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Fine print and naive buyers

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Abstract

In the hypothetical Coasian world,transactions are costless and it allows people to reach an efficient solution.By contrast,in the real world,transactions are very expensives,specially when parties are not physically one in front of the others.For that reason, contracts are usually proposed by sellers to buyers in a pre-printed form on a take-it-or-leave-it basis without negotiation(''contracts of adhesion'')and may contain standard terms,some of which written in fine print are not read by the consumer and may sound unfair. In the past,an influent doctrine(see Kessler,1943)imposed the idea that adhesion contracts are more dangerous when the seller is a monopolist;by contrast,competition among several firms should lead them to provide efficient terms at the lowest possible price. We will analyse the effect of contracts of adhesion on parties''welfare, allowing buyers to be either sophisticated or naive.Naive buyers are those who hold a priori belief about second-clauses and/or do not care of it. In this paper we will model a contract game with some naive buyers where seller(s) have to decide whether to offer a one-clause contract without guarantee or a two-clause contract which may contain a guarantee available for buyers to read at some positive cost k. We will show that our results contrast Kessler''s argument;secondly,we will reject Gabaix-Laibson''s (2006)conclusion that sellers would have no interest to disclose their contract if they were able to.

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1 Introduction

Contracts are enforceable when all parties knowingly consent. Final consumers typically do not read standard form contracts (viz. those offered on a take-it-or-leave-it basis); so their signatures do not necessarily imply that their consent was knowledgeable. A recent literature on behavioral economics elaborates on this argument. Buyers who treat some product attributes as salient implicitly hold unduly favorable beliefs about other attributes. Sellers can exploit unaware buyers by imposing unexpectedly harsh terms on non-salient attributes[1]. Such issues seem particularly stark when buyers are offered browsewrap contracts, which require clicking a hyperlink to see the terms and conditions[2]. US courts have usually enforced a standard form contract unless a buyer would not have traded had she known its contents[3]; and have used market structure as a criterion for treating terms as unconscionable (cf. Marotta-Wurgler (2005)). Courts in other jurisdictions have applied more stringent conditions for enforceability: for example, the German Civil Code requires that enforceable terms be reasonable; but it has replaced the prewar 'abuse of monopoly' test with a 'good faith' criterion[4]. German law has influenced European law on standard form contracts, which is embodied in the Unfair Terms Directive[5].

Such policies are supported by a traditional view in the literature: that buyers face onerous terms in standard form contracts when the seller is a monopolist; so courts should protect buyers by interpreting shrouded clauses against the drafter's interests when the seller has market power.

Kessler (1943) provided an early and influential version of this view, arguing that it is precisely monopolists who offer standard form contracts because their

[1] Examples include a focus on introductory offers for credit cards (cf. Bar-Gill (2004) and (2006)) and health club membership (cf. Della Vigna and Malmendier (2006)). See also Korobkin (2003).

[2] See, in particular, Hillman (2006).

[3] See, in particular, Uniform Commercial Code Restatement (Second) of Contracts Section 218.

[4] See Standard Contract Terms Act Subsection 2.9(1): "Provisions in standard contract terms are void if they unreasonably disadvantage the contractual partner of the user contrary to the requirements of good faith."

[5] Specifically, Council Directive 93/13/EEC. Article 5 states that "terms must always be drafted in plain intelligible language". See Maxeiner (2003) on German and European law.

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bargaining power allows them to impose onerous terms[6]. Kessler's argument has since been discredited on empirical and theoretical grounds:

• Competitive firms manifestly offer standard form contracts; and, more significantly, Marotta-Wurgler (2005) shows that prices in software license agreements are highly sensitive to market structure, but the severity of terms is not[7];

• According to a conventional argument, monopolists are better served by raising price than including onerous terms (cf. Rakoff (1983) and Baird (2006))[8].

Kessler's conclusion might also survive if new entrants to a competitive market have an incentive to de-bias buyers. Gabaix and Laibson (2006) use a model with boundedly rational buyers to argue that entrants may not have such an incentive if rivals obtain the de-biased custom. Both competitive sellers and monopolists may then have an incentive to include onerous terms which buyers are unaware of; so courts might protect buyers by interpreting clauses against their drafters' interests[9].

We revisit this issue by analyzing a model of homogenous, rational buyers who must incur a fixed cost to read the non-price clauses of complex contracts, comparing equilibrium play when the seller is a monopolist and when eachseller is competitive. We demonstrate that market structure matters to courts which protect buyers' interests. However, optimal policy is the reverse of that recommended in the previous tradition. We argue that such courts which seek to protect buyers should interpret shrouded clauses against the drafter's interests when sellers are competitive, but not when the seller is a monopolist.

This conclusion seems rather startling; but the intuition is quite straightforward. Absent court intervention, any seller faces a commitment problem in the sense that it offering a complex contract does not guarantee that its terms are favourable. Rational buyers must then be sceptical of the content of clauses which they do not read: and this scepticism is justified, when any seller offers a complex contract, because such a seller must include onerous, and socially inefficient terms with positive probability.

Courts can raise aggregate welfare in either market structure by resolving buyers' uncertainty about the terms in unread clauses, e.g. by interpreting them in buyers' interests. This economizes on socially wasteful reading costs (as in the literature on gap-filling: cf. Posner (2005) and Shavell (2006)) and prevents socially inefficient trade on onerous terms (as in the contract law literature). However, the beneficiaries differ across market structures. Buyers necessarily

[6] For example: "Standard contracts in particular could thus become effective instruments in the hands of powerful industrial and commercial overlords enabling them to impose a new feudal order of their own making upon a vast host of vassals." (p.640).

[7] See also Priest (1981).

[8] Gilo and Porat (2006) and Bebchuk and Posner (2006) suggest a number of other explanations for standard form contracts.

[9] This has regulatory consequences: fine print should concern consumer protection rather than anti-trust agencies. See Vickers (2004).

earn all of the extra surplus in competitive markets. By contrast, a monopolist is the sole beneficiary because the court's interpretation allows it to overcome its commitment problem, and to perfectly price discriminate. Indeed, we show that the court's interpretation can make buyers strictly worse off: otherwise, there are equilibria in which buyers earn a positive surplus because they would infer onerous terms were the monopolist to offer a higher-priced contract. Absent court intervention, sellers are deterred from raising price by adverse inferences, and do not provide a guarantee for sure because buyers would then not read, creating an incentive for sellers to drop their guarantee. Our model therefore addresses the conventional theoretical argument against Kessler's (1943) claim, which we noted in the second bullet point above. In addition, its implications coincide with some stylized facts cited by the behavioral literature: buyers mix between reading and not reading complex contracts; sellers exploit this behavior by sometimes drafting contracts with onerous terms; and some consumers regret their trades. However, our model has different policy implications because the related literature downplays the importance of market structure. A monopolist gains from court intervention because he is otherwise penalized in equilibrium for his inability to commit. Accordingly, we show that a monopolist who could choose reading costs would, if possible, draft a fully transparent two-clause contract. This result reproduces a conventional claim in the literature that opacity prevents monopolists from raising their prices (cf. Rakoff (1983) and Baird (2006)). Our results go beyond this literature by demonstrating

that courts can raise welfare when a monopolist cannot rite a fully transparent complex contract.

Our model of reading costs adapts Katz (1990), who assumes that sellers can choose from a continuum of quality levels, which implies that each seller

would always choose the minimal quality level (so there is no need for any fine print); and that no buyer would read[10]. The court can raise welfare by overriding

onerous terms levels, though reading costs are not saved; but buyers may thereby gain because sellers can never price discriminate. In further contrast

to our model, disclosure rules never affect welfare. Rasmusen (2001) studies a (bargaining) model with reading costs and a finite number of quality levels; so

equilibria involve mixing, as in our model. However, it is costly to read every clause; so unshrouded clauses cannot signal the terms in other clauses.

Our model is related to the literature on search costs, in which buyers sample each seller's price at a cost. In particular, buyers have sunk any incurred reading cost (like the search cost) when they decide whether to accept a seller's offer. By contrast, we consider a single round of search; and we suppose that price

is costlessly observable: so a seller who offers a one-clause contract is fully transparent.

[10] Our model, with a finite number of quality levels, also possesses equilibria in which buyers and sellers both mix, and all contracts contain fine print. Rasmusen (2001) shares this property in a model where the contract may contain two possible terms.

2 Naivity between Psychology and Economics

We allow buyers to be either sophisticated or naive, where naive buyers are those who hold a priori fixed belief about an eventual second-clause and/or do not care of it. In order to understand this last point, it will be helpful to distinguish, as psychologists do, between "salient" and "non salient" attributes[11]. The former are those attributes which regard elements that buyers care of in their purchasing decisions, (like price, number of items and so on) so that they always read carefully clauses that contain them; the latter are those attributes which buyers usually do not ask to know and, if included in some clauses, remain not read (like guarantees, liability exclusions, add-on prices, and so on). As logical consequence, sellers can have a stronger economic incentive to provide salient attributes at the efficient level of quality in terms of both form and content in order to make buyers willing to buy; while they have an incentive to make non-salient attributes favourable to themselves only, including them in "fine print".

In a first approximation, it can be said that the more terms are included in a contract, the more complex the contract is and the higher is the level of cognitive effort required to understand its meaning. Psychologists have demonstrated that buyers' behavior can be influenced by contract complexity in the sense that they try to minimise this effort. In particular, when buyers deal with complex decisions it seems that they react adopting a simple strategy: in our case, they do not read. Olshavsky (1979) demonstrated that when people are asked to choose between two alternatives each with four attributes, they analyse both very carefully; when attributes become ten or fifteen, some of them are not taken into account. Malhotra (1982) collected information about people preferences on houses and apartments by interview. He presented different alternatives of houses among which people were asked to choose. He found that people accuracy in finding the house which better corresponds to their needs (according with the profile given during the interview) is constant at a very high level when each alternative is presented with no more than ten attributes and significantly decreases when the number of attributes goes up to fifteen or twenty. In general terms, as the number of alternatives and/or attributes increases, the percentage of information used to make the final choice decreases. In the same sense, Grether, Schartz and Wilde (1986) argue that when the decision set is relatively small, people do not experience problems and can make the choice which corresponds to their own interests.

Given the strong evidence confirming such a theory, psychologists have also investigated why a person gives attention to some elements and not to others. Frances Luce, Bettman and Payne (1997) distinguish a voluntary attention from an unvoluntary attention. In this sense, it can be said that people voluntarily give attention to those elements or facts they care of, for instance because they guess such elements are crucial in order to maximise their utility functions; at the same time, there might be the case that some other elements involuntarily

[11] See Korobkin (2003).

come into buyers' consideration in the sense that they simply did not take them into account but recognise their importance for casual circumstances. At the same time, authors have also registered that it might be also the case in which the lack of attention registered in individual decisions is only apparent and reflects an interior conflict that pushes people to take their attention away from certain attributes simply because taking a decision about them is too hard. It is the case in which people have to choose between alternative goods with different attributes, all of which considered very important (like safety and efficiency). In situations like this, authors say that people face too much stress when involved in compensatory decisions, for this reason labeled "emotion laden". Usually it happens for contract terms which limit buyers' right of been compensated in case of damages caused by the product (such as those included in our model) or forbid buyers to appeal to a public court, such as forum selection clauses. In situations like these, people usually react ignoring such clauses in order to avoid stressful comparisons. Such removal effect is also favoured by the fact that these clauses regard eventualities that are (or are perceived as) very unlikely to occur.

Ellison and Ellison (2005) discuss in general terms the problem of buyers' bounded rationality that firms can exploit in Industrial Organization. More precisely, authors examine Internet transactions where price search engines and obfuscation interact together in order to make price search more difficult and sometimes not convenient. Therefore, in contrast with the traditional economics of information disclosure which predicts that disclosure takes place since high-quality firms have interest to differentiate themselves from others by making buyers fully informed of their offers, authors emphasize that firms in real environments are not prone to disclose their offers,specially those clauses regarding add-on goods. Following Lal and Matutes (1994), add-on prices can be considered as those prices regarding additional or complementary goods not observed by consumers when choosing to buy the base good and therefore usually equalised to the monopoly price. It allows firms to offer the base good at a very low price in order to attract buyers and, at the same time, to make high profits from high add-on prices. Ellison and Ellison (2005) give some examples of how these add-on prices work, specially in Internet transactions. In this sense, shipping costs are an example of how sellers are able to offer a product at several different prices. Buyers usually use price search engines in order to find retailers ordered by the chategory of goods sold and by price, so that for each chategory those retailers who offer the lowest price appear first. Authors suggest that a Bertrand's paradox may work as long as sellers prefer lowering as much as possible their prices for low quality goods (which work as "loss-leaders") in order to attract buyers' attention to their shops trying to deviating their purchases to medium- and high-quality goods. The analysis they conduct is both theoretical and empirical. First, authors present two different theories of how obfuscation can raise sellers' profits: the first theory is a standard search model in which obfuscation raises search costs and therefore reduces buyers' awareness; the second theory is a price discrimination model in which obfuscation does not reduce buyers' awareness but rather avoids that buyers awareness hurts sellers' interests. Then, model predictions have been tested and confirmed using data regarding eight product cathegories (four about computer memory modules and four regarding central processing units or CPUs) sold on the web by a price search engine (Pricewatch).

Some economists, like Shapiro (1995), argued that in presence of "myopic" (which means non-fully sophisticated) buyers, competitive firms would have interest to educate them by disclosing their contracts, offering efficient terms. By contrast, Gabaix and Laibson (2006) answer that, in presence of a proportion $\alpha < 1$ of myopic[12] buyers, firms may have no interest to educate them about add-on prices. The reason found by the two authors is that those firms are not able to attract buyers by advertising them, since an educated buyer carries on buying from those sellers who shroud add-on prices having now enough knowledge to exploit the contract by substituting away from future use add-ons at a certain effort e.

If the seller shrouds add-ons, no consumer can observe them and only the fraction $1-\alpha$ of sophisticated buyers takes them into account; by contrast, when the seller unshrouds add-ons, also a fraction λ of informed myopes will observe them. Therefore, unshrouding means enlarging the number of sophisticated buyers shared by all firms.

In case of shrouded add-ons, sophisticated buyers form their expectation about the price $E(p^{\circ})$ and pay the substitution effort if $e < E(p^{\circ})$. When add-ons are unshrouded, both sophisticated and informed myopes will compare e with the observed value of p°. Call x_i the expected surplus of buying from firm i rather than from any others.

Gabaix and Laibson characterise symmetric equilibria of the game as follows. For a sufficiently high α, the Shrouded Prices Equilibrium takes place; otherwise the Unshrouded Prices Equilibrium takes place and all consumers buy add-ons.

The authors underline that the Shrouded Prices Equilibrium confirms the fact that sellers tend to set a very low price for the base good and a monopoly price for add-ons, which becomes the profit-centre and balances eventual losses coming from the low price offered for the base good. This equilibrium is also inefficient, since sophisticated buyers have to pay the substitution effort.

It has to be noted that in Gabaix and Laibson's (2006) model buyers have no possibility to read the contract, even at some positive cost. The only possibilty they have to know its content with respect of the price for add-ons is that the seller unshrouds it and the only way to protect himself from a very high unknowed price for add-ons is to pay a substitution effort e. In this sense, it can be said that such substitution effort plays a role similar to the reading cost k in our model.

Moreover, other different assumptions can be found between that model and ours. More precisely, the two main differences are that 1. we do not allow for sellers including terms unfavourable to buyers, like add-ons, but any second clause can contain a guarantee; and 2. reading costs are fixed, so that sellers are not allowed to unshroud their contracts.

[12] Gabaix-Laibson define "myopic" those buyers who are not fully sophisticated.This term can be considered synonymous of "naive" which will be used in our model.

In this model we will search for equilibria in both a monopolist and competitive markets with sophisticated and naive buyers together when seller(s) have to decide whether to offer a one-clause contract without guarantee or a two-clause contract which may contain a guarantee available for buyers to read at some positive cost k, in order to pursue two different goals: first, we will show that our results against Kessler (1943) found in previous chapter hold also in presence of naive buyers, that is market structure matters in the opposite way with respect to Kessler's (1943) argument[13] even in presence of non-fully rational buyers; secondly, we will reject Gabaix-Laibson's (2006) conclusion that sellers would have no interest to disclose their contract if they were able to.

We will analyse two different kinds of naive beliefs in our model, in the sense that we will allow buyers to believe that every second clause contains the guarantee for sure (that is the belief favourable to sellers, as in Gabaix and Laibson (2006)) or that it does not contain such a guarantee for sure. We call optimist those buyers of the first category and pessimist those of the second category. Then, optimistic buyers prefer two-clause contracts as long as price is not greater than u_h; whereas pessimistic buyers do not buy at any price greater than v whatever contract is offered. According with Korobkin (2003), efficiency requires not only that buyers should be aware of the content of the contract they are signing, but also that they take into account this information as relevant for their purchase decisions. This definition does not change the model properties: what we call naivity can be also intended as lack of rationality in purchasing decision.

Once equilibria will be descripted, we will also investigate what effects will be produced on parties' utilities if the monopolist or competitive sellers voluntary disclose their contracts or they are forced to do so by courts' intervention or law. To do that, we have first to consider the effect of such policies on naive beliefs. About it, different assumptions can be made, such that naive buyers may be never or always aware of these policies when developed by sellers or public operators. Since it is not easy (and in a certain sense also aprioristic) to forecast naive buyers' reaction, we will assume that naive buyers are not able to understand voluntary or mandatory disclosure (then, we say they do not become sophisticated). Even though the most interesting case is the one with optimistic and sophisticated buyers together, we start analysing those cases when all buyers are naive.

3 Model

The game is played by $N \geq 1$ sellers and sophisticated and naive buyers together. When contract offered, sophisticated buyers and seller believe that the

quality of an indivisible good (q_S) is $q_l$with probability α and q_h otherwise, where $q_l < q_h$. If the players trade this good then the buyer can prove q in

court (after trying out the good). Write $u(q_l)$ as ul and u(qh) as u_h. Each sophisticated buyer's reservation value for good of quality q is u_q; so she would

[13] Cfr. Chapter 1, Section 4.2

pay

up to $\alpha u_l + (1-\alpha)u_h \equiv v$ without a guarantee. On the other hand, naive buyers hold fix beliefs about an eventual two-clause as specified below.

Each seller's production cost is zero; and he can transform good from low to high quality ('repair') at cost of $\rho > 0$. Consequently, each seller earns p per

unit sold if he does not repair the good, and $p - \rho$ otherwise. If $u_h < 0$ then there can be no profitable production; so suppose henceforth that $u_h > 0$. Will also assume that $v \geq 0$. Any feasible contract (c) has up to two clauses. The first clause of any contract states a price ($\gamma_1 = p$); the second clause is either non-existent (ϕ) or contains a guarantee, promising repair the good if it is of low quality (g) or contains no guarantee (n). Write $\gamma_2 \in \{\phi, g, n\}$, $\mu \equiv pr(\gamma_2 = g|\gamma_2 \neq \phi)$; and $c = \{\gamma_1, \gamma_2\}$. We denote the set of one-clause contracts by C_1, and the set of two-clause contracts by C_2. We will sometimes refer to the contents of a second clause as 'fine print'. We suppose that a given seller must offer the same contract to every buyer[14]. This assumption does not raise issues of price discrimination across buyers because they are ex ante identical. However, it implies that a seller can earn a reputation for offering a two-clause contract without a guarantee: a property which will prove important below. Buyers costlessly observe each seller's price and whether the contract has a second clause, and then decide which (if any seller to patronize). If a buyer's chosen seller offers a two-clause contract then she must pay $k \geq 0$ if to ascertain whether the second clause contains a guarantee: where k can be interpreted as the cost of reading or of hiring a lawyer.

A buyer earns $u_h - p - k$ $[resp. u_h - p]$ if she pays p for either a high-quality good or a low quality good after reading $[resp. without reading]$, and $-k$ $[resp. 0]$ if she does not accept after reading [resp. without reading]. A seller's payoff is his profit. A strategy for a seller is a feasible contract. A mixed strategy for a buyer specifies the probability with which the buyer patronizes each seller S; and, having matched with S:

- $b(c_S) \equiv pr$(buys from S without reading c_S);
- $r_0(c_S) \equiv pr$(reads c_S and then buys from S iff $\gamma_{S2} = g$);
- $r_1(c_S) \equiv pr$(reads c_S and then always buys from S);
- $r_2(c_S) \equiv pr$(reads c_S and then buys from S iff $\gamma_{S2} = n$);
- $r_3(c_S) \equiv pr$(reads c_S and then never buys from S).

Equilibrium concept: symmetric SPE in admissible strategies. Admissibility will exclude implausible equilibria when there is no reading cost. We assume that it is socially efficient for players to trade with a guarantee. Specifically:

Efficient Guarantees $\alpha(u_h - u_l - \rho) - k > v > 0$.

Efficient Guarantees can also be written as $k + v < u_h - \alpha\rho$, which will sometimes be useful below. It implies that trade is socially efficient ($u_h > \alpha\rho$).

[14] In legal terminology, we only allow for 'adhesion contracts'.

4 The Model with naive buyers only

In this section we analyse both a monopoly and a competitive market assuming that all buyers hold naive beliefs about the content of an eventual second clause.

More precisely, we will consider three possible situations:

1. All buyers are optimistic;
2. all buyers are pessimistic;
3. a proportion $\beta > 0$ of buyers is optimistic and others are pessimistic.

About the competitive market, we will solve the game looking for symmetric equilibria only.

4.1 Results

Proposition 1 *If all buyers are optimistic, then a monopolist will offer a two-clause contract without the guarantee at a price u_h and buyers accept without reading; whereas competitive sellers offer a two-clause contract without the guarantee at a price of η and buyers accept without reading.*

If all buyers are pessimistic, no equilibrium would be possible in two-clause contract, so a monopolist would offer $\{v, \varphi\}$, a competitive seller $\{0, \varphi\}$ and buyers would earn respectively 0 and v.

When some buyers are optimistic and some others are pessimistic, then a monopolist offers a one-clause contract at a price of v if β is sufficiently small and a two-clause contract without guarantee at a price of u_h otherwise; whereas no symmetric equilibrium exists in a competitive market.

Every equilibrium is inefficient.

Proof. If all buyers are optimistic, they never read and always accept every two-clause contract at any price up to u_h. Then, the monopolist can perfectly discriminates offering $\{u_h, n\}$ and earning $u_h - \eta$ while buyers believe to earn 0 but they lose $v - u_h < 0$. The monopolist has no interest neither to deviate to a one-clause contract since he could earn only $v < u_h - \eta$ nor to any other two-clause contract at any price smaller than u_h and/or containing a guarantee since he would gain less. On the other hand, competitive sellers offer $\{\eta, n\}$ earning 0 while buyers believe to earn $u_h - \eta$ but they only earn $v - \eta$. No seller has interest to raise price or to deviate to a one-clause contract since given buyers' beliefs they will not buy. In both cases, trade will be inefficient since a good can be offered without guarantee.

If all buyers are pessimistic, sellers have no interest to offer the guarantee since no buyer would believe it. Therefore, the best two-clause contract that a monopolist could offer and buyers would accept is $\{v, n\}$;so the monopolist would get a payoff of $v - \eta < v$ and he would profitably deviate to a one-clause contract. On the other hand, a competitive seller always offers a one-clause contract $\{0, \varphi\}$ and no seller has interest to raise price nor to deviate to a two-clause contract $\{\eta, n\}$ since pessimistic buyers would not buy. In either case, trade would be inefficient since a good can be offered without guarantee.

If just a proportion $\beta > 0$ of buyers is optimistic and others are pessimistic, the best one-clause contract that a monopolist can offer is (v, φ) which yields a payoff of v since all buyers would buy. If the monopolist offers a two-clause contract at any price greater than v only optimistic buyers would buy; therefore, the monopolist would have interest to offer (u_h, n) earning $\beta(u_h - \eta)$. It implies that the monopolist will offer (v, φ) only if $v > \beta(u_h - \eta)$ and (u_h, n) otherwise. Looking at the competitive market, no symmetric equilibrium exists in one-clause contract $\{0, \varphi\}$ since a seller might profitably deviate to a two-clause contract charging a price greater than 0 which would attract optimistic buyers. At the same time, no symmetric equilibrium exists in a two-clause contract $\{\eta, n\}$ since a seller might profitably deviate to a one-clause contract charging a positive price just smaller than η which would attract pessimistic buyers. It can be noted that trade can occur in a non-symmetric equilibrium in which a proportion β of sellers offers $\{\eta, n\}$ and others offer $\{0, \varphi\}$.

The Efficient Guarantee Principle implies that since guarantee is never given every equilibrium is inefficient. ■

5 The model with optimistic and sophisticated buyers together

Call $\theta > 0$ the probability that a buyer is optimistic and $(1 - \theta)$ the probability that he is sophisticated. In the next subsection, we will present equilibrium outcomes in both the monopoly and the competitive market; then, we will analyse voluntary disclosure and courts' intervention separately.

5.1 Results

5.1.1 Monopoly

We first characterise pure-strategy equilibria and then will turn to mixed strategy equilibria.

Proposition 2 *For a sufficiently small θ the monopolist offers a one-clause contract at a price of v and all buyers accept. For a sufficiently high θ the monopolist offers a two-clause contract at a price of u_h without guarantee and optimistic buyers only accept. Both equilibria are inefficient.*

Proof. The monopolist has never interest to offer a price lower than v since he would get a lower payoff. He knows that optimistic buyers would accept a two-clause contract at any price up to u_h, but sophisticated buyers would reject it if they infer that no guarantee will be given. The monopolist would earn $\theta(u_h - \eta)$ by deviating to $\{u_h, n\}$. Therefore, he has no interest to do so only if $\theta \leq \frac{v}{u_h - \eta}$. All buyers would buy and get 0 while the monopolist would get v.

By contrast, for $\theta > \frac{v}{u_h - \eta}$, the monopolist will offer a two-clause contract getting $\theta(u_h - \eta)$. The monopolist has never interest to give the guarantee since no buyer reads. Sophisticated buyers reject and earn 0, whereas optimistic buyers accept without reading, thinking of earning 0 but they get $v - u_h < 0$.

Inefficiency comes from Efficient Guarantee Principle since guarantee is given in none of equilibria. ■

From now on we will omit η and will look for possible mixed-strategy equilibria

1. for the monopolist mixing between giving and not giving the guarantee, optimistic buyers always accepting without reading and sophisticated buyers always reading; or

2. for the monopolist mixing between a one-clause contract and a two-clause contract (giving the guarantee with some positive probability), optimistic buyers always accepting without reading and sophisticated buyers always reading; or

3. for the monopolist mixing between giving and not giving the guarantee, optimistic buyers always accepting without reading and sophisticated buyers mixing between accepting with and without reading; or

4. for the monopolist mixing between a one-clause contract and a two-clause contract giving the guarantee with some positive probability, optimistic buyers always accepting without reading and sophisticated buyers mixing between reading and accepting without reading; or

5. for the monopolist mixing between a two-clause contract $\{u_h, n\}$ and a two-clause contract at a price of p_2 giving the guarantee with some positive probability, optimistic buyers always accepting without reading and sophisticated buyers rejecting any contract when $p = u_h$ and mixing between reading and accepting without reading otherwise.

About case 1, it can be said that

Proposition 3 *No equilibrium exists in which the monopolist mixes between giving and not giving the guarantee, optimistic buyers buy without reading and sophisticated buyers read.*

Proof. Suppose, per contra, that such an equilibrium exists. Optimistic buyers buy without reading at every $p \leq u_h$; sophisticated buyers strictly prefer to read only if $p \in (v + k/(1-\mu), u_h - k)$ The monopolist earns: θp if $\gamma_2 = n$ and $p - \alpha\rho$ if $\gamma_2 = g$.So he is indifferent only if $p = \alpha\rho/(1-\theta)$. The monopolist prefers this contract to $\{u_h, n\}$ only if $\theta\alpha\rho/(1-\theta) \geq \theta u_h \Leftrightarrow \alpha\rho/(1-\theta) \geq u_h$ but at that price all buyers strictly prefer not to buy. ■

About case 2, it can be said that

Proposition 4 *No equilibrium exists in which the monopolist mixes between a one-clause contract and a two-clause contract (giving the guarantee with some positive probability), optimistic buyers always accept without reading and sophisticated buyers always read.*

Proof. Such an equilibrium can exist only if $v > \theta u_h$. If sophisticated buyers always read when offered a two-clause contract, it implies that the monopolist earn $p_2\theta$ if he offers $\{p_2, n\}$ and $p_2 - \alpha\rho$ if he offers $\{p_2, g\}$, so that he is indifferent only if $p_2 = \frac{\alpha\rho}{1-\theta}$. Moreover, to be indifferent between a one-clause contract and a two-clause contract when the guarantee is offered with probability $\mu > 0$, the monopolist must always earn v, that is $\theta p_2 = v$. However, it cannot be possible since a necessary condition for such an equilibrium to exist is that $v > \theta u_h$. ■

Corollary 5 *Buyers never read with certainty in any equilibrium*

This result is again consistent with Katz (1990) and Rasmusen (2003): in fact, again it turns out that buyers do not read when offered a two-clause contract.

About case 3, for any $p_2 \leq u_h$, it is certain that an optimistic buyer buys without reading, while a sophisticated buyer mixes between reading and buying without reading or reading for $p = v + k/(1-\mu)$ and rejects every two-clause contract with $p > v + k/(1-\mu)$. About the second clause, for any $p_2 \neq v + k/(1-\mu)$, the monopolist has no interest to set $\gamma_2 = g$: in fact, on one hand a sophisticated buyer would infer that no guarantee is offered and then would reject the contract without reading; on the other hand, an optimistic buyer would buy without reading. For $p_2 = v + k/(1-\mu)$, the monopolist mixes between $\gamma_2 = g$ and $\gamma_2 = n$.

About the first clause, on one hand the monopolist has no interest to set $p_2 < v + k/(1-\mu)$ if only optimistic buyers would buy while sophisticated buyers would infer that $\gamma_2 = n$ and would not buy; so the monopolist might profitably deviate to $\{u_h, n\}$. On the other hand, the monopolist has no interest to set any $p_2 \in (v + k/(1-\mu), u_h)$ because again only optimistic buyers would buy and he would profitably deviate to $\{u_h, n\}$.

The monopolist offers the contract which yields the highest payoff. In particular, he gets v from the best one-clause contract $\{v, \varphi\}$ and θu_h from a two-clause contract $\{u_h, n\}$ where only optimistic buyers buy. He compares these payoffs with that he would obtain by mixing between giving and not giving the guarantee, where optimistic buyers again would buy and sophisticated buyers would mix. To do that, we must distinguish between those possible mixed-strategy equilibria in which sophisticated buyers mix between reading and buying without reading ($b + r = 1$) and those possible mixed-strategy equilibria in which sophisticated buyers mix between reading, buying without reading and rejecting the offer without reading ($b + r < 1$).

- $b + r = 1$ for sophisticated buyers.

  As said above, sophisticated buyers are indifferent only if $p_2 = v + k/(1-\mu)$.

To have $U^{SB} \geq 0$ it must be

$$\mu(u_h - v - k/(1-\mu) - k \geq 0 \Leftrightarrow k \leq \mu(1-\mu)(u_h - v) \qquad [1]$$

Condition [1] is satisfied for $\mu \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$, where $Y = \sqrt{1 - \frac{4k}{u_h - v}}$ is well defined only if $4k \leq u_h - v$.

The monopolist's utility is $U^S = p_2 - \alpha\rho$ if he offers the guarantee and $U^S = (\theta + (1-\theta)b)p_2$ if he does not. So, he is indifferent only if $r = \frac{\alpha\rho}{p_2(1-\theta)}$.

The monopolist has no interest to deviate to $\{v, \varphi\}$ or $\{u_h, n\}$ only if

$$p_2 - \alpha\rho \geq \max\{v, \theta u_h\}$$

Substituting for p_2,

$$v + \tfrac{k}{1-\mu} - \alpha\rho > \max\{v, \theta u_h\} \qquad [2]$$

Proposition 6 ***a****. There is no mixed-strategy equilibrium for the monopolist offering a two clause contract giving the guarantee with some positive probability, optimistic buyers always accepting without reading and sophisticated buyers mixing between reading and accepting without reading if* $k > \frac{u_h - v}{4}$*;*

b. when $\theta < \frac{v}{u_h}$*, then an equilibrium exists for* $\mu \in \left(1 - \frac{k}{\alpha\rho}, \frac{1+Y}{2}\right)$ *if reading costs are small enough and for* $\mu \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$ *otherwise;*

c. when $\theta \in \left(\frac{v}{u_h}, \frac{u_h - \alpha\rho}{u_h}\right)$ *then an equilibrium exists for* $\mu \in \left(1 - \frac{k}{\theta u_h - v + \alpha\rho}, \frac{1+Y}{2}\right)$ *if reading costs are small enough; otherwise it exists for* $\mu \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$*.*

Proof is in the Appendix.

What said shows again that a monopolist cannot offer a two-clause contract if k is large enough. If k is small enough then an equilibrium can exist only for $\mu \simeq 1$ for both $v \lesseqgtr \theta u_h$; in such a case, sophisticated buyers will read with probability close to $\alpha\rho/u_h < 1$ and the monopolist will charge a price p close to u_h[15].

About case 4., there can exist an equilibrium in which the monopolist mixes between a one-clause contract and a two-clause contract (giving the guarantee with some positive probability), optimistic buyers always accept without reading and sophisticated buyers mix between reading and accepting without reading when offered a two-clause contract if and only if

$$p_2 - \alpha\rho = v \qquad [3]$$

About point 5, there can exist an equilibrium in which the monopolist mixes between a two-clause contract $\{u_h, n\}$ and a two-clause contract at a price of $v + \frac{k}{1-\mu}$ offering the guarantee with some positive probability, optimistic buyers always accept without reading and sophisticated buyers reject $\{u_h, n\}$ and mix between reading and accepting without reading otherwise if and only if:

$$p_2 - \alpha\rho = \theta u_h \qquad [4]$$

[15] See last chapter, section 3.1

Proposition 7 *a'. There is neither an equilibrium in which the monopolist mixes between a one-clause contract and a two-clause contract (giving the guarantee with some positive probability), optimistic buyers always accept without reading and sophisticated buyers mix between reading and accepting without reading when offered a two-clause contract nor an equilibrium in which the monopolist mixes between a two-clause contract* $\{u_h, n\}$ *and a two-clause contract at a price of* $v + \frac{k}{1-\mu}$ *offering the guarantee with some positive probability, optimistic buyers always accept without reading and sophisticated buyers reject* $\{u_h, n\}$ *and mix between reading and accepting without reading otherwise if* $k > \frac{u_h - v}{4}$;

b'. if both reading costs and the proportion of optimistic buyers are small enough, there can exist an equilibrium for the monopolist mixing between a one-clause contract $\{v, \varphi\}$ *and a two-clause contract with* $p = v + \alpha\rho$ *offering the guarantee with probability* $\mu = 1 - \frac{k}{\alpha\rho}$, *optimistic buyers always accepting without reading and sophisticated buyers always accepting any one-clause contract and mixing between reading and accepting without reading when offered a two-clause contract;*

c'. if reading costs are small enough and the proportion of optimistic buyers is not too small, there can exist an equilibrium for the monopolist mixing between a two-clause contract $\{u_h, n\}$ *and a two-clause contract at* $p = \theta u_h + \alpha\rho$, *offering the guarantee with probability* $\mu = 1 - \frac{k}{\theta u_h - v + \alpha\rho}$, *optimistic buyers always accepting without reading and sophisticated buyers rejecting any contract when* $p = u_h$ *and mixing between reading and accepting without reading otherwise.*

Proof is in the Appendix.

What said can be summarised in

Proposition 8 *When some buyers are optimistic and some others are sophisticated, for* $v \geq \theta u_h$ *a monopolist offers a one-clause contract at a price of* v *and all buyers buy without reading; for* $v < \theta u_h$, *he offers a two-clause contract without guarantee at a price of* u_h *and only optimistic buyers buy. These are the only equilibria if* $k > (u_h - v)/4$ *or if* $\theta > \frac{u_h - \alpha\rho}{u_h}$. *If these last conditions fail, there might be other equilibria in which the monopolist mixes between giving and not giving the guarantee, optimistic buyers always buy without reading and sophisticated buyers mix between reading and buying without reading, earning a positive payoff. There might be also equilibria in which sophisticated buyers reject the contract without reading with positive probability. For very small values of* k *there exist also equilibria in which the monopolist mixes between a one-clause contract (a two-clause contract at a price of* u_h *without the guarantee) and a two-clause contract at a price of* p_2 *giving the guarantee with some positive probability, optimistic buyers always buy and sophisticated buyers buy from any one-clause contract and mix between reading and buying without reading when offered a two-clause contract (sophisticated buyers reject any two-clause contract when price is* u_h *and mix between reading and accepting without reading otherwise).*

Every equilibrium is inefficient.

Inefficiency comes from two sides: first, the guarantee may be not given and, second, buyers read and therefore pay the reading cost with some positive probability.

5.1.2 Competition

We now consider a market characterised by $N > 1$ sellers and assume again that buyers can observe each seller's price without any cost, so search costs are zero. Given that now buyers have heterogeneous preferences, our analysis will take into account both symmetric and asymmetric equilibria since it may be likely that sellers offer different contracts in order to attract one of the two chategories of buyers.

We start from symmetric equilibria and then we will turn to asymmetric equilibria. In both cases, we will distinguish between pure-strategy and mixed-strategy equilibria.

Symmetric equilibria

Proposition 9 *For $N > 1$ no symmetric pure-strategy equilibrium exists for sellers offering either a one-clause contract or a two-clause contract.*

Proof. Sellers cannot offer a one-clause contract at $p > 0$ since another seller could lower his price attracting all buyers.

Suppose that sellers offer a one-clause contract at a $p = 0$, so that they earn 0 and all buyers buy. This is not an equilibrium since every seller might profitably deviate to a two-clause contract $\{u_h, n\}$ which would attract optimistic buyers only and yield a profit of $\theta(u_h - \eta) > 0$.

Suppose now that sellers offer a two-clause contract $\{\eta, n\}$, so that all buyers accept and sellers earn 0. This is not an equilibrium since every seller would have interest to deviate to a one-clause contract (p, φ) with $p \in (0, \eta)$ which would attract sophisticated buyers only, yielding a positive profit.

Suppose that sellers offer a two-clause contract $\{\alpha\rho+\eta, g\}$, so that all buyers accept and sellers earn 0. This cannot be an equilibrium since every seller would have interest to deviate to $\{p, n\}$ with p just below $\alpha\rho$ in order to attract optimistic buyers earning almost $\theta\alpha\rho > 0$. ■

From now on we will omit η and will look for possible mixed-strategy equilibria

1. for sellers mixing between giving and not giving the guarantee, optimistic buyers accepting without reading and sophisticated buyers reading; or

2. for sellers mixing between a one-clause contract and a two-clause contract (giving the guarantee with some positive probability), optimistic buyers accepting without reading and sophisticated buyers reading; or

3. for sellers mixing between giving and not giving the guarantee, optimistic buyers buying without reading and sophisticated buyers mixing between accepting with and without reading: or

4. for sellers mixing between a one-clause contract and a two-clause contract (giving the guarantee with some positive probability), optimistic buyers accepting without reading and sophisticated buyers mixing between reading and accepting without reading;

5. for sellers mixing between a two-clause contract at a price of p_2 giving the guarantee with some positive probability and a two-clause contract without the guarantee at any price below p_2, optimistic buyers always accepting without reading and sophisticated buyers rejecting any contract when $p = u_h$ and mixing between reading and accepting without reading otherwise.

About case 1, it can be said that

Proposition 10 *There is no mixed-strategy equilibrium in which sellers mix between giving and not giving the guarantee, sophisticated buyers always read and optimistic buyers always buy without reading.*

Proof. In an equilibrium such this, sellers would earn: $\theta p/N$ if $\gamma_2 = n$ and $(p - \alpha\rho)/N$ if $\gamma_2 = g$. So they would be indifferent only if $p = \frac{\alpha\rho}{1-\theta}$. Sellers would then earn $\frac{\theta\alpha\rho}{N(1-\theta)}$, so that a seller could profitably deviate to $\{p, n\}$ with p just below $\frac{\alpha\rho}{1-\theta}$, attracting optimistic buyers only and earning almost $\frac{\theta\alpha\rho}{1-\theta}$. ■

About case 2, it can be said again that

Proposition 11 *There is no mixed-strategy equilibrium in which sellers mix between a one-clause contract and a two-clause contract (giving the guarantee with some positive probability), sophisticated buyers always read and optimistic buyers always accept without reading.*

Proof. Sellers must earn 0 in such an equilibrium, so that a seller could profitably deviate to a two-clause contract $\{u_h, n\}$ which will attract optimistic buyers and will yield a positive payoff. ■

What said implies

Corollary 12 *Buyers never read with certainty in any equilibrium*

About case 3, it can be said that

Proposition 13 *a. There is no equilibrium in which sellers offer a two-clause contract mixing between giving and not giving the guarantee, optimistic buyers always accept without reading and sophisticated buyers mix between reading and accepting without reading if* $k > \frac{u_h - v}{4}$;

b. if the proportion of optimistic buyers is small enough, such an equilibrium can exist for $\mu \in \left(1 - \frac{k}{\alpha\rho + v((N(1-\theta)-1)} \frac{1+Y}{2}\right)$ *if reading costs are small enough and for* $\mu \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$ *otherwise;*

c. if the proportion of optimistic buyers is not too small and not too large, an equilibrium exists for $\mu \in \frac{1-Y}{2}, 1 - \frac{k(N-1)}{N(u_h - v) - \alpha\rho - (N-1)\nu}$ *if reading costs are small enough and for* $\mu \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$ *otherwise;*

d. there can also exist an equilibrium in which optimistic sophisticated buyers reject with some positive probability for $\mu \in \left\{\frac{1-Y}{2}, \frac{1+Y}{2}\right\}$ *if reading costs are not too small; otherwise, it can exist for* $\mu = \frac{1+Y}{2}$ *if the proportion of optimistic buyers is small enough and for* $\mu = \frac{1-Y}{2}$ *if the proportion of optimistic buyers is not too small and not too large.*

Proof is in the Appendix.

Corollary 14 *There cannot exist an equilibrium of this sort if the proportion of optimistic buyers is too large.*

About point 4., we can say that

Proposition 15 *There is no equilibrium in which sellers mix between a one-clause contract* $\{p, \varphi\}$ *with* $p \leq v$ *and a two-clause contract carging more than* p*, optimistic buyers always accept without reading and sophisticated buyers accepting when offered a one-clause contract and mixing between reading and accepting witout reading otherwise.*

Proof. Assume there exists a level of $p < v$, such that sellers would be indifferent between a one-clause contract at that price and a two-clause contract at $p = \ v + \frac{k}{1-\mu}$ giving the guarantee with probability μ. It cannot be an equilibrium since every seller could get all the market simply by offering a one-clause contract at a price just below p_1.

Assume that sellers charge charge 0 whenever they offer a one-clause contract; otherwise another seller can charge a smaller price attracting all sophisticated buyers. if $p_1 = 0$, then to be indifferent sellers must charge $\alpha\rho$ whenever they offer a two-clause contract. Since $\alpha\rho < v$, at that price sophisticated buyers would always buy without reading as well as optimistic buyers so that no seller will include the guarantee in equilibrium and would get a payoff of $\alpha\rho > 0$. It cannot be an equilibrim plies that each seller can charge a price smaller than $\alpha\rho$ getting all the market.

About point 5, it can be said that ■

Proposition 16 *No mixed-strategy equilibrium can exist for sellers mixing between a two-clause contract at a price of* p_2 *giving the guarantee with some positive probability and a two-clause contract without the guarantee at any price below* p_2*, optimistic buyers always accepting without reading and sophisticated buyers rejecting any contract when* $p < p_2$ *and mixing between reading and accepting without reading otherwise.*

Proof. Sellers would be indifferent between such contracts only if $\frac{p_2 - \alpha\rho}{N} = \theta z$ where $z < p_2$. However, if all sellers mix between these contracts another seller might offer a two-clause contract $\{z', n\}$ with z' just below z attracting all optimistic buyers. ■

Asymmetric equilibria Let now turn to asymmetric equilibria, in which sellers offer different contracts or the same contract with different clauses. We will again start from pure-strategy equilibria and then we turn to those cases in which one or more players mix.

Before starting, we can state that no equilibrium exists for any chategory of buyers always rejecting without reading: more precisely, optimistic buyers will reject without reading only if they are charged more than v or more than u_h when offered a one-clause contract or a two-clause contract respectively.

Proposition 17 *For $N > 1$, there exists an asymmetric pure-strategy equilibrium for a proportion θ of sellers offering a contract $\{\eta, n\}$ which attracts all optimistic buyers and other sellers offering a contract $\{0, \varphi\}$ which will attract all sophisticated buyers. All sellers earn 0; whereas buyers earn $v - \eta > 0$ if optimistic and v if sophisticated.*

Proof. Suppose such an equilibrium exists: sellers who offer a one-clause contract (two-clause contract) cannot deviate to a higher price since buyers would not buy nor to a lower price since they would get a negative profit. They have no interest to deviate to offering $\{\eta, n\}$ ($\{0, \varphi\}$) since they would get 0 as well. At the same time, no seller has interest to deviate to $\{p, g\}$ since e would make no sale: in fact, optmistic buyers would not buy at any $p > \eta$, whereas sophisticated buyers would infer $\gamma_2 = n$ and would not buy as well.

By contrast, there cannot exist an equilibrium in which a proportion θ of sellers offers $\{\eta, n\}$ which would attract optimistic buyers and sellers offers $\{\alpha\rho + \eta, g\}$ which would attract sophisticated buyers. Sophisticated buyers never read in equilibrium since they should pay $k > 0$. All sellers would earn 0, but if sophisticated buyers accept without reading then each seller might profitably deviate to $\{\alpha\rho + \eta, n\}$ earning $\alpha\rho(1 - \theta) > 0$. ■

We will now turn to mixed-strategy equilibria. From previous analysis about symmetric equilibria, we can already exclude any equilibria in which some or all sellers mix and sophisticated buyers always read. Many other cases can be analysed:

Proposition 18 *No equilibrium can exist for some sellers offering $\{0, \varphi\}$ to sophisticated buyers and others mix between $\{p, g\}$ and $\{p, n\}$ attracting optimistic buyers who always buy without reading.*

Proof. Such an equilibrium cannot exist since no seller will offer the guarantee with some positive probability in equilibrium given that optimistic buyers will never read. ■

Proposition 19 *No equilibrium can exist for some sellers offering $\{\eta, n\}$ to optimistic buyers who always buy and other sellers mixing between $\{p, g\}$ and $\{p, n\}$ attracting sophisticated buyers who may read or mix between reading and accepting without reading or rejecting with some positive probability*

Proof. First, it can be excluded that such an equilibrium exists for sophisticated buyers always accepting without reading since no seller would include the guarantee. Sophisticated buyers always read if $\mu(u_h - p) - k > \max\{0, \mu(u_h - p) + (1-\mu)(v-p)\}$ which requires $p \in \left(v + \frac{k}{1-\mu}, u_h - \frac{k}{\mu}\right)$. Moreover, they do not turn to those who offer $\{\eta, n\}$ only if $\mu(u_h - p) - k > v - \eta$, which requires $p < u_h - \frac{k+v-\eta}{\mu}$, so that it must be

$$p \in \left(v + \frac{k}{1-\mu}, u_h - \frac{k+v-\eta}{\mu}\right)$$

Such range is non-empty only if $\mu \in \left[\frac{1-Y}{2}, \frac{1+Y}{2}\right]$.

Those sellers who offer a one-clause contract and those who offer a two-clause contract without guarantee earn 0, whereas those who offer a two-clause contract with the guarantee earn $(1-\theta)(p - \alpha\rho - \eta)$. Therefore, to be indifferent, it must be $p = \alpha\rho + \eta$ which requires

$$v + \frac{k}{1-\mu} < \alpha\rho + \eta < u_h - \frac{k+v-\eta}{\mu}$$

However, given the Efficient Guarantee Principle, it turns out that $\alpha\rho + \eta < v + \frac{k}{1-\mu}$ for every $\mu < 1$, so that such an equilibrium cannot hold.

What said implies that no equilibrium can exist for buyers mixing between reading and accepting without reading or for buyers rejecting with some positive probability. In fact, in both cases it must be $p = v + \frac{k}{1-\mu} < u_h - \frac{k+v-\eta}{\mu}$. From previous analysis we already know that no seller would deviate only if $p = \alpha\rho + \eta < v + \frac{k}{1-\mu}$ for every $\mu < 1$. ■

It also implies that

Proposition 20 *No equilibrium can exist for some sellers offering $\{\eta, n\}$ to optimistic buyers and other sellers mixing between $\{0, \varphi\}, \{p, g\}$ and $\{p, n\}$ and attracting sophisticated buyers.*

We can summarised our results in

Proposition 21 *In a competitive market, for $k > (u_h - v)/4$ there exists only an asymmetric pure-strategy equilibrium in which a proportion θ of sellers offers a two-clause contract without the guarantee charging η and other sellers offer a one-clause contract charging 0: optimistic buyers will buy from those who offer a two-clause contract, whereas sophisticated buyers will buy from those who offer a one-clause contract.*

Otherwise, if reading costs are small enough and the fraction θ of optmistic buyers is not too large, there are symmetric equilibria in which each seller mixes between offering a two-clause contract with and without a guarantee, sophisticated buyers mix between reading and accepting without reading and naive buyers buy without reading. In this case, both sellers and buyers earn a positive payoff When k is small enough, there may also be equilibria in which sophisticated buyers mix between reading, rejecting and accepting without reading. In this case, sellers earn a positive payoff and buyers earn 0.

Every equilibrium is inefficient.

In general terms and regardless any consideration about market structure, every possible equilibrium in pure- or mixed-strategy is inefficient. In every one-clause contract equilibrium inefficiency comes from the absence of any guarantee. In every two-clause contract equilibrium inefficiency comes from two sides: first, buyers might read and therefore pay the reading cost; second, sellers may not give the guarantee.

Comparing our results with Diamond (1970), it turns out that also in our model equilibrium price in the competitive market are higher than the Bertrand level. However, in this case the impact of reading costs is lower with respect of previous chapter since only a fraction of buyers (those called sophisticated) read in equilibrium at some positive probability. At the same time the presence of optimistic buyers helps this increasing in price, pushing it up to the monopoly level, for whatever value of $k < \frac{u_h - v}{4}$, as highlighted by comparing sellers' payoffs when buyers are all sophisticated and when a fraction of them is naive: in the first case sellers always get 0 in both a one-clause pure-strategy equilibrium and two-clause mixed-strategy equilibrium; by contrast, in the second case they always get a positive utility in any mixed-strategy equilibrium

It can also be noted that in any equilibrium in which competitive sellers offer a two-clause contract mixing between giving and not giving the guarantee (case 3 above), the proportion of optimistic buyers plays an important role in sellers' decision of giving or not the guarantee when $k \to 0$: in fact, sellers offer the guarantee with probability $\mu \to 1$ if θ is small enough, so that p tends to the monopoly level, whereas μ takes every possible value in the whole range $(0, 1)$ if θ is not too small and p remains below the monopoly level. Obviously, it depends crucially from the fact that optimistic buyers never read regardless of the value of k. Such a difference does not arise in a monopoly: in fact, once the monopolist offers a two-clause contract in equilibrium he offers the guarantee with probability $\mu \to 1$ for whatever level of θ compatible with such an equilibrium.

6 Optimal complexity

Till now we have assumed that k is exogenously determined. In this section we will assume that sellers can freely determine the level of k of their contracts, making them more or less complex. We also assume that such a choice does not change the writing cost level η which remains very close to zero. The question is whether sellers have interest to disclose the second clause or not. Differently from Gabaix and Laibson (2006), to simplify the analysis, we will assume that when a disclosed contract is offered naive buyers will not be aware of it and maintain their a priori beliefs.

We start again looking at the case in which all buyers are naive and then we will turn to the case in which there are optimistic and sophisticated buyers together.

Proposition 22 *1. If sellers can choose the complexity level of their contracts and all buyers are naive of any type, no seller will disclose in equilibrium; If some* *buyers are optimistic and some others are sophisticated, then the monopolist will choose to draft it fully transparent if the proportion of optimistic buyers is not very high, wheeras in a competitive market only a proportion $1-\theta$ of sellers discloses in equilibrium.*

Proof. Suppose all buyers are optimist. The monopolist gains $u_h-\eta$ in equilibrium from offering an obscure contract; therefore, he has no interest to disclose offering $\{u_h, g\}$ at $k=0$ since he would get only $u_h-\alpha\rho-\eta<u_h-\eta$. On the other hand, there is no equilibrium in which competitive sellers offer a fully transparent contract $\{\alpha\rho+\eta, g\}$ if buyers remain optimist since one of them may offer an obscure $\{p, n\}$ at some $p<\alpha\rho+\eta$ getting all the market. So that in equilibrium each seller still offers $\{\eta, n\}$ which yields a payoff of 0 and all buyers buy.

Suppose all buyers are pessimistic. A monopolist offers a one-clause contract $\{v, \varphi\}$ if $k>0$; even if he decides to disclose and offers the guarantee he cannot charge more than v since buyers remain pessimist. Therefore, he never disclose since he would get $v-\alpha\rho-\eta<v$.Turning now to a competitive market, again no seller has interest to offer a fully transparent contract $\{\alpha\rho+\eta, g\}$ since another seller can offer $\{p, \varphi\}$ with $p<\alpha\rho+\eta$ getting all the market.

Suppose a proportion β of buyers is optimist and others are pessimist. The monopolist would get $\max\{v, \beta(u_h-\eta)\}$ if $k>0$. If $\beta(u_h-\eta)>v$, the monopolist has never interest to offer a fully transparent contract $\{u_h, g\}$ since pessimistic buyers would not buy, so that he would get $\beta(u_h-\alpha\rho-\eta)<\beta(u_h-\eta)$; if $\beta(u_h-\eta)<v$, the monopolist has no interest to disclose as well since pessimistic buyers do not understand disclosure and will not buy at any price greater than v, so that the monopolist would get at most $v-\alpha\rho-\eta<v$.

Suppose a proportion θ of buyers is optimist and others are sophisticated. In such a case, the monopolist gets $\max\{v, \theta u_h\}$ if $k>\frac{u_h-v}{4}$or $\theta>\frac{u_h-\alpha\rho}{u_h}$; otherwise, there exist also mixed-strategy equilibria in wich the monopolist gets $v+\frac{k}{1-\mu}-\alpha\rho$.By offering a fully transparent contract $\{u_h, g\}$, the monopolist would earn $u_h-\alpha\rho-\eta>\max\left\{v, v+\frac{k}{1-\mu}-\alpha\rho\right\}$, so that he has always interest to disclose except for the case in which $\theta>\frac{u_h-\alpha\rho}{u_h}$ since it would imply $u_h-\alpha\rho-\eta<\theta u_h$. About the competitive market, (1) if $k>\frac{u_h-v}{4}$ or θ is large enough, there is just an asymmetric equilibrium for a proportion θ of sellers offering $\{\eta, n\}$ and others offering $\{0, \varphi\}$; otherwise, (2) there may exist mixed-strategy equilibria in which each seller gets $\frac{v+k/(1-\mu)-\alpha\rho}{N}$. In case (1), if sellers can decide the complexity level of their contract, then none of them will still offer $\{0, \varphi\}$ since another seller could profitably deviate to a fully transparent contract $\{p, g\}$ with $p<u_h-v$ which would attract all sophisticated buyers. About case 2, sellers cannot offer an obscure contract anymore since any of them can profitably deviate to a fully transparent contract $\{p, g\}$ with $_p$ slightly smaller than $v+\frac{k}{1-\mu}$ getting all the market. So that, the only equilibrium in such a case is again asymmetric. Therefore the only equilibrium iin both cases is for a proportion θ of sellers still offering an obscure contract $\{\eta, n\}$ which will attract optimistic buyers and others offering a fully transparent $\{\alpha\rho+\eta, g\}$.

Sellers still get 0, so that they do not gain and do not lose with respect of case (1) and lose with respect of case (2); on the other hand, optimistic buyers always earn $v-\eta$, so that they do not gain and do not lose with respect of case (1), whereas they may gain or lose with respect of case (2)[16]; whereas sophisticated buyers always earn $u_h-\alpha\rho-\eta$ and in light of the Efficient Guarantee Principle are now better off.

It can be noted that, with the exception of the case in which all buyers are optimistic, only a monopolist has interest to disclose his contract; it confirms the conventional argument against Kessler (1943). On the other hand, focusing on the competitive market it can be noted that Gabaix and Laibson's (2006) argument is emphasized in presence of naive buyers only since (again with the exception of the case in which all buyers are optimistic) it is not only true that competitive sellers have no interest to disclose their contract but also that no equilibrium can exist for sellers being free to set the complexity level of their contract. ■

Such conclusion for competitive markets diverges from Gabaix and Laibson's (2006) result who states that in presence of optimistic buyers firms have never interest to disclose the contract even though disclosing would generate allocational efficiency. Such difference comes from the fact that Gabaix and Laibson assume that shrouded terms may be pejorative in terms of buyers' utility, whereas our model assumes that the eventual second clause can only contain terms favourable to buyers. As consequence, sophisticated and informed buyers know that they can only gain from buying from a disclosing seller, even if price is higher. It has to be noted that also our model predicts that a disclosing seller's payoff decreases as well as in Gabaix and Laibson, but such common result has different explanations. In fact, in Gabaix and Laibson model sellers who disclose and make buyers full informed are not able to attract them; by contrast, in our model sellers who disclose are able to attract buyers, but competition will lead to a decreasing in price down to $\alpha\rho+\eta$ in equilibrium at which sellers' payoff becomes equal to zero.

Comparing equilibrium conditions for the monopoly and the competitive market, our results also show that in presence of optimistic buyers a monopolist has always interest to disclose his contract while competitive sellers will do it only in particular circumstances. This allows us to reject again the Kessler's (1943) argument.

7 Policies

We now focus on those possible public interventions which should help buyers against fine prints according with UCC Section 218 which states that a clause in unenforceable if a buyer would have not traded if he knew its content. As said in last chapter, our model is consistent with such rule whenever buyers decide

[16]It comes from the fact that if $k>0$ optimistic buyers earn 0 in every mixed strategy equilibrium in which $b+r<1$ or $\mu\left(u_h-v-\frac{k}{1-\mu}\right)+(1-\mu)\left(-\frac{k}{1-\mu}\right)>0$ in every mixed strategy equilibrium for $b+r=1$.

to buy a two-clause contract without reading and it turns out that no guarantee has been given.

Again, we will analyse different policies which can be adopted. We start again analysing the case in which courts over-ride no guarantee clauses, that is they interpret any complex clause without guarantee as if it contains it.

Another possible policy consists in introducing the guarantee as mandatory by law. In such a case, any one- or two-clause contract without the guarantee becomes unavailable. This second policy would also prevent buyers from paying high judicial costs of turning to a judge which will be anyway assumed equal to zero in the proceeding of the section. We will show that also under this unrealistic assumption court intervention may harm buyers.

As well as in the case of voluntary disclosure, we will assume that optimistic buyers do not understand or be aware of the policy adopted, so that they hold their a priori beliefs.

7.1 Court intervention

We will start again from the case of naive buyers only and then we will turn to the case with optimistic and sophisticated buyers together.

Proposition 23 *If courts over-ride no guarantee clauses, then*

1. the monopolist is always worse off if all or most of buyers are optimistic; whereas they do not gain and do not lose if all or most of buyers are pessimistic;

2. competitive sellers never gain and never lose in any case;

3. optimistic buyers never lose and sometimes gain; whereas pessimistic buyers never gain and never lose;

4. equilibrium is efficient only if all or most buyers are optimistic.

Proof. If all buyers are optimistic and courts over-ride no guarantee clauses, then a monopolist has to offer a two-clause contract $\{u_h, g\}$ and is worse off since he now earns $u_h - \alpha\rho - \eta < u_h - \eta$. He has no interest to deviate to a one-clause contract since he would get at most $v < u_h - \alpha\rho - \eta$, given the Efficient Guarantee Principle. Then, buyers are better off earning now $0 > v - u_h$, even though they do not realise it. About the competitive market with optimistic buyers only, given courts' intervention sellers offer $\{\alpha\rho + \eta, g\}$ in equilibrium earning 0. In fact, no seller has interest to deviate neither to a one-clause contract nor to a two-clause contract charging a higher price since no buyer would buy; at the same time, no seller can deviate to another two-clause contract charging a price below $\alpha\rho + \eta$ since, given courts' interpretation, he would lose. Then, sellers earn 0 in such an equilibrium, so that they do not lose and do not gain; whereas buyers earn $u_h - \alpha\rho - \eta > v - \eta$ and in light of the Efficient Guarantee Principle are better off.

If all buyers are pessimistic, court intervention does not change equilibrium outcome: in fact, since buyers are not aware of court intervention, the best two-clause contract the monopolist can offer is now $\{v, g\}$ earning $v - \alpha\rho$; therefore he will still prefer offering $\{v, \varphi\}$ so that he can earn $v > v - \alpha\rho$. So that he will prefer offering $\{v, \varphi\}$. On the other hand, competitive sellers still offer $\{0, \varphi\}$ in equilibrium and none of them can profitably deviate to a two-clause contract with $p > 0$ since no buyer would buy. Parties' payoffs are therefore unchanged in both cases.

If some buyers are optimistic and some others are pessimistic and the monopolist offers a two-clause contract $\{u_h, g\}$ only optimistic buyers would buy if others are not aware of court intervention and the monopolist would get $\beta(u_h - \alpha\rho) - \eta$; whereas, all buyers would buy if the monopolist offers $\{v, \varphi\}$ and he would get v. It implies that the monopolist will prefer to offer $\{u_h, g\}$ only if $\beta > \frac{v+\eta}{u_h - \alpha\rho}$ and $\{v, \varphi\}$ otherwise. It can be recorded that without court intervention the monopolist would have offered $\{u_h, n\}$ earning $\beta u_h - \eta$ if $\beta > \frac{v+\eta}{u_h}$ and $\{v, \varphi\}$ earning v otherwise. As consequence, the monopolist is always worse off if $\beta > \frac{v+\eta}{u_h}$ whereas he does not gain and does not lose otherwise. On the other hand, pessimistic buyers never gain and never lose; whereas optimistic buyers gain if $\beta > \frac{v+\eta}{u_h - \alpha\rho}$ and do not gain and do not lose otherwise. About the competitive market, again no symmetric equilibrium can exist even if courts over-ride no-guarantee clauses; the only equilibrium is therefore asymmetric for a proportion β of sellers offering $\{\alpha\rho + \eta, g\}$ and others offering $\{0, \varphi\}$. All sellers earn 0, so that thy do not gain and do not lose, as well as pessimistic buyers who always get v. On the other hand, in light of the Efficient Guarantee Principle, optmistic buyers are now better off since they get $u_h - \alpha\rho - \eta > v - \eta$.

It can be noted that only those equilibria in which sellers offer the guarantee are efficient: it always (never) happens in both a monopoly and a competitve market if all buyers are optimistic (pessimistic); equilibrium can be efficient as well in a monopoly even in presence of few pessimistic buyers, whereas in a competitive market equilibrium is partially efficient since just a proportion of sellers offers the guarantee. ■

It can be noted that court intervention might turn out not effective if buyers are pessimist and are not aware of it. More precisely, it can be noted that being pessimist rather than optimist turns out useful absent any intervention since it prevents the seller (specially when monopolist) from rising price without offering the guarantee. However, assuming that courts intervene in favor of buyers, such intervention turns out uneffective if all or most buyers are and remain pessimist. As we will see below, in this case introducing mandatory terms will turn out a better policy.

We now turn to the case in which some buyers are optimist and some others are sophisticated and start again with the monopolistic market.

Proposition 24 *If a proportion θ of buyers is optmist and others are sophisticated, then*

1. The monopolist always offers $\{u_h, g\}$ and gains for k small enough; if k is too high he still gains for θ small enough and loses otherwise;

2. sophisticated buyers never gain and sometimes lose;

3. optimistic buyers sometimes gain and sometimes lose;

4. every equilibrium is efficient.

Proof. For $k > \frac{u_h - v}{4}$, if free the monopolist offers $\{v, \varphi\}$ if $v > \theta u_h$ and $\{u_h, n\}$ otherwise, earning v in the former case and θu_h in the latter. For $k < \frac{u_h - v}{4}$, if free the monopolist can also offer a two-clause contract at a price of $v + \frac{k}{1-\mu}$, earning and $v + \frac{k}{1-\mu} - \alpha\rho$. If courts over-ride no guarantee clause, then the monopolist must offer the guarantee in every two-clause contract, so that he sets the highest price u_h earning $u_h - \alpha\rho - \eta$ and all buyers accept. This is an equilibrium since he has no interest to deviate to a one-clause contract which would yield a lower payoff equal to v according to the Efficient Guarantee Principle. It implies that the monopolist always gains if $v > \theta u_h$, otherwise he gains if and only if $\theta < 1 - \frac{\alpha\rho + \eta}{u_h}$. In the opposite case, the only equilibrium without court intervention would have been for the monopolist offering $\{u_h, n\}$ and optimistic buyers only accepting. It implies that the monopolist would have earned $\theta u_h > u_h - \alpha\rho - \eta$ and therefore is worse off after court intervention. On the other hand, buyers of both types earn 0 after court intervention, so that they never gain and may lose if $v > \theta u_h$, since they would have got a non-negative payoff in the mixed-strategy equilibrium without court intervention. For $v < \theta u_h$, we have to distinguish between sophisticated and optimistic buyers. Without court intervention, if k is sufficiently high optimistic buyers get $v - u_h < 0$ while sophisticated buyers reject the contract and get 0, so that the former category always gains from court intervention while the latter does not gain and does not lose. If k is small enough, then both categories never gain and sometimes lose from court intervention.

According with the Efficient Guarantee Principle every equilibrium is efficient since guarantee is always given. ■

We now turn to the competitive market.

Proposition 25 *In a competitive market if courts over-ride no-guarantee clauses, then:*

1. *Each seller never gains and sometimes loses if k not too large;*
2. *buyers of both types always gain;*
3. *every equilibrium is efficient.*

Proof. Without court intervention, for $k > \frac{u_h - v}{4}$ the only equilibrium is asymmetric for a proportion of sellers offering $\{0, \varphi\}$ and others offering $\{\eta, n\}$: then all sellers get 0, whereas optimistic buyers who buy from those who offer a two-clasue contract get $v - \eta$ and sophisticated buyers who buy from those who offer a one-clasue contract get v. For $k < \frac{u_h - v}{4}$, there can also exist a mixed-strategy equilibrium in which each firm earns $\frac{v + \frac{k}{1-\mu} - \alpha\rho}{N}$ and buyers earn a non-negative payoff.

If courts over-ride no guarantee clauses, then each seller will offer a contract $\{\alpha\rho, g\}$ in equilibrium earning 0, so that he will not gain and will not lose if $k > \frac{u_h - v}{4}$ and loses otherwise. Buyers of both types earn $u_h - \alpha\rho$ and are better off.

Again, according with the Efficient Guarantee Principle every equilibrium is efficient since guarantee is always given. ■

These results show that, contrary to Kessler's argument and to the conventional wisdom, public intervention turns out more effective when sellers are competitive rather than in case of a monopoly.

7.2 Mandatory terms

When the guarantee is included in any contract by law sellers cannot offer any contract without the guarantee; therefore, the only difference with respect to the previous case is that one-clause contracts cannot be offered.

Proposition 26 *Introducing a mandatory guarantee may yield a better outcome if all buyers are naive while no difference arises in equilibrium with respect of the case in which courts over-ride no guarantee clauses if some buyers are optimistic and some others are sophisticated*

Proof. If all buyers are naive and the guarantee is mandatory, then no one-clause contract can be offered, so that nothing changes with respect of the previous case of courts' intervention when all or buyers are optimistic.

If all buyers are pessimistic, a monopolist has to offer $\{v, g\}$ yelding $v - \alpha\rho - \eta < v$, so that he is worse off; whereas buyers get $u_h - v$, so that they are better off. On the other hand, competitive sellers will offer $\{\alpha\rho + \eta, g\}$ in equilibrium earning 0 as well as in previous case, whereas buyers are better off earning $u_h - \alpha\rho - \eta > v$.

In presence of both optmistic and pessimistic buyers the monopolist has to decide between $\{v, g\}$ and $\{u_h, g\}$: in the first case, all buyers would buy and he would get $v - \alpha\rho - \eta$, whereas in the second case only optmistic buyers would buy and he would get $\beta(u_h - \alpha\rho) - \eta$. It implies that the monopolist will offer $\{v, g\}$ only if $\theta < \frac{v-\alpha\rho}{u_h-\alpha\rho}$ and $\{u_h, g\}$ otherwise, so that he never gains with respect of court intervention and can lose if $\beta < \frac{v+\eta}{u_h-\alpha\rho}$; on the other hand, optimistic optimistic buyers earn more when they are a small proportion since the monopolist has to chare a lower price. About the competitive market, it can be noted that now there can be just a symmetric equilibrium for all sellers offering $\{\alpha\rho + \eta, g\}$ and all buyers accepting assuming that $\alpha\rho + \eta < v$[17]. Therefore, sellers always earn 0, whereas buyers are better off earning now $uh - \alpha\rho + \eta > v$.

Finally, in presence of optimistic and sophisticated buyers together, nothing changes with respect of the previous case of court intervention given that either the monopolist or competitive sellers

About the case in which there are optimistic and sophisticated buyers together proof comes from the fact thatone-clause contracts are never offered in equilibrium if courts over-ride no guarantee clauses. ■

[17] if $\alpha\rho + \eta > v$ only optmistic buyers would buy.

APPENDIX

Proposition 6 *a. There is no mixed-strategy equilibrium for the monopolist offering a two clause contract giving the guarantee with some positive probability, optimistic buyers always accepting without reading and sophisticated buyers mixing between reading and accepting without reading if* $k > \frac{u_h - v}{4}$*;*

b. when $\theta < \frac{v}{u_h}$*, then an equilibrium exists for* $\mu \in \left(1 - \frac{k}{\alpha\rho}, \frac{1+Y}{2}\right)$ *if reading costs are small enough and for* $\mu \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$ *otherwise;*

c. when $\theta \in \left(\frac{v}{u_h}, \frac{u_h - \alpha\rho}{u_h}\right)$*, then an equilibrium exists for* $\mu \in \left(1 - \frac{k}{\theta u_h - v + \alpha\rho}, \frac{1+Y}{2}\right)$ *if reading costs are small enough; otherwise it exists for* $\mu \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$*.*

Proof. a. Sophisticated buyers are indifferent between reading and accepting without reading only if $\mu \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$. We already know that $k \leq \frac{u_h - v}{4}$ is the necessary condition for Y being well defined;

b. when $\theta < \left(\frac{v}{u_h,}\right)$, then $v > \theta u_h$ and condition [2] holds if $\mu \geq 1 - \frac{k}{\alpha\rho}$. Therefore, to have an equilibrium it must be $\mu \in \left(\max\left\{1 - \frac{k}{\alpha\rho}, \frac{1-Y}{2}\right\} \frac{1+Y}{2}\right)$ as well as in the previous chapter. It comes straighforward from the fact that when the proportion of optimistic buyers is sufficiently small they do not influence the equilibrium outcome which remains unchanged with respect of the case in which buyers are all sophisticated;

c. when $\theta > \frac{v}{u_h}$ then $v < \theta u_h$ and condition [2] holds if $\mu \geq 1 - \frac{k}{\theta u_h - v + \alpha\rho}$. Therefore, to have an equilibrium it must be

$$\mu \in \left(\max\left\{1 - \frac{k}{\theta u_h - v + \alpha\rho}, \frac{1-Y}{2}\right\} \frac{1+Y}{2}\right)$$

It implies that an equilibrium exists for every $\mu \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$ if

$$k \in \left((\theta u_h - v + \alpha\rho)\left(1 - \frac{\theta u_h - v + \alpha\rho}{u_h - v}\right), \frac{u_h - v}{4}\right)$$

otherwise, an equilibrium exists for every $\mu \in \left(1 - \frac{k}{\theta u_h - v + \alpha\rho}, \frac{1+Y}{2}\right)$ which is non-empty only if

$$k < min\left\{\frac{\theta u_h - v + \alpha\rho}{2}, (\theta u_h - v + \alpha\rho)\left(1 - \frac{\theta u_h - v + \alpha\rho}{u_h - v}\right), \frac{u_h - v}{4}\right\}$$

where $1 - \frac{\theta u_h - v + \alpha\rho}{u_h - v} > 0$ only if $\theta < \frac{u_h - \alpha\rho}{u_h}$.

It implies that such an equilibrium can exist only for $\theta \in \left(\frac{v}{u_h}, \frac{u_h - \alpha\rho}{u_h}\right)$

Turning back to condition [2], it holds only if θ **is small enough and/or** μ **is large enough. By construction, every** $\mu \in \left(1 - \frac{k}{\theta u_h - v + \alpha\rho}, \frac{1+Y}{2}\right)$ **satisfies condition [2]; it implies that it is automatically satisfied also for the case in which** $\mu \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$ **since it implies that** $\frac{1-Y}{2} > 1 - \frac{k}{\theta u_h - v + \alpha\rho}$. ■

Proposition 7 *a'. There cannot be an equilibrium in which the monopolist mixes between a one-clause contract and a two-clause contract (giving the guarantee with some positive probability), optimistic buyers always accept without reading and sophisticated buyers mix between reading and accepting without reading when offered a two-clause contract nor an equilibrium in which the monopolist mixes between a two-clause contract* $\{u_h, n\}$ *and a two-clause contract at a price of* $v + \frac{k}{1-\mu}$ *offering the guarantee with some positive probability if* $k > \frac{u_h - v}{4}$

b'. if both reading costs and the proportion of optimistic buyers are small enough, there can exist an equilibrium for the monopolist mixing between a one-clause contract $\{v, \varphi\}$ *and a two-clause contract with* $p = v + \alpha\rho$ *offering the guarantee with probability* $\mu = 1 - \frac{k}{\alpha\rho}$*, optimistic buyers always accepting without reading and sophisticated buyers always accepting any one-clause contract and mixing between reading and accepting without reading when offered a two-clause contract;*

c'. if reading costs are not too small and not too high and the proportion of optimistic buyers is not too small, there can exist an equilibrium for the monopolist mixing between a two-clause contract $\{u_h, n\}$ *and a two-clause contract at* $p = \theta u_h + \alpha\rho$*, offering the guarantee with probability* $\mu = 1 - \frac{k}{\theta u_h - v + \alpha\rho}$*, optimistic buyers always accepting without reading and sophisticated buyers rejecting any contract when* $p = u_h$ *and mixing between reading and accepting without reading otherwise.*

Proof. a'. Proof corresponds to what said in previous proof at point a.;

b'. from previous proof at point b. we know that if $\theta < \frac{v}{u_h}$, then $v > \theta u_h$ and condition [3] can be satisfied if and only if $\mu = 1 - \frac{k}{\alpha\rho}$. Then, an equilibrium can exist if only if $1 - \frac{k}{\alpha\rho} \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$: from previous chapter we already know that this condition can hold only if

$$k < min\left\{\frac{\alpha\rho}{2}, \alpha\rho\left(1 - \frac{\alpha\rho}{u_h - v}\right)\frac{u_h - v}{4}\right\}$$

Substituting for μ, $p_2 = v + \alpha\rho$;

c'. from previous proof at point c. we know that if $\theta = \frac{p_2 - \alpha\rho}{u_h} > \frac{v}{u_h}$, then $v < \theta u_h$ and condition [4] can be satisfied if and only if $\mu = 1 - \frac{k}{\theta u_h - v + \alpha\rho}$.Then, an equilibrium can exist if only if $1 - \frac{k}{\theta u_h - v + \alpha\rho} \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$: again, from previous proof at point c. we already know that this condition can hold only if

$$k < min\left\{\frac{\theta u_h - v + \alpha\rho}{2}, (\theta u_h - v + \alpha\rho)\left(1 - \frac{\theta u_h - v + \alpha\rho}{u_h - v}\right), \frac{u_h - v}{4}\right\}$$

Substituting for μ,it turns out $p_2 = \theta u_h + \alpha\rho$ ■

Proposition 13 *a. There is no equilibrium in which sellers offer a two-clause contract mixing between giving and not giving the guarantee, optimistic buyers always accept without reading and sophisticated buyers mix between reading and accepting without reading if* $k > \frac{u_h - v}{4}$*;*

b. if the proportion of optimistic buyers is small enough, such an equilibrium can exist for $\mu \in \left(1 - \frac{k}{\alpha\rho + v((N(1-\theta)-1)}, \frac{1+Y}{2}\right)$ *if reading costs are small enough and for* $\mu \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$ *otherwise;*

c. if the proportion of optimistic buyers is not too small and not too large, an equilibrium exists for $\mu \in \left(\frac{1-Y}{2}, 1 - \frac{k(N-1)}{N(u_h-v)-\alpha\rho-(N-1)v}\right)$ *if reading costs are small enough and for* $\mu \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$ *otherwise;*

d. there can also exist an equilibrium in which optimistic sophisticated buyers reject with some positive probability for $\mu \in \left\{\frac{1-Y}{2}, \frac{1+Y}{2}\right\}$ **if reading costs are not too small; otherwise, it can exist for** $\mu = \frac{1+Y}{2}$ **if the proportion of optimistic buyers is small enough and for** $\mu = \frac{1-Y}{2}$ **if the proportion of optimistic buyers is not too small and not too large.**

Proof. a. Sophisticated buyers are indifferent between reading and accepting without reading only if $\mu \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$. We already know that $k \leq \frac{u_h - v}{4}$ is the necessary condition for Y being well defined;

b.Assume that $b + r = 1$ for sophisticated buyers, so that they never reject in equilibrium.It implies that sophisticated buyers earn $\mu(u_h - v) - k/(1-\mu)$, which is non-negative if and only if $k \leq \mu(1-\mu)(u_h - v)$. It means that they get a non-negative payoff and are indifferent only if $p_2 = v + k/(1-\mu)$. We already know that for sopisticated buyers not to be better off rejecting without reading it must be $\mu \in ((1-Y)/2, (1+Y)/2)$. On the other hand, optimistic buyers always buy without reading at such a price.

Sellers' payoff is $(p_2 - \alpha\rho)/N$ if $\gamma_2 = g$ and $(\theta + (1-\theta)b)p_2/N$ if $\gamma_2 = n$

This is an equilibrium if no seller has interest to deviate to a one-clause contract or to another two-clause contract. In particular,

1. Both kinds of buyers would buy from a firm offering a one-clause contract at a price p_1 such that $v - p_1 > u_h - p_2$, where $u_h - p_2$ is the optimistic buyers' perceived expected utility of buying from a two-clause contract. In such a case, a seller who deviates to such one-clause contract would get p_1, since both kinds of buyers would switch at that price. Sellers have no interest to deviate to such a contract only if $p_2 < \frac{N(u_h-v)-\alpha\rho}{N-1}$;

2. sophisticated buyers only would buy from a firm offering a one-clause contract at a price p_1 such that $v - p_1 > \mu u_h + (1-\mu)v - p_2 \iff p_1 < p_2 - \mu(u_h - v)$. Optimistic buyers do not deviate since they believe $\mu = 1$. In such a case, a seller who deviates to such a contract would get $(1-\theta)p_1$. No seller has interest to deviate only if $p_2 < \frac{\mu(u_h-v)N(1-\theta)-\alpha\rho}{N(1-\theta)-1}$

3. optimistic buyers only would buy from a seller offering another two-clause contract $\{z, n\}$, with $z \in (v, v + k/(1-\mu))$. In fact, they believe that every two-clause contract contains the guarantee, so they prefer the cheapest one. Sophisticated buyers do not buy since they infer that the guarantee is not

given. It allows to state that such a mixed-strategy equilibrium in two-clause contract is not feasible for $N \to \infty$ such that sellers' profits become equal to zero. In such a case, a seller who deviates to such a contract would get a profit just below θp_2, so that no seller will deviate only if $p_2 \geq \frac{\alpha\rho}{1-\theta N}$;

4. no buyer would buy from a firm offering another two-clause contract $\{q, n\}$ with $q > v + k/(1-\mu)$. Then, no seller would profitably deviate to another two-clause contract with a higher price.

To sum, an equilibrium can exist if and only if

$$p_2 \in \left[\frac{\alpha\rho}{1-\theta N}, \min\left\{\frac{N(u_h-v)-\alpha\rho}{N-1}, \frac{\mu(u_h-v)N(1-\theta)-\alpha\rho}{N(1-\theta)-1}\right\}\right)$$

Substituting for p_2,

$$v+\frac{k}{1-\mu} \in \left[\frac{\alpha\rho}{1-\theta N}, \min\left\{\frac{N(u_h-v)-\alpha\rho}{N-1}, \frac{\mu(u_h-v)N(1-\theta)-\alpha\rho}{N(1-\theta)-1}\right\}\right) \qquad [5]$$

If $\frac{\mu(u_h-v)N(1-\theta)-\alpha\rho}{N(1-\theta)-1} < \frac{N(u_h-v)-\alpha\rho}{N-1}$ to have an equilibrium it must be

$$p_2 \in \left(\frac{\alpha\rho}{1-\theta N}, \frac{\mu(u_h-v)N(1-\theta)-\alpha\rho}{N(1-\theta)-1}\right)$$

Since k$\leq \mu(1-\mu)(u_h-v)$ in equilibrium, a sufficient condition to have $p_2 < \frac{\mu(u_h-v)N(1-\theta)-\alpha\rho}{N(1-\theta)-1}$ becomes $\mu > 1 - \frac{k}{(N(1-\theta)-1)v+\alpha\rho}$. So that, in equilibrium it must be

$$\mu \in \left(\max\left\{\frac{1-Y}{2}, 1-\frac{k}{(N(1-\theta)-1)v+\alpha\rho}\right\}, \frac{1+Y}{2}\right)$$

If $k \in \left([N(1-\theta)-1)v+\alpha\rho]\left(1-\frac{(N(1-\theta)-1)v+\alpha\rho}{u_h-v}\right), \frac{u_h-v}{4}\right)$, then an equilibrium exists for every $\mu \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$;otherwise, an equilibrium exists for every $\mu \in \left(1-\frac{k}{(N(1-\theta)-1)v+\alpha\rho}, \frac{1+Y}{2}\right)$ which is non-empty only if

$$k < \min\left\{\begin{array}{c} (\frac{N(1-\theta)-1)v+\alpha\rho}{2}, \\ [N(1-\theta)-1)v+\alpha\rho]\left(1-\frac{(N(1-\theta)-1)v+\alpha\rho}{u_h-v}\right), \frac{u_h-v}{4} \end{array}\right\}$$

Now, turning back to condition [5], $\frac{\mu(u_h-v)N(1-\theta)-\alpha\rho}{N(1-\theta)-1} < \frac{N(u_h-v)-\alpha\rho}{N-1}$, if and only if

$$\mu < \frac{(u_h-v)(N-1)-\theta[(u_h-v)N-\alpha\rho]}{(u_h-v)(N-1)(1-\theta)}$$

which can be satisfied for the all equilibrium range of μ if it is satisfied for the maximum level $\mu = \frac{1+Y}{2}$. It requires

$$\theta < \frac{(u_h-v)(N-1)(1-Y)}{(u_h-v)[N+1-Y(N-1)]-2\alpha\rho}$$

On the other hand, $p_2 > \frac{\alpha\rho}{1-\theta N}$ if $\theta > \frac{1}{N}$ or if and only if

$$\mu < \frac{(v+k)(1-\theta N)-\alpha\rho}{v(1-\theta N)-\alpha\rho}$$

which can be satisfied for the all equilibrium range of μ again if it is satisfied for the maximum level $\mu = \frac{1+Y}{2}$. It requires

$$\theta < \frac{(v-\alpha\rho)(1-Y)+2k}{[v(1-Y)+2k]N}$$

To sum, an equilibrium can exist only if

$$\theta < \min\left\{\frac{(u_h-v)(N-1)(1-Y)}{(u_h-v)[N+1-Y(N-1)]-2\alpha\rho}, \frac{(v-\alpha\rho)(1-Y)+2k}{[v(1-Y)+2k]N}\right\}$$

c. If $\frac{N(u_h-v)-\alpha\rho}{N-1} < \frac{\mu(u_h-v)N(1-\theta)-\alpha\rho}{N(1-\theta)-1}$ to have an equilibrium it must be

$$p_2 \in \left(\frac{\alpha\rho}{1-\theta N}, \frac{N}{N-1}(u_h-v)-\frac{\alpha\rho}{N-1}\right)$$

To have $p_2 < \frac{N(u_h-v)-\alpha\rho}{N-1}$ it must be $\mu < 1-\frac{k(N-1)}{N(u_h-v)-v(N-1)-\alpha\rho}$. So that, in equilibrium it must be

$$\mu \in \left(\frac{1-Y}{2}, \min\left\{1-\frac{k(N-1)}{N(u_h-v)-v(N-1)-\alpha\rho}, \frac{1+Y}{2}\right\}\right)$$

If $k \in \left(\frac{N(u_h-v)-v(N-1)-\alpha\rho}{N-1}\left(1-\frac{N(u_h-v)-v(N-1)-\alpha\rho}{(N-1)(u_h-v)}\right), \frac{u_h-v}{4}\right)$, then an equilibrium exists for every $\mu \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$; otherwise, an equilibrium exists for every $\mu \in \left(\frac{1-Y}{2}, 1-\frac{k(N-1)}{N(u_h-v)-v(N-1)-\alpha\rho}\right)$ which is non-empty only if

$$k < \min\left\{\begin{array}{c}\frac{N(u_h-v)-v(N-1)-\alpha\rho}{2(N-1)}, \\ \frac{N(u_h-v)-v(N-1)-\alpha\rho}{N-1}\left(1-\frac{N(u_h-v)-v(N-1)-\alpha\rho}{(N-1)(u_h-v)}\right), \frac{u_h-v}{4}\end{array}\right\}$$

Now, $\frac{N(u_h-v)-\alpha\rho}{N-1} < \frac{\mu(u_h-v)N(1-\theta)-\alpha\rho}{N(1-\theta)-1}$ if and only if

$$\mu > \frac{\theta[(u_h-v)N-\alpha\rho]-(u_h-v)(N-1)}{(u_h-v)(N-1)(1-\theta)}$$

which can be satisfied for the all equilibrium range of μ if it is satisfied for the minimum level $\mu = \frac{1-Y}{2}$. It requires

$$\theta > \frac{(u_h-v)(N-1)(1+Y)}{(u_h-v)[N+1+Y(N-1)]-2\alpha\rho}$$

On the other hand, $p_2 > \frac{\alpha\rho}{1-\theta N}$ if $\theta > \frac{1}{N}$ or if and only if

$$\mu < \frac{(v+k)(1-\theta N)-\alpha\rho}{v(1-\theta N)-\alpha\rho}$$

which can be satisfied for the all equilibrium range of μ if it is satisfied for the maximum level $\mu = \left\{1 - \frac{k(N-1)}{N(u_h-v)-v(N-1)-\alpha\rho}, \frac{1+Y}{2}\right\}$.

If $1 - \frac{k(N-1)}{N(u_h-v)-v(N-1)-\alpha\rho} < \frac{1+Y}{2}$, it requires

$$\theta < \frac{u_h - v}{N(u_h - v) - \alpha\rho}$$

whereas, if $\frac{1+Y}{2} < 1 - \frac{k(N-1)}{u_h N - v(2N-1) - \alpha\rho}$, it requires

$$\theta < \frac{(v - \alpha\rho)(1 - Y) + 2k}{[v(1 - Y) + 2k]N}$$

To sum, an equilibrium always exists if

$$\theta \in \left(\begin{array}{c} \frac{(u_h-v)(N-1)(1+Y)}{(u_h-v)[N+1+Y(N-1)]-2\alpha\rho}, \\ \min\left\{\frac{u_h-v}{N(u_h-v)-\alpha\rho}, \frac{(v-\alpha\rho)(1-Y)+2k}{[v(1-Y)+2k]N}\right\} \end{array} \right)$$

d. Let assume now tat $b + r < 1$ for sophisticated buyers, so that they may reject in equilibrium with some positive probability ■

We already know that sophisticated buyers earn 0 in this class of equilibria, so that they are indifferent only if $p_2 = v + k/(1 - \mu)$. At the same time, now it must be also $p_2 = u_h - k/\mu$. So, in equilibrium it turns out

$$\mu(1 - \mu) = \frac{k}{u_h - v}$$

This equation has no solution for $4k > u_h - v$, as in the previous case. Otherwise it has solutions for $\mu = \frac{1 \pm Y}{2}$ like in the model with sophisticated buyers only. It means that $p_2 = v + \frac{2k}{1 \pm Y}$ in equilibrium. Previous analysis shows that for k not too small an equilibrium can exist for $\mu \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$, regardless of the value of θ since the monopolist would get more than $\max\{v, \theta u_h\}$ Therefore, continuity implies that an equilibrium can exist also for $\mu = \left\{\frac{1-Y}{2}, \frac{1+Y}{2}\right\}$ On the other hand, for a sufficiently small k, continuity implies that such class of equilibria can exist only for $\mu = \frac{1+Y}{2}$ if θ is very low and only for $\mu = \frac{1-Y}{2}$ for intermediate values of θ