Contracts, Damages and Incentives

Ram Singh

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Basic Model I

Contract: Suppose

- There are two individuals; Buyer B and Seller S
- The two sign a contract - S agrees to deliver a product to B
- There is time gap between the date of signing of contract and date of delivery

Let,

- $r =$ the (self-interested) reliance investment made by the Buyer;
- $V =$ the value of the performance to the Buyer; $V = V(r)$, $V'(r) > 0$, $V''(r) < 0$,
- $C =$ the cost of performance to the Seller;
- Assume that C is a random variable drawn from $[0, \infty)$, $0 < \infty$
- $F(C)$ and $f(C)$, respectively, be the distribution and density functions of C.

Basic Model II

The Time-line:

- At $t = 0$, the contract is signed - Contract price, P, is fixed, Remedies for breach is known/specified
- At $t = 1/2$, the B decides how much to invest, i.e., the level of r
- At $t = 1$, uncertainty about C is resolved and
  - S decides whether to deliver (perform) or not (breach)
  - If breach, the court awards damages for breach
  - Ex-post payoffs are realized

The First Best I

References: (Miceli 1997; and Shavell 1980, BJE)

At $t = 1$,

- investment r is a sunk cost.
- for any given realization of C, if S delivers the net social gains would be $V(r) - C - r$;
- if he does Not, the net social gains will be $-r$
- According to the K-H efficiency, at $t = 1$ S should deliver iff $V(r) - C - r \geq -r$; otherwise he should breach

The First Best II

However,

$$C \leq V(r) \quad \Leftrightarrow \quad V(r) - C - r \geq -r$$
$$C > V(r) \quad \Leftrightarrow \quad -r > V(r) - C - r.$$

Therefore, for given r, according to the K-H efficiency, S should deliver iff

$$C \leq V(r)$$

That is, for given r,

- The K-H efficient breach set $BS^*(r) = \{C|C > V(r)\}$
- The K-H efficient performance set $\tilde{BS}^*(r) = \{C|V(r) \leq C\}$.

The First Best III

Note: At $t = 1$, if S follows K-H efficient breach set, then S ensures that the ex-post surplus is $= \max \left\{ \begin{array}{c} V(r) - r - C \\ -r \end{array} \right\}$

Remark

For given r, $BS^*(r)$ is the K-H efficient as well as Pareto efficient.

Suppose, at $t = 1$, breach decision will be K-H efficient, i.e., $BS(r) = BS^*(r)$

From perspective of date $t = 1/2$, total expected social surplus, $Z(r, BS^*(r))$,

$$Z(r, BS^*(r)) = \int_0^\infty \max \left\{ \begin{array}{c} V(r) - r - C \\ -r \end{array} \right\} dF(C)$$

The First Best IV

$$Z(r, BS^*(r)) = F(V(r))V(r) - \int_0^{V(r)} CdF(C) - r$$

The optimal r, denoted by r^*, solves

$$\max_r \{F(V(r))V(r) - \int_0^{V(r)} CdF(C) - r\} \tag{1}$$

Using Leibniz Rule, the foc is given by (2)

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

If performance was guaranteed, the optimum r will be higher, and will solve

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

So, r^* accounts for the possibility of 'efficient' breach.

Legal Contracts I

A Legal Contract: Requires specification of

- 'Promise' (to do something) - by a 'Promisor' to a 'Promisee'
- Price (consideration) to be paid by the Promisee to the Promisor
- Remedies to the victim of the breach of the contract.

Definition

A Legal Contract is a tuple $(P, D(r, P))$; where

- P is the price (to be) paid by the B to the S
- D is the Damages (compensatory payments) paid by the S to the B, if the S breaches the contract

Legal Contracts II

Remark

A contract

- may provide for remedies against the breach by the either party.
- may or may not specify r for the Buyer; in the former case a contract is a tuple $(P, D(r, P), r)$

In general,

- legal remedies vary across legal jurisdictions; and
- within a jurisdiction, legal remedies can vary across contexts; i.e., different contracts are protect by different remedies.

Expectation Damages I

Under Expectation Damages:

- The reference point for damages is the performance of the contract, i.e.,
- the damages restore the victim of the breach to his position in the event of performance, i.e.,
- $D^{ED}(r, P) = V(r) - P$.

Therefore, the S will breach only if

$$P - C < -[V(r) - P], i.e.,$$

$$C > V(r), i.e.,$$

the breach set is

$$BS^{ED}(r) = \{C | C > V(r)\},$$

Expectation Damages II

i.e., for the given reliance, the breach set is Pareto efficient. The Buyer chooses r that maximizes

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

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

the r opted by the Buyer, r_{ED}, solves

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

Note that r^{ED} is opted by the Buyer is such that $r^{ED} > r^*$, and $BS^{ED}(r) \subset BS^*(r^*)$.

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

$$V'(r)-1=-\frac{f(P+r)[V(r)-P-r]}{F(P+r)}. \quad (5)$$

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}?