Optimal Successor Liability

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Preliminary and Incomplete

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Abstract

In case of a merger or an acquisition, a tort liability that arises from the seller's conduct is often imposed on the buyer through the doctrine of successor liability. If the buyer has as much information about the potential liability as the seller, the first best is achieved: all gains from acquisition are realized and the seller takes the efficient amount of precaution. However, when the seller has more information about the potential liability than the buyer, there could be too little acquisition, too little incentive on the seller, or both. The court can increase the successor liability to improve welfare. We show that imposing a higher damages against the surviving seller is better than increasing the liability against the buyer.

1 Introduction

After a tort-feasor has engaged in a potentially harmful activity, it is often not until many years after, that the victims discover the extent of the damage. Manufacturers sell or use products, that create health problems on the consumers or the employees, but the extent of the damage is ascertained only after many years, as evidenced, for instance, in asbestos and tobacco litigations. Similarly, the consequences of an environmental pollution are not only difficult to measure but also can become apparent only after an extensive delay. The problem is that by the time the damage has been discovered and estimated, the initial tort-feasor is often out of existence, either through a merger or an acquisition by another company or due to bankruptcy and subsequent liquidation. Suppose the initial tort-feasor has been acquired by another company. Should the victims be allowed to recover from the surviving company, even though the company has done nothing wrong against the victims and was not even aware of the problem at the time of the acquisition?

The tort law does allow the victims to recover from the surviving company. When the ownership of the tort-feasor has been transferred to a new company, e.g., through a stock-for-stock acquisition, the law deems the buying entity as the owner of the original company. But, even in the case where the buying company has only bought the tort-feasor's assets and has explicitly disavowed against the future liability, the courts often still allow the victims to recover from the buyer. The preliminary analysis has concluded that such successor liability provides efficient deterrence against the initial tort-feasor. When the buying company is aware of the extent of the liability, the acquisition price will decrease to reflect the liability and provide the optimal deterrence against the tort-feasor. This analysis simplistic, however. The assumption that the victims or the government authorities are not aware of the extent of the damage implies that, at the time of the sale, the selling company probably has more information about its initial conduct and the potential liability than the buyer.

This paper shows that in the presence of information asymmetry, successor liability no longer ensures the efficient allocation of resources. Asymmetric information creates two types of inefficiencies. First, not all acquisitions are consummated even though there is a definite gains from the acquisitions. Second, because the price may become insensitive to the size of the liability, it fails to provide the efficient level of incentive to the selling company. When the size of the merger gain is relatively large compared to the potential liability, the second inefficiency will be more prevalent, whereas when relatively small, the first inefficiency will be more likely. The paper, then, shows that by adjusting the size of the successor liability, i.e., by imposing higher or lower damages against the surviving company, the court can induce a better equilibrium. There could be a trade-off, however. Raising the liability can provide better deterrence against the seller at the risk of losing more beneficial acquisitions. Nonetheless, the paper shows that imposing a higher damages against the surviving seller is better than increasing the liability against the buyer.

2 The Model

There are one buyer and one seller, both risk neutral. In the first period ($t = 1$), the seller decides on the level of precaution, $e \in [0, \overline{e}]$, at a cost of $\psi(e)$. We assume that $\psi' > 0$, $\psi'' > 0$, $\psi'(0) = 0$, and $\psi'(\overline{e}) = +\infty$. The level of effort determines the probability (or likelihood), $p(e)$, of an accident ($\widetilde{L}$). The accident imposes a damage of L (> 0) onto a (future) victim and a higher level of precaution by the seller decreases the probability of the accident: $p' < 0$ and $p'' > 0$. In the second period ($t = 2$), the seller learns whether there will be an accident in the future or not, i.e., the seller learns the future realization of L. In the third period ($t = 3$), a buyer appears with probability one. We consider two cases: the buyer or the seller makes a take-it-or-leave-it offer to the other company. The buyer values the company at $V_b - \widetilde{L}$ while the seller values at $V_s - \widetilde{L}$. We assume, for now, that $V_b - V_s > L$, so that the potential merger gains is larger than the size of the liability and the seller will not bankrupt due to the liability, i.e., $V_s > L$. In the fourth period ($t = 4$), the accident is discovered and the victim costlessly recovers damages of L from the surviving corporation. We assume that there is no time discount.

2.1 The First Best

Assuming that the victim will be wholly compensated, the first best requires that the firm to be sold to the buyer with probability one and the seller to make precautionary investment to maximize $V_b - p(e)L - \psi(e)$. The maximization yields $p'(e^*)L + \psi'(e^*) = 0$, where we denote e^* as the first best level of precaution. With the signs on the second order derivatives, the second order condition is satisfied: $p''(e^*) + \psi''(e^*) < 0$. We assume that $0 < p(e^*) < p(0) < 1$. Now, suppose at $t = 3$, before making an acquisition offer, the buyer perfectly observes whether there has been an accident or not. Then, the buyer will offer V_s if there will be no liability and $V_s - L$ if there will be liability in the future. Hence, acquisition always occurs. Given the buyer's conditional offers, in the first period, the seller will maximize $E(\pi_s) = p(e)(V_s - L) + (1 - p(e))V_s - \psi(e)$. The first order condition yields $p'(e^*)L + \psi'(e^*) = 0$. Hence, when the buyer can observe the potential liability, the first best is achieved.

2.2 Seller Offer Model

Let us come back to the original assumption that, at $t = 3$, the seller knows the future liability but the buyer does not. When the seller has the power to make a take-it-leave-it offer to the buyer, she will offer either V_b or $V_b - L$. Any offer between V_b and $V_b - L$ and below $V_b - L$ is strictly dominated by $V_b - L$, and any offer larger than V_b is strictly dominated by V_b. Suppose the buyer accepts the offer of V_b with probability r and the offer of $V_b - L$ with probability q. We will first find a separating equilibrium, where the seller with value $V_s - L$ offers $V_b - L$ and the V_s seller offers V_b. To have a separation, we must have $q > r$, since otherwise, both types of seller will strictly prefer to offer V_b. The following proposition demonstrates that in the separating equilibrium, we have two types of inefficiencies: not all acquisitions take place, even though the gains from the acquisition is common knowledge, and the seller takes inefficiently low level of precaution.

Proposition 1 *In the most efficient separating equilibrium, $q = 1$ and $r = \frac{V_b - V_s}{V_b - V_s + L}$. The seller's equilibrium effort is strictly lower than the first best: $e < e^*$.*

Proof. Consider the seller with value V_s. If she offers V_b, her expected profit is given by $E(\pi_s|V_b) = rV_b + (1 - r)V_s$. Similarly, $E(\pi_s|V_b - L) = q(V_b - L) + (1 - q)(V_s)$. When the seller's value is $V_s - L$, $E(\pi_s|V_b) = rV_b + (1 - r)(V_s - L)$ and $E(\pi_s|V_b - L) = q(V_b - L) + (1 - q)(V_s - L)$. To get the separation, we need

$$\begin{aligned} rV_b + (1 - r)V_s &\geq q(V_b - L) + (1 - q)(V_s) \\ rV_b + (1 - r)(V_s - L) &\leq q(V_b - L) + (1 - q)(V_s - L) \end{aligned}$$

which simplify to

$$
\begin{aligned}
r &\geq \frac{q(V_b - V_s - L)}{V_b - V_s} \\
r &\leq \frac{q(V_b - V_s)}{V_b - V_s + L}
\end{aligned}
$$

Since $\frac{q(V_b-V_s-L)}{V_b-V_s} < \frac{q(V_b-V_s)}{V_b-V_s+L}$, we can find r that satisfies both inequalities. Although there are many different equilibria, in the most efficient equilibrium, we must have $q = 1$ and $r = \frac{V_b-V_s}{V_b-V_s+L}$.

In the equilibrium, buyer makes zero profits. For the seller, as of $t = 1$,

$$E(\pi_s) = p(e)(V_b - L) + (1 - p(e))\left(\frac{V_b - V_s}{V_b - V_s + L}V_b + \frac{L}{V_b - V_s + L}V_s\right) - \psi(e)$$

where $\frac{V_b-V_s}{V_b-V_s+L}V_b + \frac{L}{V_b-V_s+L}V_s < V_b$. The first order condition yields

$$\frac{dE(\pi_s)}{de} = p'(e)\left(V_b - \frac{(V_b - V_s)V_b + LV_s}{V_b - V_s + L}\right) - Lp'(e) - \psi'(e) = 0$$

Let e' be the solution. Compared to the first best, $e' < e^*$ because $p'(e)\left(V_b - \frac{(V_b-V_s)V_b+LV_s}{V_b-V_s+L}\right) < 0$. ■

To achieve the separation, even in the most efficient separating equilibrium, the buyer must reject the seller's higher offer (V_b) with a positive probability ($r < 1$), so that the seller with a lower valuation will not mimic the seller with the higher valuation. Not all mergers take place, even though the positive gains from the merger, even after taking into account of the liability, is common knowledge. The seller, despite her full bargaining power, cannot gain all the benefits of the merger due to the buyer's positive probability of rejection. The seller's expected profit is strictly lower than in the first best. Since the total surplus is less, the seller's incentive to exert the effort is also lower. The reduction in welfare, compared to the first best case, is

Can the court somehow adjust the size of the liability to induce a better equilibrium, i.e., provide more incentive to the seller and/or increase the probability of merger? First, we examine the possibility of adjusting the damages only on the buyer, the successor corporation. That is, if the buyer acquires the company and the victim discovers the damage and sues for compensation, the court imposes the damages of $L + m$ on the buyer, where m, the liability adjustor determined by the court, can be either negative or positive. On the other hand, if there is no acquisition and the seller is found liable, the seller will only be liable for L.

Proposition 2 *When the victim discovers the damage of L and sues the surviving company, suppose the court can impose a damages of $L+m$ against the buyer if the seller has sold the company, while imposing L on the seller in case of no sale. As m gets larger, the acquisition probability decreases and the seller takes more precaution.*

Proof. Now, the seller offers either $V_b - L - m$ or V_b. Consider the seller with value V_s. If she offers V_b, her expected profit is given by $E(\pi_s|V_b) = rV_b + (1-r)V_s$. Similarly, $E(\pi_s|V_b - L - m) = q(V_b - L - m) + (1-q)V_s$. When the seller's value is $V_s - L$, $E(\pi_s|V_b) = rV_b + (1-r)(V_s - L)$ and $E(\pi_s|V_b - L - m) = q(V_b - L - m) + (1-q)(V_s - L)$. As before, to have the separation, we need

$$
\begin{aligned}
r &\geq \frac{q(V_b - V_s - L - m)}{V_b - V_s} \\
r &\leq \frac{q(V_b - V_s - m)}{V_b - V_s + L}
\end{aligned}
$$

Again, since $\frac{V_b - V_s - L}{V_b - V_s} < \frac{V_b - V_s}{V_b - V_s + L}$, $\frac{V_b - V_s - L - m}{V_b - V_s} < \frac{V_b - V_s - m}{V_b - V_s + L}$. In the most efficient equilibrium, $q = 1$ and $r = \frac{V_b - V_s - m}{V_b - V_s + L}$. Foremost, we can immediately see that $\frac{dr}{dm} < 0$, i.e., higher liability reduces the equilibrium acquisition probability.

For the seller, as of $t = 1$,

$$
E(\pi_s) = p(e)(V_b - L - m) + (1 - p(e))\left(\frac{V_b - V_s - m}{V_b - V_s + L}V_b + \frac{L+m}{V_b - V_s + L}V_s\right) - \psi(e)
$$

The first order condition yields

$$
\frac{dE(\pi_s)}{de} = p'(e)\left(V_b - m - \frac{(V_b - V_s - m)V_b + LV_s}{V_b - V_s + L}\right) - Lp'(e) - \psi'(e) = 0
$$

Let e'' be the solution. Compared to the first best, $e'' < e^*$ because $p'(e)\left(V_b - m - \frac{(V_b - V_s - m)V_b + LV_s}{V_b - V_s + L}\right) < 0$. When $m > 0$, compared to the case where $m = 0$, we must have $e'' > e'$, since $V_b - \frac{(V_b - V_s)V_b + LV_s}{V_b - V_s + L} > V_b - m - \frac{(V_b - V_s - m)V_b + LV_s}{V_b - V_s + L}$. ■

With the higher liability on the buyer, seller decreases the offer price from $V_b - L$ to $V_b - L - m$, which, in turn, translates to a lower profit to the seller. To induce the liable seller to offer the low acquisition price, i.e., to achieve separation, the buyer now has to reject the high offer more often than before to make the high offer less attractive. The acquisition probability decreases. At the same time, since the seller makes a lower profit in case she is liable, she has a bigger incentive to reduce that contingency. The deterrence incentive goes up. In short, there is a trade-off: higher liability on the buyer worsens the merger inefficiency while improving the deterrence efficiency. Can the court somehow get away from this trade-off and simultaneously achieve both objectives? The following proposition shows that imposing a higher damages only on the surviving seller is better than imposing higher damages on the buyer.

Proposition 3 *When the victim discovers the damage of* L *and sues the surviving company, suppose the court can impose a damages of* $L + m$ *against the seller if the seller has not sold the company, while imposing* L *on the buyer in case of sale. As* m *gets larger, both the acquisition probability and the seller's incentive to take precaution increase.*

Proof. Consider a seller with value V_s. If she offers V_b, her expected profit is given by $E(\pi_s|V_b) = rV_b + (1-r)V_s$. If she offers $V_b - L$, $E(\pi_s|V_b - L) = q(V_b - L) + (1-q)V_s$. When the seller's value is $V_s - L - m$, offering V_b yields $E(\pi_s|V_b) = rV_b + (1-r)(V_s - L - m)$, while offering $V_b - L$ yields $E(\pi_s|V_b - L - m) = q(V_b - L) + (1-q)(V_s - L - m)$. To achieve separation, we need

$$\begin{aligned} r &\geq \frac{q(V_b - V_s - m)}{V_b - V_s} \\ r &\leq \frac{q(V_b - V_s + m)}{V_b - V_s + L + m} \end{aligned}$$

In the most efficient equilibrium, $q = 1$ and $r = \frac{V_b - V_s + m}{V_b - V_s + L + m}$. Note, first, that $\frac{dr}{dm} = \frac{L}{(V_b - V_s + L + m)^2} > 0$. Higher damages increases the equilibrium acquisition probability.

For the seller, as of $t = 1$,

$$E(\pi_s) = p(e)(V_b - L) + (1 - p(e))\left(\frac{V_b - V_s + m}{V_b - V_s + L + m}V_b + \frac{L}{V_b - V_s + L + m}V_s\right) - \psi(e)$$

After some simplification, the first order condition becomes

$$\frac{dE(\pi_s)}{de} = p'(e)\left(V_b - \frac{L(V_b - V_s)}{V_b - V_s + L + m}\right) - Lp'(e) - \psi'(e) = 0$$

Let e''' be the solution. Compared to the first best, $e''' < e^*$ because $p'(e)\left(\frac{L(V_b - V_s)}{V_b - V_s + L + m}\right) < 0$. When $m > 0$, compared to the case where $m = 0$, we must have $e''' > e'$, since $V_b - \frac{(V_b - V_s)V_b + LV_s}{V_b - V_s + L} > V_b - \frac{L(V_b - V_s)}{V_b - V_s + L + m}$. ■

The reason the higher liability on the surviving seller can improve both merger and deterrence efficiencies is that when the seller knows that she will be liable in the future for $L + m$, she becomes more apprehensive about offering V_b to the buyer and facing the possibility of rejection. This makes it easier for the buyer to distinguish between the two types and allows him to reduce the high offer rejection probability, i.e., increase the acquisition probability. On the deterrence side, since the seller now makes a strictly lower profit when she becomes liable for a larger damages, she has a bigger incentive to avoid that liability.

2.3 Buyer Offer Model

Suppose, at $t = 3$, the buyer makes a take-it-or-leave-it offer to the seller. Since the buyer's value can only be either V_b or $V_b - L$, the buyer will only consider offers of V_s or $V_s - L$. Any offer between V_s and $V_s - L$ is strictly dominated by $V_s - L$. Any offer larger than V_s is strictly dominated by V_s, and any offer less than $V_s - L$ is strictly dominated by $V_s - L$. The following proposition shows that there will be three possible equilibria and, as in the seller-offer model, the first best is no longer feasible. The second best will depend on the relative size of the merger gain $(V_b - V_s)$ to the size of the liability (L).

Proposition 4 *Let $\frac{V_b - V_s}{V_b - V_s + L} \equiv \alpha$. When $\alpha < p(e^*) < p(0)$, buyer only makes an offer of $V_s - L$ and the seller chooses the optimal level of precaution ($e = e^*$). When $p(e^*) < p(0) < \alpha$, buyer only makes an offer of V_s and the seller makes no precautionary effort ($e = 0$). Finally, when $p(e^*) < \alpha < p(0)$, buyer makes an offer of $V_s - L$ with probability q and an offer of V_s with probability $1 - q$, while the seller chooses e^* with probability r and 0 with probability $1 - r$, where $r = \frac{p(0)(V_b - V_s + L) - (V_b - V_s)}{(p(0) - p(e^*))(V_b - V_s + L)}$ and $q = \frac{\psi(e^*) - \psi(0)}{L(p(0) - p(e^*))}$.*

Proof. Suppose the buyer offers $V_s - L$ with probability q and V_s with probability $1 - q$, while the seller chooses e^* with probability r and 0 with probability $1 - r$. From the buyer's perspective, if he offers $V_s - L$, since the seller will accept the offer only when $\widetilde{L} = L$ and the buyer's profit,when the seller accepts, is $V_b - V_s$, $E(\pi_b | V_s - L) = (rp(e^*) + (1 - r)p(0))(V_b - V_s)$. Similarly, when the buyer offers V_s, $E(\pi_b | V_s) = (rp(e^*) + (1 - r)p(0))(V_b - V_s - L) + (r(1 - p(e^*)) + (1 - r)(1 - p(0)))(V_b - V_s)$. Since $V_b - V_s - L > 0$, both offers yield strictly positive profits (neither offer is dominated by no offer).

On the other hand, regardless of r, the buyer will strictly prefer offering $V_s - L$ over V_s (V_s is strictly dominated) if $E(\pi_b | V_s - L) > E(\pi_b | V_s)$, which is equivalent to, $rp(e^*) + (1 - r)p(0) > \frac{V_b - V_s}{V_b - V_s + L}$. Since $p(0) > p(e^*)$, this inequality is satisfied when $p(e^*) > \frac{V_b - V_s}{V_b - V_s + L}$. Conversely, if $p(0) < \frac{V_b - V_s}{V_b - V_s + L}$, the buyer strictly prefers to offer V_s to $V_s - L$. Therefore, when $p(e^*) > \frac{V_b - V_s}{V_b - V_s + L}$, buyer would only offer $V_s - L$ ($q = 1$), and the seller will choose e to maximize $E(\pi_s) = p(e)(V_s - L) + (1 - p(e))V_s - \psi(e)$, i.e., set $e = e^*$. Similarly, when $p(0) < \frac{V_b - V_s}{V_b - V_s + L}$, buyer will only offer V_s and the seller will choose $e = 0$.

When $p(e^*) < \frac{V_b - V_s}{V_b - V_s + L} < p(0)$, there does not exist any pure strategy equilibrium. If the seller were to choose e^*, $p(e^*) < \frac{V_b - V_s}{V_b - V_s + L}$ implies that, conditional on $e = e^*$, the buyer would strictly prefer to offer V_s, which, in turn, implies that the seller should set $e = 0$. The case for $e = 0$ is similar. To find the mixed strategy equilibrium, we need $E(\pi_b | V_s - L) = E(\pi_b | V_s)$, or

$$
\begin{aligned}
&(rp(e^*) + (1 - r)p(0))(V_b - V_s) \\
&\quad = (rp(e^*) + (1 - r)p(0))(V_b - V_s - L) + (r(1 - p(e^*)) + (1 - r)(1 - p(0)))(V_b - V_s).
\end{aligned}
$$

Similarly, we need $E(\pi_s|e^*) = E(\pi_s|0)$, or

$$p(e^*)(q(V_s - L) + (1-q)V_s) + (1 - p(e^*))V_s - \psi(e^*)$$
$$= p(0)(q(V_s - L) + (1-q)V_s) + (1 - p(0))V_s - \psi(0).$$

Simplifying the expressions yield

$$r = \frac{p(0)(V_b - V_s + L) - (V_b - V_s)}{(p(0) - p(e^*))(V_b - V_s + L)}$$
$$q = \frac{\psi(e^*) - \psi(0)}{L(p(0) - p(e^*))}.$$

To check that the probabilities are well defined, on r, since $\frac{V_b - V_s}{V_b - V_s + L} < p(0)$ by assumption, $p(0)(V_b - V_s + L) - (V_b - V_s) > 0$. Also, $p(e^*) < \frac{V_b - V_s}{V_b - V_s + L}$ implies that $(p(0) - p(e^*))(V_b - V_s + L) > p(0)(V_b - V_s + L) - (V_b - V_s)$, so that $0 < r < 1$. Also, from $(p(0)L + \psi(0)) < (p(e^*)L + \psi(e^*))$, $L(p(0) - p(e^*)) > \psi(e^*) - \psi(0)$. With $\psi(e^*) - \psi(0) > 0$, we have $0 < q < 1$. ■

The ratio $\frac{V_b - V_s}{V_b - V_s + L}$ $(\equiv \alpha)$ can be re-written as $\frac{1}{1 + L/(V_b - V_s)}$, where $\frac{L}{(V_b - V_s)}$ indicates the relative size of the liability to the gains from the acquisition. When the size of the gain is sufficiently large ($p(e^*) < p(0) < \alpha$), the buyer would not want to risk that gain by making a low offer ($V_s - L$). The buyer always acquires the firm at the high price (V_s), but this provides no incentive to the seller to take any precaution ($e = 0$). Conversely, when the size of the gain is relatively small, $\alpha < p(e^*) < p(0)$, the buyer is more concerned about the potential liability. The buyer makes a lower offer ($V_s - L$) and since the seller makes no profit from either with or without the acquisition, this provides the optimal incentive against the seller. In the intermediate range, the two cases are combined.

Proposition 5 *When the victim discovers the damage of L and sues the surviving company, suppose the court can impose a damages of $L + m$ against the buyer if the seller has sold the company, while imposing L on the seller in case of no sale. Imposition of liability of $L + m$ only on the buyer has no effect on the range of possible equilibria or the seller's incentive. When m is sufficiently large, however, buyer makes no offers in equilibrium.*

Proof. With respect to the acquisition price, since the seller's reservation values have not changed, the buyer still offers $V_s - L$ with probability q and V_s with probability $1 - q$, while the seller chooses e^* with probability r and 0 with probability $1 - r$. Therefore, $E(\pi_b|V_s - L) = (rp(e^*) + (1-r)p(0))(V_b - V_s - m)$, and $E(\pi_b|V_s) = (rp(e^*) + (1-r)p(0))(V_b - V_s - L - m) + (r(1 - p(e^*)) + (1-r)(1 - p(0)))(V_b - V_s)$.

Suppose, for now, that m is sufficiently small so that $V_b - V_s - L - m > 0$. As before, the buyer will only offer $V_s - L$ if $E(\pi_b|V_s - L) > E(\pi_b|V_s)$. After some algebra, the buyer will strictly prefer $V_s - L$ to V_s when $p(e^*) > \frac{V_b - V_s}{V_b - V_s + L}$ and will strictly prefer V_s to $V_s - L$ when $p(0) < \frac{V_b - V_s}{V_b - V_s + L}$. Note that the inequality is independent of r, q, and, most importantly, m. Compared to the previous case, the buyer's preferences remain unchanged. As before, conditional on the buyer's offers, when $p(e^*) > \frac{V_b - V_s}{V_b - V_s + L}$, the seller will set $e = e^*$, and when $p(0) < \frac{V_b - V_s}{V_b - V_s + L}$, the seller will choose $e = 0$. With respect to the mixed strategy equilibrium, when $p(e^*) < \frac{V_b - V_s}{V_b - V_s + L} < p(0)$, the buyer and the seller will mix with the same probabilities of q and r as before. Therefore, the three regions of equilibria are the same as before.

Now, let us examine what will happen to the respective equilibrium as m rises. Suppose, first, $p(e^*) > \frac{V_b - V_s}{V_b - V_s + L}$ and $e = e^*$, so that $E(\pi_b | V_s - L) = p(e^*)(V_b - V_s - m) > E(\pi_b | V_s)$. Since the buyer prefers to offer $V_s - L$ to V_s regardless of m, so long as $m < V_b - V_s$, the buyer will only offer $V_s - L$. When $m > V_b - V_s$, the buyer will make no offers, since $0 > E(\pi_b | V_s - L) > E(\pi_b | V_s)$. Similarly, when $p(0) < \frac{V_b - V_s}{V_b - V_s + L}$ and $e = 0$, since $E(\pi_b | V_s) = p(0)(V_b - V_s - L - m) + (1 - p(0))(V_b - V_s) > E(\pi_b | V_s - L)$, as long as m is smaller than $\frac{V_b - V_s}{p(0)} - L$, the buyer will only make the offer of V_s. When $m > \frac{V_b - V_s}{p(0)} - L$, the buyer makes no offers. With respect to the mixed strategy equilibrium, we know that the buyer is indifferent between V_s and $V_s - L$ regardless of m. Hence, so long as $m < V_b - V_s$, the buyer will mix between the two offers, and when $m > V_b - V_s$, the buyer will make no offers. The seller's strategies are comparable. ■

When the damages is adjusted only against the buyer, so long as there are acquisitions in equilibrium, a change in m has no effect on welfare because it does not affect either the buyer's or the seller's reservation values. Since the adjustment doesn't apply to the seller, the seller's reservation values are unaffected. With respect to the buyer, conditional on e, when the buyer offers $V_s - L$, the buyer acquires the company only when the liability is high and in case of acquisition, the buyer will be liable for additional amount of m. Hence, the buyer's profit is decreased by $p \cdot m$. Similarly, if the buyer offers V_s, while acquisition is consummated with certainty, the buyer knows that he will be liable for additional m with probability p, thus reducing the buyer's profit by $p \cdot m$. In both cases, therefore, conditional on e, the buyer's profit decreases by $p \cdot m$, and the buyer's preferences over one offer over the other remains unchanged.

Next, we consider the case of adjusting the liability only on the surviving seller. That is, if the seller does not accept the buyer's offer and the victim discovers the damage and sues for compensation, the seller must pay $L + m$ to the victim, whereas in the case when the buyer has bought the seller's company, the buyer will only be liable for L. In contrast to the previous case, adjusting the surviving seller's liability has a direct effect on the seller's reservation values, and given our setting of buyer making a take-it-or-leave-it offer, changing the seller's reservation values affects the equilibrium acquisition price and precautionary effort.

Proposition 6 *When the victim discovers the damage and sues the surviving company, suppose the court can impose a damages of $L+m$ on the seller if the seller has not sold, while imposing L on the buyer when the company has been sold. As m gets larger, the acquisition probability decreases and the seller takes more precaution, while as m gets smaller, the acquisition probability rises while the seller takes less precaution.*

Proof (Incomplete). The seller's reservation values are either $V_s - L - m$ or V_s. Suppose the buyer makes an offer of $V_s - L - m$ with probability q and an offer of V_s with probability $1-q$. Similarly, the seller sets $e = e^{**}$ with probability r and $e = 0$ with probability $1-r$. Then, $E(\pi_b | V_s - L - m) = (rp(e^{**}) + (1-r)p(0))(V_b - V_s + m)$, and $E(\pi_b|V_s) = (rp(e^{**}) + (1-r)p(0))(V_b - V_s - L) + (r(1-p(e^{**})) + (1-r)(1-p(0)))(V_b - V_s)$.

Now, the buyer will strictly prefer to offer $V_s - L - m$ to V_s when $p(e^{**}) < \frac{V_b - V_s}{V_b - V_s + L + m}$ and will strictly prefer V_s to $V_s - L - m$ when $p(0) < \frac{V_b - V_s}{V_b - V_s + L + m}$. When $p(e^{**}) > \frac{V_b - V_s}{V_b - V_s + L + m}$, the seller will choose e^{**} to maximizes $E(\pi_s) = p(e)(V_s - L - m) + (1 - p(e))V_s$. Note that $e^{**} > e^*$ and $p(e^{**}) < p(e^*)$. Similarly, when $p(0) < \frac{V_b - V_s}{V_b - V_s + L + m}$, the seller sets $e = 0$. When $p(e^{**}) < \frac{V_b - V_s}{V_b - V_s + L + m} < p(0)$, we get $r = \frac{p(0)(V_b - V_s + L + m) - (V_b - V_s)}{(p(0) - p(e^{**}))(V_b - V_s + L + m)}$ and $q = \frac{\psi(e^{**}) - \psi(0)}{(L+m)(p(0) - p(e^{**}))}$. ■

When the buyer offers $V_s - L - m$, the buyer knows that it will only attract the high liability seller ($\widetilde{L} = L$) and since the extra liability is already taken into account in the merger price, the buyer makes a gain of $V_b - V_s + m$. On the other hand, if the buyer offers V_s, while the offer will attract both types of sellers, the buyer knows that it might be liable for L in the future. This makes the high price offer (V_s) less attractive compared to the case when $m = 0$, and, in equilibrium, the average offer price will decrease. The lower average acquisition price implies that it is more likely that the seller won't sell to the buyer and hence bear the future liability. This provides more incentive to the seller to take more precaution. Hence, the court must make a trade-off between foregone merger gains and sub-optimal precautionary incentive.

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