Warm Glow Revenues and Endogenous Price Discrimination

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Abstract

We explore the potential benefits of an up-and-coming business model called "pay-what-you-like" in an environment where consumers experience a warm glow by patronizing a particular firm. We show that, given a social norm regarding minimum contributions, a pay-what-you-like firm should announce a minimum suggested contribution, which is positive—but smaller than the profit-maximizing single price—so as to benefit from “endogenous price discrimination,” whereby consumers differentially contribute more than the suggested minimum. Furthermore, a pay-what-you-like scheme can improve market efficiency by drastically reducing deadweight loss relative to a single price scheme. These results are robust to alternate motivations for generosity, including gift-exchange.

JEL Classification: L11, D42, D03, D64

Keywords: warm glow, price discrimination, social norm, charity, monopoly

1 Introduction

Within the last year several news sources documented instances of an up-and-coming business model called “pay-what-you-like”. The most publicized example occurred when Radiohead announced that their album *In Rainbows* could be downloaded at whatever price fans deemed reasonable. Restaurants, rental accommodations, and soccer clubs are also among those employing this business model. In fact, one pay-what-you-like Australian restaurant, Lentil as Anything, has expanded their enterprise from one to six locations since 2000 (Mantzaris, 2008).

Some suggested that sales from the Radiohead album represented a new paradigm for the economics of album sales, but their success must also be attributed to how much the fans value the band itself (Ferguson,
Therefore, the success of Radiohead and other pay-what-you-like firms contains an observation often overlooked by neoclassical theory: individuals not only care about the benefit they receive from a good, but, also that they are giving money to a particular firm.

One approach to a “pay-what-you-like” firm\(^1\) would literally be that a publicly available donation box would provide any customer with the legal right to claim a cup of coffee for any donation \(x \geq 0\). If an individual’s valuation of a cup of coffee consisted of the usual intrinsic valuation, \(v_i\), then the degenerate result would occur that everyone with \(v_i > 0\) would claim a cup of coffee for free. Our model is more sophisticated in two respects. First, we separate the intrinsic valuation for the coffee itself from a warm glow from doing business with the firm. Secondly, we posit that the firm is able to take advantage of a social norm regarding “minimum suggested contributions.” From these two attributes, our model allows for us to examine the profitability to the firm of choosing an optimal level of a minimum suggested contribution, call this \(\rho\), while letting the customers, in effect, choose their own pattern of price discrimination. While the term “warm glow” (popularized by Andreoni [1990]) suggests that consumers feel good about themselves when patronizing, or contributing to, a particular firm, research about social norms (such as past donations of others) provides a benchmark for appropriate contributions (Shang and Croson, 2005).

In our model, we combine the attributes of two social norms: 1.) there is a minimum suggested donation, \(\rho\), such that no individual will consume the product (for example, a cup of coffee) unless they donate at least this minimum, 2.) each customer \(i\) has a standard intrinsic value, \(v_i\), from consuming the cup of coffee plus a warm glow from the fact that they are patronizing that firm for their coffee purchase. The warm glow is tied to the receipt of the coffee such that no individual makes a warm glow donation in isolation.\(^2\) The functional forms will be described in more detail below. What is novel about our model is that it allows for customers to take a cup of coffee and rationally donate more than \(\rho\). Rational, heterogenous customers will thus donate somewhere in the range \([\rho, \infty)\). We call this phenomenon “endogenous price discrimination.”\(^3\) This differs from traditional first-degree price discrimination in that it does not depend upon the firm negotiating and extracting the maximum trading surplus from each customer on each unit. Rather, the task of the profit maximizing enterprise\(^4\) is, somewhat akin to a single price monopolist, choosing a single parameter, in this case \(\rho\), the minimal acceptable donation.

In Section 2 we formalize the model, including the nature of consumer preferences and the rational choice

\(^1\) We use the term “firm” broadly to apply to profit and not-for-profit corporations, individual proprietorships, partnerships, informal charities, and so forth.

\(^2\) The assumption that individuals’ incentives to donate are tied to receiving something in return is supported empirically by Karlan and List (2008) and Falk (2007).

\(^3\) Coffee shops commonly use other forms of price discrimination, such as non-linear pricing (McManus, 2007), which we abstract away from in the model by having a single homogeneous good.

\(^4\) Following Norton (2008) we posit that not-for-profit enterprises may nevertheless maximize retained earnings; they are simply prohibited from distributing those earnings to shareholders.
implications of these consumers operating in a world of a minimal acceptable contribution. Following that, we explore alternate profit maximization scenarios for the firms that take the rational decisions of warm glow consumers into account. We characterize the optimal choice of $\rho$, and specifically compare it to a naïve benchmark in which a firm, not understanding the difference between customers’ intrinsic and warm glow values, attempts to behave like a traditional single-price monopolist. In Section 3 we use specific market examples to demonstrate that a pay-what-you-like firm can earn more revenue and generate more efficient outcomes than a traditional firm. Finally, in Section 4 we briefly discuss some extensions such as a “gift exchange” motivation for the model and also the phenomenon of tip jars in fixed priced eating establishments.

2 A Theory of the Warm Glow of Patronization

In this section, we consider a scenario where a group of $N$ consumers receive a warm glow from patronizing a socially-conscious, yet profit-maximizing, monopolist. In other words, for a consumer, $i$, with an intrinsic value of $v_i \geq 0$ for the good in question, we add a "warm glow" value of $\alpha$ to the consumer’s utility if she receives the good from this particular firm. However, common sense tells us that the amount of warm glow received should depend on the amount of money given to the firm, because, for example, buying a good at cost does not help the firm at all. For simplicity, we assume that each consumer’s utility is quasi-linear in money, which enables us to directly compare $v$ and $\alpha$ to the money given to the firm. Specifically, consumer $i$’s utility is given by

$$u_i(x) = \begin{cases} v_i + \alpha(x) - x & \text{if the good is received} \\ 0 & \text{otherwise} \end{cases}$$

where $\alpha(x)$ is the warm glow received by donating $x$ to the firm and receiving the good, and here it becomes clear that a consumer will donate and receive the good if the total benefit exceeds the cost.

2.1 Functional Form of Warm Glow

In our model, we assume that a consumer does not simply care about the total amount of money being given to a firm in exchange for a good. Instead, she interprets some portion of her contribution as fair compensation for the good, with any further contribution interpreted as a gift given to support a worthy cause. The warm glow effect can only come from money which is perceived by the consumer as a gift, and therefore, $\alpha(x)$ is defined only over the portion of $x$ which is deemed a gift. We formally define a gift to be the difference between the consumer’s contribution and the minimum of $v_i$ and $\rho$, the suggested minimum contribution. In other words, if consumer $i$ donates $x$, her gift to the firm is equal to $x - \min \{v_i, \rho\}$.
For simplicity sake, and because we believe it to be a reasonable approximation of the happiness experienced when donating to a worthy cause, we assume that warm glow, $\alpha(x)$, increases at a constant rate of $\beta > 1$ as a consumer increases the size of her gift. However, while we seek to model generous consumers, we are not talking about consumers who completely empty their wallets into the donation box every time they enter the store, as this specification alone would suggest. Rather, each consumer has an intrinsic value of $w_i \geq 0$, which we refer to as a warm glow satiation point. We can interpret $w_i$ as the maximum gift that consumer $i$ is willing to give to the firm and still receive an increasingly large warm glow.

In our model, warm glow is defined to be $\beta$ times the size of the gift, with the restrictions that 1.) warm glow is maximized at $\beta w_i$ and 2.) warm glow is equal to zero if $x < \rho$.\footnote{If instead, $\alpha(x)$ is allowed to be any bounded, positive, concave function with $\alpha'(x) \geq 1$ for gift values below the satiation point, then the qualitative results of our model still hold.} More formally, we have the following definition:

**Definition 1** The warm glow of consumer $i$, with an intrinsic value of $v_i$, warm glow satiation point of $w_i$, who contributes $x \geq \rho$ to a firm whose suggested minimum contribution is $\rho$, is equal to $\alpha(x)$, where

$$\alpha(x) = \beta \cdot \min \{[x - \min\{v_i, \rho]\], w_i\}$$
2.2 Consumer’s Willingness to Pay

Since the firm is profit maximizing, it is concerned with the largest amount that any particular consumer might contribute. Let \( \omega_i \) equal consumer \( i \)’s willingness to pay. Then

\[
\omega_i = v_i + \beta w_i
\]

because a consumer will never contribute more than their value of the good plus their maximum warm glow. The values of \( v_i \) and \( w_i \) are common knowledge\(^6\) and the parameter \( \beta \) is exogenous and fixed, which means the firm perfectly knows each consumer’s willingness to pay. However, we will assume that is it not feasible for the firm to use first-degree price discrimination to extract the entire surplus from the market because such technology is too expensive, or the fact that such pecuniary motives harm the firm’s social status. Instead the firm uses a pay-what-you-like strategy, chooses a minimum suggested contribution, \( \rho \), and relies on endogenous price discrimination. Of course, if consumers take advantage of the pay-what-you-like strategy and choose to ignore the suggested minimum contribution, the monopolist may forgo much of its revenue. Therefore, in this paper we are concerned with those markets where all but an insignificant number of consumers receive a large disutility from deviating from the well-established norm of contributing at least the suggested minimum.

2.3 Consumer’s Contributions

Given the functional form of warm glow, the utility function of consumer \( i \) can be written as

\[
u_i(x) = \begin{cases} 
0 & \text{for } x < \rho \\
v_i - x + \beta \min\{x - \min\{v_i, \rho\}, w_i\} & \text{for } x \geq \rho
\end{cases}
\]

Noting that \( u_i(x) \) is piecewise linear in \( x \), we know consumer \( i \)’s utility maximizing contribution to the firm, or \( x_i^* \), will be one of the following four corner solutions

\[
x_i^*(\rho) = \begin{cases} 
\rho + w_i & \text{for } 0 \leq \rho \leq v_i \\
v_i + w_i & \text{for } v_i < \rho \leq v_i + w_i \\
\rho & \text{for } v_i + w_i < \rho \leq \omega_i \\
0 & \text{for } \omega_i < \rho 
\end{cases}
\]

\(^6\)It does not matter whether consumers’ values are drawn from a known distribution or predetermined. There is no demand uncertainty, and we are investigating the firm’s pricing decision under perfect information.
where $v_i$ and $w_i$ fully characterize a consumer, and $\omega_i$ is her willingness to pay given in 1. The four possible contributions, given in 3 confirm the behavioral assumptions of our representative consumer. If the minimum suggested contribution is very low, the consumer gives $\rho$ as compensation for the good, plus the maximum gift of $w_i$, as everything above $\rho$ is perceived as a gift. If $\rho$ climbs above the consumer’s value, the consumer treats $v_i$ as compensation for the good, because that is the most the consumer would have paid to a neutral firm, but still maximizes the warm glow by giving a gift of $w_i$ in excess of her value (See Figure 2 for an example of this type of consumer). If $\rho$ happens to be above $v_i + w_i$, the consumer does not want to give any more than $\rho$ (part of which is seen as payment, and part which is seen as a gift), but she will still make a donation and obtain the good if her willingness to pay is above $\rho$. Finally, the consumer will not receive the good if $\rho$ exceeds her willingness to pay.

2.4 Standard Profit Maximization

In this section we consider the actions of a standard profit-maximizing firm who is given perfect information about each consumer’s willingness to pay, $\omega_i$. For simplicity, we assume the firm is a monopolist which can produce at zero marginal cost. While the firm knows each $\omega_i$, the firm is unaware that $\omega_i = v_i + \beta w_i$; that is, the firm is unaware that a consumer's demand for the good comes from both an intrinsic value for the good and a desire to contribute to the firm. Suppose the firm hired an economist who was given only the schedule of $\omega_i$’s and who misinterpreted them as standard willingness to pay valuations. That is, the advisor, unaware of the potential benefits of endogenous price discrimination, would look for the \textit{prima facie} profit-maximizing single posted price of the good, which we refer to as the monopolist’s benchmark price.

**Definition 2** The \textbf{benchmark price} of a monopolist with zero marginal cost, facing $N$ consumers with willingness to pay of $\{\omega_i\}_{i=1}^N$ is equal to $p^*$ where

$$p^* = \arg \max_p \{ p * q(p) \}$$
where \( q(p) = |\{ \omega_i : \omega_i \geq \rho \}| \), or the number of consumers whose willingness to pay is greater than or equal to the price, \( p \).

The value of the benchmark price, \( p^* \), is the same whether we interpret it as the profit-maximizing price for a posted-price firm, or the suggested minimum contribution in a pay-what-you-like firm who does not make a distinction between the consumer’s two different sources of utility. In either case, some consumers may contribute more than the benchmark price (possibly using a tip jar) if it is in their interest to do so.

### 2.5 Pay-What-You-Like Profit Maximization

A sophisticated monopolist is concerned with maximizing the sum of both sources of revenue, compensation and gifts. If a pay-what-you-like firm knows how much of each consumer’s demand comes from intrinsic value for the good and how much is due to the warm glow of generosity, it can predict the contributions of each consumer and find the suggested minimum contribution which will generate the most profit.

**Definition 3** The optimal suggested minimum of a monopolist with zero marginal cost, facing \( N \) consumers with valuations of \( \{v_i\}_{i=1}^N \), warm glow satiations of \( \{w_i\}_{i=1}^N \), and a marginal utility of giving of \( \beta \) is equal to \( \rho^* \) where

\[
\rho^* = \arg \max \rho \left\{ \sum_{i=1}^N x_i^*(\rho) \right\}
\]

where \( x_i^*(\rho) \) is defined to be consumer \( i \)’s contribution given the suggested minimum contribution of \( \rho \) as determined by 3.

The optimal suggested minimum and the benchmark price should be uniquely determined by the values of \( \{v_i\}_{i=1}^N \) and \( \{w_i\}_{i=1}^N \), thus we will assume that the firm chooses the smallest value which serves as the respective maximum.

### 2.6 Comparison of Benchmark Price to Optimal Suggested Minimum

The following two lemmas will be useful for comparing the benchmark price and optimal suggested minimum.

**Lemma 4** The benchmark price, \( p^* \), and the optimal suggested minimum, \( \rho^* \), must each be equal to \( \omega_i \) for some \( i \).

**Proof.** If \( \omega_i = 0 \) for all \( i \), then \( p^* \) and \( \rho^* \) will both be equal to 0 as desired, so assume that \( \omega_i > 0 \), for some \( i \). Assume that the monopolist chooses a suggested minimum of \( \rho \) which is not equal to any consumer’s willingness to pay. If \( q(\rho) = 0 \), then the firm is not selling any goods, and by both measures
profits will increase by lowering \( \rho \) so that at least one consumer buys the good. If \( q(\rho) > 0 \), then the firm can increase both measures of profits by raising the suggested minimum to \( \min \{ \omega_i : \omega_i > \rho \} \), because such a deviation will increase the contributions of at least one consumer while not decreasing the contribution of any. Therefore \( \rho \) cannot be \( p^* \) or \( \rho^* \) unless it is in fact equal to some \( \omega_i \).

The intuition behind Lemma 4 is the well-known fact that when facing discrete willingness to pay steps, a firm would never choose a price between the steps. Because of this lemma we need only compare the firm’s outcome given a suggested minimum chosen from the set of all \( \omega_i \), which we have assumed is common knowledge. Without loss of generality, we can re-index the consumers such that

\[
\omega_1 \geq \omega_2 \geq \ldots \geq \omega_N
\]

which implies that the suggested minimum which will result in the sale of \( i \) units is simply \( \omega_i \). We can now define marginal revenue, \( MR(i) \), as

\[
MR(i) = R(i) - R(i - 1), \text{ for all } i = 1, \ldots, N
\]

where \( R(i) \) is defined to be the total contributions gained from selling \( i \) units of the good at a suggested minimum of \( \omega_i \). Any units which may have been purchased by equally willing to pay consumers, indexed by \( j > i \), are assumed to go unsold. Similarly, we now define marginal benchmark revenue, \( MBR(i) \), as

\[
MBR(i) = i\omega_i - (i - 1)\omega_{i-1}
\]

which is the additional revenue gained under the benchmark assumption that each consumer pays only the price of the good.

**Lemma 5** The marginal revenue of selling the \( i \)-th unit, \( MR(i) \), is greater than or equal to the marginal benchmark revenue of selling the \( i \)-th unit, \( MBR(i) \).

**Proof.** Having sold \( i - 1 \) units, the suggested minimum must be decreased to \( \omega_i \) in order to sell the \( i \)-th unit, and the added revenue from consumer \( i \) is thus \( \omega_i \). This is also the added revenue from consumer \( i \) under the benchmark assumption. Now consider the revenue lost from consumers 1, 2, ..., \( i - 1 \) due to a decrease in the suggested minimum from \( \omega_{i-1} \) to \( \omega_i \). Under the benchmark assumption, the revenue lost from each
consumer is exactly $\omega_{i-1} - \omega_i$. However, knowing the contribution level, $x_i^*(p)$, given in 3, we can see that

$$
\frac{d}{dp} x_i^*(\rho) = \begin{cases}
1 & \text{for } 0 < \rho < v_i \\
0 & \text{for } v_i < \rho < v_i + w_i \\
1 & \text{for } v_i + w_i < \rho < \omega_i \\
0 & \text{for } \omega_i < \rho
\end{cases}
$$

which means that as price decreases, the first $i - 1$ consumers’ contribution decreases as a rate less than or equal to the rate at which price decreases, which means that the revenue lost from each consumer is less than or equal to the magnitude of the price decrease, or $\omega_{i-1} - \omega_i$. Therefore $MR(i) \geq MBR(i)$ as desired.

Equation 4 shows that a consumer’s contribution may not be responsive to changes in the minimum suggested contribution. If $\rho$ is chosen to be anywhere between a consumer’s intrinsic value, $v_i$, and the sum of her value and warm glow satiation point, $v_i + w_i$, then that consumer’s contribution is fixed at $v_i + w_i$. The existence of this type of consumer (see Figure 2 for an example) will be a catalyst for the sophisticated monopolist to lower its price, allowing infra-marginal consumers to obtain and pay for the good, while maintaining a high revenue from some of the supra-marginal consumers.

**Proposition 6** Given a monopolistic seller with no variable costs facing $N$ consumers, each with 1.) an intrinsic value for consuming one unit of a good 2.) a linearly increasing warm glow from giving to this monopolist, up to an individually determined maximum, and 3.) a strict adherence to a norm whereby no consumer receives the good unless they have contributed the suggested minimum, the optimal suggested minimum contribution in a pay-what-you-like business model is less than or equal to the benchmark posted price for the monopolist.

**Proof.** By Lemma 4, $p^* = \omega_j$ for some $j$, and $\rho^* = \omega_k$ for some $k$, where $j$ and $k$ represent the number of units sold under each suggested minimum contribution decision. Assume that, contrary to the proposition, the optimal suggested minimum, $\rho^*$, is greater than the benchmark price, $p^*$. This means that $k < j$, because fewer units must be sold under the optimal suggest minimum. However, because $p^*$ is the global maximizer of benchmark revenue, it must be the case that increasing the number of units sold from $k$ to $j$ weakly increases benchmark revenue. In other words, we know

$$
\sum_{i=k+1}^{j} MBR(i) \geq 0
$$
However, by Lemma 5 we know that $MR(i) \geq MBR(i)$, which implies

$$\sum_{i=k+1}^{j} MR(i) \geq \sum_{i=k+1}^{j} MBR(i) \geq 0$$

which means that total revenue weakly increases by increasing the number of units sold from $k$ to $j$, which means that no value of $\rho$ greater than $p^*$ could have been the optimal suggested minimum, since setting $\rho = p^*$ would dominate it, given that the monopolist chooses the lowest suggested minimum when indifferent.

The intuition behind Proposition 6 is the following. When a firm has the luxury of choosing a lower bound to the amount of money that consumers will contribute in exchange for a good, they have an incentive to set the lower bound below the posted-price benchmark, because they will sell more units this way. In the pay-what-you-like scheme, there may be some consumers who still contribute as much as they would have at the posted-price benchmark due to their endogenous price discrimination. One might argue that this intuition suggests that the optimal suggested minimum should go all the way down to zero, but that is not the case. Our model assumes that consumers distinguish between gifts to the firm and compensation for the good, and a suggested minimum of zero implies that no money is necessary as compensation for the good, perhaps because the firm is not "asking" for anything to compensate them for the good. While setting $\rho = 0$, would maximize gifts, this amount would not in general compensate for the loss of other revenues. It is therefore a non-trivial exercise to determine $\rho^*$.\(^7\)

### 2.7 Welfare Implications of Pay-What-You-Like Scheme

This section formalizes the welfare implications of a pay-what-you-like scheme. Because we assume that the good is produced with no variable cost, any consumer who values the good but does not receive it adds to the deadweight loss in the market. Therefore, by increasing the number of consumers who receive the good, the pay-what-you-like scheme has the potential to increase efficiency, revenue for the firm, and flexibility for the consumer. This leads us to the following corollary of Proposition 6.

**Corollary 7** Given a monopolistic seller with no variable costs and $N$ consumers as described in Proposition 6, if there is at least one consumer who would like to contribute more than the profit-maximizing benchmark price, $p^*$, then a pay-what-you-like pricing strategy is a Pareto improvement over a single posted price strategy.

\(^7\)In fact, for sufficiently small $v_i$’s, $\rho^* = 0$, as the incentive to keep $\rho$ above zero diminishes because each consumer’s contribution is entirely a gift. However, for sufficiently small $w_i$’s, $\rho^* = p^*$, as the firm’s decision becomes increasingly identical to a traditional profit-maximizing monopolist as the gift-giving motive disappears. In general, $\rho^* \in [0, p^*]$. 

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Proof. Because \( \rho^* \) is the optimal suggested minimum given a pay-what-you-like strategy, the firm weakly prefers to let \( \rho = \rho^* \) over setting \( \rho = p^* \) given this strategy. However, they strictly prefer the pay-what-you-like strategy with \( \rho = p^* \) to the single posted price of \( p^* \) because of the one consumer choosing to give more. Because \( \rho^* \leq p^* \), each consumer can choose to pay \( p^* \) if they like, thus each consumer’s choice under the pay-what-you-like strategy is weakly preferred to the single posted price strategy.

2.8 Continuous Demand Case

In the previous sections we consider a finite number of consumers, which results in a finite number of possibilities for \( p^* \) and \( \rho^* \), due to the result of Lemma 4. Therefore, there are discrete jumps in the pricing decisions of the monopolist, and it may be the case that \( p^* = \rho^* \) simply because both prices fall into the same discrete jump. To eliminate this possibility, we alter the model so that there is a continuum of consumers, indexed by \( i \in [0, 1] \). Furthermore, we will assume the demand curve determined from consumers’ willingness to pay is differentiable at the price, \( p^* \). As before, consumer \( i \) has an intrinsic value of \( v_i \) and a warm glow satiation of \( w_i \), which results in a willingness to pay of \( \omega_i = v_i + \beta w_i \). As before, define \( p^* \) to be the profit-maximizing single posted price, and \( \rho^* \) the optimal suggested minimum contribution. In this version of the model, using the same intuition as before, we can prove the following stronger result.

Proposition 8 Given a monopolistic seller with no variable costs and a continuum of consumers with properties 1-3 of Proposition 6, the optimal suggested minimum contribution, \( \rho^* \), is strictly less than the profit-maximizing single posted price, \( p^* \), if the demand curve is differentiable at \( p^* \) and there is a positive (Lebesgue) measure of consumers with the following property: \( v_i \leq p^* < v_i + w_i \).

Proof. Let \( A \subseteq [0, 1] \) be defined such that \( i \in A \) if and only if \( \omega_i \geq p^* \). Let \( B \subseteq [0, 1] \) be defined such that \( i \in B \) if and only if \( v_i \leq p^* < v_i + w_i \). Note that \( B \subseteq A \), because \( p^* < v_i + w_i \) implies that \( \omega_i \geq p^* \). By the assumptions of the proposition, \( \mu(A) \geq \mu(B) > 0 \), where \( \mu(.) \) is the standard Lebesgue measure. Because demand is differentiable at \( p^* \), we know that marginal (benchmark) revenue is continuous at \( p^* \), and because this is the profit maximizing single price, it must be zero. Letting \( z \) be the absolute value of the slope of the demand curve at \( p^* \), the formula for marginal benchmark revenue at \( p^* \) is

\[
MBR(p^*) = p^* - \mu(A) * z = 0
\]

or the marginal gain from additional buyers minus the marginal loss from those who were already buying. If the firm is concerned with actual marginal revenue, it will find that their marginal gains are the same as this benchmark formula (because every marginal consumer is already paying their maximum willingness to
pay), but their marginal losses are different. In fact, only \((\mu(A) - \mu(B)) \cdot z\) is lost because those consumers who belong to \(B\) will not change their actual contributions to the firm due to an infinitesimal decrease in the suggested minimum. Therefore

\[
MR(p^*) = p^* - (\mu(A) - \mu(B)) \cdot z
\]

\[
MR(p^*) > p^* - \mu(A) \cdot z = 0
\]

which shows that the true marginal revenue of a decrease in the suggested minimum contribution is positive at \(p^*\), which implies that the firm should increase the quantity sold by choosing a lower suggest minimum \(\rho^*\) must indeed by strictly less than \(p^*\) as desired. ■

As in the discrete case, when a pay-what-you-like scheme is used, the monopolist has an incentive to include more consumers in the market, which results in greater efficiency and, typically, a Pareto improvement.

3 Examples of Markets with Known Demand

For illustrative purposes, we provide in this section two natural market examples where a pay-what-you-like scheme results in higher revenue for the seller and higher economic efficiency relative to a single posted price scheme.

3.1 Example 1: Warm Glow Aligned With Value

In our first example, those consumers with the highest valuations for a particular good also have the strongest desire to contribute to the socially-conscious firm. Consider the actions of a monopolist with no marginal costs who faces demand from \(N = 10\) consumers (with an adherence to the suggested minimum norm), each with a marginal utility of giving of \(\beta = 2\), and whose intrinsic valuations and warm glow satiation points are given as:
In this example, warm glow satiations are equal to intrinsic valuations, both of which are a linear step function. Due to Lemma 4, both a traditional single-price firm and a pay-what-you-like firm need only consider setting a price (or suggested minimum) at the 10 values of $\omega_i$, which is equivalent to choosing the quantity of goods to sell. A traditional monopolist would choose $p^* = 75$, because this is indeed the point which maximizes the product of price and number of units sold. However, if a pay-what-you-like firm were to set a suggested minimum contribution of 75, there would be two consumers who meet the criteria given at the end of Proposition 8 and have contributions similar to the consumer described in Figure 2. By
reducing the suggested minimum to $\rho^* = 45$, the monopolist sells to two infra-marginal consumers while keeping contributions unchanged for these two highest-value consumers. As seen in Figure 3, not only does the Pay-What-You-Like scheme result in higher revenues for quantities above 4, but the addition of two otherwise infra-marginal consumers enhances efficiency by reducing the deadweight loss of the market by an impressive 70%, or from 150 to 45.

3.2 Example 2: Warm Glow Inversely Related to Value

In our previous example, warm glow satiation points were assumed to be equal to consumers’ intrinsic values for the good, while in general, a person’s desire to contribute to a particular firm might not be (positively) correlated with their desire for a particular good. In this example, we keep intrinsic values the same, but assume that warm glow satiations are inversely related to value and every other consumer has no warm glow at all:

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<table>
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<th>Quantity*Price</th>
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<tr>
<td>10</td>
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Once again, there are 10 unique values of $\omega_i$, so in both payment schemes, the firm’s decision rests on determining the optimal number of units to sell. Given the price-quantity pairs from which to choose, the traditional monopolist would choose a price of $p^* = 60$. However, if a pay-what-you-like firm reduces its minimum suggested contribution to $\rho^* = 35$, it can benefit from the addition of two consumers ($i = 1, 3$) for an added revenue of 70, while still receiving a contribution of 50 from 4 of the consumers ($i = 4, 6, 8, 10$) who would have contributed 60 if the suggested minimum contribution were 60 (for a revenue loss of 40) and a contribution of 45 from the consumer with index $i = 2$ (for a revenue loss of 15). Therefore, total revenue is $300 + 70 - 55 = 315$ at $\rho = 35$, which is indeed the optimal suggested minimum contribution (See Figure
4). Once again deadweight loss is reduced by 66.7%, from 135 to 45.

4 Discussion and Extensions

The flavor of the results of this paper are robust to different ways of interpreting the generosity of customers of pay-what-you-like firms. For example, suppose consumers believe that there is a market benchmark price, $p^*$, which they would otherwise expect to pay. If a pay-what-you-like firm sets $\rho < p^*$, consumers believe they are receiving a "gift" of $p^* - \rho$. Furthermore, assume as a behavioral regularity that customers reciprocate with a gift equal to $\gamma(p^* - \rho)$ beyond the suggested minimum of $\rho$, with $0 < \gamma < 1$, unless by doing so they will spend more than the good is worth to them. A number of laboratory experiments (Fehr, Kirchsteiger, and Riedl, 1993, e.g.) and field experiments (Falk, 2007, e.g.) support the existence of this type of reciprocity, known as gift exchange. Typically, reciprocity is regarded as a hard-wired behavioral phenomenon in certain individuals who "are obligated to the future repayment of favors, gifts, invitations, and the like." (Cialdini, 1992, p. 211, as quoted in Falk, 2007) Therefore, given the assumption of consumer reciprocation at a rate of $\gamma$, a consumer with valuation of $v_i$ will make a donation to the firm equal to $x_i^*(\rho)$, where

$$x_i^*(\rho) = \begin{cases} 
\rho + \gamma(p^* - \rho) & \text{for } 0 \leq \rho \leq \frac{v_i - p^*}{1-\gamma} \\
v_i & \text{for } \frac{v_i - p^*}{1-\gamma} < \rho \leq v_i \\
0 & \text{for } v_i < \rho 
\end{cases} \quad (5)$$

Figure 4: Revenues Earned by the Monopolist in Example 2
Note that consumer contributions, \( x^*_i(\rho) \), given the gift exchange interpretation of consumer behavior, are similar to the consumer contributions given the warm glow of patronization, given in Equation 3, in an important way: in both cases there are some consumers whose contributions are less responsive to changes in \( \rho \) than the customers of a traditional single posted price firm would be. Therefore, the pay-what-you-like firm incurs less revenue loss from those consumers who are already receiving the good than a traditional firm would when reducing its price. For this reason, the gift-exchange equivalent of Propositions 6 and 8 from Section 2 are also valid, and can be proved using exactly the same intuition.

It is important to note that the phenomenon we are modeling is not the same as standard restaurant tipping. In tipping, the warm glow is not generated by anything the firm does, and the revenue from tipping does not go back to the firm (as least not directly). Furthermore, if there is any social norm in which the firm’s pricing decisions affect the level of tipping, it is the norm of tipping a fixed percentage of the menu price, which is different than the social norms we have modeled.

On the other hand, a different phenomenon in coffee shops and fast food restaurants is the “tipping jar” located at the check-out point. Perhaps donations to a tip jar more closely resemble the gift-exchange model. An empirical distinction would be if the firm reduces prices for a sale event. In a standard restaurant tipping model, tips would be expected to fall. But, if a tip-jar resembles our gift exchange model, then during a sale, tips could actually go up.

Finally, we should discuss the importance of our maintained hypothesis about the social norm of the minimum contribution to a pay-what-you-want institution. It certainly serves as a sufficient condition for the results reported here. And, it would not be hard to imagine a level of free-riding on such a norm that would eliminate the advantage to endogenous price discrimination. But it may not be a necessary condition. If the proportion of customers following the norm is “large enough,” endogenous price discrimination could remain the profit maximizing business model. The expansion of Lentil as Anything and the profitability of Calvin’s Coffee Shop in Tallahassee demonstrate that there are conditions in which a social norm of a minimum contribution is widespread enough for successful implementation of pay-what-you-want. An open question then is what characteristics of a firm drive the widespread acceptance of such a social norm, and the corresponding norms of either warm glow or gift exchange.

5 References


Cialdini, R. B. “Social Motivations to Comply: Norms, Values, and Principles.” In Roth, J. A. and J.


