Società italiana di economia pubblica

XXI CONFERENZA

PUBLIC CHOICE E POLITICAL ECONOMY
I fondamenti positivi della teoria di finanza pubblica

Pavia, Università, 24-25 settembre 2009

FINE PRINT AND NAÏVE BUYERS

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Fine Print and Naïve Buyers

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Abstract

Buyers who naively believe that fine print contains favorable terms gain from regulations which mandate favorable terms, irrespective of market structure, if enough buyers are naive. However, market structure matters in a surprising way if sophisticated buyers face a reading cost: mandating favorable terms must benefit all buyers if sellers are competitive; but cannot benefit, and may harm sophisticated buyers and few enough naive buyers if the seller is a monopolist. Regulations which mitigate rather than eliminate onerous terms may harm all buyers and a monopolist.

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

[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.

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 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 heterogeneous buyers, some of which rational, 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 each seller 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

[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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[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).

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 favorable. 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 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 it is otherwise penalized in equilibrium for its 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 overrid-

[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.

ing 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.

We discuss the problem of Naivety in Section 2. Section 3 the model in Section 2. Section 3 presents the Model, then Section 4 characterizes play when all buyers are naive whereas Section 5 turns to the case of heterogeneous buyers. Section 6 describes the effect of an eventual voluntary disclosure and Section 7 analyzes the effect of regulations We conclude in Section 8, relating our results to literature and proposing some possible extensions.

2 Naivety between Psychology and Economics

We allow buyers to be either sophisticated or naïve, where naïve 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 favorable 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 minimize this effort (Olshavsky,1979; Malhotra, 1982; Grether, Schartz and Wilde,1986)

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

[11] See Korobkin (2003).

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 equalized 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 category of goods sold and by price, so that for each category 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.

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 large enough 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 level.

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 possibility 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 unknown 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 unfavorable 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 naïve 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 market structure matters in the opposite way with respect to Kessler's (1943) argument even in presence of naïve 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 analyze two different kinds of naïve 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 favorable 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 naïvety can be also intended as lack of rationality in purchasing decision.

Once equilibria will be described, 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 naïve beliefs. About it, different assumptions can be made, such that naïve 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 naïve buyers' reaction, we will assume that naïve 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 analyzing those cases when all buyers are naïve.

3 The model

The game is played by $N \geq 1$ sellers and sophisticated and naïve 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 u_l and $u(q_h)$ as u_h. Each sophisticated buyer's reservation value for good of quality q is u_q; so she would pay up to $\alpha u_l + (1-\alpha)u_h \equiv v$ without a guarantee. On the other hand, naïve buyers hold fix beliefs about an eventual two-clause as specified below.

Each seller's production cost is zero; and it can transform good from low to high quality ('repair') at cost of $\rho > 0$. Consequently, each seller earns p per unit sold if it 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[13]. 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 its 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).

We will solve the game searching for Perfect Bayesian Equilibria 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:

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

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 ($u_h > \alpha\rho$).

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

4 The model with naïve buyers only

In this section we analyze both a monopoly and a competitive market assuming that all buyers hold naïve 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 it 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 it 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 it 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 $\{0, \varphi\}$.

Efficient Guarantees imply 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 it is sophisticated. In the next subsection, we will present equilibrium outcomes in both the monopoly and the competitive market; then, we will analyze voluntary disclosure and courts' intervention separately.

5.1 Results

5.1.1 Monopoly

We first characterize 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 it would get a lower payoff. it 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, it 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 Guarantees since no guarantee is given in equilibrium. ■

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

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

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. Such an equilibrium would require $v > \theta u_h$. If sophisticated buyers always read when offered a two-clause contract, it implies that the monopolist earn $p\theta$ if it offers $\{p, n\}$ and $p - \alpha\rho$ if it offers $\{p, g\}$, so that it is indifferent only if $p = \frac{\alpha\rho}{1-\theta}$. 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 which requires $\theta p = v$. It cannot hold since $v > \theta u_h$.

Corollary 3 *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.

It has to be noted that for any two-clause contract charging $p \leq u_h$ optimistic buyers buy 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 $p \neq v + k/(1-\mu)$, 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 $p = v + k/(1-\mu)$, 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 $p < v + k/(1-\mu)$ 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 $p \in (v + k/(1-\mu), u_h)$ because again only optimistic buyers would buy and it would profitably deviate to $\{u_h, n\}$.

The monopolist offers the contract which yields the highest payoff. In particular, it 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. it compares these payoffs with that it 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 $(b + r < 1)$.

Proposition 4 *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* $k > \frac{u_h - v}{4}$; *otherwise*

b. If $\theta < \frac{v}{u_h}$, *such 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; if* $\theta \in \left(\frac{v}{u_h}, \frac{u_h - \alpha\rho}{u_h}\right)$ *it 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 and for* $\mu \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$ *otherwise. The monopolist earn more than* v *in such equilibrium, whereas buyers earn a positive payoff up to* $u_h - v - 2\sqrt{k(u_h - v)}$*.There might be also equilibria in which sophisticated buyers reject with some positive probability and earn* 0 *(as well as optimists)*

c. If $\theta = \frac{v}{u_h}$ *there can exist an equilibrium in which the monopolist mixes between* $\{u_h, n\}$ *and* $\{v, \varphi\}$*, optimistic buyers always accept any contract and sophisticated buyers accept a one-clause contract only; if both reading costs and the proportion of optimistic buyers are small enough, there can exist an equilibrium in which the monopolist mixes 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 accept without reading and sophisticated buyers always accept a one-clause contract and mixing between reading and accepting without reading when offered a two-clause contract. If reading costs are small enough and the proportion of optimistic buyers is not too small, there can exist an equilibrium in which the monopolist mixes 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 accept without reading and sophisticated buyers reject any contract when* $p = u_h$ *and mix between reading and accepting without reading otherwise.*

d. Every equilibrium is inefficient

Proof. a. As said above, sophisticated buyers are indifferent only if $p_2 = v + k/(1 - \mu)$ and never reject if and only if

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

■

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 $4k \leq u_h - v$.

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

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

If $\theta < \frac{v}{u_h}$, 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 $\mu \in \left(\max\left\{1 - \frac{k}{\alpha\rho}, \frac{1-Y}{2}\right\} \frac{1+Y}{2}\right)$. It comes straightforward 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 were all sophisticated;

If $\theta > \frac{v}{u_h}$ 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 requires that $\frac{1-Y}{2} > 1 - \frac{k}{\theta u_h - v + \alpha\rho}$.

Sophisticated buyers may reject with some positive probability if $\mu = \left\{\frac{1-Y}{2}, \frac{1+Y}{2}\right\}$: previous analysis shows that both values are feasible in equilibrium if k is not too small and only the higher one otherwise.

c. For such an equilibrium to exist it must be

$$p - \alpha\rho = \max\{v, \theta u_h\}$$

What said implies that if $\theta < \frac{v}{u_h}$, such condition is satisfied if and only if $\mu = 1 - \frac{k}{\alpha\rho}$, so that $p = v + \alpha\rho$. We have shown that $1 - \frac{k}{\alpha\rho} \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$ only if k is small enough; whereas if $\theta \in \left(\frac{v}{u_h}, \frac{u_h - \alpha\rho}{u_h}\right)$ it must be $\mu = 1 - \frac{k}{\theta u_h - v + \alpha\rho}$ and $p = \theta u_h + \alpha\rho$.We have previously shown that $1 - \frac{k}{\theta u_h - v + \alpha\rho} \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$ only if k is small enough.

d. 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. It comes trivially from Efficient Guarantees. ■

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[14].

5.1.2 Competition

We now consider a market characterized 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 categories 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 5 *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 its 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

[14] See last chapter, section 3.1

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.

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. 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 $\frac{\theta\alpha\rho}{1-\theta}$.

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. Sellers must earn 0 in such an equilibrium, so that any of them 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 6 *Buyers never read with certainty in any equilibrium*

Proposition 7 *a. No equilibrium exists 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* $\theta > \frac{1}{N}$ *or* $\theta < \frac{v-\alpha\rho}{Nv}$ *or* $k > \frac{u_h-2v}{4(u_h-v)}$. *If none of these conditions holds, there exist mixed-strategy equilibria in which sellers mix between giving and not giving the guarantee, optimistic buyers always accept without reading and sophisticated buyers mix between reading and accepting without reading for every* $\mu \in \left(\frac{u_h-V}{2(u_h-v)}, \frac{u_h+V}{2(u_h-v)}\right)$ *if* k *is very small and for every* $\mu \in \left(1 - \frac{k(1-\theta N)}{\alpha\rho-v(1-\theta N)}, \frac{u_h+V}{2(u_h-v)}\right)$ *otherwise. No mixed-strategy equilibrium exists in which sophisticated buyers reject with some positive probability.*

b. If reading costs are not too high, there can exist an equilibrium in which sellers mix between $\{\eta, n\}$ *and another two-clause contract with a higher price which includes the guarantee with some positive probability, optimistic buyers only accept the contract charging the lower price without reading and sophisticated buyers mix between reading and accepting without reading any contract charging the higher price.*

c. Every equilibrium is inefficient.

Proof. a. Sophisticated buyers are indifferent between reading and accepting without reading and never reject only if $p_2 = v + k/(1-\mu)$ and $\mu \in \left(\frac{1-Y}{2}, \frac{1+Y}{2}\right)$. We already know that $k \leq \frac{u_h-v}{4}$ is the necessary condition for Y being well defined. It implies that sophisticated buyers earn $\mu(u_h - v) - k/(1-\mu)$, which is non-negative if and only if $k \leq \mu(1-\mu)(u_h - v)$. 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 $\gamma_2 = n$. Assuming that N is very large, sellers' payoff tends to 0. Therefore, every seller could profitably deviate to any $\{z, n\}$, with $z < v + k/(1-\mu)$ which attracts all optimistic buyers and yields a profit equal to θz if $\theta \geq \frac{1}{N}$.

Suppose that such condition does not hold. No seller will deviate only if $\mu \geq 1 - \frac{k(1-\theta N)}{\alpha\rho - v(1-\theta N)}$ which never holds if $k \geq \frac{\alpha\rho - v(1-\theta N)}{1-\theta N}$ or $\theta > \frac{v-\alpha\rho}{Nv}$. To have an equilibrium, other deviations must be not profitable. More precisely:

- 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.

- 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 at most $p_1 = 2v - u_h + \frac{k}{1-\mu}$, since both kinds of buyers would switch at that price. No seller has interest to deviate to such a contract only if $\mu < 1 - \frac{k}{u_h - 2v}$ which always holds if $u_h < 2v$;

- Sophisticated buyers only would buy from a firm offering a one-clause contract at a price p_1 such that $v - p_1 \in (\mu u_h + (1-\mu)v - p_2, u_h - p_2) \iff p_1 \in (v - u_h + p_2, p_2 - \mu(u_h - v))$. Optimistic buyers do not deviate since they believe $\mu = 1$. In such a case, a seller who deviates to such a contract would get up to $(1-\theta)(v - \mu(u_h - v) + \frac{k}{1-\mu}$. A sufficient condition to exclude again such deviation is $\mu \in \left(\frac{u_h - V}{2(u_h - v)}, \frac{u_h + V}{2(u_h - v)}\right)$ where $V = \sqrt{u_h^2 - 4(k+v)(u_h - v)}$ is well defined only if $k < \frac{(u_h - 2v)^2}{4(u_h - v)} \left(< \frac{u_h - v}{4}\right)$. What turns out is that $\left[\frac{u_h - V}{2(u_h - v)}, \frac{u_h + V}{2(u_h - v)}\right] \subset \left[\frac{1-Y}{2}, \frac{1+Y}{2}\right]$ and $\frac{u_h + V}{2(u_h - v)} < 1 - \frac{k}{u_h - 2v}$.

- Optimistic buyers only would buy from a seller offering another two-clause contract $\{z, n\}$, with $z \in (\alpha\rho, v + k/(1-\mu))$. 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 $\theta\left(v + \frac{k}{1-\mu)}\right)$, so that no seller will deviate only if $\mu \geq 1 - \frac{k(1-\theta N)}{\alpha\rho - v(1-\theta N)}$ which never holds if $\theta N < \frac{v-\alpha\rho}{v}$ or $v < \alpha\rho$.

To sum, an equilibrium always exists for

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

If $k < \min\left\{\frac{\alpha\rho - v(1-\theta N)}{1-\theta N}\left[1 - \frac{u_h}{2(u_h - v)}\right], \frac{\alpha\rho - v(1-\theta N)}{1-\theta N}\left(1 - \frac{\alpha\rho}{(u_h - v)(1-\theta N)}\right), \frac{(u_h - 2v)^2}{4(u_h - v)}\right\}$ then in equilibrium it is $\mu \in \left(\frac{u_h - V}{2(u_h - v)}, \frac{u_h + V}{2(u_h - v)}\right)$; otherwise, if $k \in \left(\frac{\alpha\rho - v(1-\theta N)}{1-\theta N}\left(1 - \frac{\alpha\rho}{(u_h - v)(1-\theta N)}\right), \min\left\{\frac{(u_h - 2v)^2}{4(u_h - v)}\right\}\right)$, then an equilibrium exists for a non-empty $\mu \in \left(1 - \frac{k(1-\theta N)}{\alpha\rho - v(1-\theta N)}, \frac{u_h+V}{2(u_h-v)}\right)$.

Since $\mu = \left\{\frac{1-Y}{2}, \frac{1+Y}{2}\right\}$ are not included in the equilibrium range, it cannot exist an equilibrium in which buyers reject with some positive probability.

b. Assuming that $N \to \infty$, sellers earn almost 0 from any contract. Optimistic buyers always accept the contract with the lower price because they believe it contains a guarantee. in light of what said above sophisticated buyers turn to the high-price contract only if $\mu \in \left(\frac{u_h-V}{2(u_h-v)}, \frac{u_h+V}{2(u_h-v)}\right)$ which requires $k < \frac{u_h-2v}{4(u_h-v)}$

c. Inefficiency comes from the fact that guarantee may not been given and reading costs may be paid with some positive probability in every equilibrium. It trivially comes from Efficient Guarantees. ■

What said exclude the existence of any equilibrium in which sellers mix between a one-clause contract $\{p, \varphi\}$ with $p \leq v$ and a two-clause contract charging $v + \frac{k}{1-\mu}$ and including the guarantee with some probability. Sellers charge 0 whenever they offer a one-clause contract; otherwise another seller can charge a smaller price attracting all sophisticated buyers. If $p = 0$, then to be indifferent sellers must charge $\alpha\rho$ whenever they offer a two-clause contract. Since $\alpha\rho < v$ at such price, sophisticated buyers would always buy without reading as well as optimistic buyers so that no seller will include the guarantee in equilibrium.

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 category 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 8 *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, optimistic 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 others offer $\{\alpha\rho+$

$\eta, g\}$ 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 analyzed:

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: no seller will offer the guarantee with some positive probability in equilibrium given that optimistic buyers will never read.

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 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 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 summarized our results in

Proposition 9 *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 there might be equilibria in which sellers mix between a two-clause contract without guarantee at price η which attract optimistic buyers and a two-clause contract at a higher price which includes the guarantee with some positive probability and attract sophisticated buyers who mix between reading and accepting without reading. Sellers earn 0*, whereas buyers earn a positive payoff of $v - \eta$ if optimistic and up to $u_h - v - 2\sqrt{k(u_h - v)}$ if sophisticated.*

If fraction θ of optimistic buyers is not too large and not too small, there are also 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 naïve buyers buy without reading. In this case, both sellers and buyers earn a positive payoff. In this case, sellers earn almost 0, whereas all buyers earn a positive payoff up to $u_h - v - 2\sqrt{k(u_h - v)}$.

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 is higher than the Bertrand level. However, in this case the impact of reading costs is mitigated by optimistic buyers who never read in equilibrium. 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 $k < \frac{(u_h - 2v)}{4(u_h - v)}$, as highlighted by comparing sellers' payoffs when buyers are all sophisticated and when a fraction of them is naïve: 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 the value of θ 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 difference does not arise in monopoly: in fact, once the monopolist offers a two-clause contract in equilibrium it 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. As well as Gabaix and Laibson (2006), we will assume that when a disclosed contract is offered just a proportion of naive buyers becomes becomes fully informed and behave as well as sophisticated buyers. We call $\lambda_O < \{1, \beta, \theta\}$ such proportion when all or some buyers are optimistic and $\lambda_P < \{1, 1-\beta\}$ such proportion when all or some buyers are pessimistic. 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 10 *If sellers can choose the complexity level of their contracts and all buyers are optimistic, then*

a. A monopolist has never interest to disclose its contract; whereas

b. Competitive sellers always disclose in equilibrium, but they do not gain and do not lose; whereas buyers always gain.

c. Monopoly equilibrium remains inefficient; whereas competitive equilibrium is efficient.

Proof. a. If buyers are optimistic, the monopolist gains $u_h - \eta$ in equilibrium from an obscure contract; therefore, it has no interest to "educate" buyers by offering $\{u_h, g\}$ at $k = 0$ since it would get only $u_h - \alpha\rho - \eta < u_h - \eta$.

b. There is no equilibrium in which competitive sellers offer $\{\eta, n\}$ since one of them may offer a fully transparent contract $\{p, g\}$ at some $p > \alpha\rho + \eta$ earning $\lambda_O(p - \alpha\rho) - \eta > 0$. So that in equilibrium each seller offers a fully transparent contract $\{\alpha\rho + \eta, g\}$ which yields a payoff of 0 and all buyers buy.Given the Efficient Guarantee Principle, buyers are better off since they earn now $u_h - \alpha\rho - \eta > v - \eta$.

c. Efficiency arises from the fact that a guarantee is always offered in the competitive market and no reading costs is paid. ■

Proposition 11 *If sellers can choose the complexity level of their contracts and all buyers are pessimistic, then*

a. A monopolist may have interest to offer a fully transparent contract in equilibrium and buyers never lose; whereas

b. No equilibrium exists in a competitive market.

c. Some monopoly equilibria are efficient; the competitive one is not.

Proof. a. A monopolist offers a one-clause contract $\{v, \varphi\}$in equilibrium if $k > 0$; assuming that it can choose the complexity level, it would get at most $\lambda_P(u_h - \alpha\rho) - \eta$ from a fully transparent two-clause contract $\{u_h, g\}$, so that it will do so only if $\lambda_P > \frac{v+\eta}{u_h - \alpha\rho}$. In such a case, buyers earn 0, so that they do not lose and do not gain.

b. There cannot be an equilibrium in which competitive sellers offer $\{0, \varphi\}$, since another seller may deviate to a fully-transparent contract $\{p, g\}$ at some $p > \alpha\rho + \eta$ earning $\lambda_P(p - \alpha\rho) - \eta > 0$. No equilibrium exists for sellers offering a fully transparent contract $\{\alpha\rho + \eta, g\}$ earning 0 since another seller can offer a one clause contract $\{p, \varphi\}$ at some $p \in (0, \alpha\rho + \eta)$ earning $(1 - \lambda_P)p > 0$.

c. Efficient equilibria are only those in which the monopolist discloses and offer the guarantee. ■

Proposition 12 *If sellers can choose the complexity level of their contracts and some buyers are optimistic and some others are pessimistic, then*

a. A monopolist may offer a transparent contract in equilibrium and is better off; in such a case, optimists cannot lose and sometimes gain, whereas pessimists never lose if the seller is a monopolist; whereas

b. No equilibrium exists in a competitive market.

c. Some monopoly equilibria are efficient.

Proof. a. If some buyers are optimistic and some others are pessimistic, a monopolist would get $\max\{v, \beta(u_h - \eta)\}$ if $k > 0$. The monopolist gets $[\lambda_O\beta + \lambda_P(1 - \beta)](u_h - \alpha\rho) - \eta$ from a fully transparent two-clause contract $\{u_h, g\}$, so that it will disclose it only if $(\beta(\lambda_O + \lambda_P) + \lambda_P)(u_h - \alpha\rho) - \eta > \max\{v, \beta u_h - \eta\}$.In such a case, optimistic buyers always buy and get 0, so that they do not lose if $v > \beta(u_h - \eta)$ and gain otherwise (since they would have bought an obscure contract $\{u_h, n\}$ earning $v - u_h < 0$). Pessimistic buyers never lose and never gain since they would have rejected an obscure contract $\{u_h, n\}$ earning 0.

b. No equilibrium exists if $k > 0$. If sellers can disclose their contracts, there cannot be an equilibrium in which all of them offer $\{\alpha\rho + \eta, g\}$ if just a proportion λ_p of pessimistic buyers becomes sophisticated. In fact, each seller might profitably deviate to a one-clause contract $\{p, \varphi\}$ with $p \in (0, \alpha\rho + \eta)$ yielding $(1 - \lambda_P)(1 - \beta)p > 0$. No equilibrium exists for sellers offering a one-clause contract $\{0, \varphi\}$ since each seller can profitably deviate to a two clause contract $\{p, g\}$ with $p \in (\alpha\rho + \eta, u_h)$ which would yield a profit of $[\lambda_O\beta + \lambda_P(1 - \beta)]p - \eta > 0$.

c. it comes from the fact that Efficient Guarantees state that only contracts which include the guarantee are efficient and it may take place only in monopoly. Furthermore, in such equilibria no reading cost is paid. ■

It can be noted that if some or all buyers are pessimistic only a monopolist has interest to disclose its 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.

We will now turn to the case with optimistic and sophisticated buyers together.

Proposition 13 *If some buyers are optimistic and some others are sophisticated, then*

a. A monopolist will offer a fully transparent contract if the proportion of optimistic buyers is not very high;

b. Competitive sellers will always offer a fully transparent contract only if the number of firms is very high and/or the proportion of uninformed buyers is very low.

c. Some equilibria in both markets are efficient.

Proof. a. Regardless of whether optimistic buyers become sophisticated or not, the monopolist may have interest to offer, if possible, a fully transparent contract charging u_h, as well as in the case of sophisticated buyers only. Then, in light of the Efficient Guarantee Principle, the monopolist would earn with respect of either offering a one clause contract or mixing between giving and not giving the guarantee since now it would get $u_h - \alpha\rho > v + \frac{k}{1-\mu} - \alpha\rho$ and buyers would get 0. The only case in which the monopolist will not disclose is for $\theta u_h > u_h - \alpha\rho$. In such a case, it will prefer offering an obscure two-clasue contract $\{u_h, n\}$ at which only optimistic buyers will buy.

b. For $k > 0$, each firm would get either 0 or $\frac{v+\frac{k}{1-\mu}-\alpha\rho}{N} \simeq 0$ by mixing between giving and not giving the guarantee. Assume that a firm offers a fully transparent contract charging a higher price. Sophisticated and informed buyers will buy from a disclosing seller only if $p \leq u_h - \mu(u_h - v) + \frac{k}{1-\mu}$. It means that a firm has interest to offer a contract $\{p, g\}$ at $k = 0$ only if $\left[u_h - \mu(u_h - v) + \frac{k}{1-\mu} - \alpha\rho\right](1-\theta(1-\lambda_O))N \geq v + \frac{k}{1-\mu} - \alpha\rho \Leftrightarrow \frac{u_h+\frac{k}{1-\mu}-\alpha\rho}{\mu(u_h-v)} \geq \frac{(1-\theta(1-\lambda_O))N}{(1-\theta(1-\lambda_O))(N-1)}$. This condition is more likely to be satisfied as $N \to \infty$ and/or $\lambda \to 1$. In such a case, the only equilibrium is for all sellers offering a disclosed contract at the lowest price of $\alpha\rho + \eta$ getting zero.

c. Again, Efficient Guarantees state that whatever equilibrium involving fully transparent contracts is efficient in both market because the guarantee is always included and no reading cost must be paid. ■

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 is 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 its 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 it knew its content. Our model is consistent with such rule whenever buyers decide 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 just a proportion $\lambda < 1$ ($\lambda \in \theta$) of buyers when they are all naive (when a proportion θ is optimistic and others are sophisticated) will understand or be aware of the policy adopted, so that they will behave as sophisticated.

7.1 Court intervention

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

Proposition 14 *If courts over-ride no-guarantee clauses, then*

a. If all buyers are optimistic, a monopolist always loses, competitive sellers never gain and sometimes lose, whereas buyers always gain;

b. If all buyers are pessimistic, a monopolist never loses and sometimes gains, competitive sellers never gain and sometimes lose; whereas buyers always gain if aware of court intervention and neither gain nor lose otherwise.

c. If some buyers are optimistic and others are pessimistic and λ_P *is large enough, a monopolist always gains whereas buyers do not gain and do not lose; otherwise, nothing changes in players' payoff except for optimistic buyers who may gain; competitive sellers never gain and may lose, whereas buyers always gain except* $1 - \lambda_P$ *pessimists.*

Proof. a. 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 it now earns $u_h - \alpha\rho - \eta < u_h - \eta$. it has no interest to deviate to a one-clause contract since it would get at most $v < u_h - \alpha\rho - \eta$ (see Efficient Guarantees). Then, buyers are better off earning now $0 > v - u_h$.

About the competitive market with optimistic buyers only, given courts' intervention, sellers offer $\{\alpha\rho + \eta, g\}$ in equilibrium and all buyers buy. 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, it would lose. Then, sellers earn 0 in such an equilibrium, so that they do not lose and do not gain; whereas buyers earn $u_h - \alpha\rho - \eta > v - \eta$, so that Efficient Guarantees imply they are better off.

b. If all buyers are pessimistic, a monopolist will offer a two-clause contract $\{u_h, g\}$ only if $\lambda_P > \frac{v-\eta}{u_h-\alpha\rho}$ and a one-clause contract otherwise; in the first case, it is better off yielding $\lambda(u_h - \alpha\rho) - \eta > v$ by construction, whereas in the second case it yields always v, so that it does not lose and does not gain. Buyers get 0 in both cases, so that they do not gain and do not lose.

On the other hand, there is just an asymmetric equilibrium in a competitive market for a proportion λ_P of sellers offering $\{\alpha\rho + \eta, g\}$ which attracts those buyers who are aware of court intervention and others offering $\{0, \varphi\}$ which attracts unaware buyers. All sellers earn 0 and cannot gain, but may lose with respect of those equilibria in which they would have got a positive payoff in a free market. Aware buyers earn $u_h - \alpha\rho - \eta$ and are better off; whereas unaware buyers still get v.

c. If some buyers are optimistic and some others are sophisticated, the monopolist offers a two-clause contract $\{u_h, g\}$ only if $(\lambda_P + \beta(1 - \lambda_P))(u_h - \alpha\rho) - \eta > v$: it requires that λ_P is large enough; otherwise, it offers $\{v, \varphi\}$. In the first case, it is better off by assumption while buyers do not gain and do not lose. In the second case, the monopolist does not gain and does not lose if $v > \beta u_h - \eta$ and loses otherwise: buyers get 0, so that those who are optimistic do not gain and do not lose if $v > \beta u_h - \eta$ and gain otherwise since $0 > v - u_h$, whereas those who are pessimistic never gain and never lose.

About the competitive market, there is just an asymmetric equilibrium in which a proportion $\lambda_P + \beta(1 - \lambda_P)$ of sellers offer $\{\alpha\rho + \eta, g\}$ and others $\{0, \varphi\}$ Optimistic and aware pessimistic buyers go for the two-clause contract and are better off; whereas unaware pessimists go for the one-clause contract and neither gain nor lose. ∎

It can be noted that court intervention turns out alwys effective if buyers are all optimistic, whereas it may turn out effective in presence of pessimistic buyers only if a large part of them becomes sophisticated. It implies that a regulation on contracts may not be enough if not followed by an informational campaign which make (all) people aware of possible risks involved in a transaction.

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

Proposition 15 *In a monopolistic market if courts over-ride no-guarantee clauses, then:*

- *The monopolist always gains for k small enough; if k is too high it still gains for θ small enough and loses otherwise;*
- *Sophisticated buyers never gain and sometimes lose;*
- *Optimistic buyers sometimes gain and sometimes lose;*
- *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. If $k < \frac{u_h - v}{4}$, there might exist also mixed-strategy equilibria in which it earns up to $u_h - \alpha\rho - \eta$. If courts over-ride no-guarantee clauses, then the monopolist must offer the guarantee in every two-clause contract, so that it sets the highest price u_h earning $u_h - \alpha\rho$ and all buyers accept. This is an equilibrium since it has no interest to deviate to a one-clause contract which would yield (according to Efficient Guarantees) a lower payoff up to v. It implies that the monopolist always gains if $v > \theta u_h$, while it gains in the opposite case if and only if $\theta < 1 - \frac{\alpha\rho}{u_h}$. On the other hand, buyers of both types earn 0 after court intervention, so that they never gain and may lose if $v > \theta u_h$ with respect of those equilibria in which they would have got a non-negative payoff in a free market. 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 Efficient Guarantees, every equilibrium is efficient since the guarantee is always given. ■

We now turn to the competitive market.

Proposition 16 *In a competitive market if courts over-ride no-guarantee clauses, then:*
- *Each seller never gains and sometimes loses;*
- *Buyers of both types always gain;*
- *Every equilibrium is efficient*

Proof. For $k > \frac{u_h - v}{4}$ no trade would take place in equilibrium without court intervention, so that both sellers and buyers get 0; if courts over-ride no-guarantee clauses, then each seller will offer a contract $\{\alpha\rho, g\}$ in equilibrium earning 0, so that it will not gain and will not lose. Buyers of both types earn $u_h - \alpha\rho > v$ and are better off.

For $k < \frac{u_h - v}{4}$, each firm would earn $\frac{v + \frac{k}{1-\mu} - \alpha\rho}{N}$ and buyers earn a non-negative payoff in every mixed-strategy equilibrium absent any court intervention. If courts over-ride no-guarantee clauses firms will offer a contract $\{\alpha\rho, g\}$ in equilibrium and will get no profit, so that they will be worse off. Sellers have interest neither to raise price nor to deviate to a one-clause contract at any price $p \leq v$ since no buyer would buy. Buyers will then earn $u_h - \alpha\rho$ and will be better off.

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

For this last case, every equilibrium is efficient regardless of market structure. Such a difference with respect of previous cases depends on the fact that this one does not include pessimistic buyers.

In general, results shown in this section prove 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 17 *Introducing a mandatory guarantee can 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 when all buyers are optimistic with respect of the previous case of courts' intervention. On the other hand, when some or all buyers are pessimistic, a monopolist offers $\{u_h, g\}$ yelding respectively $\lambda_p(u_h - \alpha\rho - \eta)$ or $[\beta + (1-\beta)\lambda_p](u_h - \alpha\rho - \eta)$; buyers get 0, so that they never gain and never lose. On the other hand, competitive sellers will offer $\{\alpha\rho + \eta, g\}$ in equilibrium if all or some buyers are pessimistic.All buyers buy if $\alpha\rho + \eta \leq v$; otherwise, just a proportion λ_P of them will buy. In both cases, sellers do not gain and do not lose yielding always 0; whereas those who buy are better off yielding $u_h - \alpha\rho - \eta > v$. It means that when buyers are all naive different policies yield different outcomes in terms of social welfare.

Nothing changes in presence of optimistic and sophisticated buyers together with respect of previous policy under which one-clause contracts are never offered in equilibrium ■

8 Conclusion

We have shown how contracts of adhesion produce inefficient outcomes in any market analyzed. Such result crucially comes from the presence of reading costs which make sophisticated buyers skeptical and less prone to accept.

We have also shown that, contrary to Gabaix-laibson, sellers would disclose their contracts if able to do so and, contrary to Kessler's (1943) argument, public intervention does not help buyers if the seller is monopolist, whereas it raises their payoff in presence of competitive sellers.

We have assumed that all sophisticated buyers incur the same cost of reading a complex contract. Hermalin et al. (2007) sketch an alternative model in which allbuyers are sophisticated, but their reading costs differ. If competitive sellers offer complex contracts in this variant on our model then enough buyers with a common reading cost (say, k^*), which cannot exceed $(u_h - v)2\sqrt{/k(u_h - v)}$, mix between accepting and reading, while buyers with reading costs less than [resp. more than] k^* are sure toread [resp. accept].

We have also assumed that all buyers have the same valuation for a good of given quality, whereas Katz (1990) and Gilo and Porat (2006) assume that valuations are heterogeneous. In that case, buyers with valuation v^* mix between accepting and reading in any complex equilibrium, while buyers with higher [resp. lower] v either accept [resp. read] or reject, depending on their valuation of a high quality good. In Katz (1990), the monopolist chooses from a continuum of warranty levels, and can therefore offer a contract which makes a buyer who reads indifferent between accepting and rejecting. As reading is costly, the monopolist offers the minimum possible guarantee, and buyers do not read. The prediction that standard form terms are as onerous as possible seems empirically problematic. It does not arise in our model because guarantees are indivisible, which allows mixed strategy equilibria to exist. Rasmusen's (2001) binary-quality model also has mixed strategy equilibria. However, he assumes that all terms are shrouded; so price cannot signal quality therein.

We have defined competition in terms of a free entry condition. Another alternative is to define competition in terms of a fixed number of sellers. This version is more complicated to analyze, but has similar qualitative properties, with the exception that competitive sellers may earn positive payoffs in a complex equilibrium.

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