

# Integrating an Agreement to Induce Information Disclosure\*

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## Abstract

When a written agreement is integrated, the parol evidence rule prevents certain types of extrinsic evidence from being introduced at trial. I examine the role played by the parol evidence rule and integration when contracting parties are asymmetrically informed of the size of the contractual surplus. I show that by integrating an agreement, an uninformed party can better induce information disclosure from an informed party by penalizing non-disclosure and limiting informed party's ex post opportunistic behavior. Better information disclosure, in turn, increases the social welfare and allows the uninformed party to get a larger share of the surplus.

## 1 Introduction

When contracting parties integrate their written agreement, the parol evidence rule bars them from introducing, at trial, extrinsic evidence of any prior or contemporaneous agreement or negotiation that is inconsistent with or additional to the written terms.<sup>1</sup> Notwithstanding the much criticism the rule has drawn from academics and practitioners,<sup>2</sup> previous research, when attempting to identify the costs and benefits of the rule, has focused on how symmetrically informed parties will attempt to maximize their joint contractual surplus.<sup>3</sup> Integration, e.g., through a merger clause, allows them to reduce the cost of litigation and judicial error by limiting the scope of evidence that can be introduced at trial.<sup>4</sup> On the other hand, integration can prevent them from completing the contract, or filling gaps, ex post by disallowing potentially relevant evidence. If the reduction of litigation cost is larger than the potential loss of relevant evidence, parties will integrate. If ex post contract completion is more important, they will not.

This paper examines how the parol evidence rule and integration affect contract formation when parties are asymmetrically informed over the size of the surplus. As is

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well known, asymmetric information can not only prevent parties from writing a complete, state-contingent contract, but can also produce inefficiency because an informed party has an incentive to leverage her informational advantage to obtain a better contractual return.<sup>5</sup> The main thesis of the paper is that an uninformed party can provide better incentive to an informed party to disclose her private information by integrating a written agreement and taking advantage of the parol evidence rule. A starting observation is that when an agreement is integrated, the informed party cannot present previously undisclosed, relevant information as evidence at trial. Integration works as a penalty against non-disclosure and this allows the uninformed party to better elicit information from the informed party.

The paper posits a scenario where a seller enters into a contract with a buyer to produce and sell a unit of widget. The buyer needs either a generic or a special widget. A generic widget will be used for ordinary purposes and, in case the widget is defective, the consequence of such breach (e.g., loss of profit or damage) is relatively small. A special widget (e.g., with extra features), on the other hand, will be used for non-ordinary purposes and, if the widget is defective, the consequential loss from the breach is larger. At the time of bargaining, if the seller can distinguish between the types, she can offer contract terms in accordance: a low price with low liquidated damages and generic features for the buyer who needs a generic widget, and a high price with high liquidated damages and special features for the buyer who needs a special widget. Setting proportionate liquidated damages is important because the seller's investment in quality is unobservable and liquidated damages works as a mechanism to alleviate the seller's moral hazard (or commitment) problem.

If the seller cannot distinguish between the types, although she can offer a menu of contracts for the buyer to self-select, if the contract is not integrated, the special buyer will be tempted to sign a contract for a generic widget and opportunistically introduce extrinsic evidence at trial to prove that the seller had "orally" promised him a special widget. Although the seller's liability is limited through a liquidated damages clause, that is not sufficient because the court cannot tell whether the generic widget does not suit the buyer's needs because it is defective or because the seller had originally promised him a different widget.<sup>6</sup> Without integration, the court will consider the extrinsic evidence of the seller's alleged oral promise and the buyer may be able to recover damages from her. To achieve separation, the seller has to reduce the liquidated damages in the generic contract below the efficient level so as to make the generic contract less attractive for the special buyer.

If the written agreements are fully integrated, on the other hand, the special buyer can no longer have the best of both worlds by paying a low price for a generic widget and arguing, *ex post*, for a special widget. Even if buyer attempts to introduce extrinsic evidence of the seller's alleged promise of a special widget which is not inconsistent with the express terms, the court will not allow such evidence.<sup>7</sup> With integration, the special buyer will be more inclined to pay the higher price for a special contract and the seller does not need to make the generic contract less attractive for the special buyer: she can restore

the liquidated damages in the generic contract to the efficient level. The ease of separation through integration is not necessarily good for the buyer, however. While it allows the seller to provide a more tailored, efficient service to the buyer in accordance with his type, it also allows the seller to extract more surplus from the buyer. Equilibrium social welfare increases through integration, but the buyer's rent disappears.

The paper is organized as follows. In the next section, we present a full model of contract formation between an uninformed seller and an informed buyer, where the seller makes a take-it-or-leave-it offer to the buyer. The seller can offer either one contract for both types of buyer to accept (pooling equilibrium) or a menu of contracts for the buyer to self-select (separating equilibrium). If the seller offers only one contract, the buyer's information (type) is not revealed, whereas if the buyer self-selects based on his type, the seller induces information disclosure from the buyer. The model demonstrates that when the agreements are integrated, the seller is more likely to induce a separation. The section also demonstrates that the seller always prefers to integrate and welfare will also be higher with integration. The last section concludes with observations for future research.

## 2 The Model

A buyer and a seller enter into a contract for the seller to produce and deliver a widget to the buyer. Both are risk-neutral profit-maximizers. The buyer can be either a generic type ( $g$ ) or a special type ( $s$ ). The generic type ( $g$ -type) needs a generic widget and values the widget at  $v_g > 0$ . The special type ( $s$ -type), on the other hand, would like to receive a special widget and values the special widget at  $v_s > v_g$ . We assume that although there is only one type of generic widget, there are infinitely many variations on the generic widget to make it special ( $s \in \mathfrak{R}$ ), e.g., it can require any number and/or combination of extra features. Because of that, it is prohibitively costly for the seller to offer a menu of contracts that covers all the variations without the buyer informing the seller of his special needs (his specific  $s$ ).<sup>8</sup> If the generic buyer were to receive a special widget, he derives no additional value from it (i.e., he values it at  $v_g$ ), and if the special buyer were to receive a generic (or a different special) widget, it is worth  $v_g$ . The ex ante probability that the buyer is a special type is  $r$  where  $1 > r > 0$ .

Either type of widget can be defective or non-defective, and the seller delivering a non-defective widget to the buyer is not a certain event. However, the seller can make unobservable investment,  $i \in [0, \infty)$ , to decrease the chance of delivering a defective widget. If we let  $q(i)$  be the probability of delivering a non-defective widget, we assume  $0 < q(i) < 1 \forall i$ ,  $q'(i) > 0$ ,  $q'(0) \gg 0$ , and  $q''(i) < 0$ . At the same time, investment is costly for the seller:  $c(i) \geq 0 \forall i$  where  $c'(i) > 0$ ,  $c'(0) = 0$ , and  $c''(i) > 0$ . Investment has a diminishing marginal return and an increasing marginal cost. The buyer realizes the value ( $v_i$ ) only when the seller delivers a non-defective widget, and if the seller delivers a defective widget,

the buyer realizes zero revenue. The production cost of the widget, either generic or special, is zero for simplicity.<sup>9</sup>

The timing of the game is as follows. At  $t = 1$ , the nature selects the buyer's type (both his type and, if special, what kinds of special features the buyer needs), and only the buyer observes the selection. At  $t = 2$ , the seller offers either a single contract or a menu of contracts to the buyer. If the seller offers a single contract, the buyer can either accept or reject. If the seller offers a menu of contracts, one generic and one special, and the special buyer chooses the special contract, the buyer reveals his specific needs and the seller fills in the description of the special widget in the contract. The contract ( $k$ ), therefore, contains a price ( $p$ ), the widget description or feature ( $f$ ), and liquidated damages ( $w$ ).<sup>10</sup> The contract can also contain a merger clause ( $m \in \{i, n\}$ ). The feature of the widget can be either generic ( $f = g$ ) or special ( $f = s$ ) where  $s \in \mathfrak{R}$ . As an example, in the generic contract, without a merger clause, the seller offers  $k_g = (p_g, g, w_g, n)$ . If the buyer reveals that he wants a special widget of type  $\hat{s}$ , the seller can include the description of the widget in the contract:  $k_{\hat{s}} = (p_{\hat{s}}, \hat{s}, w_{\hat{s}}, n)$ .<sup>11</sup> If the buyer rejects the offer, the buyer realizes zero profit (his reservation profit) and if the buyer accepts, he immediately pays the stipulated contract price.

At  $t = 3$ , the seller chooses the level of unobserved investment ( $i$ ). At  $t = 4$ , the seller delivers a non-defective widget with probability  $q(i)$ . If the seller delivers a defective widget, the buyer rejects the delivery and they proceed to  $t = 5$ , where the court awards the stipulated damages ( $w$ ) to the buyer. If the seller delivers a non-defective widget, the buyer can still reject the delivery and sue the seller (in  $t = 5$ ) for delivering a “wrong-type” or a “defective” widget. Although the court can tell that the generic widget is not working properly for the buyer, it cannot tell whether this is due to the widget being defective or due to the seller delivering a wrong-type of widget.<sup>12</sup> Both sides can attempt to present extrinsic (oral) evidence on whether or not the seller had agreed to deliver a different type of widget. Whether they can do so depends on whether the written agreement is integrated. If integrated ( $m = i$ ), the court enforces the express terms. If not integrated ( $m = n$ ), even though the express contract stipulates, for instance, generic ( $f = g$ ) widget, the buyer can (opportunistically) present extrinsic evidence that the seller orally promised him to modify the widget to make it special ( $f = s'$ ). If the special buyer wins, the court awards stipulated damages to the buyer. We assume that the party who presents evidence that is consistent with the express terms of the contract wins with probability  $\frac{1}{2} \leq \alpha < 1$ .

## 2.1 The First Best

If the social planner were to choose the level of investment with full information, the first best level of investment requires the seller to choose  $(i_s, i_g)$  to maximize

$$SW = r(q(i_s)v_s - c(i_s)) + (1 - r)(q(i_g)v_g - c(i_g)).$$

This produces the first order conditions of  $q'(i_s^*)v_s = c'(i_s^*)$  and  $q'(i_g^*)v_g = c'(i_g^*)$  where  $i^* = (i_s^*, i_g^*)$  denote the first-best levels of investment. The assumptions on  $q$  and  $c$  imply that  $i_s^* > i_g^* > 0$ : the seller should make more investment to deliver a conforming widget for the  $s$ -type than for the  $g$ -type. If the seller can observe the buyer's type and there is no ex post dispute over contract, the seller will offer a tailored contract: for the  $s$ -type, the seller offers  $k_s = (p_s, s, w_s)$ , and for the  $g$ -type, the seller offers  $k_g = (p_g, g, w_g)$ . At  $t = 3$ , the seller chooses  $(i_s, i_g)$  to maximize

$$\pi = r(p_s - (1 - q(i_s))w_s - c(i_s)) + (1 - r)(p_g - (1 - q(i_g))w_g - c(i_g)),$$

which produces the first order conditions of  $q'(i_s)w_s = c'(i_s)$  and  $q'(i_g)w_g = c'(i_g)$ . At  $t = 2$ , the seller chooses  $(p_s, w_s)$  and  $(p_g, w_g)$  to maximize the above profit function subject to four constraints:  $q'(i_s)w_s = c'(i_s)$ ,  $q'(i_g)w_g = c'(i_g)$ ,  $q(i_s)v_s + (1 - q(i_s))w_s - p_s \geq 0$ , and  $q(i_g)v_g + (1 - q(i_g))w_g - p_g \geq 0$ . In equilibrium, the seller sets  $w_s = p_s = v_s$  and  $w_g = p_g = v_g$ : the liquidated damages terms are set to produce optimal investment and the prices are set to extract all the rent from the buyer.

## 2.2 When Agreements are Not Integrated

When a written agreement is not integrated, both sides can introduce extrinsic evidence at trial to supplement the express terms of the contract. For the  $s$ -type buyer in our example, this implies that even if he had signed a contract to buy a generic widget, after the seller delivers the promised widget, the buyer can strategically argue that the seller had orally promised him to deliver a special widget. So long as the features of the special widget are not directly inconsistent with the stipulated features of the generic widget, e.g., the special widget has an added functionality vis-à-vis the generic widget, the court will consider such evidence to supplement the written agreement. If the buyer is successful, which happens with probability  $(1 - \alpha)$ , the seller will have to pay the stipulated damages of  $w_g$  to the buyer.<sup>13</sup> Whether or not the seller decides to offer one contract (induce a pooling equilibrium) or a menu of contracts (induce a separating equilibrium), she will have to take this added liability into account in designing the contract(s).

**Proposition 1** *Suppose the seller does not integrate the written agreements. In a pooling equilibrium, the seller offers less-than-full warranty for both buyers ( $w_p^{w/o} < v_g < v_s$ ) and makes an investment that is too low for both types ( $i_p^{w/o} < i_g^* < i_s^*$ ). In a separating equilibrium, the seller offers full warranty ( $w_s^{w/o} = v_s$ ) and makes optimal investment for the  $s$ -type ( $i_s^{w/o} = i_s^*$ ) but offers less than full warranty ( $w_g^{w/o} < v_g$ ) and makes too little investment for the  $g$ -type ( $i_g^{w/o} < i_g^*$ ).*

When the seller offers one contract for both types of buyer, even though the contract promises a generic widget, the seller is aware that the  $s$ -type buyer can argue, ex post,

that the seller had promised him a special widget. Since this reduces the seller's expected profit in case she delivers a generic widget (by  $(1 - \alpha)w_g$ ), the seller's incentive to deliver a non-defective widget decreases, and the seller makes too little investment even for the buyer who wants a generic widget. When the seller offers a menu of contracts, on the other hand, the conventional adverse selection dynamic applies, but in a slightly different way. Because the seller's investment is unobservable (and non-contractible), the seller's investment choice is not made necessarily to reduce the  $s$ -type's rent, as usually done in conventional screening model. Here, the investments are dictated (solely) by the size of the warranties ( $w_s$  and  $w_g$ ). Although the seller would like to promise a full warranty to the  $g$ -type buyer (so as to extract more surplus from him through a higher  $p_g$ ), increasing  $w_g$  makes the generic contract ( $k_g$ ) more attractive for the  $s$ -type buyer, because this increases his opportunistic return in case the seller delivers a non-defective, generic widget. Hence, in equilibrium, the seller lowers  $w_g$  below  $v_g$  to achieve separation.

### 2.3 When Agreements are Integrated

If a written agreement is fully integrated, neither side can present any extrinsic evidence to supplement or modify the express terms of the contract. In our case, if the contract stipulates generic widget ( $f = g$ ), once the seller delivers a generic widget, the  $s$ -type buyer cannot introduce extrinsic evidence at trial to argue that the seller had (orally) guaranteed him a special widget. With no extrinsic evidence to the contrary, the court always enforces the express terms of the contract and awards stipulated damages to the buyer only when the seller delivers a defective widget. When the seller offers only one generic contract to both types, the seller no longer needs to worry about the possibility of paying liquidated damages when she delivers a conforming widget. Similarly, when the seller attempts to separate the types by offering a menu of contracts, the  $s$ -type buyer's incentive to choose the generic contract and argue for a special widget ex post has also decreased, making it easier for the seller to achieve separation.

**Corollary 1** *Suppose the seller integrates the written agreements. In a pooling equilibrium, the seller offers a full warranty for the  $g$ -type ( $w_p^w = v_g$ ) and makes an investment that is optimal for the  $g$ -type and too low for the  $s$ -type ( $i_p^w = i_g^* < i_s^*$ ). In a separating equilibrium, the seller offers full warranty and makes optimal investment for both types ( $w_s^w = v_s$ ,  $w_g^w = v_g$ ,  $i_g^w = i_g^*$ , and  $i_s^w = i_s^*$ ).*

For the pooling equilibrium, when the seller offers  $k_p = (p_p, g, w_p, i)$  and both types of buyer accept, in contrast to the case without integration, the seller no longer needs to worry about the  $s$ -type buyer's potential opportunistic behavior ex post. The seller will be liable for  $w_p$  only when she delivers a defective widget, and she sets the damages term and chooses the investment level optimally, at least, for the  $g$ -type ( $w_p = v_g$  and  $i_p^w = i_g^*$ ). In a separating equilibrium, in a slight divergence from the conventional screening model,<sup>14</sup>

the seller makes optimal investment for both types. The reason for the divergence is that in our model, the  $s$ -type buyer's "informational rent" stems solely from his ability to opportunistically argue ex post for a special widget. His rent, under separation, is given by  $q(i_g)(1 - \alpha)w_g$ . Once his ability to engage in opportunistic behavior is gone through integration ( $\alpha = 1$ ), so is his informational rent. The seller no longer needs to worry about making a trade-off between the  $s$ -type buyer's informational rent and the distortion imposed on the  $g$ -type buyer.

## 2.4 Comparison between Integration and Non-integration

In this sub-section, we examine the seller's incentive over integration and over inducing the buyer to disclose his information. Foremost, we ask whether, conditional on the type of equilibrium, the seller always benefits by integrating an agreement. Second, conditional on integration or non-integration, we examine whether the seller is more likely to induce the  $s$ -type buyer to reveal his information. This involves comparing the seller's profits under pooling and separating equilibria. Finally, we examine which regime, integration or non-integration, engenders lower inefficiency and whether such social objective coincides with the seller's private incentive to integrate. Private and social incentives may diverge in this case because while the seller cares about the amount of rent left to the buyer, from the social welfare perspective, that imposes no loss in efficiency.

**Corollary 2** *In both types of equilibrium, the seller makes more profit when an agreement is integrated than when it is not. With integration, the seller always induces information disclosure whereas without integration, the seller may choose not to induce disclosure. Finally, although the buyer is strictly worse off with integration, the social welfare is strictly higher with integration.*

In a pooling equilibrium, the seller makes more profit when an agreement is integrated than when it is not for two reasons. First, without integration, the seller faces a higher expected liability due to  $s$ -type buyer's ex post opportunism. Second, because of the larger expected liability, the seller sets inefficiently low liquidated damages for both types ( $w_p^{w/o} < w_g^* < w_s^*$ ), which, in turn, reduces the total surplus that the seller can extract from the buyer. With integration, the seller not only faces a lower expected liability but also the size of the surplus is larger because of smaller distortion ( $w_p^w = w_g^* < w_s^*$ ). In a separating equilibrium without integration, although the seller does not face a higher expected liability, she has to leave some rent to the  $s$ -type buyer (measured by  $q(i_g^{w/o})(1 - \alpha)w_g^{w/o}$ ) and distort the liquidated damages for  $g$ -type ( $w_g^{w/o} < w_g^*$ ) to achieve separation. With integration, not only can the seller eliminate the  $s$ -type buyer's rent, but also the inefficiency she had to impose on the  $g$ -type.

Integration also helps the seller better able to distinguish between the types. Without integration, in either types of equilibrium, the seller was setting inefficiently low liquidated damages for at least one type of buyer:  $w_p^{w/o} < w_g^* < w_s^*$  in case of pooling and  $w_g^{w/o} < w_g^*$  and  $w_s^{w/o} = w_s^*$  in case of separation. Although it is tempting to say that the seller's profit should be higher with separation than with pooling, if the distortion imposed on the  $g$ -type in case of separation is very large, the seller's profit may be lower with separation. In contrast, when the seller integrates the agreement, there is distortion only in a pooling equilibrium:  $w_p^w = w_g^* < w_s^*$ . Since the seller also extracts all the surplus from the buyer through separation, the seller's profit is always higher with separation than with pooling. Finally, when the seller separates the types and integrates the agreement, the social welfare is the largest. The buyer, of course, strictly prefers non-integration, because through integration and separation, his rent has completely disappeared.

### 3 Conclusion

This paper has argued that by integrating an agreement and excluding extrinsic evidence (either consistent or inconsistent), an uninformed party can minimize the ex post opportunistic behavior of an informed party and provide better incentive to the informed party to disclose information at the time of contract formation. In particular, integration prohibits an informed party from introducing his private information ex post to affect or modify the previously agreed-upon terms of a written contract. Uninformed party can use integration (and the parol evidence rule) as a tool in providing better incentive to the informed party to disclose his private information ex ante. Integration makes disclosure more likely. The paper has also shown that the uninformed party not only prefers integration over non-integration but also makes better investment decision with integration. Social welfare also increases with integration.

In the model, when an agreement is not integrated, either party can present extrinsic (oral) evidence that either contradicts or supplements an explicit writing. For instance, even if a writing stipulates that the seller must deliver a generic widget, when the writing is not (fully) integrated, the buyer could attempt to introduce extrinsic evidence at trial to argue that the seller had orally supplemented the features of the widget. And, it is this opportunistic behavior that inhibits the seller from (1) extracting more rent from the buyer and (2) implementing more efficient contract solution. Introducing extrinsic evidence at trial is always detrimental to efficiency. In reality, however, there could be efficiency-based reasons of why even asymmetrically informed parties may deliberately want to allow extrinsic evidence to be introduced at trial. Future research can take some of these factors into account for a more complete examination of the parol evidence rule.



## Proofs

**Proof of Proposition 1.** When the seller wants to induce a pooling equilibrium, she offers  $k_p = (p_p, g, w_p, n)$ . The seller's ex ante profit is

$$\pi^p = r\{p_p - q(i)(1 - \alpha)w_p - (1 - q(i))w_p\} + (1 - r)\{p_p - (1 - q(i))w_p\} - c(i).$$

Note that the first term reflects the fact that the special buyer, even when the seller has delivered a conforming, generic widget, will argue in court that the seller had orally promised him a special widget. The special buyer will win with probability  $(1 - \alpha)$  and will be granted the liquidated damages of  $w_p$ .

At  $t = 3$ , the seller chooses  $i$ , holding  $p_p$  and  $w_p$  constant. This leads to the following first order condition

$$q'(i)(r\alpha + (1 - r))w_p = c'(i)$$

which produces an implicit function of  $i(w_p)$ , where  $\frac{di}{dw_p} > 0$ . At  $t = 2$ , with  $i(w_p)$  in mind, the seller will choose  $p_p$  and  $w_p$  to maximize

$$\pi^p = r\{p_p - q(i(w_p))(1 - \alpha)w_p - (1 - q(i(w_p)))w_p\} + (1 - r)\{p_p - (1 - q(i(w_p)))w_p\} - c(i(w_p)).$$

subject to

$$q(i(w_p))(v_g + (1 - \alpha)w_p) + (1 - q(i(w_p)))w_p - p_p \geq 0 \quad (IR_s)$$

and

$$q(i(w_p))v_g + (1 - q(i(w_p)))w_p - p_p \geq 0 \quad (IR_g)$$

Since  $q(i(w_p))(v_g + (1 - \alpha)w_p) + (1 - q(i(w_p)))w_p - p_p > q(i(w_p))v_g + (1 - q(i(w_p)))w_p - p_p$  and increasing  $p_p$  always increases the seller's profit, the seller will set  $p_p = q(i(w_p))v_g + (1 - q(i(w_p)))w_p$ . This simplifies the seller's profit to

$$\pi^p = r\{q(i(w_p))v_g - q(i(w_p))(1 - \alpha)w_p\} + (1 - r)\{q(i(w_p))v_g\} - c(i(w_p)).$$

The maximization with respect to  $w_p$ , with some simplification, yields the first order condition of

$$\frac{di}{dw_p}q'(i)(v_g - w_p) = r(1 - \alpha)q(i)$$

Since  $\frac{di}{dw_p} > 0$  and  $q'(i) > 0$ , at optimum, the seller will set  $v_g > w_p$ . From  $q'(i)(r\alpha + (1 - r))w_p = c'(i)$ , when  $v_g > w_p$ , we also know that  $i_p^{w/o} < i_g^*$ .

If the seller wants to induce the  $s$ -type buyer to reveal his type, the seller offers  $k_g = (p_g, g, w_g, n)$  and  $k_s = (p_s, s, w_s, n)$ . At  $t = 3$ , the seller chooses  $(i_s, i_g)$  to maximize

$$\pi^s = r\{p_s - (1 - q(i_s))w_s - c(i_s)\} + (1 - r)\{p_g - (1 - q(i))w_g - c(i)\}.$$

The respective first order conditions are

$$\begin{aligned} q'(i_s)w_s &= c'(i_s) \\ q'(i_g)w_g &= c'(i_g) \end{aligned}$$

At  $t = 2$ , for the  $s$ -type buyer to reveal his type and choose  $k_s$ , the contract terms must satisfy

$$q(i_s)v_s + (1 - q(i_s))w_s - p_s \geq q(i_g)(v_g + (1 - \alpha)w_g) + (1 - q(i_g))w_g - p_g \quad (IC_s)$$

On the left hand side, since the buyer reveals his type, he receives the special widget and there is no dispute ex post. On the right hand side, the  $s$ -type buyer, who has accepted  $k_g$ , introduces extrinsic evidence at trial to prove that the seller has orally agreed to deliver a special widget. For the  $g$ -type buyer to choose  $k_g$ ,

$$q(i_g)v_g + (1 - q(i_g))w_g - p_g \geq q(i_s)v_g + (1 - q(i_s))w_s - p_s \quad (IC_g)$$

Finally, for both types to accept either contract rather than reject,

$$q(i_s)v_s + (1 - q(i_s))w_s - p_s \geq 0. \quad (IR_s)$$

and

$$q(i_g)v_g + (1 - q(i_g))w_g - p_g \geq 0. \quad (IR_g)$$

In equilibrium, the constraints  $IC_s$  and  $IR_g$  bind but  $IC_g$  and  $IR_s$  do not. Since the constraint  $IR_g$  binds, the  $g$ -type buyer, in equilibrium, makes no more than his outside option. On the other hand, since  $IR_s$  does not bind, the  $s$ -type buyer receives a profit. From binding  $IR_g$  we get  $p_g = v_g$ . From binding  $IC_s$ , we get

$$p_g = q(i_g)v_g + (1 - q(i_g))w_g$$

and from the binding  $IC_s$ , we get

$$p_s = q(i_s)v_s + (1 - q(i_s))w_s - q(i_g)(1 - \alpha)w_g$$

The seller's profit, with some simplification, reduces to

$$\pi^s = r\{q(i_s(w_s))v_s - c(i_s(w_s)) - q(i_g(w_g))(1 - \alpha)w_g\} + (1 - r)\{q(i_g(w_g))v_g - c(i_g(w_g))\}.$$

When the seller maximizes the profit with respect to  $(w_s, w_g)$ , with some simplification, we get

$$\begin{aligned} \frac{di_s}{dw_s} q'(i_s)(v_s - w_s) &= 0 \\ \frac{di_g}{dw_g} q'(i_g) ((1 - r)v_g - (1 - \alpha r)w_g) &= r(1 - \alpha)q(i_g) \end{aligned}$$

From the first equation, we must have  $w_s = v_s$ , which, in turn, implies that  $i_s^{w/o} = i_s^*$ . From the second equation,  $w_g < \frac{1-r}{1-\alpha r} v_g < v_g$ , which implies that  $i_g^{w/o} < i_g^*$ . ■

**Proof of Corollary 1.** The proof of Lemma 2 is the same as that of Lemma 1, except for the fact that, now,  $\alpha = 1$ . In a pooling equilibrium, the seller offers  $k_p = (p_p, g, w_p, i)$ . The seller's ex ante profit is

$$\pi^p = r\{p_p - (1 - q(i))w_p\} + (1 - r)\{p_p - (1 - q(i))w_p\} - c(i).$$

The first order condition with respect to  $i$ , is

$$q'(i)w_p = c'(i)$$

and the first order condition, with respect to  $w_p$ , is

$$\frac{di}{dw_p} q'(i)(v_g - w_p) = 0$$

which implies that  $v_g = w_p$  and  $i_p^w = i_g^*$ .

In a separating equilibrium, the seller offers  $k_g = (p_g, g, w_g, i)$  and  $k_s = (p_s, s, w_s, i)$ . The seller's expected profit is

$$\pi^s = r\{p_s - (1 - q(i_s))w_s - c(i_s)\} + (1 - r)\{p_g - (1 - q(i))w_g - c(i)\}.$$

and the first order conditions, with respect to  $(i_s, i_g)$  are

$$\begin{aligned} q'(i_s)w_s &= c'(i_s) \\ q'(i_g)w_g &= c'(i_g) \end{aligned}$$

and the first order conditions with respect to  $(w_s, w_g)$  are

$$\begin{aligned} \frac{di_s}{dw_s} q'(i_s)(v_s - w_s) &= 0 \\ \frac{di_g}{dw_g} q'(i_g)(1 - r)(v_g - w_g) &= 0 \end{aligned}$$

At optimum, therefore, the seller will choose  $w_s = v_s$ ,  $w_g = v_g$ ,  $p_s = v_s$ ,  $p_g = v_g$ ,  $i_s^w = i_s^*$ , and  $i_g^w = i_g^*$ . ■

**Proof of Corollary 2.** When there is no integration, the seller's expected profits in pooling and separating equilibria are

$$\pi^p = q(i(w_p^{w/o}))v_g - c(i(w_p^{w/o})) - rq(i(w_p^{w/o}))(1 - \alpha)w_p^{w/o}$$

and

$$\pi^s = r\{q(i(w_s^{w/o}))v_s - c(i(w_s^{w/o})) - q(i(w_s^{w/o}))(1 - \alpha)w_g^{w/o}\} + (1 - r)\{q(i(w_g^{w/o}))v_g - c(i(w_g^{w/o}))\}.$$

respectively. When differentiated with respect to  $\alpha$ , we get

$$\frac{\partial \pi^p}{\partial \alpha} = r q(i_p^{w/o}) \alpha w_p^{w/o} > 0$$

and

$$\frac{\partial \pi^s}{\partial \alpha} = r q(i_g^{w/o}) \alpha w_g^{w/o} > 0$$

Note that because  $\frac{\partial \pi^j}{\partial w_k} = 0$  at optimum, we can ignore all terms such as  $\frac{\partial i_j^{w/o}}{\partial \alpha}$  and  $\frac{\partial w_j^{w/o}}{\partial \alpha}$  due to the envelope theorem. Hence, the seller makes more profit when the agreements are integrated.

When agreements are integrated ( $\alpha = 1$ ), seller's respective profits are

$$\pi^p = q(i(w_g^*)) v_g - c(i(w_g^*))$$

and

$$\pi^s = r \{q(i(w_s^*)) v_s - c(i(w_s^*))\} + (1 - r) \{q(i(w_g^*)) v_g - c(i(w_g^*))\}.$$

Since  $w_s^* > w_g^*$ ,  $q(i(w_s^*)) v_s - c(i(w_s^*)) > q(i(w_g^*)) v_s - c(i(w_g^*))$ . Therefore,  $\pi^p > \pi^s$ : the seller always induces separation when agreements are integrated. When they are not integrated, however, the results are ambiguous. This is because distortion imposed on the  $g$ -type buyer in case of separation may be (much) larger than the distortion imposed in case of pooling: i.e.,  $w_g^{w/o}$  may be much smaller than  $w_p^{w/o}$ .

Finally, under integration, the seller extracts all the surplus from the buyer without any distortion, whereas without integration, there is some inefficiency (imposed either on both types in case of pooling and on the  $g$ -type in case of separation). Therefore, the social welfare is larger with integration than without. ■

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## Notes

<sup>1</sup>According to UCC §2-202, “[t]erms...set forth in a writing intended by the parties as a final expression of their agreement...may not be contradicted by evidence of any prior agreement or of a contemporaneous oral agreement but may be explained or supplemented...(b) by evidence of consistent additional terms unless the court finds the writing to have been intended also as a complete and exclusive statement of the terms of the agreement.” Hence, if a written agreement is fully (as opposed to partially) integrated, i.e., is a “complete and exclusive statement of the terms of the agreement,” even extrinsic evidence that is not inconsistent with the written terms is not allowed.

The parol evidence rule does not, however, prohibit parties from introducing extrinsic evidence to clear the ambiguity of a written term, to establish the level of integration, to show fraud, or to prove damages. According to the Restatement (Second) of Contracts §214, “[a]greements and negotiations prior to or contemporaneous with the adoption of a writing are admissible in evidence to establish (a) that the writing is or is not an integrated agreement; (b) that the integrated agreement, if any, is completely or partially integrated; (c) the meaning of the writing, whether or not integrated; (d) illegality, fraud, duress, mistake, lack of consideration, or other invalidating cause; (e) ground for granting or denying rescission, reformation, specific performance, or other remedy.” UCC §2-202(a) goes further by always allowing extrinsic evidence of “course of performance, course of dealing, or usage of trade.”

For a general overview of the parol evidence rule, see Corbin (1944), Farnsworth (2004) at 414–439 and Perillo (2003) at 122–149.

<sup>2</sup>According to Professor Thayer, “Few things are darker than [the parol evidence rule], or fuller of subtle difficulties.” Perillo (2003) at 122. For recent scholarly criticisms against the rule, see Cunningham (2000), Schwartz and Scott (2003), and Daniel (2007).

<sup>3</sup>Economic analysis of the parol evidence rule has been far from extensive. A notable exception is Posner (1998), who examines the costs and benefits of the soft versus the hard parol evidence rule in a symmetric information setting. Under the hard parol evidence rule, the court relies (almost) exclusively on the writing, whereas under the soft parol evidence rule, the court also considers extrinsic evidence. This conception is similar to integration versus non-integration.

<sup>4</sup>A sample merger clause might say “this agreement supersedes all prior agreements between the parties with respect to its subject matter and constitutes a complete and exclusive statement of the terms of the agreement between the parties with respect to its subject matter.” Model Stock Purchase Agreement (1995) by the American Bar Association.

<sup>5</sup>The latter story is pretty standard in asymmetric information models. See Laffont and Martimort (2002) and Bolton and Dewatripont (2005). The best demonstration of the former story is in Spier (1992). In her paper, an informed party may decide not to offer a complete contract because she is afraid of sending a bad signal to an uninformed party.

<sup>6</sup>For the main thesis, it does not matter whether the seller liquidates the damages. We can apply the *Hadley*-type foreseeability limitations on the expectation damages that the

buyer can recover. Then, the main issue will be whether or not the buyer disclosed his special circumstances to the seller, at the time of contract formation, so as to make the higher damages foreseeable for the seller. If the written agreement is integrated, extrinsic evidence will less likely be allowed at trial. See Ayres and Gertner (1989) and Bebchuk and Shavell (1991) for more complete analysis of *Hadley* foreseeability limitations.

<sup>7</sup>The case of *UAW-GM Human Resource Center v. KSL Recreation Corporation*, 228 Mich. App. 486 (1998), is illustrative. The plaintiff and the defendant entered into a written contract, with an explicit merger clause, whereby the plaintiff was to use the defendant's property for a convention. Although the agreement was silent, the plaintiff, at trial, attempted to introduce extrinsic evidence that the defendant was to use only union employees. The proffered evidence was not necessarily inconsistent with the written terms. The Michigan Appellate Court denied such extrinsic evidence even for the purpose of determining whether the agreement was fully integrated, stating that "if parol evidence were admissible with regard to the threshold issue of whether the written agreement was integrated despite the existence of an integration clause, there would be little distinction between contracts that include an integration clause and those that do not."

<sup>8</sup>Another way of thinking about this is that because all the *s*-type buyers have the same valuation  $v_s$ , the single-crossing property (or Spece-Mirrlees condition) is not satisfied and the seller cannot induce a separation among them. See Laffont and Martimort (2002) at 134–142 and Bolton and Dewatripont (2005) at 77–81.

<sup>9</sup>This assumption can be easily modified to let  $c_i$  be the unit cost of production where  $c_s \geq c_g$ . So long as  $v_s - c_s$  is larger than  $v_g - c_g$  so that the seller has a higher profit margin on the *s*-type than on the *g*-type, the main results will not change.

<sup>10</sup>Here we assume that the seller can include a liquidated damages clause and the buyer cannot, ex post, introduce extrinsic evidence that is inconsistent with the damages clause, i.e., argue for higher damages. This is to reflect the reality that it is relatively easy for the seller to include a warranty disclaimer in a written agreement. However, courts do not always honor warranty disclaimers. According to UCC §2-316(1), "[w]ords or conduct relevant to the creation of an express warranty...[or] to negate or limit warranty shall be construed wherever reasonable as consistent with each other; but subject to...parol or extrinsic evidence [rule]...negation or limitation is inoperative to the extent that such construction is unreasonable." For instance, even if a written agreement contains a limitation of warranty (or consequential damages) clause, if the buyer produces extrinsic evidence that the seller orally promised full warranty, the court may not honor such limitation, especially if there is no merger clause. If the buyer is able to introduce such inconsistent extrinsic evidence, our results over integration becomes even stronger.

<sup>11</sup>Note that the contract does not have an investment clause. This is because investment is assumed to be unobservable. If liquidated damages were zero, the seller will have no incentive to undertake any costly investment at  $t = 3$ , and the buyer, anticipating this, will pay a much lower price for the contract. Liquidated damages are important, therefore, to cure the seller's moral hazard (or commitment) problem. As we will see, however, higher liquidated damages also encourages the buyer's opportunistic behavior.

<sup>12</sup>If the seller delivers a widget with attributes  $g = (x, y)$ , the court cannot tell whether (1) the seller had originally promised to deliver a generic widget and did so, or (2) whether the seller had initially (orally) promised to deliver  $s = (x, y, z)$  and delivered a non-conforming, generic widget. The seller can also argue, after delivering a defective generic widget  $g' = (x', y')$ , that that is what the buyer orally ordered from the seller. The opportunism from the seller's perspective can be easily incorporated into the model but will not change the main results. In our model, there are some non-verifiable elements in the contract and the court cannot determine without error what the parties had intended. This is similar to uncertain legal standards, as in Craswell and Calfee (1986), or judicial competence of interpretation, as in Hadfield (1994).

<sup>13</sup>In reality, the court can strike down the stipulated damages ( $w_g$ ) for being a penalty and opt for the difference between the values ( $v_s - v_g$ ), especially if  $w_g$  is (much) larger than  $v_s - v_g$ . According to Restatement (Second) of Contracts §356, liquidated damages must be "reasonable in light of the anticipated or actual loss caused by the breach." To reflect this concern, we can assume that the special buyer, instead of collecting  $w_g$ , can collect  $\min\{w_g, v_s - v_g\}$ , or alternatively,  $v_s - v_g > v_g$ .

<sup>14</sup>In the conventional screening model, the contract offeror has to make a trade-off between reducing the more efficient type's ( $s$ -type's) "informational rent" and reducing the distortion imposed on the less efficient type ( $g$ -type). The larger the distortion on the less efficient type, the easier it is to separate the types and to reduce the more efficient type's rent. Sometimes this is called rent extraction-efficiency trade-off. See Laffont and Martimort (2002) at 41–46 and Bolton and Dewatripont (2005) at 52–56.