $\mu > 1 - \frac{\nu}{\nu}$ and $\sigma > \bar{\sigma}$ with $\alpha^* \in (\alpha^I, 1)$ and $p^L = I$. 

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In order to understand why $\sigma$ and $\mu$ affect the profitability of the linked good, it is important to explain the channels through which “linking” affects the profits across each separate consumer group. For altruistic consumers, the linked good improves profits through $\alpha$ which increases their demand. Higher levels of $\alpha$ are, however, a drag on profits from the non-altruistic group since their demand is not influenced by $\alpha$. The potential for an improvement in revenues from this group comes from the possibility of increasing the price of the private good. Profits over this group are high when the seller can raise the price of the linked good without raising $\sigma$ substantially. When $\sigma$ is small, the exhibition utility for altruistic consumers is less sensitive to $\alpha$. In this case the seller’s profit gain over group $A$ is relatively small. At the same time, since demand from group $A$ is less responsive to $\alpha$, the seller’s ability to raise price without hurting revenues from this group is also limited. Hence, with a positive $\alpha$ and a limited price increase, the seller incurs a large loss over group $N_A$ which is not offset by the small gain in profits over group $A$. Thus, the linked good is profitable only if positive levels of $\alpha$ are reinforced by adequate levels of publicity on the linked good.

The proportion of altruistic consumers affects the extent to which price discrimination through the linked good affects the seller’s revenues over the non-altruistic group. As mentioned earlier, the linked good allows the seller to increase the price of the private good by taking it closer to the non-altruistic group’s optimal price. When $\alpha = 0$, the price is lower than the optimal price for group $N_A$ consumers, i.e. $p_0^* < \frac{v}{2}$ and profits from this group are $\left(1 - \frac{\alpha}{\mu} \right) p_0^*$. When $\alpha > 0$ profits from this group are $\left(1 - \frac{\alpha}{\mu} \right) p^* (1 - \alpha)$. Profits from group $N_A$ are higher with $\alpha > 0$ if and only if $\alpha < 1 - \frac{(v - p_0^*) p_0^*}{(v - p^*) p^*}$. However, in order for such an $\alpha > 0$ to exist, $(v - p^*) p^* > (v - p_0^*) p_0^*$, i.e. revenues must be higher with positive $\alpha$. This is true if and only if $p^* \in (p_0^*, v - p_0^*)$. Thus as long as $p^* \in (p_0^*, v - p_0^*)$ and $\alpha$ is low, the seller can improve her profits over this group. When the proportion of non-altruistic consumers in the group is very large, i.e. when $\mu$ is small, $p_0^*$ is very close to $\frac{v}{2}$ and the seller is already pricing close to the optimal price over group $N_A$ even without linking. Hence, for any $p^* \in (p_0^*, v - p_0^*)$ where the seller can potentially improve revenues over group $N_A$, the gain in revenues from this group is likely to be small. On the other hand, the seller has to bear the cost of making contributions making it unprofitable to link contributions to sales for this group. At the same time, with low $\mu$, there is only a small proportion of altruistic consumers in the market over which the seller can raise profits. Thus the gain in profits from a few altruistic consumers does not offset the loss incurred over the large number of non-altruistic

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4 This follows from the assumption $E_{w_0} > 0$. 

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consumers making it unprofitable to sell the linked good.

Finally, note that in our set-up, the seller makes higher profits on the linked good only when \( \sigma \) is high enough so that \( p^* = I \). This is because the demand for the private good is linear in prices. Hence, for \( p^* < I \), the demand for the linked good is exactly \( \frac{N}{2} \) which is the same as the demand without linking (across both consumer groups). In this case, \( \alpha \) has no effect on demand at the optimal \( p^* \) and hence any increase in \( \alpha \) has to be offset by an increase price that leaves \( (1 - \alpha) p \) unchanged. This means the seller does no better in the linked good market than with the unlinked private good. The independent effect of \( \alpha \) on demand occurs only when \( \sigma \) is high enough so that the seller chooses a high \( \alpha \) in the linked good market where \( p^* \) has to be risen all the way up to \( I \). When this happens, the seller can improve profits from by choosing a positive \( \alpha \).5

### 4.2 Aggregate Charitable Contributions

In order to understand how total charitable contributions change when the private good is linked, let us examine the effect on each consumer group separately. Non-altruistic consumers do not make any contributions when \( \alpha = 0 \). However, when they buy the linked good at \( p^* = I \), they are forced to indirectly contribute \( \alpha I \). Hence the contribution of this group is always higher with linking. On the other hand, as explained in the previous section, any increase in private good expenditure by the altruistic group necessarily reduces their charitable contributions. Hence as the seller enhances profits over this group, their contributions go down. Total contributions over both groups increase only if higher contributions from non-altruistic consumers offset lower contributions from the altruistic group. If much of the seller’s profits in the linked good market comes from altruistic consumers, then this is less likely to be true. On the other hand, if profits are driven by better pricing and improved revenues over the non-altruistic group then we may see an increase in total contributions.

The difference in total contributions in the two markets is given by

\[
G^* - G_0 = \pi_0^* - \pi^* + (1 - \mu) N \left[ \left( \frac{1 - I}{v} \right) I - \left( \frac{1 - P_0^*}{v} \right) P_0^* \right].
\]

The difference in contributions has two components. The first is the difference in the seller’s profits. As before, given \( p_0^* \), higher profits to the seller lower contributions. But now there is a

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5In a more general model where \( f(g) \) is not linear and hence altruistic demand is not linear in prices, we can have an interior solution where \( p^* < I \) for \( \sigma \) low enough. The results of our analysis are not sensitive to this linearity in our model.
second factor that affects \( G^{ls} - G^{a}_{0} \) which is the difference in private good expenditure or the seller’s revenues over the non-altruistic group. Since the seller links the private good only if \( \pi^{*}_{0} \leq \pi^{*} \), a necessary condition for \( G^{ls} > G^{a}_{0} \) is that \( (1 - \frac{1}{\mu}) I > (1 - \frac{\mu^{2}}{e}) p^{*}_{0} \) and \( \mu < 1 \). In other words, the seller’s revenues over group \( NA \) must increase with linking. To see why, consider the effect of a dollar increase in the contributions from the non-altruistic group with linking. If this group spends less on the private good with linking, then the seller must necessarily be making a loss of more than a dollar on these consumers. The seller can make up for this loss by increasing her profits over the altruistic group by more than a dollar. Since higher profits from altruistic consumers correspond dollar for dollar with a decrease in their contributions, it must be the case that their contributions drop by more than a dollar. But this means that overall contributions over both consumer groups necessarily decrease.

The following lemma, outlines the parameter restrictions under which this necessary condition that \( (1 - \frac{1}{\mu}) I > (1 - \frac{\mu^{2}}{e}) p^{*}_{0} \) holds.

**Lemma 2** \( (1 - \frac{1}{\mu}) I \geq (1 - \frac{\mu^{2}}{e}) p^{*}_{0} \) if and only if \( \lambda \geq \lambda_{1} \) or \( \lambda_{2} \leq \lambda \leq \lambda_{1} \) and \( \mu \geq \hat{\mu} \), where \( \lambda_{1} > \lambda_{2} > 1 \) and \( \hat{\mu} = (1 - \frac{\mu}{e}, 1) \) are defined in the appendix.

As explained before, revenues over non-altruistic consumers can increase if the seller is able to improve pricing over this group in the linked good market. This, in turn, is possible if non-altruistic consumers are substantially subsidized in the private good market with \( \alpha = 0 \), i.e. if \( p^{*}_{0} \) is much lower than \( \frac{\mu}{e} \). Note that \( \lambda \) denotes the constant marginal utility to altruistic consumers from a dollar of donation. When \( \lambda \) and \( \mu \) are low the variation in consumer values for the private good is small so that \( p^{*}_{0} \) is close to \( \frac{\mu}{e} \). In this case, revenues over the non-altruistic group decrease in the linked good market.

**Proposition 4** If \( \lambda < \lambda_{1} \), then total charitable contributions always decrease when the linked good is sold in the market. For \( \lambda \geq \lambda_{2} \) or \( \mu \geq \hat{\mu} \), there exists \( \hat{\sigma} > \sigma \) such that \( G^{ls} \geq G^{a}_{0} \) and \( \pi^{ls} \geq \pi^{*}_{0} \) if and only if \( \sigma \leq \sigma \leq \hat{\sigma} \).

The above proposition shows the conditions under which charitable contributions increase even when it is profitable to link private good sales to donations. As shown in Proposition 3, it is profitable to sell the linked good only if \( \sigma > \hat{\sigma} \). Proposition 4 states that contributions are higher if \( \sigma < \hat{\sigma} \). While higher revenue from non-altruistic consumers is a necessary condition for \( G^{ls} > G^{a}_{0} \), it is not sufficient. At low levels of \( \sigma \), the demand for the linked good from altruistic consumers is
not very high. As the level of publicity associated with the linked good increases, the seller draws a larger and larger proportion of her profits from altruistic consumers as more of these consumers buy the linked good and replace direct contributions with lower levels of linked contributions through their private good purchase. For \( \sigma \) large enough, the decrease in contributions from altruistic consumers offsets higher contributions from the non-altruistic group and total contributions in the linked good market fall relative to when \( \alpha = 0 \).

5 Conclusion

In this paper we explore a new rationale for why firms engage in Corporate Social Responsibility (CSR). The particular form of CSR which we highlight in this paper is one where the firm agrees to donate a portion of private good revenue to charity. We argue that linking charitable donations to private good purchase in this way allows the firm to price discriminate between consumers with different altruistic propensities. We consider a market where some consumers receive altruistic utility from donating to charity while others do not. Although both consumer groups have the same intrinsic value for the private good, the altruistic consumers have less residual income left for spending on the private good relative to non-altruistic consumers. This drives a wedge in their private good demand and forces the seller to subsidize non-altruistic consumers. The linked good which ties private good purchase to charity then effectively allows the seller to discount the price paid by altruistic consumers while keeping the private good price paid by non-altruistic consumers high.

We also examine the role of advertising the linked good in terms of profitability and aggregate charitable donations. Advertising serves to exploit the exhibition value that altruistic consumers receive by having their altruism made public. By increases the visibility of the charitable act linked to the private good purchase, advertising increases the value of a dollar donation through the linked good relative to a dollar donated directly out of income. As a result, linked donations crowd out direct donations by altruistic group and hence charitable contributions from this group decrease with this form of CSR. On the other hand, since the linked good brings in charitable donations from non-altruistic consumers who do not make donations otherwise, it is possible for aggregate charitable donations to increase in the linked good. We describe the conditions under which higher profits and greater donations are compatible within the linked good market.
6 Appendix

**Proof of Proposition 1.** The profit function when \( \alpha = 0 \) is \( \pi_0 (p) = N \{ \mu (1 - \theta_0^+ ) + (1 - \mu ) (1 - \theta_0^{NA}) \} \). \( \pi_0 (p) \) is concave in \( p \) and under our assumptions, \( \frac{d\pi_0 (p)}{dp} \bigg|_{p=0} > 0 \) and \( \frac{d\pi_0 (p)}{dp} \bigg|_{p=1} < 0 \); hence the First Order Condition is necessary and sufficient. So the equilibrium price, \( p_0^* \) solves \( \frac{d\pi_0 (p)}{dp} \bigg|_{p=p_0^*} = 0 \) which gives \( p_0^* = \frac{\nu}{2 \mu \lambda + 1 - \mu} \). Substituting \( p_0^* \) into the demand function \( D_0 \) and the profit function, \( \pi_0 (p) \) gives us \( D_0^* = \frac{N}{2} \) and \( \pi_0^* = \frac{N}{2} \frac{\nu}{2 \mu \lambda + 1 - \mu} \). Finally substituting \( p_0^* \) into the total contribution function, \( G_0 \) gives, \( G_0^* = N \left[ \mu I - \left( 1 - \frac{\lambda}{2 \mu \lambda + 1 - \mu} \right) \frac{\nu}{2 \mu \lambda + 1 - \mu} \right] \). ■

**Proof of Proposition 2.** For \( \alpha \in [0, 1] \), the profit function \( \pi^l (p^l; \alpha) \) is concave with \( \frac{d\pi^l (p^l; \alpha)}{dp} \bigg|_{p=0} > 0 \). Looking at the price that solves the First Order Condition, we get \( p^{I^*} (\alpha) = \frac{\nu}{\nu \mu (1 - \alpha) v + (1 - \mu) [v + E(\alpha, \sigma)]} \). \( p^{I^*} (\alpha) \) is increasing in \( \alpha \). At \( \alpha = 0 \), we know that \( p^{I^*} = p_0^* < I \). At \( \alpha = 1 \), \( p^{I^*} = \frac{\nu}{2 (1 - \mu)} < I \) if and only if \( \mu \leq 1 - \frac{\nu}{27} \).

Hence for \( \mu \leq 1 - \frac{\nu}{27} \), \( p^{I^*} \leq I \) for all \( \alpha \) and for \( \mu > 1 - \frac{\nu}{27} \), \( p^{I^*} \leq I \) if and only if \( \alpha \leq \alpha^I \), where \( \alpha^I \in (0, 1) \) solves \( p^{I^*} (\alpha^I) = I \). ■

**Proof of Lemma 1.** a) From Proposition 2,

\[
R^s (\alpha) = N \left\{ \begin{array}{ll}
\frac{\nu}{2} \frac{\nu (v + E(\alpha, \sigma))}{(1 - \alpha) \nu \mu + (1 - \mu) [v + E(\alpha, \sigma)]} & \text{if } 0 \leq \mu < 1 - \frac{\nu}{27} \text{ or } 0 < \alpha < \alpha^I \\
\frac{\mu}{2} \left( 1 - \frac{\lambda}{v + E(\alpha, \sigma)} \right) + (1 - \mu) \left( 1 - \frac{\lambda}{v + E(\alpha, \sigma)} \right) & \text{otherwise.}
\end{array} \right.
\]

\( \frac{dR^s (\alpha)}{d\alpha} > 0 \) and hence \( R^s (\alpha) \geq R^s (0) \) and \( R^s (\alpha) > R^s (0) \) for \( \alpha > 0 \).

b) Looking at direct donations as a function of \( \alpha \), we have from Proposition 2,

\[
G^{d^s} (\alpha) = N \left\{ \mu \left[ 1 - \frac{\nu}{2} \left( 1 - \frac{\lambda}{2 \mu \lambda + 1 - \mu} \frac{(1 - \alpha) \nu \mu + (1 - \mu) [v + E(\alpha, \sigma)]}{(1 - \alpha) \nu \mu + (1 - \mu) [v + E(\alpha, \sigma)]} \right) \right] \right. \left. \frac{v + E(\alpha, \sigma)}{\mu \lambda (1 - \alpha) \nu \mu + (1 - \mu) [v + E(\alpha, \sigma)]} \right. \left. \text{if } 0 \leq \mu < 1 - \frac{\nu}{27} \text{ or } 0 < \alpha < \alpha^I \right. \right. \left. \text{otherwise.}
\]

Differentiating \( G^{d^s} (\alpha) \) with respect to \( \alpha \) we have \( \frac{dG^{d^s} (\alpha)}{d\alpha} < 0 \). So \( G^{d^s} (\alpha) \leq G^{d^s} (0) \) and \( G^{d^s} (\alpha) < G^{d^s} (0) \) for all \( \alpha > 0 \). ■

**Proof of Proposition 3.** From Lemma 1, the profit function from the linked good has two segments. In the first segment, \( p^{I^*} \) is interior and demand is constant at the equilibrium price, i.e. \( \pi^{I^*} = \frac{N}{2} (1 - \alpha) p^{I^*} (\alpha) \). The profit function is concave in \( \alpha \) and at \( \alpha = 0 \), \( \frac{d\pi^{I^*} (\alpha)}{d\alpha} < 0 \) at \( \sigma = 0 \). So at \( \pi^{I^*} (\alpha) \bigg|_{\sigma=0} < \pi_0^* \). However, since \( p^{I^*} \) is interior, by the envelope theorem, \( \frac{d\pi^{I^*}}{d\alpha} = 0 \). This means that \( \pi^{I^*} (\alpha) = \pi^{I^*} (\alpha) \bigg|_{\sigma=0} < \pi_0^* \) for all \( \alpha \). Thus the linked good is not profitable for any \( \mu \leq 1 - \frac{\nu}{27} \). For the same reason, if \( \mu > 1 - \frac{\nu}{27} \), the linked good is not profitable for any \( \alpha \leq \alpha^I \). It can be checked that \( \frac{d\pi^{I^*} (\alpha)}{d\alpha} \bigg|_{\alpha^I, \sigma=0} = -N \frac{\nu}{2} + N \mu I \frac{1}{v} \left( 1 - \alpha^I \right) \left( 1 - \alpha^I \right) E_{\alpha}(\alpha, \sigma) \left( 1 - \alpha^I \right) \) is increasing in \( \alpha \). At \( \sigma = 0 \), \( \frac{d\pi^{I^*} (\alpha)}{d\alpha} \bigg|_{\sigma^I, \sigma=0} = -N \frac{\nu}{2} + N \mu I \frac{1}{v} \left( 1 - \alpha^I \right) \) where \( \alpha^I (0) = 1 - \frac{\nu}{2 \mu \lambda} + \frac{1}{\mu \lambda} (1 - \mu) \).
Substituting we get, \( \left[ \frac{d\pi^*}{d\alpha} \right]_{\sigma,\alpha^I=0} = -NI \{ \frac{I}{v}(1-\mu) \} < 0 \). So define \( \sigma_1 > 0 \) as \( \left[ \frac{d\pi^*}{d\alpha} \right]_{\sigma,\alpha^I=0} = 0 \). Then for \( \sigma > \sigma_1 \), there exists \( \alpha^* \in (\alpha^I,1) \) such that the linked good is profitable with \( \alpha = \alpha^* \) and \( p^I = I \). \( \alpha^* \) solves the First Order Condition

\[
- \left[ \mu \left( 1 - \frac{\lambda(1-\alpha^*)}{v+E(\alpha^*,\sigma)} \right) + (1-\mu) \left( 1 - \frac{I}{v} \right) + (1-\alpha^*) \mu I \left( \frac{v+E(\alpha^*,\sigma)}{[v+E(\alpha^*,\sigma)]^2} \right) \right] = 0.
\]

Further given \( \sigma > \sigma_1 \), \( \left[ \pi^I - \pi^0 \right] \) is increasing in \( \sigma \). At \( \sigma = \sigma_1 \), \( \left[ \pi^I - \pi^0 \right]_{\sigma_1} < 0 \). Hence \( \left[ \pi^I - \pi^0 \right] > 0 \) if and only if \( \sigma > \tilde{\sigma} \), where \( \left[ \pi^I - \pi^0 \right]_{\tilde{\sigma}} = 0 \).

**Proof of Lemma 2.** \( (1-\frac{v_0}{\bar{v}}) p^*_0 < (1-\frac{I}{v}) I \) if and only if

\[
(v-p^*_0) p^*_0 < (v-I) I \text{ if and only if } LHS = \left( 1 - \frac{1}{2[\mu \lambda^+1]} \right) \frac{v^2}{2[\mu \lambda^+1]} = \frac{2\mu(\lambda-1)+1}{[\mu(\lambda-1)]^2} \frac{v^2}{4} \text{. It can be checked that it is decreasing in } \mu.
\]

At \( \mu = \frac{2I-v}{2I} \),

\[
[LHS]_{\mu=\frac{2I-v}{2I}} = \left( \frac{(2I-v)(\lambda-1)+I}{[(2I-v)(\lambda-1)+2I]^{2}} \right) v^2 \text{ is decreasing in } \lambda.
\]

\[
[LHS]_{\mu=\frac{2I-v}{2I},\lambda=1} = \frac{v^2}{4} > (v-I) I, \text{ since } \frac{v^2}{4} < I.
\]

So for \( \lambda_1 > 1 \) which solves \( \left( \frac{(2I-v)(\lambda_1-1)+I}{[(2I-v)(\lambda_1-1)+2I]^{2}} \right) v = v - I \), if \( \lambda < \lambda_1 \), then \( [LHS]_{\mu=\frac{2I-v}{2I}} > (v-I) I \). For \( \lambda \geq \lambda_1 \), \( [LHS]_{\mu=\frac{2I-v}{2I}} < (v-I) I \). Hence \( (v-p^*_0) p^*_0 < (v-I) I \) for all \( \mu > \frac{2I-v}{2I} \).

\[
[LHS]_{\mu=1} = \left( \frac{2\lambda-1}{\lambda^2} \right) \frac{v^2}{4}
\]

Again \( [LHS]_{\mu=1} \) is decreasing in \( \lambda \). At \( \lambda = 1 \), \( \frac{v^2}{4} > (v-I) I \). At \( \lambda_1 \), \( [LHS]_{\mu=\frac{2I-v}{2I},\lambda=1} = (v-I) I > [LHS]_{\mu=1,\lambda_1} \). Hence there exists \( \lambda_2 < \lambda_1 \), which solves \( [LHS]_{\mu=1,\lambda_2} = 0 \).

\[
(v-p^*_0) p^*_0 > (v-I) I \text{ for all } \mu \text{ if } 1 < \lambda \leq \lambda_2 \text{ for all } \mu.
\]

If \( \lambda \in (\lambda_2,\lambda_1) \) then \( (v-p^*_0) p^*_0 > (v-I) I \) if and only if \( \mu < \hat{\mu} \) where \( \hat{\mu} \in (1-\frac{v}{2I},1) \) solves

\[
(v-p^*_0) p^*_0 = (v-I) I.
\]

Finally if \( \lambda \geq \lambda_2 \), then \( (v-p^*_0) p^*_0 < (v-I) I \) for all \( \mu \).

**Proof of Proposition 4.** From Lemma 2 and Proposition 3, if \( \lambda \geq \lambda_1 \), then for all \( \mu > \frac{2I-v}{2I} \) and for all \( \sigma \geq \tilde{\sigma} \), \( (v-p^*_0) p^*_0 \geq (v-I) I \) and \( \pi^*_0 - \pi^I \leq 0 \) so that \( G^I - G^*_0 < 0 \).

The same holds for \( \lambda \in (\lambda_2,\lambda_1) \) and \( \frac{2I-v}{2I} \leq \mu \leq \hat{\mu} \).

If \( \lambda \leq \lambda_2 \) or if \( \lambda \in (\lambda_2,\lambda_1) \) and \( \hat{\mu} < \mu \leq 1 \), then for all \( \sigma \geq \tilde{\sigma} \), \( \pi^*_0 - \pi^I \leq 0 \) while \( (v-p^*_0) p^*_0 \leq (v-I) I \). \( [G^I - G^*_0] \) is decreasing in \( \sigma \) and at \( [G^I - G^*_0]_{\tilde{\sigma}} \leq 0 \). Hence there exists \( \tilde{\sigma} \geq \tilde{\sigma} \), such that \( G^I \geq G^*_0 \) for \( \sigma < \tilde{\sigma} \). Thus for \( \sigma \in [\tilde{\sigma},\tilde{\sigma}] \), \( G^I \geq G^*_0 \) and \( \pi^I \geq \pi^*_0 \). ■
References


