CONSUMER SOPHISTICATION AND CONTRACT DISCLOSURE

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Abstract

The theory of asymmetric information suggests that economic agents tend to use their informational power to exploit other less informed players. In this paper I prove that even in the presence of fully rational consumers who can monitor contract terms at some positive cost, a monopoly seems to assure an outcome which turns out overall less inefficient than in competition. Precisely, I find that competitive sellers may not disclose their terms in equilibrium even if the related cost is very small, and lower than the cost for consumers to monitor; conversely a monopolist may not disclose in equilibrium only if the related cost is higher than the monitoring cost.

Such results overturn the traditional belief that competition among firms, contrary to a monopoly, leads the market to an efficient outcome, and suggest that some regulation which assures information disclosure may turn out helpful to consumers, who gain in terms of payoffs, if the market is competitive.

1 Introduction

The theory of asymmetric information suggests that economic agents tend to use their informational power to exploit other less informed players. Typical examples are offered by most of the markets for goods and services where adverse selection and/or moral hazard usually characterize sellers' strategies against consumers' interests. Precisely, whereas sellers or producers can know the true value of the good or service on sale simply because this is their job, consumers cannot have access to the same source of information on quality, safety and other non-evident features.

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On this point, both lawyers and economists have stressed on the implications of asymmetric information characterizing standard form contracts. Using such an expression lawyers refer to those contracts (1) presented by sellers to consumers in a take-it-or-leave-it form and (2) containing standard terms. The first feature emphasizes the unequal bargaining power between parties: the drafter is usually involved in many transactions of the same type with several different consumers, while the consumer is usually involved in an occasional transaction. It explains why sellers usually include the same terms (for that reason called standard) in every contract, some of which are written in fine print and usually turn out onerous to consumers. Precisely, it is not given (rather, very unlikely) that an ordinary consumer, is immediately able to understand terms written in a technical legal language. For this reason, it is said that understanding the content of fine print implies a cost on the side of the consumer[1].

Economists have focused their attention on this crucial element as shown by the large literature on monitoring or reading costs characterizing standard form contracts. Katz (1990) develops a bargaining model in a form-contract setting involving a seller and a consumer, both drawn from a population of sellers and consumers of various types given by individual's preferences over quality, that is private information on the side of the seller; he shows that the consumer never reads in equilibrium, so that the seller will speak only if the speaking cost is below a threshold level, and offers the minimum quality level available without speaking otherwise.

Che and Choi (2009) assume an heterogeneous unit mass of consumers and consider a competitive market where sellers may offer a high quality contract (which attracts a proportion of consumers who care of quality) and a low quality contract (which attracts the other consumers). They consider two different legal regimes, named "duty to speak" and "duty to read", showing that none of the two regimes predominates, but the outcome approaches the first best in both cases as reading costs approach zero.

Following a different perspective, D'Agostino and Seidmann (2011) compare two different market structures, a monopoly and a competitive market, where the seller(s) can offer either favorable or unfavorable terms which consumers can read at some positive cost. They show that, contrary to the major legal doctrine[2], onerous terms characterize both markets, and a regulation aiming to protect consumers in fact harms them if implemented against a monopolist, whereas it turns out effective if implemented in competitive markets.

Generally speaking, the attention of these papers focuses on the possible effects of regulation on parties' welfare in order to identify whether the most efficient legal regime is that with sellers being free to choose terms and conditions

[1] Following this line, Restatement (second) of contracts Section 211 (3) states that "where the other party - the drafter - has reason to believe that the party manifesting such assent - the non drafter - would not do so if he knew that the writing contained a particular term, the term is not part of the agreement".

[2] The authors reject the Kessler's (1943) argument that regulation in favour of buyers should focus on non-competitive market because only sellers who can exploit some market power, and above all monopolists, could include onerous terms, whereas competition should push sellers to offer efficient terms in equilibrium.

to include in their contracts, or a regulated system imposing some limits to the sellers' freedom in order to protect possibly unaware consumers[3].

This paper does not care of possible regulations in favor of one of the two parties. Rather, I wish to understand whether markets, especially if competitive, may find in themselves the right incentives leading to an efficient outcome in equilibrium. Precisely, I wish to show whether competition among sellers may push them to voluntarily disclose their offers and make consumers fully informed about the transaction terms.

On an empirical point of view, it is a matter of fact that fine print characterized not only monopolies and oligopolies but also more competitive markets. In this sense, Priest (1981) also confirmed the usage of boilerplate terms in competitive markets. More precisely, he examined the guarantees offered for 62 products of different types of household appliances, such as refrigerators and washing machines, in relation with the industry concentration data and found that in those industries characterized by few firms with high market share the usage of standard terms is not more frequent than in other industries with more firms sharing the market. More recently, Marotta Wurgler (2008) has shown that in the market for software licences prices are very sensitive to market structure, but the severity of terms used in those agreements is not. In a sample of 647 software agreements from 598 different software companies of different sizes, Marotta-Wurgler found that with few exceptions no significant difference arose between competitive and concentrated markets within the software industry in the quality of standard terms included, but that competition significantly reduces product prices.

On a theoretical point of view, there is a large literature focusing on the effects of asymmetric information when the less informed party is not fully rational or sophisticated. Schwartz and Wilde (1983) discuss the general problem of price searching and show that in the presence of enough consumers who compare sellers' offers before buying from one of them, competition will lead to an efficient outcome by pushing sellers to offer good terms at the lowest possible price. On a similar line, Shapiro (1995) argues that in the presence of "myopic" (meaning non-fully sophisticated) consumers, competitive firms would have an interest to educate them by disclosing their contracts, offering efficient terms. Also Armstrong (2008) agrees in the possible incentive for sellers to disclose all their prices as they could increase their profits by increasing prices during the bargaining process rather than by a "rip-off".

On a different point of view[4], Ellison and Ellison (2009) discuss in general terms the problem of consumers' bounded rationality that firms can exploit. Precisely, the authors examine internet transactions where price search engines

[3] The US jurisprudence about this choice has radically changed over time. Courts strictly implementing the freedom of contract principle even in the presence of contracts of adhesion, notably in Graham v. Scissor-Tail Inc., 623 P.2d 165 (Cal. 1981), moved to a more protective approach in favor of the weaker party (cf. Philyaw v. Platinum Enterprises Inc., 54 Va.Cir. 364, 2001).

[4] Against the "informed minority hypothesis" on a legal point of view see Slawson 1975; Rakoff 1983.

and obfuscation interact together to make a price search more difficult and sometimes not convenient. Therefore, in contrast with the traditional economic theory which predicts that disclosure takes place since high-quality firms have an interest to differentiate themselves from others by making consumers fully informed of their offers, the authors emphasize that firms in real environments are not prone to disclose their offers, as well as those clauses regarding add-on goods, to be intended as the additional or complementary goods not observed by consumers when choosing to buy the base good (Lal and Matuses, 1994).

Gabaix and Laibson (2006) argue that, in the presence of some myopic consumers, firms may have no interest to educate them about add-on prices. The reason found by the two authors is that firms are not able to attract consumers by advertising them, since an educated consumer continues on buying from those sellers who shroud add-on prices having now enough knowledge to exploit the contract by substituting add-ons away from future use at a certain effort level (In this sense, *see* also Gilo and Porat 2011).

Gabaix and Laibson assume, as well as the previous literature, that consumers cannot have access to the source of information required to evaluate a seller's offer, proving that in such situations competition does not prevent sellers from opportunistic behaviors, not only supported by asymmetric information but rather by both asymmetric information and bounded-rationality on the side of consumers.

This paper strengthens this literature and proves that competitive sellers may not disclose in equilibrium even if all consumers are fully rational and may monitor the contract terms before purchasing at some positive cost. Precisely, I show that even if sellers may bear the cost of disclosing their terms and such a cost is lower than the cost for consumers to monitor, competitive sellers may decide not to disclose their offers and include one-sided inefficient terms in some equilibria, which turn out inefficient. Turning to a monopoly, whose analysis is presented to offer a comparison with the results characterizing competitive markets, I find that the only seller may not disclose in equilibrium only if disclosing is more expensive than monitoring.

Even though such a conclusion is counter-intuitive, the intuition behind it is quite straightforward. If all sellers make obscure offers then sophisticated consumers will be sceptical about the content they do not monitor because they know that sellers may have included bad terms. It allows for equilibria in mixed strategies in which they monitor with some positive probability and sellers offer high quality with some positive probability charging a price greater than cost that allows for positive profits. By contrast, a monopolist facing a relatively low disclosing cost has always an interest to disclose and offer good terms as he is allowed to rise price up to consumers' reservation level and can increase his profits. In terms of welfare, my results encompass D'Agostino and Seidmann's (2009) conclusion that disclosure turns out in the consumers' best interest when sellers are competitive because they have to offer efficient terms at the lowest possible price to attract consumers. In contrast, it harms consumers when the seller is monopolist as he offers efficient terms, but can also increase the price up to consumers' reservation level. Such a result rejects the legal doctrine based

on "market structure" that the risk of one-sided inefficient terms characterizes only those markets where sellers may exploit some market power, and above all in monopolies (see Kessler 1943; D'Agostino and Seidmann 2009)..

Although the aim of the paper does not rely on the choice between different legal regimes, the results I obtain raise a question about the implementation of the so-called "duty to speak" regime, which can be phrased "duty to disclose", as an alternative to the traditional "duty to read" or "duty to monitor" rule based on parties' freedom of contract. Precisely, I show that imposing a duty to disclose on sellers may turn out useful to the social welfare if they are competitive since they may not disclose in a free market; a result that is common to D'Agostino and Seidmann (2011), although for different reasons. By contrast, imposing a "duty to disclose" would turn out unuseful in a monopoly because the only seller has always an interest to disclose if the related cost is lower than the cost for consumers to monitor.

The paper is also related to the large literature on searching costs. Diamond (1971) shows that the competitive outcome in equilibrium changes significantly when prices cannot be freely observed, but consumers search sequentially for price information and must pay a search cost in order to observe a given seller's price, Precisely, he proves that the existence of even small search costs will lead to equilibrium prices in a competitive market from the Bertrand solution to monopoly levels. My results are partially similar to Diamond (1971): precisely, I will show that monitoring costs may keep competitive prices above the Bertrand level but below the monopoly level in some non-disclosing equilibria. In this sense, they influence the final equilibrium price less strongly than search costs in Diamond, and make the results less paradoxical. It follows from the fact that, contrary to Diamond (1971), I allow consumers to observe price for free in every contract, so that sellers charging a price close or equal to the monopoly level would be undercut. However, when an obscure offer is proposed to consumers, some features are not freely observable and may not be monitored: it allows sellers to keep prices above the marginal cost.

The paper is organized as follows. Section 2 presents the model assumptions and specifies the solution concept. Sections 3 and 4 present and discuss the results respectively for a competitive market and for a monopoly. Section 5 discusses the implications of disclosure in a comparison with the previous literature, and section 6 concludes.

2 Model

The game is played by $N \geq 1$ sellers (he) and a unit mass of consumers (she). If $N = 1$ then the market is a monopoly; if $N > 1$ there are several sellers into the market, which is often referred to as competitive. Sellers produce a good that is indivisible in consumption and looks like identical to consumers, but may vary in quality according to $q \in \{h, l\}$, with $h > l$. Low quality can be assimilated to bad terms. Sellers face no cost if they produce low quality, and pay $c > 0$ to produce high quality; they simultaneously set price p and quality q and make

an offer to all potential consumers. At the same time, they also choose whether to make quality fully transparent or not. I call D the disclosure strategy which consists of a binary choice $D = \{0, d\}$.

If quality is not disclosed, trivially $D = 0$: consumers attach a probability $\gamma \in [0, 1]$ that the quality offered is high and those willing to have access to such an information must pay a monitoring cost $\mu > 0$. I assume that monitoring is reliable with no risk of fault and may consist of the cost of paying an expert to read and explain fine print, or to test the good before purchasing. Furthermore, in contrast to Che and Choi (2009), I assume that such a cost is fixed and independent from sellers' strategies.

If $D = d$, then the seller is disclosing quality at some cost $\delta > 0$, which the seller pays for each consumer he matches with. I assume that δ is exogenous and equal for every seller, and may consist of the cost to assure that each consumer understands the content of the term[5].

To sum, a seller's strategy consists in offering a set $\{p, q, D\}$.

Since each consumer can match with one seller only per time the game consists in N rounds. The first round is structured in two stages:

1°*stage*− Sellers simultaneously decide quality and price and whether to make quality transparent or not;

2° *stage*− Consumers simultaneously observe both price and quality of those offers made transparent; whereas they observe only price of those offers not made transparent. In both cases, they pay a small cost $\varepsilon \simeq 0$ to enter the market and match with a seller. In contrast to Diamond (1971) and the literature on searching costs, the cost that consumers pay to enter the market is very small and unimportant because it is paid after having observed the offers. However, it is useful in order to exclude equilibria in which consumers who enter the market reject without monitoring with some positive probability. Once each consumer has matched with a seller she decides whether to accept or reject the offer or, if the offer is not transparent, to monitor quality at some cost $\mu > 0$.

More formally, consumers choose at one information set is the selected offer is transparent, and at two different information sets otherwise. Precisely, if the offer is made transparent consumers observe price and quality of each offer at the first information set. Then, consumers willing to enter the market pay a small cost, match with a seller and decide whether to buy. If the offer is not transperent, consumers observe only the price at the first information set, and may reach the second information set after having paid both the entry cost ε and the monitoring cost μ. Then, a strategy for a consumer specifies the contract she selects: whether she accepts or rejects if the contract is transparent; whether she accepts, rejects or monitor an obscure offer at her first information set, and (in the last case of monitoring) whether she accepts or rejects at her second information set.

To simplify the analysis, I present a one-shot game by assuming that consumers cannot match with other sellers in future periods of time (see section 3).

[5] For instance, the seller may bear the cost of paying a legal expert to explain each consumer the content of the clause on quality, or to offer a guarantee for the good.

Obviously, if the market is a monopoly, then $N = 1$, and the game is one-shot by assumption.

Consumers cannot observe other consumers' decisions, and cannot cooperate: it excludes a free-riding problem of monitoring by buyers. They value $L > 0$ a low quality good and $H > L$ a high quality good; it is common knowledge. I define m as the probability of consumers monitoring and a as the probability of consumers accepting without monitoring. Whenever the contract offered in equilibrium is not disclosed, given the asymmetric information about the seller's type, consumers can always infer that any deviation from a putative equilibrium comes from a seller offering low quality; as a consequence, they reject any off-equilibrium path offer charging more than their evaluation for a low quality good (L)..

A consumer who rejects without monitoring earns $-\varepsilon$; a consumer who accepts an offer at a price p without monitoring earns $Q-p-\varepsilon$: where $Q \in \{H, L\}$ is her evaluation for the good of a given quality. A monitoring consumer earns μ less in each eventuality. On the other hand, a seller's payoff from trade with a given consumer is the difference between his revenue and his costs: where revenue is price (p) and costs are incurred by producing high quality and/or by disclosing the offer. His total payoff corresponds to the integral of his payoffs from trading with all his customers.

I use an Efficiency Condition throughout the paper: $H-c-\max\{\mu, \delta\}-\varepsilon > L > 0$. The left-hand inequality implies that it is socially efficient for players to trade a high quality good. The right-hand side inequality simply implies that trade is mutually profitable even if quality offered is low, and excludes no trade equilibria.

I will solve the game searching for symmetric subgame-perfect equilibria ('equilibria') in a competitive market and in a monopoly. According to D'Agostino and Seidmann (2011), equilibria will be symmetric in the sense that all sellers will make the same offer to all consumers: a condition that must hold if the seller is monopolist. At the same time, symmetry also implies that a consumer matches with a given seller with the same probability and attaches the same probability that a given seller offers high quality, given the price charged: this will simplify the analysis, especially for the competitive market which I focus on.

Obviously, in the extreme case of $\mu = 0$, consumers always monitor in equilibrium and reject any $p > L$ if quality turns out low. Thus, a monopolist offers $\{H - \varepsilon, h, 0\}$ and gets $H - c$, whereas competitive sellers offer $\{c, h, 0\}$ and get 0. Consumers get 0 if they face a monopolist, and $H - c - \varepsilon$ if they face a competitive seller, and such equilibria are efficient in both markets.

From now on I will assume that $\mu > 0$ and, to make calculations as simple as possible, I will omit the entry cost ε.

3 Competition

In this section I assume there is a fixed number $N \geq 2$ of sellers. Contrary to D'Agostino and Seidmann (2011) who assume N adjusts so that sellers make no profits in every equilibrium[6], I fix N as an exogenous variable and allow for sellers getting positive profits in equilibrium. It makes the analysis cover a large spectrum of real markets. The assumption of sellers making positive payoffs, used by Gabaix and Laibson (2006) as well, is useful in order to understand whether real firms, making in fact small but positive profits, have an interest to disclose or not. However, to make the analysis as simple as possible and without affecting the main message, contrary to Gabaix and Laibson (2006) I assume that sellers do not differ from each other in terms of reputation or size, so that they share the market equally. Thus, the notion of competition simply refers to the presence of several sellers into the market.

Proposition 1 *In a competitive market:*

1) There exists an equilibrium for sellers offering $\{c+\delta, h, d\}$ *and earning a payoff equal to* 0*, and consumers accepting and earning a positive payoff equal to* $H-c-\delta$*. There exists also an equilibrium in which sellers mix between disclosing and non-disclosing and consumers accept only from those who disclose;*

No other equilibrium exists if the monitoring cost is large enough ($\mu > \frac{H-L}{4}$)*.*

In every other equilibrium:

2) Sellers do not disclose and mix between $\{p, l, 0\}$ *and* $\{p, h, 0\}$ *with* $p > c$*, at some*

$$\begin{aligned} \gamma &\in \left[\left\{\frac{NH-L+c-\Omega}{2N(H-L)}\right\}, \left\{\frac{NH-L+c+\Omega}{2N(H-L)}\right\}\right], \\ \text{where } \Omega &= \sqrt{[NH-L(2N-1)-c]^2 - 4\mu N(N-1)(H-L)}; \end{aligned}$$

and consumers mix between monitoring and accepting without monitoring. Both sellers and consumers earn positive payoffs in this class of equilibria that can exist only if the monitoring cost is small enough ($\mu \leq \min\left\{\frac{H-L}{4}, \frac{[(L-c)(N-1)+N\delta]^2}{4N(N-1)(H-L)}\right\}$) *and* $L > c$*.*

3) The only efficient equilibrium is that in which sellers disclose.

Proof. 1) No equilibrium exists for sellers offering $\{p, h, 0\}$: consumers would accept without monitoring at any $p \leq H$, so each seller could profitably deviate to $\{p, l, 0\}$. No equilibrium can exist for sellers offering $\{p, l, 0\}$ at any $p > 0$, else each seller could profitably undercut.

Suppose that sellers offer $\{0, l, 0\}$, which consumers would accept without monitoring. Consumers earn L from such an offer and would deviate to a seller

[6] The reason why they use such an assumption is easily explained in the light of the analysis they conduct on the effects of public regulation or courts' intervention: assuming that sellers do not make positive profits in equilibrium strenghtens the analysis making their results more robust. The authors, however, allow for positive payoffs per trade characterizing some equilibria.

offering a transparent $\{q, h, d\}$ such that $q < H - L$. That seller would get $H - L - c - \delta$ from such a deviation, which Efficiency Condition assures being strictly positive, and therefore profitable.

In turn, the only pure-strategy equilibrium is for sellers offering $\{c + \delta, h, d\}$ and getting 0, and conbsumers accepting in round 1 and earning $.H - c - \delta$. No seller can deviate to a higher price because he would make no sale; consumers have no interest to reject in round 1 and wait for future rounds as they would lose the entry cost.

There can also exist an equilibrium in which sellers mix between $\{c + \delta, h, d\}$ and $\{0, l, 0\}$: consumers accept only from those making a transparent offer because the Efficiency Condition states that $H - c - \delta > L$. Thus, sellers get 0 from any offer.

2) Suppose sellers mix between $\{p, l, 0\}$ and $\{p, h, 0\}$. No equilibrium can exist for consumers either monitoring or accepting without monitoring because sellers would never offer respectively $\{p, l, 0\}$ or $\{p, h, 0\}$. Then, consumers must mix between monitoring and accepting without monitoring in this class of equilibria. At the same time, the existence of a small entry cost prevents consumers from rejecting without monitoring with any positive probability in equilibrium.

Each seller gets $\frac{p-c}{N}$ from $\{p, h, 0\}$ and $(1 - m)\frac{p}{N}$ from $\{p, l, 0\}$, where m is the probability that consumers monitor the term on quality. So, sellers are indifferent iff $m = \frac{c}{p}$. No seller can profitably deviate to not trading if $p > c$.

Consumers get $\gamma H + (1 - \gamma)L - p$ if they accept without monitoring, and $\gamma(H - p) - \mu$ from monitoring. Thus, they are indifferent iff $p = L + \frac{\mu}{1-\gamma}$ and do not deviate to rejecting iff

$$\gamma \in \left[\frac{1 - \Delta}{2}, \frac{1 + \Delta}{2}\right]:$$

where $\Delta = \sqrt{1 - \frac{4\mu}{H-L}}$ is well defined because $\mu \leq \frac{H-L}{4}$.

Sellers are indiffereny between the two offers if $m = \frac{c}{p}$, where m is the probability of consumers monitoring.

Since consumers believe that any off-equilibrium path offer contains low quality, a deviating seller has no interest to offer high quality if he does not disclose. Thus, consumers would deviate to any seller offering $\{z, l, 0\}$ if

$$L - z > \gamma H + (1 - \gamma)L - p.$$

Substituting for p, it requires

$$z < L(1 + \gamma) - \gamma H + \frac{\mu}{1 - \gamma}.$$

Such a deviation is unprofitable for sellers iff

$$L(1 + \gamma) - \gamma H + \frac{\mu}{1 - \gamma} \leq \frac{L + \frac{\mu}{1-\gamma} - c}{N},$$

that is satisfied if

$$\gamma \in \left[\frac{NH-L+c-\Omega}{2N(H-L)}, \frac{NH-L+c+\Omega}{2N(H-L)}\right] \subset \left[\frac{1-\Delta}{2}, \frac{1+\Delta}{2}\right]:$$

where $\Omega = \sqrt{[NH-L(2N-1)-c]^2 - 4\mu N(N-1)(H-L)}$ is well defined iff $\mu \leq \frac{[NH-L(2N-1)-c]^2}{4N(N-1)(H-L)}$.

Suppose $\delta \leq \mu$, so that disclosure would be efficient.

A deviating seller who discloses must offer high quality, and would attract all consumers by offering $\{z, h, d\}$ such that

$$\begin{aligned} H - z &> \gamma H + (1-\gamma)L - L - \frac{\mu}{1-\gamma} \\ &\Leftrightarrow \quad z < (1-\gamma)H + \gamma L + \frac{\mu}{1-\gamma}. \end{aligned}$$

Such a seller would therefore get strictly less than $(1-\gamma)H + \gamma L + \frac{\mu}{1-\gamma} - c - \delta$ from disclosure, which is unprofitable if

$$(1-\gamma)H + \gamma L + \frac{\mu}{1-\gamma} - c - \delta \leq \frac{L + \frac{\mu}{1-\gamma} - c}{N}. \quad (1)$$

Condition (1) always holds for every

$$\gamma \in \left[\frac{2NH-(N+1)L-(N-1)c-N\delta-\Sigma}{2N(H-L)}, \frac{2NH-(N+1)L-(N-1)c-N\delta+\Sigma}{2N(H-L)}\right]: \quad (2)$$

where $\Sigma = \sqrt{[(L-c)(N-1)-N\delta]^2 - 4N(N-1)\mu(H-L)}$ is well defined iff $\mu \leq \frac{[(L-c)(N-1)+N\delta]^2}{4N(N-1)(H-L)} < \frac{[NH-L(2N-1)-c]^2}{4N(N-1)(H-L)}$

The Efficiency Principle and $L \geq c$ imply that condition (2) always holds in equilibrium because $\frac{NH-L+c-\Omega}{2N(H-L)} > \frac{2NH-(N+1)L-(N-1)c-N\delta-\Sigma}{2N(H-L)}$ and $\frac{NH-L+c+\Omega}{2N(H-L)} < \frac{2NH-(N+1)L-(N-1)c-N\delta+\Sigma}{2N(H-L)}$, meaning that sellers have no interest to disclose in this class of equilibria. Such a result trivially holds if $\delta > \mu$. Sellers charge no more than $L + \frac{2N\mu(H-L)}{N(H-L)-(N-1)L-c-\Omega}$ in this class of equilibria. l'Hopital's rule implies that this value converges to $\frac{N(H-L)-(N-1)L-c}{N-1}$ as μ converges to 0; consequently, it requires that consumers must monitor with probability m close to $\frac{(N-1)c}{N(H-L)-(N-1)L-c}$.

Sellers earn $(p-c)/N$ in this class of equilibria, whereas consumers earn a non-negative payoff equal to $\gamma(H-L) - \frac{\mu}{1-\gamma}$, with a maximum value of $H - L - 2\sqrt{\mu(H-L)}$.

There cannot exist an equilibrium in which sellers mix between $\{p, h, d\}$, $\{q, l, 0\}$ and $\{q, h, 0\}$. Those making their offer transparent cannot charge more than $c + \delta$, otherwise another seller could profitably undercut. It means that sellers must earn 0 from disclosure, so they could profitably deviate to an obscure offer that yields a positive payoff.

Likewise, no equilibrium can exist for sellers mixing between $\{p, l, 0\}$ and $\{z, h, 0\}$ with $H \geq z \geq L \geq p$: consumers would always accept without monitoring when charged $q \leq H$, so sellers could profitably deviate to $\{q, l, 0\}$ to economize on the production cost. For similar reasons there cannot be an equilibrium for a monopolist mixing between either $\{p, h, 0\}$ and $\{z, h, 0\}$, or $\{p, l, 0\}$ and $\{z, l, 0\}$.

3) Every equilibrium in which sellers do not disclose is inefficient because they never offer high quality without consumers never paying the monitoring cost: it comes straightforward from the Efficiency Condition. Conversely, trade is efficient in every equilibrium in which sellers disclose since quality on sale is high, but not the final outcome because sellers waste the disclosing cost. However, it is less inefficient than the outcome without disclosure if $\delta < \mu$. ■

The game is characterized by an efficient equilibrium in pure strategies: sellers offer transparent contracts with high quality at the minimum price, and consumers accept. The existence of this equilibrium depends on consumers' beliefs that any off-equilibrium path offer comes from a low quality seller. The model also allows for a class of equilibria without disclosure in mixed strategies even if disclosing is cheaper than monitoring as long as the monitoring cost is small enough; for buyers never read with positive probability and sellers have never an interest to include high quality into an obscure offer.

Gabaix and Laibson (2006) find a similar result in a market where a proportion of consumers are not fully rational (myopes) and may not learn from sellers' disclosure (*uninformed myopes*). In this model I have assumed that consumers are all rational and become fully informed about terms if sellers disclose. Nonetheless, in some equilibria I find that sellers may not disclose even if the related cost δ is small and lower than the cost for consumers to monitor. It suggests that inefficient outcomes may characterize competitive markets even in the presence of sophisticated, fully rational consumers if some information can be hidden by sellers and possibly monitored by consumers at some positive cost. This result is supported by the assumption that consumers who monitor and find low quality exit the market as they believe that every other seller offers the same quality. In this way no consumer will remain into the market and the model becomes one shot. The analysis can be extended to a repeated game in which consumers do match with other sellers in different periods of time. However, it would make the analysis complicated without improving the main message of the paper.

Results are closely similar to Schwartz and Wilde (1983) who include a searching cost on the consumers' side in order to compare different offers and assume that just a proportion of consumers (called *shoppers*) are willing to pay it. In this way, they consider a market where every information about the offer, including price, is costly to consumers who are heterogeneous as well as in Gabaix and Laibson. I show that a similar outcome characterizes the game even if price is freely observable but not other terms, and consumers are all rational.

Comparing the results with Diamond (1971), it also turns out that the monitoring cost works similarly to the search cost in moving prices from the Bertrand level (characterizing pure-strategy equilibria) to higher levels. However, con-

trary to Diamond, the equilibrium price remains below the maximum level H (corresponding to what Diamond calls the "monopoly level") because consumers can observe price for free in this model and pay only to monitor the terms on quality, whereas in Diamond they have to pay in order to know the price.

Next section shows that most of these results do not apply to a monopoly.

4 Monopoly

In this section I solve the same game assuming $N = 1$. It will help highlight the results obtained in the previous sub-section for competitive markets.

Proposition 2 *1. In a monopoly, the only seller discloses in equilibrium, and offers $\{H, h, d\}$: consumers accept and earn 0, whereas the monopolist earns $H - c - \delta$. This equilibrium is efficient only if δ tends to 0.*

No other equilibrium exists if $\delta \leq \mu$; otherwise

2. If $\mu < \min\left\{\delta, \frac{H-L}{4}\right\}$, there may also exist a class of equilibria in which a monopolist does not disclose and mixes between offering high quality and low quality charging $p > c$, and consumers mix between accepting and monitoring. Players get positive payoffs in this class of equilibria. There may also exist an equilibrium in which a monopolist discloses with some positive probability. Such equilibria are inefficient.

Proof. 1. A disclosing monopolist must offer high quality; for consumers would reject any $p > L$ and a monopolist could profitably deviate to $\{L, l, 0\}$ to economize on the disclosure cost. At the same time, he has no interest to lower price below H if he discloses because he would get a lower payoff.

A monopolist can get $H - c - \delta$ from offering $\{H, h, \delta\}$ and no more than L by deviating to not disclosing if consumers infers that he offers low quality. Efficiency Condition then implies that such a deviation is not profitable because $\delta < H - L$.

Conversely, no equilibrium can exist for a monopolist proposing obscure offers and mixing between high and low quality at the same price: a monopolist must charge less than $H - \mu$, otherwise no buyer would monitor with some positive probability in equilibrium. A monopolist would then get strictly less than $H - c - \mu$ in such a class of equilibria and could profitably deviate to $\{H, h, \delta\}$ if $\delta \leq \mu$ as he would get $H - c - \delta$.

Trade is efficient in the only pure-strategy equilibrium as the seller offers high quality and consumers do not pay the monitoring cost. However, since the monopolist pays the disclosure cost, the outcome becomes efficient in the extreme case $\delta \simeq 0$.

2. Suppose $\delta - \mu > 0$.

What said above implies that consumers must mix between monitoring and accepting without monitoring. They get $\gamma H + (1 - \gamma)L - p$ from accepting without monitoring and $\gamma(H - p) - \mu$ from monitoring, where γ is again the probability that a monopolist offers high quality; thus, consumers are indifferent

iff

$$p = L + \frac{\mu}{1-\gamma},$$

and do not reject iff

$$\gamma \in \left[\frac{1-\Delta}{2}, \frac{1+\Delta}{2}\right]:$$

where again $\Delta = \sqrt{1 - \frac{4\mu}{H-L}}$ is well defined if $\mu \leq \frac{H-L}{4}$.

A monopolist gets $p - c$ from offering high quality and $(1-m)p$ from low quality; so, he is indifferent iff $m = c/p < 1$ because $p > c$.

A monopolist cannot profitably deviate to $\{L, l, 0\}$ iff $p - c \geq L$, that requires

$$\gamma \geq 1 - \frac{\mu}{c}.$$

If μ is small enough, then $1 - \frac{\mu}{c} > \frac{1-\Delta}{2}$, and the necessary condition becomes

$$\gamma \in \left[1 - \frac{\mu}{c}, \frac{1+\Delta}{2}\right]$$

At the same time, the monopolist may deviate to $\{H, h, d\}$, which turns out unprofitable if

$$L + \frac{\mu}{1-\gamma} - c \geq H - c - \delta.$$

Since $\delta > \mu$, a sufficient condition becomes

$$\gamma \geq 1 - \frac{\mu}{H - L - \mu}.$$

To be feasible in equilibrium it must be

$$1 - \frac{\mu}{H - L - \mu} \leq \frac{1+\Delta}{2},$$

that requires

$$\delta \in \left[\frac{(H-L)(1-\Gamma)}{2}, \frac{(H-L)(1+\Gamma)}{2}\right]: \quad [5]$$

where $\Gamma = \sqrt{1 + \frac{4\mu}{H-L}}$. However, the Efficiency Condition requires $\delta < H - L - c < \frac{(H-L)(1+\Gamma)}{2}$. It implies that condition [5] becomes

$$\delta \in \left[\max\left\{\mu, \frac{(H-L)(1-\Gamma)}{2}\right\}, H - L - c\right],$$

meaning that such a class of equilibria may exist for relatively high values of $\delta > \mu$, which are compatible with the Efficiency Principle. A monopolist earns $p - c$ in this class of equilibria, whereas consumers earn a non-negative payoff equal to $\gamma(H-L) - \frac{\mu}{1-\gamma}$, with a maximum value of $H - L - 2\sqrt{\mu(H-L)}$.

If $p = H - \delta$ and $\gamma = 1 - \frac{\mu}{H-L-\delta}$, there exists an equilibrium in which a monopolist may offer a transparent contract with some positive probability.

These equilibria are inefficient because a monopolist offers low quality with some positive probability and either consumers pay the monitoring cost or the monopolist pays the disclosing cost with some positive probability. ■

Results show that contrary to competition, disclosure always takes place in a monopoly if $\delta \leq \mu$, and the only seller gains from making his offer transparent as he can raise the price up to the consumers' reservation level. Such a result looks like very similar to Katz (1990) who proves that a monopolist will speak whenever the cost of speaking is below a threshold level. In Katz, a speaking seller offers the full-information profit-maximization quality; in this model, he offers efficient terms charging the maximum price and is better off in respect to any equilibrium involving obscure contracts. Conversely, a monopolist may not disclose in equilibrium if $\delta > \mu$.

A monopolist always gets $H - c - \delta$ in equilibrium if he discloses and no more than $L + \frac{2\mu}{1-\Delta} - c$ otherwise; on the other hand, consumers get 0 if he discloses and a positive payoff equal to $\gamma(1-\gamma)(H-L) - \mu$ otherwise. This result encompasses D'Agostino and Seidmann's (2009) argument that consumers lose from disclosure if the seller is monopolist as they are charged a price equal to their reservation level.

On a first view, these results are also consistent with the empirical literature[7] that the usage of bad terms (in this case, low quality) does not depend on market concentration, but characterizes both a monopoly and a market with several sellers. At the same time, according to Marotta-Wurgler's (2008) evidence, price tends to be higher the more concentrated is the market. Precisely, the model predicts that the equilibrium price equals the consumers' reservation level in a monopoly if the seller discloses and can reach $L + \frac{2\mu}{1-\Delta} < H$ if the seller does not disclose; conversely, competitive sellers charge $c + \delta$ in equilibrium when they disclose and no more than $L + \frac{2N\mu(H-L)}{N(H-L)+L-c-\Omega} < L + \frac{2\mu}{1-\Delta}$ if they do not disclose.

On a social point of view, disclosure assures an efficient trade and an almost efficient outcome if $\delta \leq \mu$: in other words, any putative equilibrium without disclosure would have turned out more inefficient than the only existent one. At the same time, trade may be inefficient in the opposite case $\delta > \mu$ if the monopolist does not disclose, and consumers have to pay the monitoring cost; however, the outcome is less inefficient in respect to an equilibrium in which the monopolist discloses and pays $\delta > \mu$.

5 Efficiency and policies

In this section I propose an analysis covering both the economic and legal effects of the main results characterizing the model.

Both markets are characterized by an interval of equilibria in which seller(s)

[7] *Cf.* Priest (1981) and Marotta-Wurgler (2008)

do not disclose and consumers deal with an obscure message that cannot be fully informative about the seller's type. Since sellers prefer the buyer to believe that the quality offered is high and want to trade at high prices, equilibria refinements, like strategic stability or properness, cannot be useful.

Theorem 1 (Efficiency) *If μ is large enough the equilibrium outcome is equally (in)efficient in both markets. If μ is low enough to allow for mixed-strategy equilibria, then the outcome in a monopoly is less inefficient if $\delta \leq \mu$ and equally inefficient than in competition otherwise.*

The proof of Theorem 1 relies on the fact that, on the one hand, if the monitoring cost is large enough both markets are characterized by a pure-strategy equilibrium in which contracts are offered fully transparent, and consumers accept without monitoring. The only difference, not relying on efficiency, is in the redistributive effects of such an equilibrium iby comparing the players' payoffs in the two markets. On the other hand, if the monitoring cost is small enough to make feasible a class of mixed-strategy equilibria with seller(s) not disclosing their contracts and consumers monitoring with some positive probability, then a monopoly assures a more efficient (say better, less inefficient) outcome if $\delta \leq \mu$ as the seller will always disclose. Conversely, in the opposite case $\delta > \mu$, both markets may be characterized by mixed-strategy equilibria without disclosure, so that the outcome is equally inefficient.

Such considerations allow to conclude that a monopoly provides an outcome that is never more inefficient than in competition and sometimes less. Such a conclusion crucially depends on the different effects of disclosure on the seller(s)' payoff. Precisely, competitive sellers lose from disclosure as they cannot charge more than their costs; it sustains a class of equilibria in which they do not disclose and earn positive payoffs even in the presence of a very small disclosure cost. Conversely, a monopolist always gains from disclosure as he can raise price up to the consumer's reservation level: it explains why he discloses in equilibrium if the related cost is small.

Even if the present analysis does not refer to the efficiency and effectiveness of alternative policies, the model suggests that some regulation should be implemented in both markets, albeit of different kind, in order to protect consumers and assure an efficient outcome at the same time. Thus, I briefly analyze the effects of different policies, like imposing a duty to monitor to consumers or a duty to disclose to sellers[8]

Theorem 2 (Policies) *In a monopoly a duty to monitor regime dominates the other in terms of both efficiency and consumers' protection.*

In a competitive market, a duty to disclose regime dominates the other in terms of efficiency if $\delta < \mu$, and is dominated otherwise. No regime strictly dominates the other in terms of consumer protection, but a duty to disclose regime is preferable if $\mu > \delta \simeq 0$.

A monopolist discloses in equilibrium if $\delta \leq \mu$, and may not disclose otherwise: it follows that imposing a duty to disclose would not turn out useful in

[8] The two regimes correspond to what Che and Choi (2009) call respectively "duty to read" and "duty to speak".

terms of efficiency. In this sense, theorem 2 goes further Katz's (1990) conclusion that no limit should be imposed to a speaking seller; rather, this model predicts that no limit on contract terms should be imposed at all. At the same time, consumers earn a positive payoff if the monopolist does not disclose, and exactly 0 otherwise: it follows that imposing a duty to disclose would not turn out in their interests.

However, even if a duty to monitor regime dominates the other it does not mean that the outcome is efficient[9]: in this sense, some regulation on price may be preferable in order to assure both trade efficiency and consumer protection.

Turning to competition, the model suggests that some limits should be imposed to the sellers' freedom of drafting contracts, especially when there exist conditions for sellers not disclosing in a free market (viz. small enough monitoring cost) and the disclosing cost is low enough to make disclosure desirable for the social welfare. Imposing a duty to disclosure to sellers turns out also protective for consumers who enjoy higher payoffs. By contrast, it may turn out less inefficient if $\delta > \mu$ because sellers may economize on the expensive disclosing cost.

The results for the two markets together reject the "market structure" hypothesis proposed by Kessler (1943)[10]. At the same time, the model offers an argument to reject the legal doctrine of the "informed minority" hypothesis[11] claiming that in the presence of even a small proportion of fully rational consumers competitive sellers may have an interest to offer good terms; an argument invoked by those who are against regulations that limit parties' freedom of contract and also used by courts to decide about the enforceability of standard terms[12]. Rather, results highlight that competitive sellers may offer bad terms in equilibrium even if consumers are all rational and may not disclose their offers even at a relatively cheap cost. The reason has to be found in the existence of a cost for consumers to monitor a seller's offer which may discourage them from monitoring, even if rational. It makes unprofitable for sellers to disclose their offers in respect to some equilibria where they can charge a price higher than cost and offer good terms with some positive probability.

Bakos *et al.* (2009) raise doubt on the relevance of the "informed minority" hypothesis on an empirical point of view. Precisely, they analyze the on-line market for software licence and find that only one or two out of every thousand over a population of 45,091 consumers observe terms and conditions, and partially read them before purchasing; it implies that it is hard to assert that sellers' decision about the quality of the terms to insert in their offers may be influenced by a so small percentage of sophisticated consumers. Thus, the model looks like consistent to this evidence.

[9] *Cf.* the previous section.
[10] *Cf.* D'Agostino and Seidmann (2009).
[11] *Cf.* Beales, Craswell, and Salop (1976), Baird (2006) and Gillette (2005).
[12] *Cf. ProCD vs. Zeidenberg* 86 F. 3d 1447 (7 Cir. 1996).

6 Final remarks

I have provided a very simple model with $N \geq 1$ sellers making an offer which may turn out fully transparent or partially obscure for consumers to understand. I have shown that even if consumers are rational, competition may not push sellers to offer transparent and efficient offers in some equilibria if consumers have to pay a cost in order to monitor such an offer. This outcome does not depend on the magnitude of the disclosing cost. Vice versa, a monopolist always finds profitable to disclose only if disclosure is less expensive than consumers' monitoring, and may not disclose otherwise.

The model may be improved by assuming that consumers have different knowledge levels about terms and conditions, meaning that they bear different monitoring costs; at the same time, it may be of some interest to assume consumers' heterogeneity in their attitude to wait for future periods.

My results go further Gabaix and Laibson's conclusion that competitive sellers may not disclose in the presence of a high enough proportion of myopic consumers, showing that the decision of sellers to not disclose does not depend on consumers' lack of sophistication, but is feasible in equilibrium even assuming that they are all rational as long as they cannot have free access to given terms and conditions.

Even if the model does not introduce alternative legal regimes into the analysis, its results may be of some help in order to choose between different legal regimes: precisely, rules forcing sellers to disclose may turn out in favor of consumers is sellers are competitive, and may also be socially efficient if the cost of disclosing is lower than the cost of monitoring. Vice versa, they are not desirable if the seller is monopolist and able to disclose; more importantly, even if implemented, such policies would not turn out in favor of consumers' interests. However, the model suggests that in a monopoly a regulation on price may be the only way to protect in fact consumers' interests.

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