Consumer protection and the incentive to become informed

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Abstract

We discuss the impact of consumer protection policies on consumer incentives to become informed of the best deals available in the market. In a market with costly consumer search, we find that imposing a cap on suppliers' prices reduces the incentive to engage in search, with the result that prices paid by consumers (both informed and uninformed) may rise. In a related model where consumers have the ability to refuse to receive marketing, we find that this ability softens price competition and can make all consumers worse off.

1 Introduction

An important determinant of the intensity of competition in some markets is the effort that consumers make to search out good deals and avoid bad deals. If consumers typically compare the offers of very few firms, then the elasticity of demand facing each firm is low, so equilibrium prices will tend to be high, irrespective of the supply-side structure of the market. In the limit where no consumers make price comparisons there is the Diamond Paradox that the equilibrium price is the monopoly price whatever the number of firms. On the other hand, the more that consumers know about deals in the market, the greater is the competitive pressure on firms to offer good deals. Thus there is a positive externality between consumers in the sense that each consumer benefits when others possess better market information.[1]

In such circumstances, regulatory interventions which act indirectly to reduce the information held by consumers may harm consumers, even if the policies are intended to protect consumers from more direct harm. We consider two such consumer protection policies: a cap on the prices suppliers can charge, and measures which allow

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[1] In the taxonomy of Armstrong (2008) this is a "type A" situation. As that paper discusses, there are other market settings where interests of informed and uninformed consumers are by contrast negatively related.

consumers to refuse to receive advertising. For instance, a price cap which protects consumers from bad deals may be a mixed blessing for them. The direct effect of the regulation is positive for consumers because high pricing is prevented. But the policy reduces price dispersion and blunts incentives to search, which in turn weakens the competitive pressure on firms to offer low prices. This indirect effect of regulation weakening competitive market forces goes against its direct effect in curbing high prices. The aim of this paper is to see which effect is stronger in a simple search model. Likewise, a policy which allows consumers to opt out of advertising reduces the fraction of consumers who are well-informed about deals in the market, which encourages firms to offer higher prices. This indirect effect might outweigh the direct benefit to those consumers who dislike receiving intrusive marketing.

The market we model is an extension of that studied by Burdett and Judd (1983). We allow for a richer information structure than that paper, as well as for (plausible) heterogeneity in consumer information costs. We then use this model to discuss the two consumer protection policies. Earlier, Fershtman and Fishman (1994) examined the impact of a price cap in Burdett and Judd (1983)'s model, and showed that the price cap acted to raise expected prices. Thus, the indirect competition-weakening effect of regulation outweighed the direct price-limiting effect (unless regulation is so tight as to remove any incentive to search). Consumer protection is then counter-productive for consumers. In section 3.1, we revisit their analysis using our extended model. We find that when search costs are constant across consumers, the price-raising effect of price caps continues to be present even with our more general information structure. However, when consumers differ in their cost of search the impact of a price cap on consumers is ambiguous, and with enough heterogeneity price controls help all consumers. Thus, the stark result uncovered by Fershtman and Fishman (1994) need not hold in richer settings, but the "moral hazard" trade-off that we explore—between regulation protecting consumers more and consumers consequently making less effort to look after their own interests—applies more generally.[2]

Likewise, our analysis in section 3.2 shows that introducing measures which permit consumers to opt out of advertising has ambiguous effects on consumers. When consumers are alike in their aversion to advertising, though, the impact is harmful to consumers, and the indirect impact of the policy to relax competition outweighs the direct benefit to ad-averse consumers. This negative impact can be overturned when consumers differ in their disutility from advertising, although the introduction of such measures will harm those consumers who are not strongly ad-averse (since they do not use such measures in any case).

[2] This point is not new. Indeed, long ago Posner (1969, page 67) went so far as to apply it to frauds (instead of our focus on high prices): "Just as the cheapest way to reduce the incidence of certain crimes, such as car theft, is by inducing potential victims to take simple precautions (locking car doors), so possibly the incidence of certain frauds could be reduced at least cost to society by insisting that consumers exercise a modicum of care in purchasing, rather than by placing restrictions on sellers' marketing methods."

2 Description of a Market

A large number of identical firms, F in number, supply a homogeneous product to a continuum of consumers of unit mass. For simplicity, normalize the cost of supply to zero. Consumers are risk-neutral, and all have maximum willingness-to-pay for a unit of the product equal to v. Consumers are endogenously divided into two groups, the *informed* (or more informed) and the *uninformed* (or less informed). The former observe more prices on average than the latter.

Specifically, suppose that the informed have a probability of observing exactly n distinct prices which is equal to α_n, where $\sum_{n=0}^{\infty} \alpha_n = 1$. Similarly, the less informed have a chance of observing exactly n prices equal to β_n, where $\sum_{n=0}^{\infty} \beta_n = 1$.[3] It is convenient to make the following assumptions on consumer information:

$$\alpha_0 = \beta_0 = 0 \ ; \ \beta_1 > 0 \ ; \ \alpha_1 = 0 \ . \tag{1}$$

The first part of (1) states that all consumers are aware of at least one price and so can make a purchase. The second part states that less informed consumers have a chance of observing only one price, and this implies that firms have some market power since they may face a consumer with no other choice of supplier. The third part states that the more informed consumers always have a choice of supplier, which implies that when all consumers are informed the market is perfectly competitive (equilibrium price equals marginal cost).

For $0 \leq x \leq 1$, define

$$\alpha(x) \equiv \sum_{n=0}^{\infty} \alpha_n x^n \ , \ \beta(x) \equiv \sum_{n=0}^{\infty} \beta_n x^n$$

be the respective *probability generating functions* for the number of prices observed by the two kinds of consumer. We suppose that the number of prices observed by the more informed consumers (first order) stochastically dominates the number observed by the less informed consumers. For $x \leq 1$ this implies that[4]

$$\alpha(x) \leq \beta(x) \ .$$

Suppose a fraction λ of consumers are informed and the remaining fraction uninformed. (We will discuss shortly how λ is determined.) Let $\phi(x) = \lambda\alpha(x) + (1-\lambda)\beta(x)$ and let $\phi_n = \lambda\alpha_n + (1-\lambda)\beta_n$ be the proportion of all consumers who see n prices.

How do firms set their prices when faced with this population of consumers? The answer is given by an extension to Burdett and Judd (1983)'s analysis. There is a symmetric mixed strategy equilibrium in which each firm chooses a price greater than p with probability $x(p)$ on the support $[p_L, v]$. The proportion of consumers who see i's price and who also see exactly $k-1$ other prices is $k\phi_k/F$. A consumer

[3] The number of price observations cannot exceed F, so we assume $\alpha_n = \beta_n = 0$ for $n > F$.

[4] Write $A_n = \sum_{k=0}^{n} \alpha_k$ and $B_n = \sum_{k=0}^{n} \beta_k$ for the respective partial sums, in which case $\alpha(\cdot)$ and $\beta(\cdot)$ can be written as $\alpha(x) = (1-x)\sum_{n=0}^{\infty} A_n x^n$ and $\beta(x) = (1-x)\sum_{n=0}^{\infty} B_n x^n$. Therefore, $\beta(x) - \alpha(x) = (1-x)\sum_{n=0}^{\infty}[B_n - A_n]x^n$, which is positive when $B_n \geq A_n$ with strict inequality for some n.

will buy from firm i if she sees i's price and that price is lower than any other price she observes, and so firm i's expected demand with price p is

$$\frac{\phi_1 + 2\phi_2 x(p) + 3\phi_3 (x(p))^2 + ...}{F} = \frac{\phi'(x(p))}{F} \ .$$

Since each firm must be indifferent between choosing all prices in the support $[p_L, v]$, and since v is in this support, we have

$$p\frac{\phi'(x(p))}{F} \equiv v\frac{\phi'(x(v))}{F} = v\frac{\phi'(0)}{F} = v\frac{(1-\lambda)\beta_1}{F} \ , \tag{2}$$

and so all p in the support satisfy

$$p\phi'(x(p)) = v(1-\lambda)\beta_1 \ ,$$

which implicitly defines the equilibrium choice of $x(\cdot)$. It is more convenient to use the inverse function $p(x)$ rather than $x(p)$, i.e., $x(p(x)) \equiv x$, which satisfies

$$p(x) = \frac{v(1-\lambda)\beta_1}{\phi'(x)} \ . \tag{3}$$

In particular the lowest price in the support is $p_L = p(1)$.[5]

From (2), industry profit, which is the expected price paid by a random consumer, denoted P, is

$$P = v(1-\lambda)\beta_1 \ . \tag{4}$$

This is proportional to the fraction of consumers who are captive and see just one price, $(1-\lambda)\beta_1$. The density of the lowest of k prices is $\frac{d}{dp}(1 - [x(p)]^k) = -k[x(p)]^{k-1}x'(p)$, so the expected price paid by an informed consumer, P_I, is

$$P_I = -\sum_{k=1}^{\infty} \int_{p_L}^{v} p\alpha_k k[x(p)]^{k-1}x'(p)\ dp = -\int_{p_L}^{v} p\alpha'(x(p))x'(p)dp = \int_0^1 p(x)\alpha'(x)dx$$

where $p(\cdot)$ is the inverse function to $x(\cdot)$. Here, the final equality follows from changing variables from p to $x(p)$. From (3), an explicit formula for P_I is

$$P_I = vI(\lambda), \text{ where } I(\lambda) \equiv \beta_1(1-\lambda)\int_0^1 \frac{\alpha'(x)}{\phi'(x)}\ dx \ . \tag{5}$$

Likewise, the expected price paid by an uninformed consumer, P_U, is

$$P_U = vU(\lambda), \text{ where } U(\lambda) \equiv \beta_1(1-\lambda)\int_0^1 \frac{\beta'(x)}{\phi'(x)}\ dx \ , \tag{6}$$

Of course, the average price paid P in (4) is equal to $\lambda P_I + (1-\lambda)P_U$.

[5] Note that $\phi'(1) = \sum_{n=1}^{\infty} n\phi_n$ is the expected number of prices seen by a random consumer. Thus the ratio of the lowest to the highest price seen in the market, p_L/v, is equal to the ratio of the chance that a consumer knows just one price to the expected number of prices seen by a consumer.

The gross benefit to a consumer of being informed is

$$P_U - P_I = \int_0^1 p(x)\,[\beta'(x) - \alpha'(x)]\,dx = \int_0^1 p'(x)\,[\alpha(x) - \beta(x)]\,dx \geq 0$$

where the second equality follows from integration by parts and the observation that $\alpha(0) = \beta(0) = 0$ and $\alpha(1) = \beta(1) = 1$, while the inequality follows by the assumed stochastic dominance. Note that when all consumers are informed ($\lambda = 1$), we have $P_U = P_I = 0$. Thus the incentive to become informed is always non-negative, and it converges to zero when nearly all consumers are informed.

The following result summarizes further properties of these expected prices:

Lemma 1 *(i) P_I and P_U decrease with λ, (ii) $P_U - P_I$ is strictly concave in λ, and (iii) P_I/P_U decreases with λ.*

Proof. To save on notation, write $g \equiv \alpha'(x)/[\lambda\alpha'(x) + (1-\lambda)\beta'(x)]$, in which case

$$\frac{1-\lambda g}{1-\lambda} = \frac{\beta'(x)}{\lambda\alpha'(x) + (1-\lambda)\beta'(x)}$$

and

$$g_\lambda = \frac{\partial g}{\partial \lambda} = \frac{g(1-g)}{1-\lambda}\ .$$

(i) Differentiating (5) and (6) yields

$$\frac{dP_I}{d\lambda} = \frac{d}{d\lambda} v\beta_1(1-\lambda)\int_0^1 g dx = v\beta_1 \int_0^1 [(1-\lambda)g_\lambda - g]\ dx = -v\beta_1 \int_0^1 g^2\ dx < 0\ ,$$

and similarly,

$$\frac{dP_U}{d\lambda} = -v\beta_1 \int_0^1 g \frac{1-\lambda g}{1-\lambda}\ dx < 0\ .$$

(ii) Noting that

$$P_U - P_I = v\beta_1 \int_0^1 [1-g]\ dx\ , \tag{7}$$

it follows that $P_U - P_I$ is strictly concave in λ since g is strictly convex in λ.
(iii) Using expressions (5)–(6) and differentiating with respect to λ shows that P_I/P_U decreases with λ if

$$\left(\int_0^1 [1-\lambda g]\ dx\right)\left(\int_0^1 [(1-\lambda)g_\lambda - g]\ dx\right) + \left(\int_0^1 (1-\lambda)g\ dx\right)\left(\int_0^1 [\lambda g_\lambda + g]\ dx\right)$$

is negative. But this expression simplifies to

$$\left(\int_0^1 g dx\right)^2 - \int_0^1 g^2 dx < 0$$

which is indeed negative from the Cauchy-Schwarz Inequality. ■

Part (iii) of this result states that the average price paid by an informed consumer falls proportionately more than that paid by an uninformed consumer when there is an increase in the number of informed consumers.

Suppose a consumer can choose to become informed by incurring a search cost $s \geq 0$. In general, consumers may differ in their search cost, and let $s(\lambda)$ be the search cost of the marginal consumer when λ consumers search. (The function $s(\cdot)$ is weakly increasing.) In addition, write $S(\lambda) = \int_0^\lambda s(\tilde{\lambda})d\tilde{\lambda}$ for the total search costs incurred when λ consumers search. For the marginal consumer to be indifferent between becoming informed or remaining uninformed, the fraction λ of consumers who choose to become informed must satisfy

$$P_U(\lambda) - P_I(\lambda) = s(\lambda) \ . \tag{8}$$

If search costs are so large that there is no solution to (8), then in equilibrium no consumer chooses to become informed and $\lambda = 0$. Without making further assumptions, it is possible that there are several solutions to (8), and hence several λ which are consistent with equilibrium behaviour by firms and consumers.[6] However, since s is above $P_U - P_I$ for λ close to 1, if the two curves cross at all, at at least one intersection $P_U - P_I$ will cross s from above. (See Figure 1 below for an illustration.) When there are several roots to (8), we assume that a root where $P_U - P_I$ crosses s from above is the selected equilibrium (since only such equilibria are stable).

As is often the case in search models, in this market there is too little search in equilibrium from the consumer viewpoint. A consumer decides whether to become informed on the basis of her private costs and benefits, and ignores the positive externality that her search decision has on other consumers. In our model, total outlay by consumers is $P + S(\lambda)$, where P is the average price in (4). This total outlay is decreasing in λ if $v\beta_1 > s(\lambda)$, which is always the case whenever some consumers have an incentive to search.[7]

To illustrate this discussion, consider an example where uninformed consumers know just one price, so $\beta(x) = x$, and informed consumers know two prices, so $\alpha(x) = x^2$. (This example corresponds to the structure assumed in Burdett and Judd (1983) and Fershtman and Fishman (1994).) Then (5) and (6) imply

$$P_I = v\frac{1-\lambda}{\lambda}\left(1 - \frac{1-\lambda}{2\lambda}\log\frac{1+\lambda}{1-\lambda}\right) \ ; \ P_U = v\frac{1-\lambda}{2\lambda}\log\frac{1+\lambda}{1-\lambda} \ .$$

If $v = 1$ and all consumers have search cost $s = 0.05$, one can show numerically that approximately 95% of consumers become informed. All consumers make the expected payment (including search costs where relevant) of $P_U \approx 0.1$.

[6] Since $P_U - P_I$ is concave in λ, in the special case where $s(\lambda)$ is constant (or convex), there can be at most two solutions to (8).

[7] From (7), if in equilibrium $\lambda > 0$ we must have $v\beta_1 \int_0^1 (1-g)dx = s(\lambda)$, and so $v\beta_1 > s(\lambda)$.

3 Two Consumer Protection Policies

3.1 Imposing a price cap

Consider a policy aimed at protecting uninformed consumers against unduly high prices. (For instance, a usury law might take this form.) That is to say, policy constrains firms to set prices no higher than $\bar{p}$, where $\bar{p} < v$ is a market price cap. Then all the analysis in section 2 above remains valid so long as v is replaced everywhere by $\bar{p}$. Such a policy has pros and cons. For given λ, the intervention benefits both the informed and the uninformed consumers. (From (6) and (5) the expected prices paid by the two groups of consumers are $\bar{p}I(\lambda)$ and $\bar{p}U(\lambda)$.) But the incentive to become informed, $P_U - P_I = \bar{p}(U(\lambda) - I(\lambda))$, is also proportional to $\bar{p}$ for any given λ, and so a price cap causes the number of consumers choosing to become informed to fall. (See Figure 1 below for an illustration.)

Consider imposing the price cap $\bar{p} = 0.5$ in the above numerical example. In this case the number of informed consumers satisfies $\bar{p}\,[U(\lambda) - I(\lambda)] = s$ which entails $\lambda \approx 0.74$. Thus, the fraction of uninformed consumers rises about 5-fold. Each consumer pays $\bar{p}U(\lambda)$, which is now increased by about 70% to $P_U = 0.17$. Industry profit in (4) more than doubles as a result of the imposition of the price cap, rising from around 0.05 without regulation to 0.13.

Note that when the price cap is tight enough (in this example, this occurs when $\bar{p}$ is below around 0.48), there is no equilibrium in which any consumer chooses to become informed, and the regime shifts discontinuously to the Diamond Paradox in which all consumers shop randomly and firms choose to price at the cap. In this case, regulation entirely displaces competition as the market discipline. Clearly, as the cap approaches marginal cost (zero in this example), prices will converge to the first best. But for a very wide range of cases, consumer welfare falls when a price cap is introduced.[8]

Beyond this numerical example, when does imposing a price cap harm consumers? With a cap $\bar{p}$, aggregate consumer outlay is

$$\bar{p}\,[\lambda I(\lambda) + (1-\lambda)U(\lambda)] + S(\lambda) \ ,$$

where λ satisfies $\bar{p}\,[U(\lambda) - I(\lambda)] = s(\lambda)$. Therefore, in equilibrium, total consumer outlay as a function of λ is

$$s(\lambda)\frac{U(\lambda)}{U(\lambda) - I(\lambda)} - \lambda s(\lambda) + S(\lambda) \ . \tag{9}$$

Since λ is an increasing function of $\bar{p}$ whenever some consumers search, consumer welfare increases with $\bar{p}$ whenever (9) decreases with λ. Differentiating (9) yields

$$\frac{d}{d\lambda}\left[s(\lambda)\frac{U(\lambda)}{U(\lambda) - I(\lambda)} - \lambda s(\lambda) + S(\lambda)\right] = \underbrace{s\frac{d}{d\lambda}\frac{U}{U-I}}_{<\,0} + \underbrace{\left\{\frac{U}{U-I} - \lambda\right\} s'}_{\geq\,0} \ . \tag{10}$$

[8]Note the total welfare (the sum of profit and consumer welfare) in this unit demand framework is simply $W = v - S(\lambda)$, which decreases with λ. Thus, total welfare here is improved by the price cap, merely *because* of the moral hazard induced by regulation.

Note that the first term in (10) is negative from part (iii) of Lemma 1, while the second term is positive if $s(\lambda)$ is strictly increasing. In the special case where all consumers have the same search cost ($s' \equiv 0$), expression (10) is surely negative. Thus, as discussed in Fershtman and Fishman (1994), provided the price cap is not so tight that all consumers cease searching, the imposition of a price cap makes all consumers pay higher expected prices.[9]

This analysis is illustrated in Figure 1. Without a price cap, the equilibrium number of consumers who become informed, λ_H in the figure, is found where the $P_H - P_I$ curve meets the search cost curve s (assumed flat in the figure), and the outlay of each consumer is then given by the price P_U evaluated at this λ_H. (Even informed consumers have this outlay, since they are indifferent between being informed and not being informed.) If a price cap is imposed, this causes both $P_U - P_I$ and P_U to be reduced equi-proportionately, say to the dashed curves on the figure. The result is that the informed fraction falls to λ_L, while the outlay of each consumer rises. The mathematical property which ensures that the indirect harm (moving higher up the P_U curve) outweighs the direct benefit (moving to a lower P_U curve) is precisely that P_I/P_U falls with λ. Since $P_U - P_I$ is concave, it either monotonically decreases over the range $\lambda \in [0, 1]$, or attains a maximum for some interior λ. In the latter case, when the price cap is made sufficiently tight, the incentive to search will fall below the horizontal search line, at which point all consumers will cease searching, and the market will jump discontinuously to the Diamond Paradox case where all firms price deterministically at the cap.

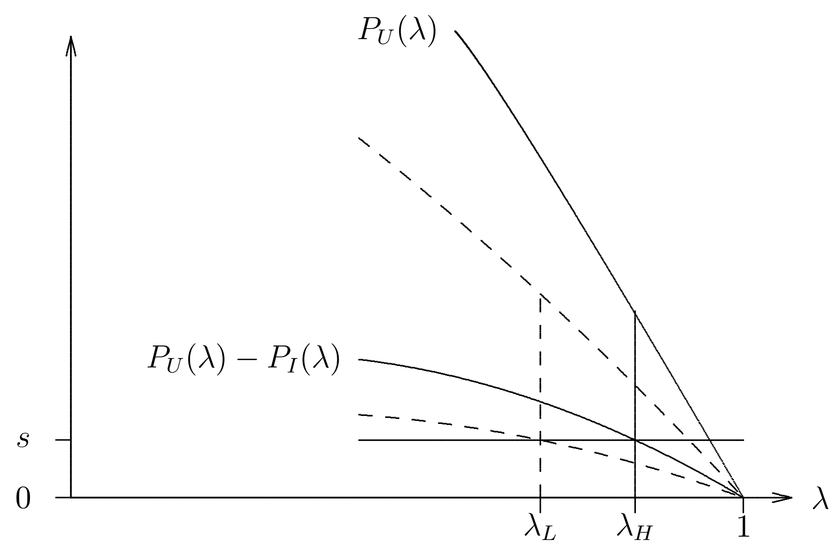

Figure 1: The Impact of a Price Cap

This discussion formalises a claim sometimes made informally, which is that imposing price controls on an oligopoly market could act to raise equilibrium prices.

[9] As discussed by Fershtman and Fishman (1994), a similar "perverse" outcome can be seen when a minimum wage is imposed in a model of job search.

One intuition for such a claim is that a price cap acts as a focal point for tacit collusion. Equilibria in this model, however, are non-cooperative, so tacit collusion is playing no role. Rather, price controls soften competition by blunting consumers' incentives to search for good deals. Although the direct effect of a price cap is to lower prices, the indirect effect of reduced search lessens each firm's demand elasticity so much that prices on average go up.

However, if consumers differ in their search costs, so that $s(\lambda)$ is strictly increasing, imposing a price cap causes fewer consumers to cease their search efforts. If $s(\lambda)$ is sufficiently steep, expression (9) increases with λ and the price cap benefits consumers. Consider the limit case where an *exogenous* fraction of consumers λ are informed while the remaining consumers are uninformed. This situation could be interpreted as there being a vertical curve rather than a horizontal curve for search costs on Figure 1 (i.e., a fraction λ of consumers have zero search cost, and the remainder have an infinite search cost); or we could hold a behavioural interpretation, that a fraction $1 - \lambda$ of consumers are "naive" and do not think there is a benefit to shopping around. (For instance, these consumers might mistakenly believe the market to be competitive, and all firms offer the same price.) When λ is constant, the imposition of a price cap is unambiguously beneficial to both groups of consumers, and harms industry profits. In intermediate cases, an upward-sloping curve on Figure 1 (as opposed to a vertical or horizontal line) representing search costs makes the net impact of a price cap ambiguous for consumers.

3.2 Allowing consumers to opt out of advertising

Nowadays consumers have various means by which to limit the volume of marketing materials they receive.[10] Television recording devices allow consumers to skip through advertising breaks, and consumers on the internet can use pop-up blockers and spam filters to lessen intrusive advertising. A popular consumer policy is to introduce a "do not call" list, to which consumers can sign up and choose not to receive "cold calls" from firms. Those consumers who perceive the costs of receiving marketing to outweigh the benefits from learning about the deals available in the market will therefore choose to avoid adverts. In simple terms, we can think of those consumers who refuse to receive adverts to constitute the uninformed pool of consumers, and those who remain willing to receive marketing are the more informed. If s measures a consumer's disutility from receiving marketing material, this can be interpreted as the cost of being informed and we can use the model presented in section 2.

In more detail, consider a consumer protection policy which allows consumers to refuse to accept advertising by signing up to a list. Suppose for simplicity that firms can costlessly attempt to send adverts to consumers who are not on the list (or to all consumers if no such list is introduced). Consumers who do not sign up to the

[10] There is now a substantial literature discussing the impact of consumer ability to avoid adverts. See for example Hann, Hui, Lee, and Png (2008) the references therein for further discussion. However, most of this literature makes the simplifying assumption that prices are exogenously fixed and only advertising strategies are chosen by suppliers. Such papers are unable to address the issue of how ad-avoidance affects price competition.

list will be informed, i.e., they will incur their marketing disutility s and obtain the number of price observations governed by $\alpha(\cdot)$. Those consumers who choose not to receive marketing will be less informed but avoid the disutility s. Assume that firms cannot price discriminate according to whether a consumer has signed up to the list.

When no such list is introduced, consumers have no method to avoid adverts and all consumers will be informed ($\lambda = 1$). By assumption (1), the market will then be perfectly competitive. Therefore, all consumers will pay price equal to marginal cost (zero in this case) but in aggregate they will incur disutility $S(1)$. When the list is introduced, if $1 - \lambda$ consumers choose to sign up, firms will price as described in section 2. The equilibrium fraction of people who will sign up satisfies condition (8). (If disutilities are so large that no solution to (8) exists, then all consumers will sign up to the list and $\lambda = 0$.) As discussed in section 2, from the consumer point of view too many consumers sign up to the list.[11] If the list is abandoned, this forces all consumers to become informed, which moves λ in the right direction but with the danger that the correction goes too far.

In more detail, similarly to expression (9), when the list is available total outlay by consumers is

$$s(\lambda)\frac{I(\lambda)}{U(\lambda)-I(\lambda)} + (1-\lambda)s(\lambda) + S(\lambda) \ ,$$

and so the increase in total outlay as a result of the introduction of the list is

$$\underbrace{s(\lambda)\frac{I(\lambda)}{U(\lambda)-I(\lambda)}}_{>\,0} + \underbrace{(1-\lambda)s(\lambda) - [S(1)-S(\lambda)]}_{\leq\,0} \ . \tag{11}$$

The first term is clearly positive, while the second term is non-positive since $s(\cdot)$ is weakly increasing. As in section 3.1, the comparison is clear-cut in the special case where all consumers have the same cost s. Here, the second term in (11) is zero, and so the introduction of the list causes all consumers to be made worse off. In economic terms, without the "do not call" list all consumers incur disutility s but obtain the product at the competitive price (i.e., at marginal cost). When the list is introduced, all consumers pay the informed consumers' price, which is s plus an imperfectly competitive price (above marginal cost). When a consumer decides based on her private cost-benefit calculation to sign up to the list, this reduces the fraction of informed consumers, which in turn harms all consumers via the higher prices which then ensue. Moreover, industry profits—which are negatively related to the number of informed consumers—rise when the list is introduced. Thus, firms may support the introduction of "no not call" lists and the like, for the same reason that firms in some industries have historically supported measures to restrict price advertising.[12]

[11] Anderson and de Palma (2008) study a model in which firms do not compete in prices and where consumers dislike seeing adverts. They discuss a "do not call" list, and find that too many consumers sign up to such a list from the viewpoint of total welfare (not consumer welfare). The cause is not externalities between consumers (as in our model), but the fact that consumers ignore the negative impact their opt-out decision has on supplier profits.

[12] See for instance Armstrong (2008, section V).

When some consumers have higher marketing disutility than others, though, the comparison is ambiguous. In the extreme case where some consumers are extremely averse to receiving unsolicited marketing, the list will enhance aggregate consumer welfare. However, there is then a distributional effect: those consumers who are not strongly ad-averse (i.e., those who do not sign up to the list when it is introduced) will be harmed by the policy, since the price they pay rises due to the decreased consumer monitoring.

4 Possible Extensions

This short paper has discussed some potentially undesirable effects of potential consumer protection policies. Using a parsimonious oligopoly model exhibiting price dispersion, we argued that when consumers have homogenous information costs (i) imposing a price cap might lead to price rises to consumers and (ii) permitting consumers to opt out of advertising might make all consumers worse off. In each case, the cause of the harm was that the policy reduced the volume of market information held by consumers, and this allowed firms to charge higher prices.

It would be useful to extend this stylized model to richer settings. For instance, it is not common to impose caps on headline prices in oligopoly markets, as we assumed in section 3.1. Rather, price controls might be applied to "small print" charges in a contract, or minimum quality standards might be imposed on aspects of product quality. It would be worthwhile to extend our model so that consumers must expend effort to understand these less salient aspects of a firm's offer. For instance, could the introduction of a minimum quality standard lead to lower average quality in the market, due to consumers being insured against low quality?

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