



## **The Morality of Markets**

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# The Morality of Markets\*

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*Abstract:* Scholars and civil society have argued that competition erodes supplier morality by offering consumer choice: “If I don’t do it, someone else will”. This paper establishes a robust irrelevance result, whereby intense market competition does not crowd out consequentialist ethics; it thereby issues a strong warning against the wholesale moral condemnation of markets and pro-competitive institutions. Intense competition, while not altering the behavior of profitable suppliers, however may reduce the standards of highly ethical suppliers or non-profits, raising the potential need to protect the latter in the marketplace.

*Keywords:* Competition, consequentialism, replacement effect, non-profits, corporate social responsibility, strategic complementarities, race to the ethical bottom.

*JEL numbers:* D21, D43, D6, I11, L21.

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# 1 Introduction

Whether markets impede ethical behavior has always engendered a variety of views. Many 18<sup>th</sup> century thinkers believed that such concerns are either irrelevant or mistaken. Adam Smith stressed that self-interest could lead to socially optimal outcomes. Condorcet, Hume, Montesquieu (who talked about “doux commerce”), and Turgot viewed market institutions as creating trust among otherwise unrelated individuals; see Hirschman (1977) and the economic history work of McCloskey (2006) and Mokyr (2016)<sup>1</sup>. A different tradition, dating back to Karl Marx and popular in today’s public opinion and among social scientists, politicians and religious leaders, argues in contrast that markets promote unethical<sup>2</sup> behavior. For instance, numerous prominent contemporary philosophers have warned against the religion of the marketplace, with a variety of viewpoints from the necessity to ban repugnant markets to the stance that a market economy is an unlikely path to a harmonious society (see Anderson, 1993, Sandel 2012, Satz, 2010 and Walzer, 2008). The critique that market competition obliterates our moral compass is the focus of this paper.

Some recent experimental work demonstrates in specific environments the power of the “replacement effect”, the idea that if a supplier refuses to engage in an immoral trade, “someone else will”.<sup>3</sup> This work echoes widespread narratives used by firms and countries selling weapons to dictatorships or bribing officials to win a contract, by banks selling toxic products or providing short-term incentives to talents they want to attract, by employees ingratiating themselves to their superiors in order to be promoted, by doctors overprescribing opioids, antibiotics and sick leave, by professional athletes taking illicit drugs to defeat their competitors, by farmers exploiting animals,<sup>4</sup> or by companies white-washing their products’ potential shortcomings (their brittleness or high fat and sugar content). Does intense competition make such behaviors lose their moral overtones and become mere (monetary or psychic) “costs of doing business”?

Our framework assumes that suppliers, as well as the stakeholders (buyers, workers, investors) are driven by both a material motive and social preferences. We assume that social preferences are consequentialist, meaning that their holders internalize the impact

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<sup>1</sup>In conformity with this view of markets, Dufwenberg et al. (2022) find experimental support for individuals having reciprocal preferences and for successful market interactions (interpreted as the efficient equilibrium outcome in a cooperative coordination game) triggering generosity in a dictator game. Our perspective is different in that we focus on how the nature of market interactions themselves affect players’ own tradeoffs between profits and ethical concerns. Like Dufwenberg et al., we assume market interactions do not change intrinsic preferences.

<sup>2</sup>We will use “ethics” and “morals” indifferently in this paper. For our purpose, it does not matter whether the social preferences of suppliers or stakeholders refer to rules provided by an external source, or reflect an individual’s own principles regarding right and wrong.

<sup>3</sup>In the policy debate, the “replacement effect” is sometimes called “first-mover disadvantage”: “If I reduce my carbon footprint, I will lose market share”.

<sup>4</sup>Animal exploitation induces an externality/harm on other sentient beings and is considered by philosophers as morally problematic. The rhetoric of animal farmers is often based on the replacement effect: “We like animals but if we did not put animals in cages, we would import cheaper and less humane meat from competitors.”

of moral choices in proportion to quantity; say, the social cost of 2 tons of carbon emissions is twice the cost of a single ton.<sup>5</sup> A supplier's social preferences are most simply interpreted as either those of the manager in the case of an owner-managed firm (entrepreneur, doctor) or those of shareholders under shareholder value. Alternatively, they might reflect a mixture of the two, with different weights depending on the extent of agency. "Shareholders" stand for active investors, who exert voice to impact the firm's choice. In contrast, passive investors have no such impact but may accept a lower return when investing in an ethical firm (their influence will then be reflected in the cost function).

The framework distinguishes between socially "irresponsible", "responsible" and "neutral" consumers. Consumers are *socially responsible* if an immoral supplier choice decreases their demand: Consumers desire to buy fair-trade products and boycott firms that use child labor or pollute. The exploitation of suppliers, child labor or the environment on the other hand reduces the cost of manufacturing ("cost-based benefits of cutting ethical corners").

Consumers are socially *irresponsible* if an immoral supplier choice increases their demand for that supplier (the benefits of cutting ethical corners are then demand-based). Such situations correspond to the ones mentioned above. There are at least two potential rationales for such a disconnect between what is desired by the client and what is good for society. The first possible wedge may be traced to an *internality* (a doctor overprescribes opioids, which are attractive to the client's "current self" but, being addictive, detrimental to her "long-term self", who is then a victim). Second and closely related, the disconnect may stem from an *externality* (as when doctors deliver fake medical certificates to allow their client not to be vaccinated or to take sick leave, or when a firm bribes an official who awards a government contract or supplies weapons to a dictator; the client cynically benefits from the supplier's immoral behavior).

Finally, socially *neutral* consumers are either of the homo economicus type (their preferences are purely material) or, more interestingly, cannot express their social preferences as they do not observe the suppliers' moral choices prior to their purchase.<sup>6</sup>

We also allow workers and investors to have moral concerns, preferring for example to work for or invest in "green" firms. These concerns operate exclusively through the cost of manufacturing as these stakeholders are willing to engage with moral firms for a lower wage or financial return. The social responsibility of input-supplying stakeholders

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<sup>5</sup>As we will see, consequentialist preferences admit a range of variants: A supplier may internalize her impact on "narrow ethical welfare" (e.g. the firm's own amount of pollution or the doctor's own volume of opioid prescriptions), "ethical welfare" (e.g., the industry's total amount of pollution or opioid prescriptions, reflecting also on what would happen if they did not serve the client, as stated in the replacement effect), or else "full welfare" (which accounts for both ethical welfare and the cost of misallocation of consumers to firms).

<sup>6</sup>As we will see however, neutrality does not always obtain when the moral choice is unobservable. Overstating quality with gullible consumers, or failing to disclose the need for add-ons (as in Gabaix Laibson 2006) leads to an increase in demand, and (in the latter case only) a decrease in cost associated with the hold-up profit on the add-on.

has consequences that differ from that for consumers, which affects demand and therefore potentially interacts with competitive pressure.

Section 2.1 develops the baseline model. Firms operate in an imperfectly competitive industry and select two actions: a price and a moral action. The moral action affects demand and/or production cost. The product's consumers are socially responsible, irresponsible or neutral depending on whether a more moral action increases, decreases or does not affect the firm's demand.

Section 2.2 discusses the three key assumptions: Consequentialism, price flexibility, and (less crucially) constant returns to scale. It also describes when consumers are expected to be socially responsible, irresponsible and neutral. Section 2.3 shows that for given prices moral choices are strategic complements, for two reasons. First, facing irresponsible consumers, rivals' behaving immorally intensifies a firm's competitive pressure by raising its elasticity of demand ("elasticity effect"); the firm cannot afford moral behavior without a substantial loss of market share; put differently, the only way for the firm to restore its competitiveness is to also behave less ethically. The same holds in reverse for responsible consumers. Second, when rivals cut ethical corners, it becomes socially more important for the supplier to take market share away from them by pandering to the consumers oneself ("social responsibility effect"); the way to do so is to cut ethical corners under irresponsible consumers. This strategic complementarity suggests that multiple ethical norms are commonplace for given prices (in contrast, as we show next, a single norm arises under flexible prices).

Section 3 asks: Does an increase in the elasticity of demand faced by the firms (due to the entry of new rivals, a reduction in the search cost, or an increase in the substitutability among products) weaken the firms' moral compass? This question is important not only because it investigates the validity of the widespread concern about markets expressed by the public opinion, social scientists, politicians and religious leaders, but also because it affects our stance vis-a-vis key competition-enhancing public policies such as the opening of borders to free trade, competition policy and the deregulation of industries.

In this respect, Section 3 obtains a startling result: The degree of competitive pressure is irrelevant (moral choices are independent of demand functions) if prices are flexible. Take the case of irresponsible consumers for instance. When prices are flexible, suppliers can either lower their price or cut ethical corners to attract consumers. A stronger competition gives more prominence to market share concerns and thereby lowers the incentive to be virtuous; however, more competition also reduces prices and therefore the stake in attracting clients through unethical behavior. We explain why the "replacement effect" and the "reduced-stakes effect" exactly offset each other.

Section 3.2 shows that the irrelevance result is robust to strategic substitutability in the non-moral domain (replacing the differentiated-products Bertrand model by the Cournot one), to imperfect consumer information, to alternative consequentialist forms of supplier internalization of welfare, to some forms of non-linear price discrimination, to some environments with non-constant returns to scale, but not to standard non-consequentialist

preferences. The bottom line remains that under consequentialism there is no presumption that more competition reduces morality.

This very general irrelevance result runs counter the popular wisdom. It is also in stark contrast with earlier theoretical results on the irrelevance of social preferences in highly competitive environments (see the literature review for a detailed comparison) in particular with Dufwenberg et al (2011) and Sobel (2015): Here social preferences (of suppliers, consumers, workers and investors) matter regardless of the competitive pressure and it is the intensity of competition that is irrelevant. The following two sections investigate the impact of competition when the irrelevance property fails. As the reduced stakes effect suggests, the clue lies in the rigidity of prices.

Section 4 thus departs from the flexible-price paradigm by assuming that prices are either regulated (Section 4.1) or downward constrained by limited liability (Section 4.2). For simplicity, we assume an otherwise symmetric (demand and cost) competitive environment. Price regulation is a good approximation of many publicly regulated markets (taxis, notaries) and some specific unregulated ones (e.g. apps and franchising environments). Other prominent industries in which providers receive externally-set prices are education – the price is the payment per voucher – and healthcare– for which the price is the payment allowed by the Social Security system, Medicare or an HMO.

Under regulated prices both the intensity of competition and the distinction between irresponsible and responsible consumers matter. We show that with irresponsible consumers, more competition *impedes* moral behavior, validating the common criticism of markets. On the other hand, when consumers are responsible, more intense competition *fosters* moral behavior. Taken together, our results imply that more intense competition is rather more “neutral” than “detrimental” to morality: (i) morally-irrelevant under flexible prices; (ii) morally-detrimental (resp. morality-enhancing) with irresponsible (resp. responsible) consumers under regulated prices.

Section 4.2 considers the impact of supplier asymmetric weights on social preferences or of differences in corporate charters and takes up cases where prices are nominally flexible, but are de facto fixed for some industry players. First, firms with different corporate forms, for-profits and not-for-profits, may co-exist. Indeed, it is often suggested that in industries with strong moral overtones (health, education), the profit motive should be eliminated. The not-for-profits must align revenue with cost and so their prices, while endogenous, are not fully flexible. Second, when suppliers are for-profits but differ in their social preferences, the most ethical suppliers’ preferred policy puts them in the red when competition is sufficiently intense; this implies that they are de facto, although not de jure, not-for-profits. For either most ethical suppliers or not-for-profits, prices are endogenous but akin to regulated prices (non-negative-profit constraint).

We show that intense competition leads to a race to the “for-profit-supplier ethical bottom”: While for-profits mimic not-for-profits’ low price, all firms converge to the lowest-ethics-for-profit ethical choice, which however integrates ethical concerns from

other stakeholders. This implies that, to be able to make their corporate form matter, not-for-profits must be insulated from an intense competitive pressure from for-profits.

Section 5 demonstrates the relevance of the analysis to shed light on current debates and the real world, and, while emphasizing the need for more empirical work, discusses various forms of evidence supporting the theory. Section 6 relates the paper to the existing literature. Section 7 summarizes the main insights. Omitted proofs and more specific material are relegated to the Online Appendix.

## 2 Framework

### 2.1 Model description

Section 2.1 describes the framework and leaves the discussion of its assumptions to Section 2.2. Our baseline model is one of differentiated Bertrand competition. There are  $n$  suppliers,  $i \in \{1, \dots, n\}$  and a mass 1 of unit-demand, price-taking clients. The outside option is indexed by 0. Suppliers compete in price and non-price dimensions. Supplier  $i$  selects its price  $p_i$  as well a moral or ethical choice  $a_i$ , both in  $\mathbb{R}^+$ .

*Net prices and demands.* The vector  $(p_i, a_i)$  determines the “net price”  $\hat{p}_i$  perceived by the consumers, as described below ( $\hat{p}_0$  is the net price for the exogenous outside option). Supplier  $i$  faces demand function  $D_i(\hat{\mathbf{p}})$  where  $\hat{\mathbf{p}} \equiv (\hat{p}_1, \dots, \hat{p}_n)$  denotes the vector of supplier net prices. We will also write firm  $i$ ’s demand as  $D_i(\hat{p}_i, \hat{\mathbf{p}}_{-i})$ , where  $\hat{\mathbf{p}}_{-i}$  denotes the vector of net prices charged by supplier  $i$ ’s rivals. Firm  $i$ ’s demand is decreasing in its own (net) price. [In Section 4.2, we will specialize to the case of a fixed demand (everyone needs a doctor or a school, say), with a mass 1 of consumers and  $\sum_{i=1}^n D_i(\hat{\mathbf{p}}) = 1$  in the relevant range; we will then say that the market is “covered”.]

The demand function  $D_i(\hat{\mathbf{p}})$  stems from a consumer discrete choice model: Consumers have unit demands with valuations  $\{\varepsilon_{hi}\}_{i \in \{0, \dots, n\}}$  drawn from some smooth joint distribution. Consumer  $h$  therefore buys from supplier  $i$  if  $\varepsilon_{hi} - \hat{p}_i > \max_{\substack{j \neq i \\ j \geq 0}} \{\varepsilon_{hj} - \hat{p}_j\}$  and does not if the inequality is in the other direction. As we will later show that the irrelevance result extends to the Cournot model, we should note that the perfect-substitutes demand function is a special case of the discrete choice model, with perfect correlation of the differential between the oligopolists’ products and the outside option:  $\varepsilon_{hi} - \varepsilon_{h0} = \varepsilon_{hj} - \varepsilon_{h0} = v$ , where  $v$  is the valuation, distributed according to some c.d.f.  $F(v)$ .

*Ethical choice.* Besides price  $p_i$ , supplier  $i$  picks a level of morality  $a_i \in [0, \bar{a}_i]$  with  $\bar{a}_i \leq +\infty$ . Choice  $a_i$  has per-unit-of-output welfare impact  $W_i(a_i)$ . For example,  $a_i$  might be a choice of technology; a CO<sub>2</sub> emission level of  $\psi_i(a_i)$  yields welfare  $W_i(a_i) = -\psi_i(a_i)e$ , where  $e$  is the social cost of carbon. A higher value of  $a_i$  indexes a more moral choice:

$W'_i(a_i) > 0$  on  $[0, \bar{a}_i]$ . We assume that  $W''_i(a_i) < 0$  for all  $a_i$  and  $W'_i(0) = +\infty$ .<sup>7</sup> The outside option, “good 0”, generates exogenous welfare impact  $w_0 \equiv W_0(a_0)$ . For example, the absence of purchase of conventional electricity generation might involve no pollution (energy sobriety) or else be highly polluting (return to coal or wood-burning). Let  $\mathbf{a} \equiv (a_1, \dots, a_n)$  denote the vector of ethical choices. Ethical choices are observable (later, we show that the model also accounts for credence goods, for which the moral choice is not observed).

*Social responsibility.* Incentives for suppliers to choose a given action  $a_i$  will depend crucially on consumer attitudes towards  $a_i$ . “Consumers” are parties who impact the demand side. These may be ordinary consumers of goods and services or an “agent” selecting on behalf of them (officials selecting a contractor, current incarnation). The consumers’ cost or benefit of the moral action is captured through its monetary equivalent  $\phi_i(a_i)$  with  $\phi'_i \geq 0$ , such that the consumers’ demand for product  $i$  depends only on its net price  $\hat{p}_i$  (and on the net prices charged by other suppliers)

$$\hat{p}_i \equiv p_i + \phi_i(a_i). \quad (1)$$

So we assume that the extent to which consumers care about  $a_i$  is independent of the price, in the same way we model the impact of a sales tax in econ 101. Note also that the consumer’s cost or benefit of the moral action could be heterogenous. The function  $\phi_i(a_i)$  would then stand for the average cost or benefit (there is a formal equivalence for a linear demand system).

**Definition** (*social responsibility*). Consumers are (i) socially irresponsible when  $\phi'_i(a_i) > 0$  (their demand decreases with the morality of the firm’s offer); (ii) socially responsible when  $\phi'_i(a_i) < 0$  (their demand increases with the morality of the firm’s offer); (iii) socially neutral when  $\phi'_i(a_i) = 0$ .

All cases are relevant, even though they typically depict different contexts: See Section 2.2.2.

*Costs.* To allow for cost-side impacts of moral behavior, supplier  $i$ ’s unit cost,  $c_i$ , may depend on the ethical choice  $a_i$ :  $c_i(a_i)$ ,<sup>8</sup> with  $c'_i(a_i) \geq 0$  and  $c''_i(a_i) > 0$  for all  $a_i$ . The firm may use child labor or fossil fuel sources of energy in order to keep its cost low, in which case  $c'_i(a_i) > 0$ . Alternatively, the ethics-dependent cost function captures investor and worker<sup>9</sup> social responsibility. The latter may be willing to forego some return or some wage to be associated with a more ethical enterprise. Suppose, for the sake of illustration, that investors (resp. workers) are willing to accept a reduction in their return equal to  $\alpha_I W_i(a_i)$  (resp. in their wage equal to  $\alpha_W W_i(a_i)$ ) to be associated with firm  $i$ . Assuming that 1 unit of output requires 1 unit of labor and 1 unit of investment, and letting  $\gamma_i(a_i)$

<sup>7</sup>In the applications developed in Online Appendix A, making the action even more ethical than  $\bar{a}_i$  is so costly that it reduces welfare and so has no appeal to a consequentialist, however prosocially-minded she may be.

<sup>8</sup>Section 3.2.5 studies non-constant returns to scale.

<sup>9</sup>Note that investors, workers and consumers may be different actors.



denote firm  $i$ 's operating cost (where  $\gamma'_i$  is typically weakly positive), then

$$c'_i(a_i) = \gamma'_i(a_i) - \alpha_I W'_i(a_i) - \alpha_W W'_i(a_i),$$

and the analysis carries over with  $c'_i < 0$  if  $\gamma_i$  is constant. A moral action then reduces the cost of doing business. The sign of  $c'_i(a_i)$  thus hinges on the context.

*Demand elasticity.* The suppliers are substitutes ( $\partial D_i/\partial \hat{p}_i < 0 < \partial D_i/\partial \hat{p}_j$ ), and their marginal revenue is decreasing in price keeping the ethical action constant ( $(p_i - c_i)D_i(\hat{\mathbf{p}})$  is concave in  $p_i$ ). We will let  $\eta_i(\hat{\mathbf{p}}) \equiv (-\partial D_i/\partial \hat{p}_i)/(D_i/p_i)$  denote the price elasticity of demand for supplier  $i$ 's services (note that  $\partial D_i/\partial \hat{p}_i$  is the price sensitivity of demand from (1)).<sup>10</sup>

We assume that the goods are (local) strategic complements:<sup>11</sup> Supplier  $i$ 's elasticity of demand increases with competitive pressure:

$$\frac{\partial \eta_i}{\partial \hat{p}_j} < 0.$$

*Objective functions.* Suppliers care about profit, but have social preferences, as reflected in their internalization of welfare.<sup>12</sup> Supplier  $i$ 's internalization of social welfare  $\mathcal{W}_i(\hat{\mathbf{p}}, \mathbf{a})$  depends on net prices and ethical choices. Let  $\alpha_i \geq 0$  denote supplier  $i$ 's (common knowledge) intrinsic ethics, that is the weight on welfare relative to that on profit. Supplier  $i$  maximizes the sum of profit and internalized perceived social welfare; letting  $\alpha_i \geq 0$  denote the intensity of her social preferences,<sup>13</sup> her utility function is:

$$V_i \equiv [p_i - c_i(a_i)]D_i(\hat{\mathbf{p}}) + \alpha_i \mathcal{W}_i(\hat{\mathbf{p}}, \mathbf{a}).$$

Note that in corporations that are run by managers the relative weight suppliers put on profit and social welfare hinges on their compensation scheme. For example, the behavior of a supplier  $i$  who is an agent with social preferences  $\alpha_i$  and receives a fraction  $\xi_i$  of the profit associated with their activity is indistinguishable from that of a residual claimant

<sup>10</sup>In Section 4, we will index  $\eta_i$  by a parameter  $\sigma \in \mathbb{R}^+$  of intensity of competition. For instance,  $\sigma$  might be the inverse transportation cost in the Hotelling model but there are many alternative interpretations. We will assume that  $\eta_i$  grows with  $\sigma$  and tends to infinity as  $\sigma \rightarrow +\infty$  whenever supplier  $i$  faces an elastic demand (which may not be the case if supplier  $i$  has a zero market share or to the contrary corners the market).

<sup>11</sup>Abusing notation and noticing that  $\partial \eta_i/\partial \hat{p}_j = \partial \eta_i/\partial p_j$ , this familiar condition for competition to increase the elasticity of demand ( $\partial \eta_i/\partial p_j < 0$ , or  $\partial D_i/\partial p_j \geq -[D_i/(-\partial D_i/\partial p_i)] (\partial^2 D_i/\partial p_i \partial p_j)$ ), is closely related to the one stating that the goods are strategic complements, namely  $\partial D_i/\partial p_j \geq -(p_i - c_i)(\partial^2 D_i/\partial p_i \partial p_j)$ . The left-hand side of both conditions,  $\partial D_i/\partial p_j$ , is positive and reflects the fact that the increased competition reduces the number of supplier  $i$ 's inframarginal consumers. A sufficient condition for either is  $\partial^2 D_i/\partial p_i \partial p_j \geq 0$ . Furthermore, the two conditions coincide when supplier  $i$ 's price is optimized.

<sup>12</sup>See Section 3.2.6 for alternative moral imperatives.

<sup>13</sup>Were social preferences not common knowledge, suppliers might be reputation-conscious, in which case the objective function below would have to be augmented with an image term as in, e.g., Bénabou-Tirole (2006).

for the firm’s profit with social preference parameter  $\hat{\alpha}_i \equiv \alpha_i/\xi_i$ . For example, private equity and LBOs are usually characterized by high-powered incentives (high  $\xi_i$ ).<sup>14</sup>

We assume that suppliers care about the social impact of the industry’s activity, for example the resulting total pollution or opioid overuse. We define this “ethical welfare” as:

$$\mathcal{W}_i(\hat{\mathbf{p}}, \mathbf{a}) = \mathcal{E}(\hat{\mathbf{p}}, \mathbf{a}) \equiv \sum_{j=0}^n W_j(a_j) D_j(\hat{\mathbf{p}}).$$

Section 3.2.4 will show that consequentialism accommodates a broader class of internalizations by the suppliers.

## 2.2 Key assumptions and discussion of modeling

We first identify the three key assumptions that will underly the irrelevance property so as to highlight them. We then discuss the demand side.

### 2.2.1 Key assumptions

**Assumption 1** (*consequentialism*). *All players (suppliers, consumers, workers, investors)’ perception of the social impact of their trade is proportional to the size of this trade.*

Consequentialist preferences have been explicitly assumed for suppliers ( $\partial \mathcal{W}_i / \partial a_i = W'_i(a_i) D_i(\hat{\mathbf{p}})$ ). They have been assumed more implicitly for other players as they transact only one unit of good, labor or savings. However the theory carries over as long as the internalized welfare impact of ethical choice scales with quantity. For example, a consumer consuming  $q_C$  units from supplier  $i$  at tariff  $T_i(q_C)$  would react to net tariff  $T_i(q_C) + \phi_i(a_i) q_C$ .<sup>15</sup>

**Assumption 2** (*flexible prices*). *Prices are (locally) flexible at equilibrium price configuration  $\hat{\mathbf{p}}$ . Namely, for equilibrium choices  $(p_j, a_j)_{j=1, \dots, n}$ , any local change in ethical behavior  $\delta a_i$  can be offset by a price change  $\delta p_i = -\phi'_i(a_i) \delta a_i$  so as to keep supplier  $i$ ’s net price and therefore demand constant.*

Flexible pricing is a central assumption in much of economics. While it is a natural leading assumption, it does not apply to every context. Prices are flexible at some price configuration  $\hat{\mathbf{p}}$  if (i) price  $p_i$  is not locally constrained by a public or private regulation, and (ii) supplier  $i$ ’s corporate charter or limited liability constraint does not preclude it from increasing or decreasing its price. The second condition is violated if the supplier is not-for-profit, even though its price is then endogenous. It also fails to hold if supplier  $i$ ’s would lose money at its optimal choice.

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<sup>14</sup>Such reinterpretations must be kept in mind when thinking about the opioid scandal, as Purdue pharma had access to the doctors’ prescription data and could (and did) provide high-powered incentives to its sales representatives (see US General Accounting Office, 2003, also discussed in Section 5.1).

<sup>15</sup>See Section 3.2.4 for the extension of the irrelevance property to non-linear tariffs.

**Assumption 3** (*constant returns to scale*). A supplier’s marginal cost of raising the morality of her production is proportional to her output (her cost function can be written as  $C_i(q_i, a_i) = c_i(a_i)q_i + d_i(q_i)$ ).

### 2.2.2 Consumer social responsibility

There are three possible interpretations of the focus on  $\hat{p}_i \equiv p_i + \phi_i(a_i)$ . In the first, which applies particularly to irresponsible consumption, the purchase decision is taken by an agent, who enjoys private benefit:  $b_i(a_i) = -\phi_i(a_i)$ . This benefit for example might be the bribe received by the official in charge of public procurement (possibly net of the risk of being caught). In the opioid case,  $b_i(a_i)$  might stand for the instant gratification benefit enjoyed by the short-term self, at the detriment of the long-term self. Online Appendix A indeed develops in more detail these two microfoundations -externality and internality- for the wedge between private and social interests and verifies that all assumptions on the welfare footprint  $W_i$  are satisfied (in all cases with  $\bar{a}_i < +\infty$ ). In both microfoundations a less ethical behavior boosts demand.<sup>16</sup>

In the second interpretation, more in line with socially responsible consumers, consumers do not “delegate” the decision and  $\alpha_C W_i(a_i) = -\phi_i(a_i)$  might be the benefit from feeling one is doing the right thing. The separability assumption seems reasonable provided that the consumer’s utility is separable in disposable income and accomplishment of one’s moral duty.<sup>17</sup> Socially responsible consumers derive a psychological benefit from consuming carbon-free or fair-trade products.<sup>18</sup>

Finally, consumers may be *socially neutral* (like in the homo economicus paradigm, except that moral issues arise). We have so far focused on search goods, i.e. goods for which non-price attributes (here  $a_i$ ) are observed prior to the purchase decision. That consumers and other stakeholders observe  $a_i$  is realistic in the case of a trade with ir-

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<sup>16</sup>Like all other works building on social preferences, we assume that tort law does not provide a perfect Pigovian correction of the wedge between market and society’s demands (which is the case for the applications envisioned throughout the paper). This may hold for multiple familiar reasons: (a) Limited liability, risk aversion or managerial turnover may prevent the collection of the Pigovian tax; (b) there may be no political will to levy or enforce such a tax (for example due to lobbying); (c) laws may embody loopholes; (d) the behavior may not be verifiable (e.g. corruption, doctors’ “judgement”, interpretation of advertising); (e) law enforcement is too costly for minor misdemeanors (Kaplow-Shavell 2007); (f) a last reason is the inability to tax externalities, such as the use of child labor, corruption or pollution, exerted by suppliers operating in different jurisdictions.

<sup>17</sup>For example, the consumers could be consuming many such goods, indexed by  $x$  and have utility  $\xi(y - \int p_x dx, \int -\phi_x(a_x) dx, -\int \varepsilon_x dx)$  where  $\xi$  is increasing in the three arguments,  $y$  is the endowment,  $(p_x, a_x)$  are the price and morality of his choices of sub-brand of good  $x$ , and  $\varepsilon_x$  is the hedonic benefit of his choice of sub-brand to his preferred specification ( $\varepsilon_x$  is consumer idiosyncratic). Taking a linear approximation yields the model studied in this paper.

<sup>18</sup>That the consumer internalizes the welfare associated with her choice does not imply a “narrow internalization”. To be certain, an alternative choice (say, firm  $j$ ) would have welfare consequences that depend on  $a_j$ . However, this is taken into consideration by the consumer when selecting a supplier. Letting  $\varepsilon_{hk}$  denote the valuation of consumer  $h$  for good  $k$ , the consumer compares  $\varepsilon_{hi} - [p_i - \alpha_C W_i(a_i)]$  with  $\varepsilon_{hj} - [p_j - \alpha_C W_j(a_j)]$ . That is, the consumer accounts for the welfare impact of alternative choices.

responsible consumers involving an internality or externality: Prescriptions of opioids, performance-enhancing drugs or sickness certificates are observed by patients.

By contrast, the IO and agency literatures have studied environments in which the non-price attributes is not observed at all (credence good) and  $a_i$  is a quality parameter (with  $c'_i > 0$ ).<sup>19</sup> Despite unobservability, which implies that demand does not depend on the quality choice ( $\phi'_i \equiv 0$ ), supplier ethical concerns ( $\alpha_i > 0$ ) imply that equilibrium quality need not be set at its lowest possible level  $a_i = 0$ . A rational consumer bases her purchase decision on the expected (i.e. equilibrium) moral actions. Once sold, the product is consumed and so there is no renegotiation: The food contains too much salt or fat, the product is more fragile than the consumer expects, etc. In this case  $c'_i(a_i) > 0$ .

In much of the recent “shrouded attributes” literature building on Gabaix-Laibson (2006)<sup>20</sup>,  $a_i$  refers to a disclosure decision ( $a_i = 1$  if the supplier discloses some bad news and  $a_i = 0$  if he does not). The lack of disclosure of bad news for the consumer (say, the unexpected need for the latter to purchase an add-on, then sold later at an inflated price) can be viewed as decreasing the unit cost (by exactly the ex-post profit on the add-on if consumers are naïve):  $c'_i(a_i) > 0$  again, but the moral high-ground ( $a_i = 1$ ) reduces demand, a case of “irresponsible consumers” (in the sense that  $\phi_i$  is decreasing in  $a_i$ ). So the moral action in the product misrepresentation application impacts both cost (positively) and demand (negatively), and our framework accounts for the type of environments considered in the Gabaix-Laibson literature.

## 2.3 Determinants of moral choices

Prior to the study of equilibrium in Sections 3 and 4, we logically start with that of reaction curves. This section, besides obtaining sufficient conditions for strategic complementarity in ethical choices, will be used for the irrelevance proposition, both through the analysis of the first-order condition and for the study of price flexibility (which is endogenous).

**Proposition 1** (*sufficient conditions for strategic complementarity*). *For given prices, ethical choices are strategic complements if (i) consumers are irresponsible, or (ii) equilibrium is symmetric, or else (iii) suppliers do not internalize the social impact of their ethical choices too much.*<sup>21</sup>

*Proof of Proposition 1*

*Optimal moral choice.* Consider the first-order condition with respect to the ethical choice ( $\partial V_i / \partial a_i = 0$ ), for given prices  $\mathbf{p} = (p_1, \dots, p_n)$ . Behaving more ethically (increasing  $a_i$ )

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<sup>19</sup>See also Section 3.2.2.

<sup>20</sup>See Heidhues-Köszegi (2018) for a detailed overview of this literature.

<sup>21</sup>This can be captured by scaling the internalization parameters by some  $\lambda$ :  $\lambda\alpha_i$ . Then for  $\lambda \leq \bar{\lambda}$  for some  $\bar{\lambda} > 0$ , ethical choices are strategic complements.

has three effects on supplier  $i$ 's payoff function  $V_i = [p_i - c_i(a_i)]D_i(\hat{\mathbf{p}}) + \alpha_i \mathcal{W}_i(\hat{\mathbf{p}}, \hat{\mathbf{a}})$ :

$$\frac{\partial V_i}{\partial a_i} = \underbrace{(p_i - c_i)\phi'_i \frac{\partial D_i}{\partial \hat{p}_i} - c'_i D_i}_{\text{impact on profit}} + \underbrace{\alpha_i W'_i D_i}_{\substack{\text{ethical} \\ \text{impact on} \\ \text{supplier } i\text{'s} \\ \text{inframarginal} \\ \text{consumers}}} + \underbrace{\alpha_i \phi'_i \frac{\partial \mathcal{W}_i}{\partial \hat{p}_i}}_{\substack{\text{ethical} \\ \text{impact} \\ \text{of gain/} \\ \text{loss in} \\ \text{market} \\ \text{share}}} = 0. \quad (2)$$

using

$$\frac{\partial D_i}{\partial a_i} = \phi'_i \frac{\partial D_i}{\partial \hat{p}_i} = \phi'_i \frac{\partial D_i}{\partial p_i}. \quad (3)$$

In (2), the impact of the choice of  $a_i$  on profit captures the demand and cost effects that are familiar from models of quality choice (e.g. Spence 1975). The other two effects are proportional to supplier  $i$ 's social preferences parameter  $\alpha_i$ . The increase in  $a_i$  has a positive ethical impact on supplier  $i$ 's inframarginal consumers. Finally, supplier  $i$  also gains (resp. loses) market share at the detriment of the other suppliers. Letting  $w_j \equiv W_j(a_j)$ , note that  $\partial \mathcal{W}_i / \partial \hat{p}_i = \sum_{j=0}^n w_j (\partial D_j / \partial p_i)$ : The last term in (2) captures the ethical impact of the reallocation of market shares (including with the outside good). Assuming, say,  $\phi'_i > 0$ , it is positive if supplier is “on average” more ethical than alternatives (where “average” refers to weights based on the intensities of market share transfers). We will return to this shortly when we introduce the social responsibility index.

*Strategic complementarity.* When deconstructed, the familiar phrase, “if I don’t do it, someone else will”, explicitly suggests a need for less ethical behavior when facing a strong competitive pressure. More implicitly, the “someone else” is behaving in an unethical manner (the mere loss of market share per se does not seem a strong moral defense). One can rewrite the first-order condition with respect to  $a_i$  in the following simple form:

$$\frac{\alpha_i W'_i(a_i) - c'_i(a_i)}{\phi'_i(a_i)} = \eta_i L_i, \quad (4)$$

where  $\eta_i$  is the elasticity of demand facing supplier  $i$ ,  $L_i$  is the “generalized Lerner index”<sup>22</sup>

$$L_i = \frac{p_i - [c_i - (\partial \mathcal{W}_i / \partial \hat{p}_i)] / (-\partial D_i / \partial \hat{p}_i)}{p_i} \equiv \frac{p_i - (c_i - \alpha_i S_i)}{p_i},$$

and  $c_i \equiv c_i(a_i)$  for short. Under irresponsible consumers,  $\phi'_i(a_i) > 0$  and the LHS of (4) is a decreasing function of  $a_i$ . Under responsible consumers,  $\phi'_i(a_i) < 0$ , and the LHS of (4) is an increasing function of  $a_i$ .<sup>23</sup> Under neutral consumers,  $\phi'_i(a_i) = 0$  and the Lerner index has the standard expression  $(p_i - c_i) / p_i$ .

<sup>22</sup>Using  $\sum_{j=0}^n D_j(\hat{\mathbf{p}}) = 1$  and so  $\sum_{\substack{j=0 \\ j \neq i}}^n \frac{\partial D_j}{\partial p_i} + \frac{\partial D_i}{\partial p_i} = 0$ ,  $\frac{\partial \mathcal{W}_i}{\partial \hat{p}_i} = (-\frac{\partial D_i}{\partial \hat{p}_i}) S_i$ .

<sup>23</sup>Indeed, in this case the partial derivative of the LHS wrt  $a_i$  is  $[\phi'_i(\alpha_i W''_i - c''_i) - \phi''_i(\alpha_i W'_i - c'_i)] / (\phi'_i)^2$ , which is positive since  $\text{sgn}(\phi'_i) = \text{sgn}(\alpha_i W'_i - c'_i)$  from (4).

To understand condition (4), note first that  $\alpha_i W'_i(a_i) - c'_i(a_i)$  is the net per-unit-of-output benefit for the supplier from behaving more ethically (moral benefit minus extra cost). The division by  $\phi'_i(a_i)$  transforms this net benefit into a monetary equivalent. Under our assumptions, the LHS of (4) is independent of the demand curve, and therefore of competitive pressure. The RHS of (4) is the standard product of the elasticity of demand and the Lerner index, except that the production cost is net of the parameter of social preferences times a social responsibility index  $S_i$ , which depicts whether a reshuffling of market shares in favor of or against supply  $i$  makes the industry more or less virtuous.

Letting  $\sigma_{ij} \equiv [\partial D_j / \partial p_i] / [-\partial D_i / \partial p_i]$  (where  $\sum_{\substack{j \neq i \\ j \geq 0}} \sigma_{ij} = 1$ ) measure the fraction of the market share gain by supplier  $i$  that comes from supplier  $j$ 's customers when supplier  $i$  lowers her price by one unit,  $S_i$ , the ‘‘social responsibility index’’, can be expressed as:

$$S_i \equiv \sum_{\substack{j \neq i \\ j \geq 0}} \sigma_{ij} (w_i - w_j), \quad (5)$$

The social responsibility index captures supplier  $i$ 's competitive impact on overall welfare and is equal to her ethical differentials with other suppliers weighted by her substitutability with these suppliers. As announced earlier,  $S_i$  is positive if supplier  $i$  is on average more ethical than her rivals (including the outside option) and negative otherwise.

For example, in the symmetric equilibrium ( $w_i = w_j$  for  $i, j \geq 1$ ) of an Hotelling-Lerner-Salop model of product differentiation in which the outside option is not binding ( $\sigma_{i0} = 0$ ), the social responsibility index is nil and the generalized Lerner index  $L_i$  is equal to the ordinary Lerner index:

$$S_i = 0 \quad \text{and} \quad L_i = L \equiv \frac{p - c}{p}.$$

How does an increase in supplier  $i$ 's rivals' morality affect her own moral choices? Equation (4) suggests two possible channels of strategic interaction when, say,  $a_j$  changes ( $j \neq i$ ): Through  $\eta_i$  (elasticity effect) and through  $L_i$  (social responsibility effect).

*Elasticity effect.* Because price and moral choices jointly determine the net price ( $\hat{p}_i = p_i + \phi_i(a_i)$ ), a strategic complementarity of moral choices is inherited from the strategic complementarity in the price domain, regardless of whether consumers are socially irresponsible, neutral, or responsible.<sup>24</sup>

*Social responsibility effect.* How is the social responsibility index  $S_i$  altered when a rival's action,  $a_j$ , changes? An increase in  $a_j$  increases  $w_j$  and thereby decreases supplier  $i$ 's social responsibility index:  $\partial S_i / \partial a_j < 0$ . Put simply, stealing market share away from supplier  $j$  becomes morally less attractive. Under irresponsible consumers, a higher  $a_j$  increases the incentive to raise  $a_i$ , creating a second source of strategic complementarity. Under responsible consumers, a higher  $a_j$  reduces the incentive to raise  $a_i$ : The social

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<sup>24</sup>Formally,  $\partial \eta_i / \partial a_j = [\partial \eta_i / \partial \hat{p}_j] \phi'_j(a_j)$ . Our assumption that prices are strategic complements ( $\partial \eta_i / \partial \hat{p}_j < 0$ ), then implies that  $\text{sign}(\partial \eta_i / \partial a_j) = \text{sign}(-\phi'_j(a_j))$ . And so, because  $\text{sign}(\frac{d}{da_i}(\frac{\alpha_i W'_i(a_i) - c'_i(a_i)}{\phi'_i(a_i)})) = \text{sign}(-\phi'_i(a_i))$ , we have  $\text{sign}(\partial a_i / \partial a_j) = \text{sign}(\phi'_i(a_i) \phi'_j(a_j)) \geq 0$ .

responsibility effect per se induces strategic substitutability. Note that in either case, in a symmetric equilibrium,  $S_i = 0$ , and so the net strategic effect (elasticity plus social responsibility) is strategic complementarity. ■

As shown by Proposition 1, under price competition, there are strong forces toward strategic complementarity in moral choices. So one should not be surprised by the possibility of multiple equilibria in the absence of price flexibility (while, strikingly, moral outcomes will be uniquely determined under flexible prices). Such multiplicity fits well with some informal discussions of multiple social norms regarding morality.

*Example of multiple equilibria.* Consider a symmetric duopoly with perfect substitutes and equal market shares in case of equally attractive offerings. Suppose that the price is regulated at level  $p$ , and that unit cost  $c < p$  does not depend on moral choices  $a_i \in \{a_L, a_H\}$ , which in contrast affect demand: Consumers are socially irresponsible with  $\phi(a_L) < \phi(a_H)$  while  $a_L < a_H$ . A high-morality equilibrium ( $a_i = a_H$ ) exists if the material gain from immoral behavior is smaller than internalized social consequences:

$$\frac{p - c}{2} \leq \alpha[W(a_H) - W(a_L)]$$

The low-morality equilibrium always exists as raising one's moral offer to  $a_H$  implies profit loss  $\frac{p-c}{2}$  and no ethical gain because of the replacement effect: all consumers keep consuming at the low-morality level  $a_L$ .

## 3 The irrelevance result

### 3.1 Derivation

We first derive the paper's main result.

**Proposition 2** (*irrelevance*). *Suppose that prices are flexible at an equilibrium  $(\hat{p}, \mathbf{a})$ . Supplier  $i$ 's ethical behavior  $a_i^\dagger$  is then uniquely defined by*

$$\alpha_i W_i'(a_i^\dagger) = c_i'(a_i^\dagger) + \phi_i'(a_i^\dagger) \quad (6)$$

*It is therefore independent of the demand curve  $D_i$  faced by firm  $i$ , and thus of the intensity of competition.*

Note that the left-hand side of Condition (6) (the supplier's marginal demand for ethical behavior) is decreasing in  $a_i$ , while the right-hand side (the generalized marginal cost) is increasing; furthermore, as  $a_i$  tends to  $\bar{a}_i$  (resp. 0), the left-hand side goes to 0 (resp.  $+\infty$ ). So even though the sign of  $c_i'$  and  $\phi_i'$  can be positive or negative as we discussed, given that  $\alpha_i W_i - c_i - \phi_i$  is strictly concave, Condition (6) defines a unique level of ethics  $a_i^\dagger$ , in sharp contrast with the possible multiplicity for given prices due to the strategic complementarity in moral choices.

*Proof of Proposition 2.*<sup>25</sup> Using the definition of net prices, we can rewrite supplier  $i$ 's objective function as

$$V_i = [\hat{p}_i - \phi_i(a_i) - c_i(a_i)]D_i(\hat{\mathbf{p}}) + \alpha_i \mathcal{W}_i(\hat{\mathbf{p}}, \mathbf{a}). \quad (7)$$

Because  $\partial \mathcal{W}_i / \partial a_i = W'_i(a_i)D_i(\hat{\mathbf{p}})$ , supplier  $i$ 's optimal ethical choice satisfies  $\frac{\partial V_i}{\partial a_i} = [-\phi'_i(a_i) - c'_i(a_i) + \alpha_i W'_i(a_i)]D_i(\hat{\mathbf{p}}) + \frac{\partial V_i}{\partial \hat{p}_i} \phi'_i(a_i)$ . The latter term is equal to 0 under price flexibility from the envelope theorem; hence, supplier  $i$ 's ethical behavior  $a_i$  is independent of the demand function, and so of the intensity of competition. The first-order condition w.r.t.  $a_i$  yields condition (6).<sup>26</sup> ■

The simple, but striking irrelevance result runs counter the conventional wisdom that competition erodes firms' moral compass. It calls for four comments:

(a) *Intuition.* To obtain some first intuition, consider the case of socially irresponsible consumers, which is often viewed as generating market immorality. And assume, as we did, that low prices make individual demands more elastic. The result does not hinge on these assumptions, but they define a natural case to focus on. When each supplier faces more intense competition in the sense of a more elastic demand, lowering one's ethical behavior has a bigger impact on supplier  $i$ 's market share and is therefore more tempting for the suppliers; so the first effect is to lower each supplier's moral conduct. Our strategic complementarity result reinforces this and leads to even worse ethical behavior. *Ceteris paribus*, suppliers cut ethical corners in reaction to the increase in competition. However there is a second, opposite effect under price flexibility: a more intense competition implies that prices and markups are smaller, making ethical concerns more important relative to material ones. To ensure that these two effects exactly offset, one can invoke consequentialism and constant technological returns to scale, as we now show.

One way of understanding the irrelevance result consists in viewing it as cost minimization. The per-unit cost is  $c_i(a_i)$ , to which the monetary measure of demand-side cost perception,  $\phi_i(a_i)$ , must be added (or subtracted if negative). The supplier's per-unit psychological cost, expressed in monetary terms, is  $-\alpha_i S_i$ . So supplier  $i$ 's overall unit cost is

$$c_i(a_i) + \phi_i(a_i) - \alpha_i \sum_{\substack{j \neq i \\ j \geq 0}} \sigma_{ij}(\hat{\mathbf{p}}) [W_i(a_i) - W_j(a_j)] = [c_i(a_i) + \phi_i(a_i) - \alpha_i W_i(a_i)] - K(\hat{\mathbf{p}}, \mathbf{a}_{-i}),$$

where the function  $K$  is independent of  $a_i$ . Price flexibility ensures a decoupling between cost minimization and the choice of net price.

The same reasoning holds under Cournot competition, replacing the vector of net prices  $\hat{\mathbf{p}}$  by that of quantities  $\mathbf{q}$  (Section 3.2.1). It also holds for multi-unit demand

<sup>25</sup>An alternative way of proving (6) considers instruments  $(p_i, a_i)$  (instead of  $(\hat{p}_i, a_i)$ ), shows that the standard oligopoly price optimization expression  $L_i = 1/\eta_i$  holds even if there is social responsibility and applies condition (4).

<sup>26</sup>Together with  $\lim_{a_i \rightarrow 0} W'_i(a_i) = +\infty$  and  $W'_i(\bar{a}_i) = 0$ , if  $c'_i(\hat{a}_i) + \phi'_i(\hat{a}_i) > 0$ , there exists an interior solution, since the LHS of (6) is decreasing from  $+\infty$  to 0 as the moral action increases from 0 to  $\bar{a}_i$ , while the RHS is convex by assumption. See Online Appendix B for the verification of the global second-order condition.



consumers when each supplier  $i$  offers a (possibly non-linear) tariff  $T_i(q_i)$ , and demand is  $D_i(\mathbf{T})$  where  $\mathbf{T} \equiv (T_1(\cdot), \dots, T_n(\cdot))$  (Section 3.2.4). Finally, regardless of whether competition is in price or quantity, one could add suppliers' choices of quality (provided quality is devoid of moral connotations), again yielding the same demonstration of the irrelevance result.

(b) *A special case: universal social responsibility.* Suppose that stakeholders, workers (W), investors (I) and final consumers (C)<sup>27</sup> internalize welfare  $W_i(a_i)$  with coefficients  $\alpha_W$ ,  $\alpha_I$ , and  $\alpha_C$  respectively (as discussed earlier). Letting  $\gamma_i(a_i)$  denote the operating cost:

$$c'_i(a_i) \equiv \gamma'_i(a_i) - (\alpha_W + \alpha_I)W'_i(a_i)$$

Similarly, let consumers be socially responsible and internalize the welfare impact of their consumption decisions:

$$\phi'_i(a_i) = -\alpha_C W'_i(a_i).$$

And so, formula (6) shows that welfare internalizations add up:<sup>28</sup>

$$(\alpha_i + \alpha_W + \alpha_I + \alpha_C)W'_i(a_i) = \gamma'_i(a_i). \quad (8)$$

Under flexible prices, equilibrium ethics is thus independent of the degree of competition but influenced by the (un)ethical urge of all stakeholders.

(c) *When are prices indeed flexible?* Consequentialism and constant returns to scale are embodied into the model. In contrast, the third key assumption, price flexibility, is an endogenous assumption, to be verified ex post by looking at the putative equilibrium.

**Proposition 3** (*flexible prices*). *Conditions that are individually sufficient for prices to be flexible at the putative equilibrium, include:*

- *Either the equilibrium is symmetric and covered (implying that the social responsibility index  $S_i$  is equal to 0).*
- *Or the equilibrium is symmetric and  $a^\dagger \leq a_0$ .*
- *Or, ceteris paribus, ethical concerns  $\alpha_i$  are small enough.*

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<sup>27</sup>The firm may have multiple groups of consumers. For example, the official who may receive a bribe or the consumers longing for opioids see their demand increase with the unethical action; meanwhile consumers of the firms' other products may frown upon such practices and reduce their demand when the firm behaves unethically.

<sup>28</sup>Condition (8) formalizes the notion of “doing well by doing good” as a special case. Suppose that firm  $i$ 's consumers are willing to pay  $\alpha_C W_i(a_i)$  if their coffee is produced in conformity with fair trade principles “at level  $a_i$ ”. Fair-trade-production costs increase with  $a_i$ :  $c'_i(a_i) > 0$ . Suppose that the firm is a pure profit maximizer ( $\alpha_i = 0$ ). Condition (8) then yields  $\alpha_C W'_i(a_i) = c'_i(a_i)$ . Keeping other firms' policies constant, concavity then implies that the firm makes more profit than when operating at the cost-minimizing ethical bottom  $a_i = 0$  (this special case was labelled “delegated philanthropy” in Bénabou-Tirole 2010's informal treatment).

- Or else competition, as measured by the semi-elasticities of individual demands, is not too strong.

*Proof of Proposition 3.* Suppose that prices are unregulated but that the suppliers cannot lose money (supplier  $i$ 's choices must satisfy:  $p_i - c_i(a_i) \geq 0$ ), and consider the FOC with respect to prices:  $\frac{p_i - c_i(a_i^\dagger) + \alpha_i S_i(\mathbf{a}^\dagger)}{p_i} = \frac{1}{\eta_i}$ . So, prices are flexible if and only if

$$\alpha_i S_i(\mathbf{a}^\dagger) \leq p_i / \eta_i. \quad (9)$$

Either the market is covered and then  $S_i(\mathbf{a}^\dagger)$  is indeed equal to 0 in a symmetric equilibrium. Or the market is not covered, and in a symmetric equilibrium  $a^\dagger$ ,  $S_i(\mathbf{a}^\dagger) \leq 0$  if and only if  $a^\dagger \leq a_0$ , where  $a_0$  is the morality of the outside option and  $a^\dagger$  the symmetric choice, in which case  $p_i - c_i(a_i^\dagger) \geq 0$ . This case arises if no trading by the industry yields a virtuous outcome (e.g. no pollution or no corruption).

Consider a family  $\{\alpha_i = \lambda \alpha_i^1\}_i$ ; then one can show that for  $\lambda \leq \bar{\lambda}$  for some  $\bar{\lambda} > 0$ , equilibrium prices exceed unit costs. As  $\lambda$  become small,  $a_i^\dagger$  converges to the level that obtains for  $\alpha_i = 0$  and  $\alpha_i S_i(\mathbf{a}^\dagger)$  tends to 0. ■

(d) *Cartel.* The irrelevance result applies equally well when comparing the cartel and the competitive solutions. To avoid questions relative to the aggregation of preferences when supplier objective functions differ, consider a symmetric oligopoly, omit subscripts and look for the cartel-optimal symmetric policy  $\{p^m, a^m\}$  (where “ $m$ ” stands for monopoly). Then,  $\alpha W'(a^m) = c'(a^m) + \phi'(a^m)$ . The moral behavior is the same as under competition. In contrast, prices and net prices are higher for a cartel. The standard cartel analysis for competition policy remains unchanged under supplier social preferences.

## 3.2 Robustness

This section performs a few robustness checks. We show in particular that the irrelevance result remains valid under Cournot competition, under imperfect consumer information, under a variety of supplier ethical criteria, under volume-based price discrimination, under several forms of non-constant returns to scale, and under non-consequentialist preferences like categorical imperative. The intensity of competition has an ambiguous impact on ethics under ethics-based price discrimination, or non-consequentialist preferences like deontologism. The punchline of Section 3.2 is that the irrelevance result is pretty general, the key exceptions being in Section 4.

### 3.2.1 Strategic complements vs. strategic substitutes (prices vs. quantities)

Is the irrelevance property specific to the differentiated-products Bertrand model?

(a) *Cournot*. We first look at the other standard model of imperfect competition: The Cournot model with perfect substitutes.<sup>29</sup> Supplier  $i$  picks  $(q_i, a_i)$ . Under Cournot competition and for total quantity  $Q = \sum_{j=1}^n q_j$ , all net prices are equalized in the market clearing process:<sup>30</sup>

$$P(Q) = p_i + \phi_i(a_i)$$

There is no replacement effect here, as a reduction in  $q_i$  does not induce an increase in  $q_j$ . So  $\sigma_{ij} = 0$  for  $j \neq i$ , 0 and  $\sigma_{i0} = 1$ . Supplier  $i$ 's social responsibility index is therefore  $S_i(a_i) = W_i(a_i) - W_0(a_0)$ . Supplier  $i$  solves:

$$\max_{(q_i, a_i)} [P(\sum_{j=1}^n q_j) - c_i(a_i) - \phi_i(a_i)]q_i + \alpha_i S_i(a_i)q_i.$$

The FOC w.r.t.  $a_i$  yields the irrelevance result for strategic substitutes for the non-moral choice:  $a_i = a_i^\dagger$  where  $c'_i(a_i^\dagger) + \phi'_i(a_i^\dagger) = \alpha_i W'_i(a_i^\dagger)$ . The outcome in quantities is given by the Cournot outcome with unit cost  $\hat{c}_i \equiv c_i(a_i^\dagger) + \phi_i(a_i^\dagger) - \alpha_i [W_i(a_i^\dagger) - W_0(a_0)]$ .

(b) *Search*. The irrelevance result is also robust to a different model of strategic complementarity. An alternative to differentiated Bertrand is the search model, a classical version of which we here extend to incorporate moral choices. Suppose that there is a large- actually infinite- number of suppliers; so, in this model competition is indexed not by the number of suppliers, but by the level of the search cost. We will say that competition becomes more intense when the search cost  $s$  decreases. Suppliers are identical (same cost and demand function, same moral preferences). At each search with a new supplier, the unit-demand consumer draws a valuation  $v$  from distribution  $F(v)$  (independently of previous draws). She can take the offer and stop the search or continue searching. An extra search involves known search cost  $s$ . We assume that  $s$  is not too large so that search occurs in equilibrium (in this case all consumers purchase and the market is therefore covered). In a symmetric equilibrium, all offers are the same and so the cutoff  $v^*$  for the acceptance of an equilibrium offer is given by the sequential search condition:

$$s = \int_{v^*}^{+\infty} (v - v^*) dF(v)$$

Each firm chooses  $(\hat{p}, a)$  given other firms' strategy  $(\hat{p}^*, a^*)$ , so as to solve:

$$\max_{(\hat{p}, a)} [\hat{p} - \phi(a) - c(a) + \alpha[W(a) - W(a^*)]][1 - F(v^* - (\hat{p}^* - \hat{p}) - (\phi(a^*) - \phi(a)))]$$

The FOC w.r.t.  $a$  is again independent of the demand function (while in contrast  $p^*$  decreases with  $s$ ):  $a^* = a^\dagger$ , where

$$c'(a^\dagger) + \phi'(a^\dagger) = \alpha W'(a^\dagger),$$

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<sup>29</sup>This is only for conciseness. The following reasoning applies also to the differentiated-products Cournot model.

<sup>30</sup>If  $F(v)$  is the distribution of valuations, then the inverse demand function  $P(Q)$  is given by  $Q = 1 - F(P(Q) - \phi_0(a_0))$  (or  $1 - F(P(Q) - p_0 - \phi_0(a_0))$  if the outside option has a non-zero price).

so the irrelevance property holds ( $a^\dagger$  is independent of  $s$ ). Once again, consequentialism and constant returns to scale, imply that everything is linear in demand, and thanks to flexible prices we can adjust the ethical choice while leaving demand unchanged.

### 3.2.2 Imperfect consumer information

We have assumed that consumers are fully informed about the suppliers' moral choice (the latter is a search good). Alternatively, they could be uninformed (the moral choice is a credence good and so  $\phi'_i = 0$ ) or imperfectly informed (the supplier's choice is revealed with some probability). Assume that, with probability  $1 - x$  consumers do not observe supplier  $i$ 's ethical choice and rationally expect equilibrium choice  $a_i^*$ , and with probability  $x$  the actual choice  $a_i$  is publicly revealed (say, there is a scandal revealed in the media). Assume linear and symmetric demand (as we do later in Section 4). If  $x$  denotes the probability that one's behavior is observed, then the average net price charged by firm  $i$ , which determines the demand it faces, is

$$\hat{p}_i \equiv p_i - x\phi(a_i) - (1 - x)\phi(a_i^*),$$

where  $a_i^*$  is the equilibrium behavior (anticipated by customers). So the elasticity of demand with respect to  $a_i$  is now smaller, and supplier  $i$ 's first-order condition under flexible prices is:

$$\alpha W'(a^*) = c'(a^*) + x\phi'(a^*).$$

With responsible consumers (we argued that  $x = 1$  is the natural assumption for irresponsible consumers), a reduction in  $x$  implies an increase in the RHS of this condition, and thus a decrease in the level of ethics (as is the case for a decrease in  $\alpha$ ), which is also intuitive since the supplier gains customers by behaving more ethically only when this is observed by them.<sup>31</sup> The irrelevance result still holds.

### 3.2.3 Alternative internalizations

*Suppliers.* We assumed that suppliers internalize ethical welfare  $\mathcal{E} = \sum_j W_j(a_j) D_j(\hat{\mathbf{p}})$ . More generally, our results hold as long as internalized welfare impacts scale with actual impacts, i.e. are proportional to demands: There exists a non-negative, non-increasing function  $\Gamma_i(a_i)$  such that  $\lim_{a_i \rightarrow 0} \Gamma_i(a_i) = +\infty$  and  $\lim_{a_i \rightarrow \bar{a}_i} \Gamma_i(a_i) = 0$ , and

$$\frac{\partial \mathcal{W}_i}{\partial a_i} = \Gamma_i(a_i) D_i(\hat{\mathbf{p}}). \quad (10)$$

That  $\partial \mathcal{W}_i / \partial a_i$  is proportional to demand  $D_i$  is required by consequentialism: Ethical choices are uniform over supplier  $i$ 's customers and so their impact on well-being is proportional to demand. The condition that  $\Gamma_i$  be non-increasing simply expresses the

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<sup>31</sup>Bonneton (2020) studies the provision of information about supplier moral behavior in the form of a binary standard. In his paper, suppliers are intrinsically motivated and have image concerns as well.

idea that returns to the ethical choice are non-increasing. This consequentialist internalization is related to effective altruism and admits a wide variety of perceptions of social well-being.

Besides ethical welfare, condition (10) is in particular satisfied by :

Narrow ethical welfare. Suppliers sometimes take a narrower view of ethical welfare, associated with the impact of their own production on well-being.<sup>32</sup>

$$\mathcal{W}_i(\hat{\mathbf{p}}, \mathbf{a}) = \mathcal{E}_i^n(\hat{\mathbf{p}}, \mathbf{a}) \equiv W_i(a_i)D_i(\hat{\mathbf{p}}).$$

Full welfare. Consumers may not be matched with their preferred supplier. This will be the case even in symmetric oligopoly when net prices  $\{\hat{p}_i\}$  differ. To illustrate this misallocation, consider for notational simplicity constant, identical costs (the reasoning extends to heterogenous costs). The misallocation cost for consumer  $h$  is the difference between the surplus she gets from her preferred supplier and that offered by the supplier  $i(h)$  she ends up picking. Using the discrete-choice notation introduced above and aggregating over all consumers yields the misallocation cost:

$$\mathcal{M}(\hat{\mathbf{p}}) \equiv \int [(\max_i \varepsilon_{hi}) - \varepsilon_{hi(h)}] dh.$$

More generally, total welfare is<sup>33</sup>

$$\mathcal{W}(\hat{\mathbf{p}}, \mathbf{a}) = \mathcal{E}(\hat{\mathbf{p}}, \mathbf{a}) - \mathcal{M}(\hat{\mathbf{p}}).$$

Condition (10) is satisfied by all three welfare internalizations, since  $\partial \mathcal{M} / \partial a_i = 0$ ,  $\partial \mathcal{E} / \partial a_i = W'_i(a_i)D_i(\hat{\mathbf{p}})$  and so

$$\Gamma_i(a_i) \equiv W'_i(a_i)$$

satisfies  $\Gamma'_i < 0$ .

Note that in symmetric oligopoly  $\mathcal{M}(\hat{\mathbf{p}}) = 0$  (and is therefore minimized) when all net prices are equal. This implies that misallocation losses are locally second-order:  $\partial \mathcal{M} / \partial \hat{p}_i = 0$  at a symmetric equilibrium. For example, in the Hotelling-Lerner-Salop model of differentiation, the misallocation cost is quadratic in price differences.<sup>34</sup>

$$\mathcal{M} \propto \sum_{i < j} (\hat{p}_i - \hat{p}_j)^2.$$

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<sup>32</sup>The distinction between ethical and narrow ethical welfares is reminiscent of Oehmke-Opp (2020)'s distinction between broad and narrow mandates and Green and Roth (2020)'s contrast between sophisticated and naive social investors (or "impact" and "value" investors).

<sup>33</sup>We could add the consumer net surplus from consumption (weighted by  $\alpha$ ), but this would not change the derivations below; for, a small change in  $i$ 's policy implies a shift, from or toward alternative suppliers, of marginal consumers who by definition are indifferent between supplier  $i$  and their best alternative supplier. So the marginal impact on consumer surplus is 0.

<sup>34</sup>Consider an  $n$ -firm overlapping Hotelling model in order to provide a concrete expression for the misallocation cost  $\mathcal{M}$ . There are  $\frac{n(n-1)}{2}$  markets, each with a mass  $\frac{2}{n(n-1)}$  of consumers (so total mass is still 1). Each pair  $(i, j)$  is an Hotelling duopoly on one of these markets. The corresponding segment has length 1, firms are located at the two ends of the segment, the transportation cost is  $t$  per unit of distance, and the segment is covered. Assume that firm  $i$  adopts a uniform policy  $\{p_i, a_i\}$  in all submarkets in which

**Lemma 1** Consider a symmetric equilibrium of a symmetric-oligopoly game in which the firms internalize the ethical welfare  $\mathcal{E}$ . Then the resulting allocation is also an equilibrium of the game in which the firms internalize the full welfare  $\mathcal{W} = \mathcal{E} - \mathcal{M}$ .

*Proof.* Even though a supplier's deviating from a symmetric-equilibrium behavior generates a misallocation of consumers to firms, the proof of Lemma 1 is straightforward: The resulting misallocation of consumers to firms makes such a deviation away from symmetric behavior even less attractive under full-welfare internalization than when only the ethical welfare is considered. ■

Section 2.3 provides sufficient conditions for moral choices to be strategic complements for given prices and ethical welfare  $\mathcal{E}$ . What about alternative forms of internalization? Consider first narrow ethical internalization ( $\mathcal{W}_i = \mathcal{E}^n$ ). Firm  $i$ 's ethical choice is still given by (4), except that the modified Lerner index is now  $L_i = [p_i - (c_i - \alpha_i w_i)]/p_i$ . So, other firms' ethical choices no longer impact the social responsibility index  $S_i (= w_i)$ , and so strategic complementarity is driven solely by the elasticity effect.

Last, suppose that suppliers internalize the full welfare ( $\mathcal{E} - \mathcal{M}$ ). Relative to the expression for the ethical welfare, condition (2) implies an extra incentive to decrease  $a_i$  when  $a_j$  goes down, namely  $-\alpha_i \phi'_i(a_i) \frac{\partial \mathcal{M}(\hat{\mathbf{p}})}{\partial \hat{p}_i}$ . The derivative with respect to  $a_j$  of this incentive is proportional to  $-\partial^2 \mathcal{M}(\hat{\mathbf{p}})/\partial \hat{p}_i \partial \hat{p}_j$  since  $\phi'_i(a_i) \phi'_j(a_j) \geq 0$ . The consideration of the misallocation cost therefore adds another factor of strategic complementarity if  $\partial^2 \mathcal{M}/\partial \hat{p}_i \partial \hat{p}_j < 0$ . The latter property holds for instance for the generalized Hotelling model developed in footnote 34, where the cross-term in  $\mathcal{M}$  is (proportional to)  $(\hat{p}_i - \hat{p}_j)^2$ . Intuitively, optimizing the matching of consumers to firms often requires aligning net prices and therefore, for a given common price, aligning ethical behaviors. This effect can be labelled the “misallocation minimization effect”, or alternatively the “net price alignment effect”.

*Other stakeholders.* We assumed that workers and investors internalize  $W_i(a_i)$ . While this is natural, the irrelevance result does not hinge on this assumption. As for suppliers, one could assume that they internalize an arbitrary  $\Lambda_i(a_i)$  per unit (with  $\Lambda'_i > 0 > \Lambda''_i$ ; they could also have internalizations that differ across stakeholders).

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it is involved, whether for transaction-cost, legal or informational reasons (it cannot tell the submarkets apart; the case in which it can engage in segment-contingent policies yields similar results). Letting  $\sigma \equiv \frac{n-1}{nt}$ , the resulting demand system is then symmetrically linear in the relevant range:

$$D_i = \frac{1}{n} - \sigma \left[ \hat{p}_i - \frac{\sum_{j \neq i} \hat{p}_j}{n-1} \right].$$

The misallocation cost can be written as

$$\mathcal{M} = \frac{\sigma n}{4(n-1)} \sum_{i < j} (\hat{p}_i - \hat{p}_j)^2.$$

### 3.2.4 Non-linear pricing

Proposition 2 does not require unit demands. The consumers might be consuming multiple units. As long as pricing is linear and economic agents are consequentialists, the irrelevance result carries over. But what about non-linear pricing? One can consider two types of second-degree price discrimination, one based on volume and the other on moral intensity.

(a) *Volume-based price discrimination.* Suppose that consumers all have the same moral preferences,  $-\phi(a)q$  for consumption  $q$ , and differ in their marginal utility of consumption as in Mussa-Rosen (1978) and Maskin-Riley (1984):  $u(q, a, \theta) = v(q, \theta) - T(q) - \phi(a)q$  where  $T(q)$  is the tariff to be paid for  $q$  units. Consumer  $h$ , when buying from supplier  $i$ , has utility  $U_i(\theta) + \varepsilon_{hi}$  (where, as earlier, the vector  $\{\varepsilon_{hi}\}_{i \in \{0, \dots, n\}}$  is distributed according to some smooth joint distribution), where

$$U_i(\theta) = \max_q \{v(q, \theta) - T_i(q) - \phi_i(a_i)q\}.$$

As in Armstrong-Vickers (2001), Rochet-Stole (2002) or B enabou-Tirole (2016), one can view competition as a competition in utilities rather than transfers: Supplier  $i$  chooses  $\{U_i(\theta), q_i(\theta), a_i\}$  subject to incentive compatibility and individual rationality.<sup>35</sup> Letting  $\mathbf{U}(\theta) = \{U_i(\theta)\}_{i \in \{1, \dots, n\}}$  let  $X_i(\mathbf{U}(\theta))$  denote the market share of supplier  $i$  among types  $\theta$ . Letting  $\mathbb{E}$  denote the expectation with respect to  $\theta$ , supplier  $i$ 's objective function is:

$$\mathbb{E}[X_i(\mathbf{U}(\theta)) [v(q_i(\theta), \theta) - [\phi_i(a_i) + c_i(a_i)]q_i(\theta) - U_i(\theta)] + \alpha_i \sum_j W_j(a_j) X_j(\mathbf{U}(\theta)) q_j(\theta)].$$

A subprogram consists in minimizing cost

$$\min \mathbb{E} \left[ [\phi_i(a_i) + c_i(a_i) - \alpha_i W_i(a_i)] q_i(\theta) \right]$$

with respect to  $a_i$ , yielding again the irrelevance result.<sup>36</sup>

(b) *Price discrimination based on moral preferences.* Suppose now that consumers have unit demands, but are heterogeneous in their moral preferences: They differ in their internalization  $\phi_\theta(a)$ , where a higher  $\theta$  indicates a more moral consumer ( $\phi'_\theta(a)$  grows with  $\theta$ ). The results go as follows: (i) Competition affects moral choices. (ii) Whether competition makes the allocation more or less moral depends on the nature of the outside option, i.e. on whether  $\phi_\theta(a)$  grows or decreases with  $\theta$ .<sup>37</sup>

Suppose for instance that there are two types, a low-morality and a high-morality types. Note first that in this private-value model, competition delivers each type the

<sup>35</sup>Namely  $dU_i/d\theta = v_\theta(q_i(\theta), \theta)$  and  $U_i(\theta) \geq U_i^0(\theta)$  (the utility from the outside option). Assuming that the ethical choice can be tailored to type  $(a_i(\theta))$  would not affect the irrelevance result obtained shortly.

<sup>36</sup>The counterpart of price flexibility is that the choice of  $U_i(\cdot)$  among mechanisms that are incentive compatible and individually rational is unconstrained.

<sup>37</sup>Readers familiar with mechanism design will here recognize the distinction between classic and countervailing incentives.

symmetric-information moral outcome, given by  $c'(a_\theta^\dagger) + \phi'_\theta(a_\theta^\dagger) = \alpha W'(a_\theta^\dagger)$ , so  $a_H^\dagger > a_L^\dagger$ . To illustrate how monopoly power affects moral choices, suppose first that the outside option involves no pollution (case of responsible consumers) or no corruption (irresponsible consumers); then  $a_0 = \bar{a}$ . More moral types then get a lower net utility from trade with the monopolist than less moral ones. The participation constraint under monopoly is then binding on the most moral type. There is no distortion for the less moral type ( $a_L = a_L^\dagger$ ). The moral type's allocation is distorted upwards ( $a_H > a_H^\dagger$ ) so as to prevent mimicking by the less moral type. So the monopoly allocation is more moral than the competitive one. Conversely, suppose that the outside option involves maximal pollution (say, coal-based electricity generation) or maximal corruption:  $a_0 = 0$ . Then the participation constraint under monopoly is binding on the less moral type, and we are in the Maskin-Riley/Mussa-Rosen configuration, with no distortion for the high type and a downward distortion for the low type, making the competitive market more moral than monopoly.

### 3.2.5 Non-constant returns to scale

We listed constant returns to scale as a key assumption for the irrelevance result. To see why, consider an arbitrary cost function  $C_i(q_i, a_i)$  that is not necessarily linear in output. The generalization of condition (6) is then:

$$\frac{\partial C_i(q_i, a_i)/\partial a_i}{q_i} + \phi'_i(a_i) = \alpha_i W'_i(a_i) \quad (11)$$

There are nonetheless interesting cases in which returns are not constant, and yet competition is irrelevant for moral choices:

(a) *Demand-side relevance of moral choices.* Suppose first that the moral incentive does not reside on the cost side ( $C_i$  depends only on  $q_i$ ) but on the demand side, as is the case in the examples with irresponsible consumers mentioned in the introduction. Then (11) boils down to  $\phi'_i(a_i) = \alpha_i W'_i(a_i)$  and so the irrelevance property holds regardless of the returns to scale.

(b) *Covered market.* Suppose a symmetric, covered market. Then equilibrium scale is invariant to competition ( $q_i = 1/n$ ) and so is the moral action. Irrelevance holds again.

(c) *Separability.* Suppose (as we did earlier) that the moral action impacts cost proportionally to output while returns need not be constant:  $C_i(q_i, a_i) = c_i(a_i)q_i + d_i(q_i)$ . Condition (11) then implies the irrelevance property.<sup>38</sup>

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<sup>38</sup>We have not undertaken a general study for non-constant returns to scale. Let us just add that, besides these three irrelevance situations, competition makes the market more immoral in the symmetric, multiplicative form:  $C(q, a) = c(a)d(q)$ , assuming that average cost (and so  $d(q)/q$ ) is increasing in  $q$ .



### 3.2.6 Non-consequentialist preferences

Last, focusing on supplier ethics, we compare the implications of consequentialism with those of the two main alternatives to consequentialism in moral philosophy: deontologism and categorical imperative. In the former, the supplier cares about her selected action rather than about its consequences; the impact of competition depends on the way in which it affects the profit stake of moral actions. In the latter, each supplier assumes everybody will mimic her action choice and so the suppliers' optimum always occurs. We thus obtain testable differences in the predictions of consequentialist and alternative moral criteria.

(a) *Deontologism*. Deontologism postulates that the morality of an action is based on whether the action is in itself right or wrong, irrespective of its scale and its consequences. Suppose therefore that supplier  $i$  values the act per se rather than its consequences. For instance, supplier  $i$ 's payoff could be  $V_i = [p_i - c_i(a_i)]D_i(\hat{\mathbf{p}}) + \alpha_i\mathcal{W}_i(a_i)$ , where  $\mathcal{W}_i(a_i)$  (satisfying  $\mathcal{W}'_i > 0 > \mathcal{W}''_i$ ) is an increasing and concave function of  $a_i$ . Such preferences are only partly deontological, as they reflect a material component (unless  $\alpha_i$  is large).<sup>39</sup> The first-order condition for the moral choice under flexible prices writes:  $\frac{\phi'_i(a_i) + c'_i(a_i)}{\alpha_i\mathcal{W}'_i(a_i)} = \frac{1}{D_i(\hat{\mathbf{p}})}$ , and so the irrelevance property associated with consequentialist preferences in general does not hold.<sup>40</sup> If competition results in an expansion of the per-firm production ( $D_i$  increases), the profit motive is magnified relative to the ethical one and morality is *eroded*. A stricter enforcement of antitrust laws is an example in which increased competition is associated with an expansion of per-firm output. In contrast, if increased competition results from an increase in the number of licenses (an increase in  $n$ ) and the market is covered, more competition is associated with a decline in per-firm output  $D_i$ ; in this case, competition *boosts* the ethical behavior of firms with deontological preferences.

(b) *Categorical imperative*. Suppose that suppliers follow Kant's categorical imperative. If the market is covered,<sup>41</sup> then each supplier, behaving as if her choice was to be mimicked by other suppliers, selects the socially optimal  $a = \bar{a}$  (assuming symmetry, otherwise it is not clear what the categorical imperative means). Suppliers behave fully ethically (as if  $\alpha_i = +\infty$ ). There is by construction no scope for the replacement effect. Markets are always maximally moral regardless of the intensity of competition. So markets raise no moral concerns.

<sup>39</sup>Such preferences exhibit the Kahneman and Knetsch (1992)'s "embedding effect". Contingent valuations surveys tend to deliver stated willingnesses to pay that neglect scale.

<sup>40</sup>The irrelevance property still holds when the market is symmetric and covered ( $D_i = 1/n$ ) and the increase in competition comes from an increase in substitutability, keeping the number of firms constant; in contrast, if the market is covered, but the increase in competition comes from entry of new firms ( $n$  increases), the increase in competition fosters moral behavior: Competition limits financial stakes and makes it more appealing to "do the right thing".

<sup>41</sup>We are agnostic as to the meaning of the categorical imperative in the presence of outside options, as the latter have no reason to obey the imperative and align the moral content with the suppliers' moral choice.

In conclusion, not only does the model accommodate a range of variations on the moral criterion as described in section 3.2.3, but the irrelevance result is also valid under the categorical imperative criterion, although with a highly moral outcome. As for deontology, the impact of the intensity of competition is nonzero, but it is ambiguous and depends on the precise way competition is affected.

### 3.3 Welfare

#### 3.3.1 Preliminaries

Our analysis so far has been positive: how is the morality of the market affected by the intensity of competition? Any normative analysis of market morality requires taking a stance on the following four issues (the first two unrelated to ethical behavior):

1. *Is more competition good for given moral choices?* While an important industrial-organization body of theory and empirical work extols the virtues of competition, we also know that there are exceptions to the rule. A possible stance, which we will adopt here, is the presumption that, for antitrust cases handled in the real world, the answer is “competition is good for given moral choices”.
2. *What drives the increase in competition?* Relatedly, we will posit that there is no direct cost for firms or benefit for consumers from increased competition. An increase in competition is indeed relatively costless when, in a search environment, a comparison website increases competition, in the sense of increasing the within-elasticity  $\eta$ . Another example of costless increase in competitive intensity is a strengthening of antitrust enforcement that has the effect of reducing tacit collusion. A third example is an increase in the number of licenses (e.g. of taxi medallions). Of course, it may also cost to increase competition. For example, an entry subsidy reducing the fixed cost of entry for firms would have to be accounted for in the welfare analysis. But these are standard considerations in antitrust and industrial organization, and therefore likely to be accounted for by analysts.
3. *Should the drivers of socially irresponsible behavior be included in the social welfare function?* In the case of an externality or an internality, the decision-maker does not internalize the damage done to someone else or to the future self. Should the decision-maker’s benefit from selfish/impatient behavior be included in social welfare? We will take the answer to be “no”. In the case of an internality, we thereby follow the standard approach in public finance of looking at welfare from the point of view of the long-term self.
4. *Should the drivers of socially responsible behavior be included in the social welfare function?* This is a more difficult question. There is some disagreement among economists as to whether warm glows (here the suppliers’, consumers’, workers’ and investors’ internalization of welfare) should be counted as part of welfare. The case in favor of

doing so is that warm glows drive individual behavior and that social welfare should reflect individual preferences. On the other hand, including warm glow gives rise to some paradoxes.<sup>42</sup> See Akkinson (2009), Bergstrom (2006), and Diamond (2006) for discussions of the pros and cons. In the following, we will not account for warm glow, but our conclusions would not be affected if we did: The irrelevance result implies that we can take ethical behavior as a given when altering the intensity of competition: See footnote 45 below.

For conciseness we will focus on a symmetric equilibrium  $(p^*, a^\dagger)$ . We take the antitrust authority's objective function to be  $U + \chi\Pi$  where  $U$  is the consumers' material surplus and  $\Pi$  is industry monetary profit. The parameter  $\chi \in [0, 1]$  is the weight put on profit; it is equal to 1 in the usual definition of welfare and to 0 under the consumer-standard mission given to many antitrust authorities.

### 3.3.2 The covered market case

In the covered-market case, total output is  $Q = 1$ . Letting  $v$  denote the consumers' (average) valuation for the good or service,  $U = v - p^* + W(a^\dagger)$  and  $\Pi = p^* - c(a^\dagger)$ . So total welfare is

$$v - (1 - \chi)p^* - \chi c(a^\dagger) + W(a^\dagger).$$

Using the equilibrium condition,  $a^\dagger$  is constant (Proposition 2, applied to the symmetric case, yields  $c'(a^\dagger) + \phi'(a^\dagger) = \alpha W'(a^\dagger)$ ), and welfare increases with (is constant in) the intensity of competition if  $\chi \in [0, 1)$  (resp.  $\chi = 1$ ). The antitrust presumption that competition is good for welfare carries over under ethical concerns<sup>43</sup>.

### 3.3.3 The non-covered market case

More generally, it is important to distinguish between the within-elasticity (between individual products in the industry), and the across-elasticity (giving the overall elasticity relative to the outside good). The latter plays a role when the market is not covered. In that case, there is a horserace between the standard welfare gain from more competition and for example a higher or lower externality from market expansion.

Let's take the Cournot example. Let  $F(v)$  denote the distribution of valuations (so the across-semi-elasticity is  $f/(1 - F)$ ). Letting  $v^* \equiv p^* + \phi(a^\dagger) - \phi(a_0)$  denote the cutoff,

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<sup>42</sup>For example, depriving someone of income and giving another person the opportunity to help the former may create social value.

<sup>43</sup>Suppose we accounted for warm glows in the social welfare function. The latter would then write:

$$[v - [p^* + \phi(a^\dagger)] + (\alpha_I + \alpha_W)W(a^\dagger)] + \chi[p^* - (\gamma(a^\dagger) - (\alpha_I + \alpha_W + \alpha)W(a^\dagger))]$$

where  $\alpha = \alpha_i$  for all  $i$  is the suppliers' common internalization parameter. So the derivative of social welfare with respect to  $p^*$  is again  $-(1 - \chi)$ .

welfare is equal to

$$\int_{v^*}^{+\infty} [v - (1 - \chi)p^* - \chi c(a^\dagger)] dF(v) + [1 - F(v^*)]W(a^\dagger) + F(v^*)W(a_0).$$

Suppose that competition becomes more intense, leading to a decrease in  $p^*$ . The derivative of welfare w.r.t.  $p^*$  is:

$$-(1 - \chi)[1 - F(v^*)] - f(v^*) \left[ \chi[p^* - c(a^\dagger)] - [[W(a^\dagger) - W(a_0)] - [\phi(a^\dagger) - \phi(a_0)]] \right].$$

The first term of this derivative was already present in the covered-market case and captures the inframarginal consumers' monetary gain from increased competition. This term is necessarily dominant if the across-semi-elasticity  $f/(1 - F)$  is not too large.

The first element in the “market expansion” term (proportional to  $f(v^*)$ ) is the weight  $\chi$  on profit times the markup,  $p^* - c(a^\dagger)$ , which is always positive. It reinforces the direct price decrease impact,  $(1 - \chi)[1 - F(v^*)]$ . To make the last term more concrete, assume that  $W(a) = -\psi(a)e$ , where  $e$  is a pollution externality, and  $\phi(a) = \alpha_C W(a)$ , with  $\alpha_C < 1$  (less than full internalization). Then

$$[W(a^\dagger) - W(a_0)] - [\phi(a^\dagger) - \phi(a_0)] = [1 - \alpha_C][W(a^\dagger) - W(a_0)].$$

This term's sign depends on whether the market is more or less moral than the outside option: For example, using natural gas is bad for greenhouse emissions and certainly worse than not using energy or using a clean one (then  $a^\dagger < a_0$ ), but is good if the outside option is to reopen coal mines (then  $a^\dagger > a_0$ ). So a more intense competition increases welfare unless the demand is very elastic and production is much less moral than non-production.

## 4 When does competition alter moral choices?

Are the widespread opinion that competition erodes morality and the discussion around the related replacement effect groundless? Proposition 2 suggests answers to this question. An impact of competition on (consequentialist) moral behavior must be related to prices not being flexible (whether constrained by regulation –Section 4.1–, solvency or the corporate charter –Section 4.2). If so, should we expect market morality to increase or decrease with the intensity of competition?

### 4.1 Regulated prices in symmetric oligopoly

**Definition** (*symmetric oligopoly*). The oligopolistic market is symmetric if

- (i) suppliers have the same cost function ( $c_i(a_i) = c(a_i)$  for all  $i$ ), symmetric demand functions ( $D_i(\hat{p}_i, \hat{\mathbf{p}}_{-i})$  is invariant to permutations of  $\hat{\mathbf{p}}_{-i}$  and  $D_j(\hat{p}_i, \hat{\mathbf{p}}_{-i}) = D_i(\hat{p}_i, \hat{\mathbf{p}}_{-i})$  for all  $(\hat{p}_i, \hat{\mathbf{p}}_{-i})$ ), and the same social preferences ( $\alpha_i = \alpha$  for all  $i$ );

- (ii) the functions  $\phi$ ,  $c$  and  $W$  are the same for all firms;
- (iii) the market is covered.<sup>44</sup>

By “symmetric equilibrium”, we will mean an equilibrium in which all suppliers pick  $a_i = a^*$  for some  $a^*$ , and the market is covered. Suppose that prices are regulated at level  $p$ . The strategic complementarity between moral choices (Proposition 1) makes multiple equilibrium norms common. Online Appendix D establishes assumptions that guarantee equilibrium uniqueness and allow us to prove the comparative statics stated in the following proposition. It demonstrates the sharp contrast between the case of irresponsible consumers (for which an increase in competition makes the market less moral) and that of responsible consumers (where an increase in competition makes the market more moral):

**Proposition 4** (*impact of competition on ethics under regulated prices*). *Consider a symmetric oligopoly, and suppose that there exists a unique symmetric equilibrium under regulated price  $p$ . The symmetric-equilibrium level of ethics is given by*

$$\frac{\alpha W'(a^*) - c'(a^*)}{\phi'(a^*)} = \eta(p, a^*)L(p), \text{ where } L(p) = \frac{p - c}{p}.$$

- (i) *Suppose that an exogenous parameter  $\sigma \in (0, \infty)$  (e.g. a substitutability parameter<sup>45</sup> or the number of firms) moves the elasticity  $\eta(p, a^*; \sigma)$  with  $\partial\eta/\partial\sigma > 0$  and  $\lim_{\sigma \rightarrow \infty} \eta = +\infty$ . Then, with irresponsible consumers, the equilibrium level of ethics  $a^*$  is decreasing in the intensity of competition ( $\sigma$ ) towards the ethic-free outcome, that obtains ( $a^* = 0$ ) under perfect competition ( $\sigma = \infty$ ). Instead, with responsible consumers and  $\phi(a) = -\alpha_C W(a)$ , the equilibrium level of ethics  $a^*$  is increasing in the intensity of competition towards the socially desirable level  $\bar{a}$ , that obtains under perfect competition.*
- (ii) *With irresponsible consumers, the equilibrium level of ethics  $a^*$  is decreasing in the fixed price ( $p$ ), from the socially desirable level  $\bar{a}$  for  $p = c$  to the ethics-free outcome 0 as  $p$  tends to  $\infty$ .<sup>46</sup>*

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<sup>44</sup>A covered market combined with the symmetry among the  $n$  suppliers will imply that the firm’s social responsibility index is equal to 0 in equilibrium. In contrast, if the outside option has positive market share, there is no reason why the associated welfare,  $w_0$ , be equal to the welfare generated by the suppliers,  $w^*$ , and that  $S_i = 0$  in equilibrium. In general, there cannot be symmetry between the options offered to the consumers if the outside option is binding.

<sup>45</sup>Suppose for instance a linear demand system:  $D_i = \frac{1}{n} - \sigma[\hat{p}_i - \frac{\sum_{j \neq i} \hat{p}_j}{n-1}]$ . Then, at a symmetric equilibrium,  $\eta(p, a^*)L(p) = [\sigma n p] \left[ \frac{p-c}{p} \right] = \sigma n(p-c)$ . So the substitutability parameter  $\sigma$  and the number of firms  $n$  are alternative measures of how competitive the industry is.

<sup>46</sup>With responsible consumers, when  $p = c$ , we also have the socially-efficient level of ethics  $\bar{a}$ ; with higher prices,  $a^*$  can thus only go down; but for very high prices, raising  $a_i$  is very attractive, since it is the only way to gain market share and so there is an incentive to go all the way to  $\bar{a}$ . Of course, for very large  $p$ , the assumption that the market is covered becomes much less plausible.

(iii) *The equilibrium level of ethics  $a^*$  is increasing with  $\alpha \in [0, +\infty)$  from the profit-maximizing level (which is the ethic-free outcome  $a^* = 0$  for irresponsible consumers, but not for responsible consumers) to the socially efficient level ( $\bar{a}$ ).*

## 4.2 Asymmetries and financial viability

Regulation is only one reason why a firm's price may not be flexible. A break-even constraint may prevent the supplier from cutting price below cost. Such a downward price rigidity may in turn originate from an asymmetry in preferences (say, a firm is more virtuous than its rivals and may lose money) or in corporate charter (the firm may have the nonprofit status, say). Regarding the latter possibility, it is often argued that industries that are highly exposed to ethical choices, such as health and education, are particularly suited to the non-profit paradigm.<sup>47</sup> Is this so? Should we expect not-for-profit hospitals or schools to behave differently when in competition with for-profit entities? Furthermore, one would want to understand how competition among for-profits with different ethical objectives plays out. To contrast it with Section 4.1, we assume in the entire section that prices are unregulated.

To encompass both forms of asymmetry, we allow suppliers to differ in their corporate forms and/or their ethical values. To avoid compounding multiple sources of heterogeneity, we assume that the suppliers face symmetric demand and cost functions. Suppliers  $i \in \{1, \dots, n_1\}$  are for-profit suppliers ranked by the intensity of their social preferences:<sup>48</sup>

$$0 < \alpha_1 \leq \alpha_2 \leq \dots \leq \alpha_{n_1}.$$

As earlier, we denote by  $a_i^\dagger$  the level of morality given by condition (6) ( $\alpha_i W'(a_i^\dagger) \equiv c'(a_i^\dagger) + \phi'(a_i^\dagger)$ ), with  $a_1^\dagger \leq \dots \leq a_{n_1}^\dagger$ . Suppliers  $i \in \{n_1 + 1, \dots, n\}$  are not-for-profits; note that the absence of profit motive implies that their objective function is  $\alpha_i \mathcal{W}_i$ , and so their social preferences do not matter whenever  $\alpha_i > 0$ , which we will assume.<sup>49</sup>

To handle such asymmetric environments, we further strengthen our assumptions:

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<sup>47</sup>Indeed, many health and school providers around the world are not-for-profit entities, when not state-owned.

<sup>48</sup> $\alpha_1 = 0$  is allowed as well (taking the limit as  $\alpha_1 \rightarrow 0$ ). We assume  $\alpha_1 > 0$  for expositional simplicity.

<sup>49</sup>We could assume that firms with different corporate status attract employees with different social preferences (see e.g. Besley-Gathak (2005), Prendergast (2007), Brekke-Nyborg (2008), Kosfeld-von Siemens (2011), Lazear et al (2012), Barigozzi-Buranib (2019); for field experiments on sorting and prosociality, see Ashraf et al (2020) and the references therein). A motivation for this assumption on the empirical side is assortative matching (not-for-profits attract more ethical employees), although it is not clear that working for a not-for-profit is necessarily the moral thing to do for someone who wants to have a strong ethical impact (Singer 2015). The same holds for entry decisions into an industry. It may well be that entering an immoral industry in which one can make a difference is more moral than entering an ethical one (Moisson (2020) shows that the moral pecking order is highly context specific; a known example of this general point concerns socially responsible investment, for which best-in-class strategy may have a bigger impact than the exclusion of sin stocks. See also Green-Roth (2020)).

Of course, there may be no such thing as a pure not-for-profit. Insiders may manage to convert profits into private benefits; private benefits are an inefficient currency, but more to the point, such conversion of profits would reinstate a role for the not-for-profit suppliers' exact level of altruism.

**Assumption 4** (*linear demand system, covered market*) In the relevant-prices range, the demand system is  $D_i = \frac{1}{n} - \sigma \left[ \hat{p}_i - \frac{\sum_{j \neq i} \hat{p}_j}{n-1} \right]$ , and so the market is covered.

An important property of this linear demand system is that firm  $i$ 's change of behavior impacts other suppliers symmetrically.<sup>50</sup> Indeed, letting  $\bar{w}_{-i} \equiv \frac{\sum_{j \neq i} w_j}{n-1}$  denote the average welfare footprint of  $i$ 's rivals, the social responsibility index is

$$S_i = \sigma(w_i - \bar{w}_{-i}).$$

**Assumption 5** (*financial viability*) Suppliers must be financially viable:  $p_i \geq c(a_i)$  for all  $i$ .

To illustrate the rationale for Assumption 5 in the case of for-profits, consider an otherwise symmetrical duopoly situation in which one supplier is more ethical than its rival, prices are flexible, cutting ethical corners boosts demand and not cost ( $c(a_i) = c$  for all  $a_i$ ) and finally there exists an interior welfare-maximizing action  $\bar{a}$  (such that  $W'(\bar{a}) = 0$ ).<sup>51</sup> Supplier 1 is selfish ( $\alpha_1 = 0$ ), and therefore selects  $a_1 = 0$ ; supplier 2 is a saint ( $\alpha_2 = +\infty$ ), and therefore, in the absence of financial constraint, selects  $a_i = \bar{a}$  and is willing to set any price that will take market share away from firm 1: A deep-pocket, very ethical supplier would lose money when facing a much less ethical rival.<sup>52</sup>

Assumption 5 deserves a couple of further comments. First, ignoring the issue of access to capital, Assumption 5 is irrelevant when differentials in social preferences are “not too large”; what this exactly means depends on the intensity of competition.<sup>53</sup> Second, Assumption 5 is innocuous in the absence of investors who have strong social preferences and are willing to foot the bill for virtuous actions. To be certain, one can think of undertakings that are financed by such investors (like some big NGOs or foundations), but the thrust of the debate on market morality is on firms that must at the very least break even (whether for-profits or not-for-profits).

We will say that there is a *race to the supplier ethical bottom* if

$$\lim_{\sigma \rightarrow +\infty} a_i = a_1^\dagger \quad \text{for all } i.$$

In particular, in the limit in which one of the suppliers is a pure profit maximizer, a race to the supplier ethical bottom implies that competition prevents any pro-social behavior originating from *supplier* social preferences. As we will later observe, though,  $a_1^\dagger$  still reflects the stakeholders' social preferences and therefore ethical behavior need not converge to 0.

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<sup>50</sup>For example, one can construct strongly asymmetric linear demand systems for which Proposition 6 does not hold.

<sup>51</sup>This is the case in all examples provided as microfoundations in Online Appendix A.

<sup>52</sup>For perfect substitutes, supplier 2 loses  $\phi(\bar{a}) - \phi(0) > 0$ .

<sup>53</sup>For example, for a duopoly (with  $\alpha_2 > \alpha_1$ ) and demand-based benefits from unethical behavior, a sufficient condition for the financial constraint not to bind is  $1 \geq 2\sigma\alpha_2(w_2 - w_1)$ , where  $\alpha_i W'(a_i) = \phi'(a_i)$  and  $w_i \equiv W(a_i)$ .

**Proposition 5** (*behavioral convergence and race to the supplier ethical bottom*). Assume  $n_1$  for-profits with social preferences  $\alpha_1 \leq \alpha_2 \leq \dots \leq \alpha_{n_1}$  and  $n_2 = n - n_1$  not-for-profits, and flexible prices. Under Assumptions 4-5,

- (i) Not-for-profits behave more ethically than for-profits (there exists  $a^*$  such that  $a_i = a^* \geq a_j$  if  $i > n_1 \geq j$ ). Furthermore, there exists  $1 < m \leq n_1$  such that  $a_i = a_i^\dagger$  for  $i \leq m$  and  $p_i = c(a_i)$  and  $a_i = a^*$  for  $i > m$ . That is, constrained suppliers (all not-for-profits and those for-profits who are financially constrained) adopt the same moral behavior and are more virtuous than the financially unconstrained for-profits.
- (ii) The behaviors of all suppliers converge when competition (as indexed by  $\sigma$ ) is intense: The for-profits mimic the not-for-profits' low price ( $p_i \rightarrow c(a_i)$  for all  $i$  as  $\sigma \rightarrow +\infty$ ), while the latter behave no more ethically than for-profits: There is a race to the supplier ethical bottom:  $a_i \rightarrow a_1^\dagger$  for all  $i$  as  $\sigma \rightarrow +\infty$ .
- (iii) Suppose that initially there are only not-for-profits. Under intense competition, the entry of a single for-profit changes the not-for-profits' moral behavior from the socially optimal level  $\bar{a}$  to the low level  $a_1^\dagger$  (and maintains the price close to marginal cost).

Part (i) of the Proposition (proved in Online Appendix E) says that the more virtuous among the for-profits are financially constrained and therefore behave like not-for-profits. Their scruples makes them less attractive (in the case of demand-based benefits of unethical behavior) or face a cost disadvantage (for cost-based benefits), making it more difficult to compete for market share and even to break even. This holds for any intensity of competition  $\sigma$ . Part (ii) looks at intense competition. Under intense competition for consumers, suppliers end up charging similar net prices. The for-profits must lower their markup toward 0 to not lose all demand, while the not-for-profits must pander at (approximately) level  $a_1^\dagger$  for the same reason. Competition homogenizes behavior across corporate forms and ethical preferences. Convergence happens toward the low-price, low-ethics “anchor” ( $p = c(a_1^\dagger)$ ,  $a = a_1^\dagger$ ). Thus not-for-profits have no influence on the market when competition is intense.

*Does intense competition crowd out moral behavior?* Proposition 5 indicates that intense competition crowds out supplier ethics. If firms are all for-profit and for example consumers are responsible, formula (8) derived in the absence of financial constraint in section 2 for each supplier  $i$ :

$$(\alpha_i + \alpha_W + \alpha_I + \alpha_C)W'(a_i^*) = \gamma'(a_i^*)$$

under financial viability becomes in the limit as competition becomes very intense:

$$(\alpha_1 + \alpha_W + \alpha_I + \alpha_C)W'(a^*) = \gamma'(a^*).$$

While intense competition crowds out supplier ethics, it does not do so for the ethical impact of other stakeholders.



Should we expect  $\alpha_1$  to be close to zero when competition in the market is intense? In many countries “shareholder value” has become the key force determining firm behavior (with top management being largely paid in stocks and stock options). But, as argued by Broccardo et al. (2022), this need not imply a pure for-profit behavior without any ethical consideration, since shareholders may have social preferences too. Moreover, the emergence of very large asset managers voting “on behalf of” diversified shareholders and owning stakes in many big players of key markets in the economy is a trend that could reduce the variance of supplier altruism.

Finally, Online Appendix F analyzes when competition should be expected to weed out suppliers with high ethical standards or a nonprofit status (Gresham’s law).

## 5 Relevance

### 5.1 Connection to real world markets

While the broad question of the morality of markets is ancient, it has been prominent in some recent policy discussions.

First in the matter of antitrust policy. The Biden administration’s heads of the DOJ and the FTC, and the White House advisor on competition policy have pledged to crack down on buyout groups and their “buy, strip and flip model”. Targeting private equity firms as deal sponsors is new territory, as it departs from the antitrust focus on conducts and transactions. This debate on private equity and antitrust would be meaningless, were all private entities pure profit maximizers as is assumed in much industrial organization. Instead, the underlying view here is that some entities are more assertive profit maximizers, which may create more collateral damages for some stakeholders. Proposals for the revision of the 2011 antitrust guidelines in Europe have also put moral issues at the center stage.<sup>54</sup>

Ethical debates linked to the intensity of the pursuit of profit are, unsurprisingly, ubiquitous in the healthcare sector, an area where ethical stakes are very high as patients are often ill-informed.

Scholars have studied the competition between not-for-profit and for-profit hospitals. Proposition 5 is consistent with evidence on the hospital sector. As argued in classic work by Weisbrod (1988) and Hansmann (1996), not-for-profits have historically been an important commitment device against excesses associated with the profit motive (see also Besley-Ghatak 2005). In recent decades, though, for-profit hospitals have made

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<sup>54</sup>They “aim to make it easier for undertakings to cooperate in ways which are economically desirable and thereby, for example, contribute to the green and digital transitions and to fostering the resilience of the internal market”. This statement is directly connected with what the social responsibility of business should be. See also the sustainability chapter (chapter 9) of the recent EC Guidelines on the applicability of Article 101 of the Treaty on the Functioning of the European Union to horizontal co-operation agreements.

inroads in the sector, and, unsurprisingly, have been shown to put more emphasis on profit-related managerial compensation (Ballou-Weisbrod 2003) in comparison with their not-for-profit peers, consistently with part (i) of Proposition 5. In support of part (ii) of that proposition, Arnould et al. (2005) show that more competition from for-profit hospitals leads to a higher importance of the “profit motive” (i.e. net financial income) among not-for-profit ones, both in terms of the structure of managerial compensation and of managerial turnover decisions (and this is understood by donors, who reduce their contribution as a result of this weakening of the not-for-profit mission).

Observers have also contrasted the ethical performances of for-profit entities in the pharmaceutical industry differing in their governance. For example, US generics drug maker Impax sale in 2015 of its US rights to the Daraprim brand to privately-held Turing Pharmaceuticals was blamed for the 56-fold increase in the price of this antiparasitic drug, hurting patients. Another spectacular example is Purdue Pharma, a privately-held family firm that became hugely profitable through aggressive and deceptive marketing.<sup>55</sup> In conformity with Propositions 1 and 5, the strategy of Purdue Pharma, the undisputed leader in the opioid crisis, had a strong contamination effect on other players in the industry.

Observers have more broadly expressed concerns about private equity (PE) groups’ impressive indent into the US hospital sector.<sup>56</sup> In this respect, the nursing-home-sector study by Gupta et al. (2021) concludes: *“PE ownership increases the short-term mortality of Medicare patients by 10%, implying 20,150 lives lost due to PE ownership over our twelve-year sample period. This is accompanied by declines in other measures of patient well-being, such as lower mobility, while taxpayer spending per patient episode increases by 11%. We observe operational changes that help to explain these effects, including declines in nursing staff and compliance with standards. Finally, we document a systematic shift in operating costs post-acquisition toward non-patient care items such as monitoring fees, interest, and lease payments”*.

Our theory sheds light on the link between the intensity of competition and equilibrium ethics in a world where “intrinsic ethical urges” (the  $\alpha$ ’s, which we take as reduced form to represent the (inverse) power of the individual supplier’s incentives can vary. However our irrelevance result shows that reducing competition per se is unlikely to solve the

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<sup>55</sup>Downplaying the addiction risk of its blockbuster Oxycontin, tying half of the compensation of its representatives to the prescription behavior of “their” medical doctors, and offering Oxycontin samples that would be free only for a limited time periods. These various practices were already discussed in a 2003 official report (see US General Accounting Office, 2003).

<sup>56</sup>Ethical concerns were for example relayed by Robeznieks (2022), who summarizes the conclusions of a recent American Medical Association roundtable as follows: *“PE funds can help spur innovations or provide stable funding for workers’ pensions, but investor expectations for a quick return on investment may clash with a medical practice’s long-term sustainability and physicians’ ethical demands”*. And he adds that, in this roundtable, the immediate past chair of the AMA-PPPS (Private Practice Physician Section) Governing Council, noted that “this group, more than others, is not anti-profit given that section members often view themselves as—among other things—small business owners. But the problem is if the profit is a beginning and an end to itself, added an AMA member. It has no empathy, sympathy or engagement with the consumer ... which is the patient”

problem. In fact, Proposition 2 suggests that competition authorities can safely push for more competition without having to fear negative ethical consequences, at least as long as its actors do not significantly differ in terms of greed.

Instead, the model indicates that the governance of suppliers matters. While it is difficult to observe the moral preferences of managers, our theory indicates that high-powered incentive schemes tend to reduce market morality, consistently with Gupta et al. (2021). And that the existence of for-profit suppliers may be ethically “dominant” in that not-for-profit suppliers may have to mimic for-profits’ low-ethics choices if consumers are irresponsible and competition is intense, consistently with Arnould et al. (2005). On a more positive note, the ethical urges of other stakeholders (responsible consumers, workers and investors) will not be hampered under such circumstances, and can be “encouraged” for example by the transparency of supplier ethical choices.

Overall, our model stresses that, for markets where ethical worries are significant (due to externalities, internalities or shrouded attributes) and hard to regulate away, there is value in mitigating the pursuit of profit, a concern of the by-now large CSR/ESG literature. Our value added here is to say that policy instruments on this dimension, from transparency to board composition to the choice of legal form (like that of a Benefit Corporation, which protects managers in case they diverge from pure profit maximization to pursue predefined societal objectives) should be the focus of attention, rather than trying to weaken product market competition.

## 5.2 Experimental evidence

Our theoretical framework can be related to the evidence on the replacement effect. Falk et al (2020) show that (the perception of) pivotality is key to sustaining moral behavior. Their baseline experiment has full pivotality, with a single subject deciding between “killing a mouse” (not saving a surplus mouse) and forgoing 10 €. In the treatment, each subject can choose between unconditionally forgoing 10 € and giving the mouse a chance to survive, which will happen only if all 7 other subjects also abandon 10 € (which is unlikely). Many more choose to keep the 10 €. This experiment points at consequentialist preferences rather than deontological ones and at the potency of the replacement effect.<sup>57</sup> Falk et al’s findings are consistent with Proposition 4 (i): The stakes are fixed (10 €), but the probability that the monetary sacrifice delivers the morally right action decreases with the reduction in pivotality.

Bartling et al (2015) run experiments in settings similar to our “socially responsible consumers/cost benefits from cutting ethical corners/flexible prices” case. “Sellers” both set prices and a production technology: They choose between a costly & clean good and a cheap & polluting one. Bartling et al ask, will the cheapest, polluting good be delivered in a competitive market, as the replacement effect would suggest? They find, to the

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<sup>57</sup>Bartling and Ozdemir (2021) demonstrate that the replacement effect is less prevalent when there is a strong social norm.

contrary, that “increased competition does not diminish the degree of concern exhibited toward externality-bearing parties outside of the market”, consistently with Proposition 2.

## 6 Related literature

Dufwenberg et al (2011) and Sobel (2015), like us, assume some form of non-standard preferences, and then derive conclusions regarding the nature of market outcomes. Both papers derive conditions under which other-regarding preferences (ORPs) make no behavioral difference relative to selfish preferences. In both papers, the absence of market power is key to the result. In Dufwenberg et al. (which only allow for consumer, and not producer, ORPs), this is in the context of a Walrasian setting, in Sobel perfect competition emerges as the limit of a standard double auction (with one good and money) with anonymous trading in large economies. Sobel also extends the analysis to the existence of market power and identifies conditions under which ORPs do not make a difference either.

At first glance our results may seem to be drastically at odds with those in Dufwenberg et al and Sobel. With flexible prices, our firms adopt the same behavior regardless of the intensity of competition: In many circumstances, a monopolist behaves as morally as firms under intense competition; what is irrelevant for moral behavior in our model is the intensity of competition, not social preferences like in these two papers. The difference in conclusions naturally can be traced to the different assumptions.

Dufwenberg et al and Sobel assume that one can only affect others’ utilities through one’s impact on others’ quantities traded or the market price. Dufwenberg et al study a standard multi-good Walrasian setting. Indeed, next to a separability assumption (consumers’ ordering over feasible consumptions is independent of other’s choices, an assumption we also make), they assume that consumer  $i$ ’s preferences can be represented by a utility function  $V_i(m_i(x_i), x_{-i}, B)$  where  $m_i(x_i)$  is the material utility from consumption vector  $x_i$ ,  $x_{-i}$  is the vector of consumptions by others, and  $B$  are the agents’ budget sets. This framework allows for externalities as well as inequality aversion (Velez 2017), but they exclude some key consequentialist internalizations: in particular, they do not consider as ORP the fact that an individual may want to change her consumption basket just because it is objectionable to others, even if this does not affect their ability to trade. Another difference with their framework is that decisions are interdependent in ours: A supplier’s moral action conditions the support of its stakeholders and therefore affects the supplier indirectly as well as directly. Finally the additional assumption on preferences which guarantees irrelevance of ORPs is that individuals prefer to make a desirable trade themselves rather than let another individual make exactly the same trade, an assumption which we also make but is not consequential in our framework.

Next to our general irrelevance result, we provide a precise identification of environments in which the intensity of competition makes markets more or less moral. While in the limit supplier ethics may be crowded out fully (i.e. only the lowest  $\alpha_i$  matters), other stakeholders' ethical urges remain relevant even under these circumstances.

The paper also has a strong connection with the corporate social responsibility (CSR) literature.<sup>58</sup> A prominent view of CSR equates it with “delegated philanthropy”. The firm is a channel for the expression of citizen values; as in our model, consumers may be willing to pay a bit more for fair coffee,<sup>59</sup> investors may accept getting a smaller return from green funds, and workers may take a wage cut when employed by an NGO. A profit-maximizing company then maximizes profit as they pass through the higher cost or the lower return to the stakeholders. This view is embraced in Aghion et al. (2019), Besley-Ghatak (2007), Besley-Persson (2019), Green-Roth (2020), Landier-Lovo (2020), Moisson (2020), Oehmke-Opp (2020) and Barigozzi and Tedeschi (2015, 2019). Focusing on the impact of the intensity of competition, Aghion et al. formalizes CSR behavior as a quality parameter, and shows that under some conditions competition induces greener behavior and tests this hypothesis. And Weber and Zhang (2021) find experimental support for our result that competition fosters ethical behavior when consumers are willing to pay more to those suppliers who stand for their values (they show that there is indeed such a willingness to pay and that the suppliers react by incurring costs to express support to the causes that are favored by the buyers).

An alternative view of CSR is “insider-initiated corporate philanthropy”, namely philanthropy that clashes with profit-maximization.<sup>60</sup> This is the approach taken in Hart-Zingales (2017) and Broccardo et al (2022), where shareholders compare their monetary gains with the ethical impact of their actions. This tradeoff has “bite” when they vote at the general assembly or board of directors, since both impacts are non-zero only if their vote is pivotal. By contrast, this leads them to focus solely only on monetary gains when they buy shares (there is no socially responsible investment), since they rationally

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<sup>58</sup>See, e.g., the taxonomy in Bénabou-Tirole (2010). The suppliers' role in shaping the morality of markets is in line with Henderson (2020)'s view of managers as key engines for “reimagining capitalism”. That economic agents in general may behave altruistically has received support in experimental economics and is a common assumption in the theoretical literature on social responsibility (see e.g. Besley-Ghatak 2018, Broccardo et al 2020, Green-Roth 2020, Hart-Zingales 2017, Landier-Lovo 2020, Oehmke-Opp 2020).

<sup>59</sup>Conversely, responsible consumers can boycott firms that behave unethically, in the tradition of Baron (2001) and subsequent papers of his and Egorov and Harstad (2017) in a dynamic context. Feddersen and Gilligan (2001) show that “activist intermediaries”, who are better informed than consumers about supplier behavior, can help coordinate such boycott strategies and thereby push supplier actions towards more ethical behavior.

<sup>60</sup>Even leaving aside the agency literature, there is of course a long tradition of analyses of non-profit-maximization goals: Beckerian discrimination theory, labor-managed firms, etc. Becker (1957) made the point that (perfect) market competition weeds out those suppliers who have a preference for discrimination. There is complementary with our results, since he considers situations where suppliers ‘enjoy’ an immoral behavior that raises the cost of business, namely the wage bill. He also argues that purely profit-maximizing (and thus unprejudiced) suppliers will “cater” to the prejudices of consumers. This is consistent with the results derived from limit results of our model when  $\alpha_i = 0$ .

expect not to be pivotal and therefore affect the company’s future actions only with a tiny probability, a “leakage” that is also present in Green-Roth (2020) and Moisson (2020). Broccardo et al (2022) extend the analysis in a model where they endogenize investor divestments and consumer boycotts (which they call “exit” mechanisms) where individual investors and consumers internalize their (nonzero) impact on firm behavior on aggregate social surplus. In their model, under social preference parameters consistent with experimental evidence, divestments and boycotts are insufficient and shareholder engagement through voting (“voice”) is socially preferable.<sup>61</sup> This “insider-initiated corporate philanthropy” literature can be seen as an ‘input’ to our model in that it focuses on how institutions shape suppliers’ ethical urges, i.e. their  $\alpha_i$ ’s where we then look at how equilibrium ethics results from the  $\alpha_i$ ’s and the intensity of competition.

To sum up, our paper belongs to these two literatures, as we allow both the supplier and the stakeholders to have social preferences and allow ethical choices to maximize corporate profits or to reduce them. Its unique focus is on the impact of the intensity of competition on market morality and on the predictions of heterogeneity in preferences and corporate form for moral behavior.

Finally, we have a model with two strategic variables,  $p$  (or  $q$ ) and  $a$ , and we look at the interplay between the two as a function of the intensity of competition. Some models in the literature similarly have effort or quality instead of  $a$ . The multi-task incentive literature (e.g., Holmström and Milgrom 1991) stresses that high-powered incentives by a principal may compromise the agent’s provision of non-contractable quality.<sup>62</sup> Relatedly, the paper connects to the literature on not-for-profit firms. This literature emphasizes that the absence of profit motive reduces the incentive to cut on unobservable quality (Hansmann 1980, Glaeser-Shleifer 2001, Besley-Malcomson 2018).<sup>63</sup> Our paper is complementary: It assumes by contrast that the “quality” assessed by consumers is observable (directly, or through word of mouth or reputation) but not necessarily socially desirable; and it looks at a different set of issues (e.g., the convergence of behavior of for- and not-for profit firms as a function of the degree of competition).<sup>64</sup>

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<sup>61</sup>Oehmke-Opp (2020) also emphasizes the benefits of voice exerted by socially responsible investors; in their paper, the latter relax the firm’s borrowing constraint conditional on choosing a clean production process. A recent paper by Herweg and Schmidt (2022) makes the point that managers’ ability to express their social responsibility depends on the institutions designed by the state. They compare cap-and-trade mechanisms and carbon taxes as alternatives for putting a price on carbon. Consequentialist managers behave solely in function of their material interests under a cap-and-trade as total pollution is fixed.

<sup>62</sup>Where quality here is viewed from the principal’s standpoint. In Lazear (1989), two workers are engaged in a tournament. The relative performance determines individual pay raises, which is conducive to “sabotaging”. Itoh (1991) studies optimal incentives for team workers who have individual performance measures but help each other.

<sup>63</sup>For instance, Besley and Malcomson posit that not-for-profits internalize the benefits of various dimensions of quality, although maybe in a paternalistic fashion. Their focus is on the ease of entry by a non-profit facing a for-profit incumbent, and variations thereof, to match the observations on entry in the school and hospitals sectors.

<sup>64</sup>The IO literature on competition and incentives does stress the role of product market competition on firms’ non-price behavior. In that literature, a firm’s manager picks an effort under profit-based compensation, in the same way our suppliers pick a moral action and not solely a price. The “principal”

## 7 Summing up

Critics of market economies have long emphasized that the institutional context may frame our ethical choices. Does that mean that competition- understood as an increase in the number of competitors or in their substitutability or a decrease in search costs- may strengthen incentives to cut ethical corners in order to please the consumer or to cut costs? The paper develops theoretical foundations for this concern, providing its rationale, the reasons why moral choices in general are strategic complements, and an exact identification of the environments in which intense competition affects ethical choices.

The paper embodies two main contributions. First, and importantly for the public debate and public policies, it offers a strong warning against a sweeping condemnation of the market based on the ground that it promotes immoral behavior. Indeed, our central irrelevance result robustly shows that the intensity of competition does not affect behavior as long as (1) individuals and firms are consequentialists, (2) prices are flexible, an assumption that describes well many markets, and (3) technology is characterized by constant returns to scale (understood as the marginal cost of ethical choices being proportional to output). What determines equilibrium ethics in a market is then the set of ethical urges of the players, not the intensity of competition. Overall, the presumption should be that competition, unlike the values of the players, cannot be the overriding source of moral problems in trade; at the very least, it is ill-advised to blame the market for immoral behavior and to question the appropriateness of competition policy, anti-bottleneck regulation and competition through trade, without specifying in detail the nature of competition.

The second contribution is to analyze environments where price flexibility does not apply, either because of regulation, or because of “corner solutions” due to a zero-profit constraint linked with asymmetric competition or a not-for-profit status. When prices are fixed by regulation and consumers are irresponsible, critics of the market are vindicated: more competition among symmetric suppliers fosters immoral behavior. In contrast, an increase in competition fosters moral behavior under fixed prices and socially responsible consumers.

When suppliers differ in their ethics, either intrinsically or because of their corporate mission (some actors’ prices being de facto, although not de jure, constrained, as they must equate revenue with cost), competition can also erode equilibrium ethics. Of course, not-for-profits behave more ethically than for-profit suppliers; and among the latter, more ethical suppliers tend to behave more ethically than less ethical ones. But the key lesson

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of the IO literature corresponds to the stakeholders in our model, who demand a higher moral action; but there is no counterpart in the IO literature to our irresponsible consumers, who play a key role in the replacement effect literature. Besides the rather distinct motivations, the mechanisms described in the literature whereby competition may enhance effort (or not) are different from those in our paper : for example, the information or benchmarking route in Hart (1983) and the desire to avert bankruptcy in Schmidt (1997) which both positively link competition and effort, and the “scale effect”, the idea that effort is a fixed cost which is less valuable under lower market share, which does the opposite in Raith (2003).

is that intense competition in the market leads to a race to the for-profit-supplier ethical bottom (without however changing the impact of other stakeholders' ethical urges on equilibrium ethics). This suggests in particular not mixing corporate forms within the same competitive markets if the goal is to encourage moral behavior.

We saw that the competitive pressure may leave morality unaffected, reduce it or increase it. Does anything go or is the theory testable? The answer is that it is testable, because it makes clear predictions within each situational context. Under consequentialism and flexible prices, we should expect little relation between ethics and the intensity of competition. Under regulated prices and ethics-contingent demand, consumer attitudes will instead be crucial. Take fair trade, say: rich-world consumers enjoy no direct gain from poor farmers' getting a higher income. Their demand is entirely driven by social responsibility and so the prediction is that competition will improve moral behavior by empowering morally conscious consumers. In contrast, in the bribing, performance-enhancing drug, unneeded prescription of opioids or sick days, or product misrepresentation examples, immoral behavior boosts demand. The context offers a clue as to the relevant prediction; this also shows that the apparently-divergent experimental results discussed in Section 5.2 are in fact not inconsistent.



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# Online Appendix

## A Socially irresponsible consumers: The three wedges between consumer and social demands

We provide reasons why demand-side considerations may drive immoral choices. In all cases, there is a wedge between the quality perceived by the customer and that assessed by a social planner; and being more ethical means reducing demand.

*Example 1: Internalities (painkiller prescriptions).* The supplier (a doctor) decides whether to prescribe an opioid to the client (the patient).<sup>65</sup> The fee  $p_i$  paid by the patient is either regulated or competitive, and is paid for the visit, regardless of what the doctor will prescribe. The painkiller brings known benefit  $b$ , but has side effects with cost  $\gamma$ . This cost is observed only by the doctor (who learns who is at risk) and is distributed according to distribution  $G(\gamma)$  and density  $g(\gamma)$ . The doctor chooses a threshold  $\gamma^*$  under which she prescribes the painkiller. Assume that the patient knows  $\gamma^*$ ; one may have in mind that patients know the doctor’s reputation for being easy (“pill mill doctor”) or tough on prescriptions. Welfare is  $b - \gamma$ , but clients have hyperbolic preferences with coefficient  $\beta < 1$ : They long for quick relief and value the prescription at  $b - \beta\gamma$ . And so the surplus of the short-term self,  $u_i$ , and welfare,  $w_i$ , are:

$$u_i = \int_0^{\gamma_i^*} (\beta\gamma - b)g(\gamma)d\gamma \quad \text{while} \quad w_i = \int_0^{\gamma_i^*} (b - \gamma)g(\gamma)d\gamma.$$

The maximum gross surplus of the short-term self corresponds to  $\gamma_i^* = b/\beta$  and is equal to  $u^* \equiv \int_0^{b/\beta} (\beta\gamma - b)g(\gamma)d\gamma$ , yielding  $\underline{w} \equiv \int_0^{b/\beta} (b - \gamma)g(\gamma)d\gamma$ . The welfare optimum corresponds to  $\gamma_i^* = b$ ,  $\bar{u} \equiv \int_0^b (\beta\gamma - b)g(\gamma)d\gamma$ , and  $\bar{w} \equiv \int_0^b (b - \gamma)g(\gamma)d\gamma$ . Letting  $a_i \equiv -u_i$ , one has<sup>66</sup>  $W' > 0 > W''$  over the relevant range  $a_i \in [-u^*, -\bar{u}]$ .

Instances of overconsumption due to imperfect self-control or biases in predicting one’s future behavior are many outside the health domain (excessive indebtedness, gambling, videogaming, impulsive clicking on privacy consent forms...).

*Example 2: Externalities (vaccines, overprescription of branded drugs).* This example replaces the internality of Example 1 by an externality. Patients have heterogenous prob-

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<sup>65</sup>Opioid overconsumption illustrates internalities, given the addictive nature of such painkillers. Opioids represent both a useful treatment for acute pain (e.g. in case of terminal cancer) but also run the risk of addiction without proven medical benefits in the case of chronic pain (e.g. back pain). Opioid overdoses have been called the worst drug epidemic in the history of the United States (McGreal 2018). The crisis has multiple dimensions, including the role of companies like Purdue Pharma in inducing doctors to prescribe their opioid OxyContin. Our paper focuses on doctors’ decision when facing patient demands for opioid prescriptions (see Schnell 2019 for a recent assessment of policies aimed at keeping opioid prescriptions in check).

<sup>66</sup>One has

$$W''(a) = \frac{d}{d\gamma^*} \left( \frac{b - \gamma^*}{\beta\gamma^* - b} \right) / \frac{da}{d\gamma^*} < 0.$$

abilities  $x$  of getting sick in the absence of vaccination, in which case they suffer damage  $d$  and contaminate an expected number  $e$  of other people. Patients are selfish and value being vaccinated at  $E[b - \gamma]$ , where  $b = xd$  is the benefit and  $\gamma$  is a cost of vaccination. The social planner attaches value  $E[(1 + e)b - \gamma]$ . It is easy to check that this externality example is mathematically akin to the internality example, Example 1. After all, an internality is just an externality of the short-term self on the long-term one.<sup>67</sup>

Underconsumption, unlike overconsumption, raises the question of how the supplier can provide a quantity that exceeds the client's desired consumption: A doctor cannot physically vaccinate a patient who refuses to be inoculated. A first interpretation of the underconsumption model goes as follows: When the state mandates children to be vaccinated in order to be able to go to school or public sport facilities, parents may try to obtain a complacent (fake) vaccination certificate from the doctor (underconsumption of vaccines). Similarly, in some countries, occupational physicians may routinely deliver fake medical certificates allowing employees to take paid sick leave (underprovision of work). In both examples, unethical supplier behavior is associated with a fraudulent report to a third party. A second interpretation applies when no law or rule mandates a level of consumption in excess to that desired by the client. Ethical/unethical behavior then relates to the intensity with which the doctor puts pressure on the patient, say to be vaccinated; it may range from attempts at persuasion to outright refusal to keep seeing a patient who refuses the vaccination.

Overconsumption occurs in the case of antibiotics. Another case in point is the overconsumption of branded drugs when generics are available, imposing an externality on the social security system. A fraction of French patients has always viewed generics as inferior products. Until the mid-90s French doctors faced no cost of prescribing branded drugs instead of generics (and pharmacists' compensation was proportional to the price of the drug!). Lo and behold, doctors pandered to their patients and generics' market share was about 2%. A reform introduced incentives for doctors to prescribe generics, and also gave pharmacists the ability to replace a branded drug by an equivalent generic. The share of generics' prescriptions improved, especially with general practitioners (whose patients are more loyal than for specialists, in conformity with the theory developed below). But the low percentage (36%)<sup>68</sup> of generics among prescriptions reimbursed by the social security system suggests that there is still substantial pandering.

*Example 3: Product misrepresentation.* Product misrepresentation implies that the choice of  $a_i$  is unobservable (so a priori consumers are "neutral"). But a lower  $a_i$  increases demand (unlike, say, in the case of unobserved ethical choices affecting third parties. Child labor, pollution, etc). Tobacco companies' advertising failed to warn against the harmful effects of smoking. More generally, firms typically emphasize positive attributes of their

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<sup>67</sup>Underconsumption of vaccines may also be driven by a misperception of their side-effects. For example, a triple jab of the measles vaccine was falsely accused in *The Lancet* of causing autism, which led to a substantial drop in MMR vaccination. Such misperceptions may be captured as an underestimation of the net value of the vaccine, independently of contagion considerations.

<sup>68</sup>Generics penetration in the US, UK and Germany exceeds 80%.



goods and services and rarely their flaws. To be certain, consumer protection agencies' and courts' mission is to combat inappropriate statements or frauds. But there is a thin line between outright misrepresentation and fraud on the one hand, and omission, opaque language and the exploitation of consumer inattention on the other hand. Unexpected obsolescence, vague recommended usage or the downplaying of side effects may not be illegal or else hard to regulate given their ubiquity and the limited means of the agencies. Like internalities and externalities, product misrepresentations leave scope for moral judgment.

One way to formalize this within our model goes as follows: Suppose that the good actually delivers gross surplus  $\hat{u}$  to the consumers. Supplier  $i$  can inflate this surplus and claim it is  $u_i \in [\hat{u}, \bar{u}]$ . Gullible consumers take the announcement at face value (see below for a more rational version) and plan around the announced value, leading to later inconvenience (complementary investments miscalibration, misleading claims made to downstream users...) cost  $\Gamma(u_i - \hat{u})$ , with  $\Gamma(0) = 0$ ,  $\Gamma'(0) = 0$ ,  $\Gamma'(u_i - \hat{u}) > 0$  and  $\Gamma''(u_i - \hat{u}) > 0$  for  $u_i > \hat{u}$ , and  $\Gamma'(\bar{u} - \hat{u}) = +\infty$  for some maximum exaggeration level  $\bar{u} - \hat{u}$ . Again let  $a_i = -u_i$ . Then  $W(a) \equiv -\hat{a} - \Gamma(\hat{a} - a)$  satisfies the general assumptions. Letting supplier  $i$ 's objective function when internalizing the ethical welfare is  $(p_i - c)D_i(\hat{\mathbf{p}}) + \alpha_i[W(a_i)D_i(\hat{\mathbf{p}}) + \sum_{j \neq i} W(a_j)D_j(\hat{\mathbf{p}})]$ . Finally, note that a more rational, asymmetric-information, version of the model would have consumers not know about the misreporting function. For example, with some probability they believe that misreporting is infeasible; the "irrational version" is just the limit of the "rational version" as this probability goes to 1.

## B Verifying global second-order conditions under flexible prices in symmetric oligopoly

Let us check that the tentative equilibrium is a global optimum for each supplier. Let  $D_i(\hat{p}_i, \hat{p})$  denote the demand faced by supplier  $i$  when it charges net price  $\hat{p}_i$  and all others offers the same net price  $\hat{p}$ . Suppose that suppliers internalize  $\mathcal{E}$  (which implies that a symmetric equilibrium is still an equilibrium when they internalize  $\mathcal{E} - \mathcal{M}$ ). Equilibrium behavior requires that there be no  $(p_i, a_i)$  such that

$$[p^* - c(a^*)]D_i(p^* + \phi(a^*), p^* + \phi(a^*)) < [p_i - c(a_i) + \alpha[W(a_i) - W(a^*)]] D_i(p_i + \phi(a_i), p^* + \phi(a^*)) \\ \equiv \mathcal{V}(p_i, a_i).$$

The concavity of  $[\alpha W - c - \phi]$  and condition (6) imply that

$$\alpha[W(a_i) - W(a^*)] \leq [\phi(a_i) + c(a_i) - \phi(a^*) - c(a^*)].$$

So

$$\mathcal{V}(p_i, a_i) \leq [p_i - c(a^*) + \phi(a_i) - \phi(a^*)]D_i(p_i + \phi(a_i), p^* + \phi(a^*)).$$

The maximization w.r.t. the net price for a given moral behavior  $a^*$  by supplier  $i$  implies that for all  $\tilde{p}_i$ ,  $[p^* - c(a^*)]D_i(p^* + \phi(a^*), p^* + \phi(a^*)) \geq [\tilde{p}_i - c(a^*)]D_i(\tilde{p}_i + \phi(a^*), p^* + \phi(a^*))$ . Applying this to  $\tilde{p}_i = p_i + \phi(a_i) - \phi(a^*)$  yields

$$[p^* - c(a^*)]D_i(p^* + \phi(a^*), p^* + \phi(a^*)) \geq [p_i - c(a^*) + \phi(a_i) - \phi(a^*)]D_i(p_i + \phi(a_i), p^* + \phi(a^*)),$$

a contradiction. ■

## C Price discrimination based on moral preferences

Suppose that there are two types of consumers: type  $H$  (moral), in proportion  $\rho$ , and type  $L$  (less moral), in proportion  $1 - \rho$ . The  $H$  type cares more about morality than the  $L$  type:

$$\phi'_H(a) < \phi'_L(a). \quad (\text{C.1})$$

Let us look at the polar cases of pure monopoly and perfect competition (more generally we could consider all degrees of imperfect competition as in Benabou-Tirole 2016 and Garrett et al 2019). The following holds for both the socially responsible and irresponsible consumers.

*Perfect competition*

Equilibrium conditions are:<sup>69</sup>

$$p_L + \phi_L(a_L) = p_H + \phi_L(a_H) \quad (\text{C.2})$$

$$a_H = a_H^\dagger \quad (\text{C.3})$$

$$a_L = a_L^\dagger. \quad (\text{C.4})$$

*Monopoly*

The incentive compatibility condition does not determine who has a rent, which is crucial in the case of a monopoly (but not for perfect competition, as the participation constraints are then not binding).

*Countervailing incentives.* Assume, first, that the  $L$  type has a rent, i.e. moral preferences are individually a nuisance (reduce utility): for  $a < \bar{a}$

$$\phi_H(a) > \phi_L(a). \quad (\text{C.5})$$

Consumer utility is type-independent at  $a = \bar{a}$ :

$$\phi_H(\bar{a}) = \phi_L(\bar{a}) \quad (\text{C.6})$$

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<sup>69</sup>The concavity of the objective functions guarantees incentive compatibility.

Thus, we posit that if there is no moral issue, consumers are not differentiated according to their moral preferences.<sup>70</sup> (a) Responsible consumers: all consumers have the same preferences if there is no pollution, i.e.  $a = \bar{a}$ , but the  $H$  type loses more utility from pollution. (b) Irresponsible consumers: all consumers have the same preferences if there is no corruption, i.e.  $a = \bar{a}$ , but the  $H$  type gains less utility from corruption.

In either case (responsible or irresponsible consumers), the  $L$  type has a rent and the incentive constraint implies that  $a_H \geq a_L$ , implying in turn that  $p_H \geq p_L$  (responsible consumers) and  $p_H \leq p_L$  (irresponsible consumers)

As usual, we will denote by  $a_\theta^\dagger$  the symmetric-information moral action (assuming it is interior):

$$c'(a_\theta^\dagger) + \phi'_\theta(a_\theta^\dagger) = \alpha W'(a_\theta^\dagger)$$

with

$$a_H^\dagger > a_L^\dagger.$$

The IR and IC conditions are

$$p_H + \phi_H(a_H) = v \tag{C.7}$$

and

$$p_L + \phi_L(a_L) \leq p_H + \phi_L(a_H). \tag{C.8}$$

The monopolist solves:

$$\max\{\rho[p_H - c(a_H) + \alpha W(a_H)] + (1 - \rho)[p_L - c(a_L) + \alpha W(a_L)]\}$$

There is no distortion at the top (here at type  $L$ ) and distortion at the bottom:

$$a_H > a_H^\dagger \tag{C.9}$$

and

$$a_L = a_L^\dagger \tag{C.10}$$

where  $a_H$  depends on  $\rho$  according to a slight modification of the standard quality discrimination condition:

$$c'(a_H) + \phi'_H(a_H) - \alpha W'(a_H) = \frac{1 - \rho}{\rho} [\phi'_L(a_H) - \phi'_H(a_H)] > 0. \tag{C.11}$$

There is more moral behavior under monopoly (that is linked with the fact that the immoral type has a rent). There is an interesting analogy with the existing literature here. Starting with Lewis-Sappington (1989), the latter has studied “countervailing incentives”, namely the situation that occurs when a monopolist price-discriminates, “higher types” value quantity or quality more, but have better outside opportunities, so the

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<sup>70</sup>For example, suppose that  $a \in [0, \bar{a}]$  and  $\phi_\theta(a) = \beta_\theta(\bar{a} - a)$  with  $\beta_H > \beta_L$  and  $\beta_\theta > 0$  for socially responsible consumers and  $\beta_\theta < 0$  for socially irresponsible consumers.

individual-rationality constraint binds for the high types. There is then an enlargement of the “quantity/quality spectrum”, rather than the traditional Mussa-Rosen (1978) and Maskin-Riley (1984) compression of that spectrum. That literature does not consider competitive price discrimination, but speaks to why under monopoly highly moral types consume with especially high moral intensity.

*Classical incentives.* Under countervailing incentives, monopoly delivers a higher morality than competition. This suggests the following result: suppose, say, that the outside option pollutes maximally or involves maximal corruption (for instance):  $a_0 = 0$ . Then the  $H$  type is the type who enjoys a rent when dealing with the firm; we are then in the Mussa-Rosen/Maskin-Riley conventional case and we have a lower morality under monopoly than under competition (classical incentives case). More formally, keep the sorting condition (C.1) and replace conditions (C.5) by: for  $a > 0$ ,

$$\phi_H(a) < \phi_L(a) \tag{C.12}$$

and (C.6) by:

$$\phi_H(0) = \phi_L(0). \tag{C.13}$$

The standard proof then shows that under monopoly and if both types are served:<sup>71</sup>

$$a_H = a_H^\dagger > a_L^\dagger > a_L \tag{C.14}$$

while the outcome under competition is still  $(a_H^\dagger, a_L^\dagger)$ . Competition then yields a more moral outcome.

## D Sufficient conditions for equilibrium uniqueness under regulated prices and proof of Proposition 4

Consider an arbitrary fixed price  $p \geq c$ . Let us make an assumption which will ensure the uniqueness of equilibrium and the monotonicity of equilibrium behavior  $a^*$  with respect to the symmetric fixed price  $p$ :

**Assumption 6** *Suppose that the price is fixed at some level,  $p_i = p \geq c$  for all  $i$ . Let  $\eta(p, a^*) \equiv -\frac{\partial D_i(\hat{\mathbf{p}})}{\partial p_i} p / D_i(\hat{\mathbf{p}})$  denote the elasticity of demand in a symmetric equilibrium ( $a_i = a^*$  for all  $i$ ) and  $L(p) \equiv (p - c)/p$  denote the ordinary Lerner index. Then, for all  $a^*$ ,*

$$(i) \quad \frac{\partial \eta(p, a^*) L(p)}{\partial p} > 0,$$

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<sup>71</sup>If only type  $H$  is served, then type  $L$  consumes the outside option and  $a_L = 0$ ; so again monopoly reduces morality.

$$(ii) \quad \frac{\partial \eta(p, a^*) / \partial a^*}{\eta(p, a^*)} \geq \frac{\alpha W''(a^*) - c''(a^*)}{\alpha W'(a^*) - c'(a^*)} - \frac{\phi''(a^*)}{\phi'(a^*)}.$$

Note first that  $\frac{dL}{dp} > 0$ . So for Assumption 6(i) to be satisfied, it suffices that the elasticity of demand does not decrease too fast with  $p$ . For example, the elasticity of demand is proportional to  $p$  (and so is increasing in  $p$ ) when consumers' demand is linear and the market is covered. As for part (ii), it is satisfied for example in the discrete choice model when the market is covered (for which  $\partial \eta / \partial a^* = 0$ ). Assumption 6 (ii) guarantees that there is a unique symmetric equilibrium.

We also assume that the second-order condition is satisfied; a sufficient condition for this is that the demand be linear or concave.

$W'(0) = +\infty$  implies that the continuous function

$$\alpha W'(a^*) - c'(a^*) - \eta(p, a^*) L(p) \phi'(a^*)$$

is positive at  $a^* = 0$ . It is strictly negative at  $a^* = \bar{a}$  (as  $W'(\bar{a}) = 0$ ). Its derivative when it takes value 0 is negative from Assumption 6 (ii). So, the function equals 0 at exactly one value of  $a^*$ .

- (i) Suppose that  $\sigma \rightarrow \infty$ . For  $\phi' > 0$  (irresponsible consumers),  $-\eta L \phi(a)$  tends to  $-\infty$  for a given  $a$ . So either  $\phi'(a)$  tends to 0 or  $\alpha W'(a)$  tends to infinity. The former is inconsistent with  $\phi'' < 0$ . So  $a \rightarrow 0$ .

For  $\phi' = -\alpha_C W'(a) < 0$  (responsible consumers),  $\phi(a)$  must go to 0 as  $\eta$  becomes infinite and so  $a \rightarrow \bar{a}$ .

- (ii) and (iii). The proofs of (ii) and (iii) follow similar lines.

## E Proof of Proposition 5.

Let  $\mathbb{1}_{\mathcal{M}} = 1$  if suppliers internalize full welfare ( $\mathcal{E} - \mathcal{M}$ ) and  $\mathbb{1}_{\mathcal{M}} = 0$  if they internalize only the ethical welfare ( $\mathcal{E}$ ). Let  $\mathcal{M}(\hat{p}_i, \hat{\mathbf{p}}_{-i})$  denote the misallocation cost when firm  $i$  charges  $\hat{p}_i$  while its rivals charge  $\hat{\mathbf{p}}_{-i}$ .

We distinguish three groups. Unconstrained for-profits select a positive mark-up ( $p_i > c(a_i)$ ). Proposition 2 then implies that  $a_i = a_i^\dagger$ . For these suppliers,  $w_i \equiv W(a_i^\dagger)$ . Constrained for-profits have no mark-up ( $p_i = c(a_i)$ ) and therefore behave like suppliers in the third group, the not-for-profits. We gather the latter two groups under the heading "constrained suppliers".

The objective function of supplier  $i$  in any of these three groups is

$$V_i = [\hat{p}_i - \phi(a_i) - c(a_i)] D_i(\hat{p}_i, \hat{\mathbf{p}}_{-i}) + \alpha_i \left[ w_i D_i(\hat{p}_i, \hat{\mathbf{p}}_{-i}) + \sum_{j \neq i} w_j D_j(\hat{p}_i, \hat{\mathbf{p}}_{-i}) - \mathcal{M}(\hat{p}_i, \hat{\mathbf{p}}_{-i}) \mathbb{1}_{\mathcal{M}} \right],$$

where we can without loss of generality adopt the convention that  $\alpha_i = +\infty$  for not-for-profits and constrained for-profits.<sup>72</sup>

Let us show that at least one firm must be unconstrained. Suppose, a contrario, that all suppliers sell at cost. Then in a symmetric equilibrium with moral action  $a^*$ ,  $p_i = c(a^*)$  and  $w_i = W(a^*)$  for all  $i$ . A small increase in the price  $p_i$  of a for-profit then has only a second-order effect on the misallocation (all net prices are equal) and no impact on ethical welfare (as all suppliers select the same  $a_i$ ). This price increase raises profit by  $D_i = 1/n$ . And so not all suppliers can charge their marginal cost.

Using the identity  $\hat{p}_i = \phi(a_i) + c(a_i)$  for all constrained suppliers  $i > m$ , their FOC with respect to  $a_i$  yields  $a_i \equiv a^*$  (with associated welfare  $w^* \equiv W(a^*)$  and individual demand  $D^*$ ), where

$$\frac{W'(a^*)}{\phi'(a^*) + c'(a^*)} D^* = \sigma \frac{\sum_{j \neq i} (w^* - w_j)}{n-1} + \frac{\partial \mathcal{M}}{\partial \hat{p}_i} \mathbb{1}_{\mathcal{M}}. \quad (\text{E.15})$$

Turning to unconstrained suppliers ( $k \leq m$ ), their FOC with respect to  $\hat{p}_k$  is

$$D_k - [\hat{p}_k - \phi(a_k^\dagger) - c(a_k^\dagger)] \sigma - \alpha_k \left[ \sigma \frac{\sum_{j \neq k} (w_k^\dagger - w_j)}{n-1} + \frac{\partial \mathcal{M}}{\partial \hat{p}_k} \mathbb{1}_{\mathcal{M}} \right] = 0. \quad (\text{E.16})$$

The opportunity cost function,<sup>73</sup>  $c(a) + \phi(a)$ , is always increasing in the case of irresponsible consumers; for responsible consumers,  $c(a) + \phi(a)$  is first decreasing (for  $a < \hat{a}$ ) and then increasing (for  $a > \hat{a}$ ), where  $\phi'(\hat{a}) \equiv -c'(\hat{a})$ . Intuitively, choices  $a_i < \hat{a}$  are dominated for supplier  $i$ : They represent immoral actions that have a high cost. So, in the following we will focus on choices in  $[\hat{a}, \bar{a}]$ , where  $\hat{a} = 0$  in the case of irresponsible consumers.

Suppose, first, that  $\mathbb{1}_{\mathcal{M}} = 0$ . To show that constrained firms behave more ethically than unconstrained for-profits, suppose a contrario that  $a^* < a_m^\dagger \Leftrightarrow w^* < w_m^\dagger \Leftrightarrow \phi(a^*) + c(a^*) < \phi(a_m^\dagger) + c(a_m^\dagger)$  for choices  $a^*$  and  $a_m^\dagger$  in the relevant range (above  $\hat{a}$ ). Because  $p^* = c(a^*)$  and  $p_m \geq c(a_m^\dagger)$ ,  $\hat{p}_m > \hat{p}^*$ , and so  $D_m < D^*$ . Now, let

$$E^* \equiv \sum_{j \neq i} \frac{(w^* - w_j)}{n-1} \quad \text{for } i > m$$

and

$$E_m \equiv \sum_{j \neq m} \frac{(w_m^\dagger - w_j)}{n-1}.$$

Conditions (E.15) and (E.16) can be rewritten (when  $\mathbb{1}_{\mathcal{M}} = 0$ ) as

$$\frac{W'(a^*)}{\phi'(a^*) + c'(a^*)} D^* = \sigma E^* \quad \text{and} \quad \frac{W'(a_m^\dagger)}{\phi'(a_m^\dagger) + c'(a_m^\dagger)} D_m \geq \sigma E_m,$$

<sup>72</sup>More precisely, a not-for-profit maximizes the term in brackets in the expression of  $V_i$ .

<sup>73</sup>A unit increase in  $\phi(a)$  can be compensated by a unit decrease in price, implying de facto an increase in cost.

using  $\alpha_m W'(a_m^\dagger) = \phi'(a_m^\dagger) + c'(a_m^\dagger)$ . Because  $W'/[\phi' + c']$  is decreasing,  $\frac{W'(a^*)}{\phi'(a^*) + c'(a^*)} D^* > \frac{W'(a_m^\dagger)}{\phi'(a_m^\dagger) + c'(a_m^\dagger)} D_m$ . On the other hand,  $a^* < a_m^\dagger$  implies that  $E^* < E_m$ , a contradiction.

Condition (E.15) requires that as  $\sigma \rightarrow \infty$ ,  $[mw^* - \sum_{j \leq m} w_j^\dagger]/n$  tend to 0. And so  $w_j \rightarrow w(a_1^\dagger)$  for all  $j$ : The equilibrium exhibits a race to the supplier ethical bottom.

Using condition (E.15), condition (E.16) requires that  $\hat{p}_k \rightarrow \phi(a_k^\dagger) + c(a_k^\dagger)$  as  $\sigma \rightarrow +\infty$ , and so there is convergence to marginal cost pricing. Note also that only suppliers with  $\alpha_k = \alpha_1$  can be unconstrained as  $\sigma$  goes to  $\infty$ .

The equilibrium when  $\mathbb{1}_{\mathcal{M}} = 0$  satisfies  $\hat{p}_i = \phi(a_1^\dagger) + c(a_1^\dagger)$  in the limit as  $\sigma \rightarrow +\infty$ . And so, any small departure from the net price structure has only second-order effects:  $\frac{\partial \mathcal{M}}{\partial \hat{p}_i}(\hat{p}_i, \hat{\mathbf{p}}_{-i})|_{\hat{p}_i = \hat{p}_1 = \phi(a_1^\dagger) + c(a_1^\dagger)} = 0$ . So the equilibrium when only ethical welfare is internalized is still an equilibrium when full welfare is internalized, that is when  $\mathbb{1}_{\mathcal{M}} = 1$ .

Next, suppose that there are only not-for-profits in the industry ( $n_1 = 0$ ). Condition (E.15) yields a uniform moral behavior with  $a_i = \bar{a}$  for all  $i$  (such that  $W'(\bar{a}) = 0$ ),  $p = c(a_i)$  and no misallocation ( $\mathcal{M} = \frac{\partial \mathcal{M}}{\partial \hat{p}_i} = 0$ ). This shows that when competition is intense ( $\sigma \rightarrow +\infty$ ) and when suppliers internalize either the ethical welfare or the full welfare, a single “bad apple” (a for-profit) drastically changes the behavior of not-for-profits and morality (from  $\bar{a}$  to  $a_1^\dagger$ ).

■

## F Gresham’s law of ethical behavior with irresponsible consumers

Do unethical suppliers drive out ethical ones? The proof of Proposition 5 (i) only shows that constrained/ethical suppliers and not-for-profits have higher opportunity costs ( $c(a^*) + \phi(a^*) \geq c(a_k^\dagger) + \phi(a_k^\dagger)$  for an unconstrained firm  $k$ ). But they also have lower markups. To investigate the possibility of a “Gresham law of ethical behavior”, we consider the following simple environment:

**Proposition 6** (*Gresham’s law*) *Consider a symmetric oligopoly with for-profit firms satisfying Assumption 4,  $\phi' > 0$  (irresponsible consumers), and  $c(a) = c$  for all  $a$ . There are  $n_A$  suppliers with social preferences  $\alpha_A$  and  $n_B$  suppliers with social preferences  $\alpha_B > \alpha_A$  (so  $n_A + n_B = n$ ). Consider equilibria in which suppliers’ strategies are  $\{p_A, a_A\}$  and  $\{p_B, a_B\}$  (uniform within a group), and per-firm realized demands are  $D_A$  and  $D_B$ . Suppliers internalize ethical welfare.*

(i) *Under a fixed price ( $p > c$ ), less ethical suppliers command a larger market share:*

$$D_A > D_B.$$

(ii) Under flexible prices and assuming that the financial-viability constraint is not binding (which requires that  $\sigma$  not be too large), there exists  $n_A^* \geq 1$  such that

- $D_A > D_B$  for  $n_A \leq n_A^*$  (this is therefore the case under duopoly)
- $D_A \leq D_B$  for  $n_A > n_A^*$ .

*Proof of Proposition 6* We study sequentially fixed and flexible prices. Suppose that suppliers differ solely in their ethical concerns. Assuming that  $\mathcal{W}_i = \mathcal{E}$  (ethics-based internalization), supplier  $i$  solves:

$$\max \{(p_i - c)D_i + \alpha_i [w_i D_i + \sum_{j \neq i} w_j D_j]\}.$$

*Regulated prices.* Let  $w_i = W(a_i)$  and  $\bar{w}_{-i} = \frac{\sum_{j \neq i} w_j}{n-1}$ . In the fixed-price context,  $p_i \equiv p$  for all  $i$ , and the only decision variable is  $a_i$ . The maximization of supplier  $i$ 's objective function with respect to  $a_i$  yields first-order condition

$$\sigma[(p - c) + \alpha_i(w_i - \bar{w}_{-i})]\phi'(a_i) = \alpha_i W'(a_i)D_i. \quad (\text{F.17})$$

The intuition behind condition (F.17) goes as follows: A unit decrease in  $a_i$  (and so in  $\hat{p}_i$ ) attracts  $\sigma$  new clients, bringing markup  $(p - c)$  on each of them. A unit increase in market share further improves welfare by  $w_i - \bar{w}_{-i}$  (decreases it if  $w_i < \bar{w}_{-i}$ ). Finally, the decrease in the welfare corresponding to the  $D_i$  clients of supplier  $i$  has an ethical cost and a monetary benefit for supplier  $i$ .

Consider two firms  $i$  and  $j$  with types  $B$  for firm  $i$  and  $A$  for firm  $j$ . Suppose that  $a_i \leq a_j$ , implying for socially irresponsible consumers  $\phi'(a_i) \leq \phi'(a_j)$ . Then  $w_i \leq w_j$  and so  $(w_i - w_{-i}) - (w_j - w_{-j}) = \frac{n}{n-1}(w_i - w_j) \leq 0$ , so the LHS of (F.17) is weakly smaller for firm  $i$  than for firm  $j$ . Furthermore  $\hat{p}_i \leq \hat{p}_j$  and the symmetry of the demand functions imply that  $D_i \geq D_j$ . Finally,  $W'(a_i) \geq W'(a_j) > 0$ . This implies that  $\alpha_i W'(a_i)D_i > \alpha_j W'(a_j)D_j$ . And so (F.17) cannot be satisfied for both  $i$  and  $j$ , a contradiction. This proves (i) for this case: *High-ethics firms have a lower market share*, and so  $\hat{p}_i > \hat{p}_j$  or  $a_i > a_j$ .

Next, let us check whether the solution to the FOCs satisfies financial viability and positive demand. Because  $p$  must exceed  $c$  for firms to be financially viable, the financial constraint is not binding. Remembering that more ethical firms have a lower market share, if  $D_B = 0$ , type- $\alpha_B$  suppliers could set ethical choice  $a_A + \varepsilon$  for  $\varepsilon$  small, command a positive market share, make a financial profit and improve overall morality. Hence all suppliers have a strictly positive equilibrium market share.

*Flexible prices.* The first-order condition with respect to  $p_i$  is

$$-\sigma[(p_i - c) + \alpha_i(w_i - \bar{w}_{-i})] + D_i = 0. \quad (\text{F.18})$$

The intuition for (F.18) is similar to that underlying condition (F.17). Furthermore, combining (F.17) and (F.18) yields the irrelevance property in our context:

$$\alpha_i W'(a_i) = \phi'(a_i). \quad (\text{F.19})$$



Do firms with higher ethical concerns still command a lower market share? Condition (F.19) implies that  $a_B > a_A$  and so their ethical choices will make them unattractive to clients. But this is not the end of the story. Their lack of attractiveness calls for lower prices. And their ethical concerns also make them eager to capture market shares away from less scrupulous suppliers, who conversely do not want to gain market share for that specific reason. Subtracting the first-order conditions (F.18) for the two groups and using Assumption 4 yields

$$\left(\frac{2n-1}{n-1}\right)(\hat{p}_B - \hat{p}_A) = \phi(a_B) - \phi(a_A) + (w_A - w_B) \left[ \alpha_A \frac{n_B}{n-1} + \alpha_B \frac{n_A}{n-1} \right].$$

The concavity of  $W$ , the convexity of  $\phi$  and condition (F.19) yields

$$\phi(a_B) - \phi(a_A) + \alpha_A[W(a_A) - W(a_B)] > 0 > \phi(a_B) - \phi(a_A) + \alpha_B[W(a_A) - W(a_B)].$$

Thus there exists  $n_A^* < n$  such that  $\hat{p}_B < \hat{p}_A$  if and only if  $n_A \geq n_A^*$ . In the duopoly case ( $n_A = n_B = n - 1$ ),  $\hat{p}_B < \hat{p}_A$  and so the ethical firm commands a higher market share. Finally, the ethical group's financial viability constraint is not binding for  $\sigma \leq \sigma^*$  for some  $\sigma^*$ . ■

Part (i) of Proposition 6 is intuitive. Under regulated prices, a more ethical firm is less attractive to irresponsible consumers. This handicap in the market place translates into a smaller market share. Part (ii) stresses a force in the opposite direction; namely, under flexible prices, a more ethical supplier can lower price to offset her “quality” disadvantage, and gain market share in particular at the expense of less ethical suppliers; the ethical impact of such undercutting hinges on the “market’s morality”. With few unethical suppliers, the ethical gain is low and an ethical firm still commands a lower market share than an unethical one. By contrast, in a low-morality market, the ethical firm has a big impact when undercutting and ends up commanding a higher market share.

The bottom line of Proposition 6 is that, although ethical suppliers are at a competitive disadvantage due to their scruples, they need not command a smaller per-firm market share: Their moral obligation to make the market ethical makes them fierce competitors in the market place. Indeed, they command a higher market share when there a few of them in proportion to unethical ones.

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