Damages and Incentives

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Reliance Damages I

Under Reliance Damages:

- The reference point for damages is the reliance decision
- the damages restore the victim of the breach to his position if she did not rely on the promise by the promisor, i.e.,
- $D^{RD}(r, P) = r$.

Under Reliance Damages: The B's profit is

$$\begin{cases} \text{V(r)-P-r} & \text{if S delivers the good;} \\ \text{r-r=0} & \text{if S does NOT deliver but pays damages.} \end{cases}$$

S will deliver as long as

$$\begin{aligned} P - C &\geq -r, i.e., \\ P + r &\geq C, i.e., \\ C &\leq P + r, i.e., \end{aligned}$$

Reliance Damages II

E.g., if contract price $P = 170$. S will deliver as long as

$$C \leq 170 + r, i.e.,$$

S will NOT deliver if

$$C > 170 + r$$

Remark

Whether S will deliver or not depends on Contract price as well as level of r.

To sum up, the breach set $BS^{RD}(r)$ is

$$BS^{RD}(r) = \{C | C > P + r\},$$

i.e., for the given level of reliance the breach set is *not* Pareto efficient; assuming that $V(r) > P + r$.

Reliance Damages III

Moreover, the Buyer chooses r that maximizes

$$F(P+r)[V(r)-P]+(1-F(P+r))r-r,\ i.e.,$$

$$F(P+r)[V(r)-P-r],\ i.e.,$$

r opted by the Buyer, r^{RD}, solves

$$V'(r)-1=-\frac{f(P+r)[V(r)-P-r]}{F(P+r)}. \tag{1}$$

That is, r^{RD} is opted by the Buyer is such that $r^{RD}>r^{ED}>r^{*}$. Why?

Reliance Damages IV

Note that $BS^{RD}(r^{RD}) \supset BS^{*}(r^{RD})$.

Question

What is the relationship between BS^{RD} and BS^{ED}?

Question

What will be the contract price under Reliance Damages?

Restitution Damages I

Under Restitution Damages:

- The reference point is the state of 'No Contract'.
- Damages restore to the victim of the breach whatever he had paid to the promiser
- If payment is made on delivery,

$$D^{RS}(r, P) = D^{RS}(r, P) = 0.$$

The r^{RS} opted by the Buyer, solves

$$\max_{r}\{F(P)V(r) - r\}, i.e.,$$

$$F(P)V'(r) - 1 = 0. \tag{2}$$

$$r^{RS} < r^{*} < r^{ED}.$$

Restitution Damages II

Question

What is the relationship between BS^{RS} and BS^{ED}?

Also note that since r^{ED} solves

$$\max_r \{V(r) - r\}$$

So

$$P < V(r^{RS}) - r^{RS} < V(r^{ED}) - r^{ED} < V(r^{ED}).$$

Therefore,

$$BS^{RS}(r^{RS}) \supset BS^{ED}(r^{ED})$$

.

Question

What will be the contract price under Restitution Damages?

Specific Performance

Under this measure, the breach set

$$BS^{SP} = \emptyset.$$

Therefore, the probability of performance is 1, and the Buyer chooses r that maximizes

$$V(r) - P - r, \; i.e.,$$

the r^{SP} opted by the Buyer, solves

$$V'(r) - 1 = 0. \tag{3}$$

That is, r^{SP} is opted by the Buyer is such that $r^{SP} = r^{ED} > r^*$.

Question

What will be the contract price under Specific Performance?

Damages Compared I

Proposition

Expectation damages are K-H superior to Specific Performance.

Proposition

Expectation damages are K-H superior to Reliance damages.

Proof:

- Take a contract under Reliance damages; Say, $(D(r,P),P) = (r,P)$.
- Suppose under this contract, the equilibrium outcome is $(r^{RD}, BS^{RD}(r^{RD}))$.

Damages Compared II

Clearly

$$BS^{RD}(r^{RD}) = \{C|C > P + r^{RD}\}.$$

First of all notice that for given r, by definition

$$Z(r, BS^*(r)) \geq Z(r, BS(r)).$$

In particular,

$$Z(r^{RD}, BS^*(r^{RD})) \geq Z(r^{RD}, BS^{RD}(r^{RD})).$$

When the breach set is efficient, for given r, the total social surplus

$$Z(r, BS^*(r)) = \int max\{V(r) - r - C, -r\}dF(C).$$

Damages Compared III

Since r^{ED} solves $\max_r\{V(r) - r\}$, therefore, regardless of the value taken by C, for all $r > r^{ED}$,

$$\begin{aligned} V(r^{ED}) - C - r^{ED} &> V(r) - C - r \\ -r^{ED} &= -r. \end{aligned}$$

So, for any given $r > r^{ED}$,

$$max\{V(r^{ED}) - r^{ED} - C, -r^{ED}\} > max\{V(r) - r - C, -r\}.$$

Since $r^{RD} > r^{ED}$, we have

$$max\{V(r^{ED}) - r^{ED} - C, -r^{ED}\} > max\{V(r^{RD}) - r^{RD} - C, -r^{RD}\}.$$

This means,

$$Z(r^{ED}, BS^*(r^{ED})) > Z(r^{RD}, BS^*(r^{RD})).$$

Damages Compared IV

But,

$$\begin{aligned} Z(r^{ED}, BS^{ED}(r^{ED})) &= Z(r^{ED}, BS^{*}(r^{ED})) \\ Z(r^{RD}, BS^{*}(r^{RD})) &\geq Z(r^{RD}.BS^{RD}(r^{RD})). \end{aligned}$$

Therefore,

$$Z(r^{ED}, BS^{ED}(r^{ED})) > Z(r^{RD}, BS^{RD}(r^{RD}))$$

Q.E.D.

Complete Contingent Contract I

Complete Contingent Contract (CCC) explicitly determines

- the BS to be followed by S, i.e., perform iff $C \in \widetilde{BS}$
- r that is to be opted by the Buyer.

Consider a CCC, (BS, r). Let

- $E^B(BS, r)$ be the expected benefit to the Buyer, exclusive of the price.
- $E^S(BS, r)$ be the expected benefit to the Seller, exclusive of the price.
- P the (expected) price fixed under the CCC (BS, r).

Complete Contingent Contract II

Therefore, the expected payoff to the Buyer and the Seller are $E^B(BS, r) - P$ and $E^S(BS, r) + P$, respectively.

Total Social Surplus

$$TSS = B(BS, r) - P + S(BS, r) + P = B(BS, r) + S(BS, r) = Z(BS, r).$$

Proposition

A CCC is Pareto efficient iff it maximizes TSS

Proof: Take a CCC, say (BS, r, P). Suppose it does not maximizes the TSS. This means that

- there are BS' and r' such that $Z(BS, r) < Z(BS', r')$.
- That is, for some $\delta > 0$, $Z(BS', r') - Z(BS, r) = \delta$.

Complete Contingent Contract III

Now, consider the contract (BS', r', P'), where

$$P' = P + E^B(BS', r') - E^B(BS, r) - \frac{\delta}{2}.$$

This means,

$$\begin{aligned} E^B(BS', r') - P' &= E^B(BS, r) - P + \frac{\delta}{2} \\ &> E^B(BS, r) - P, \end{aligned}$$

i.e., the Buyer is strictly better off under (BS', r', P') rather than under (BS, r, P).
Also,

Complete Contingent Contract IV

$$
\begin{aligned}
E^S(BS', r') + P' &= E^S(BS', r') + P + E^B(BS', r') - E^B(BS, r) - \frac{\delta}{2} \\
&= Z(BS', r') + P - E^B(BS, r) - \frac{\delta}{2} \\
&= Z(BS', r') - Z(BS, r) + E^S(BS, r) + P - \frac{\delta}{2} \\
&= E^S(BS, r) + P + \frac{\delta}{2} \\
&> E^S(BS, r) + P
\end{aligned}
$$

i.e., the Seller is strictly better off under (BS', r', P') rather than under (BS, r, P). Q.E.D.

Why a Contract (may) can not be a CCC?

First Best Contract I

Consider the contract $(P, D(r, P)$; where

- $D(r, P) = V(r^*) - P$, and
- $\int_0^{V(r^*)} CdF(C) \leq P \leq V(r^*)$.

S will breach iff $P - C < -(V(r^*) - P)$, i.e., iff

$$C > V(r^*),$$

therefore the breach set is

$$BS(r) = \{C | C > V(r^*)\}, \ i.e., \ BS(r) = BS^*(r^*),$$

and
the performance set

$$\widetilde{BS(r)} = \{C | V(r^*) \leq C\}.$$

First Best Contract II

Given the breach set, the Buyer opts for r that maximizes

$$F(V(r^*))[V(r) - P] + (1 - F(V(r^*))[V(r^*) - P] - r, \; i.e.,$$

the r opted by the Seller, solves

$$F(V(r))V'(r) - 1 = 0. \tag{4}$$

That is, r^* is opted by the Seller.

So, the contract $(P, V(r^*) - P)$ achieves the first best and is Pareto efficient.

Liquidated Damages

Proposition

If contracting is costless and parties have complete freedom to decide on the terms of the contract, they will choose the following contract

$$D(r, P) = V(r^*) - P,$$

where

$$\int_0^{V(r^*)} C dF(C) \leq P \leq V(r^*).$$