Law And Economics

Contract Law II

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Efficient Breach

When is efficient to breach an enforceable contract?

- Unforeseen changes can render the contract inefficient.
- Ideal contract law should generate incentives for parties to breach contracts only when it is efficient to do so.

Reasons for Efficient Breach

- Reasons for efficient breach:
  - Realized high cost of promise keeping (Hold-up model from before)
  - Realized low value.
  - Third party that values more.
  - Third party that can produce cheaper.

Efficient Breach Model

The Efficient Breach Model

- In this model, we focus on uncertainty about costs.
  - Value for Buyer V (deterministic).
  - Cost for Seller C (random variable).

- Timing:
  - Parties contract: decide a price P.
  - **Reliance**: Buyer makes investment R that is not *salvageable*.
  - C is realized and publicly observable.
  - Seller decides if goes ahead with production $(a = 1)$ or not $(a = 0)$.

Goal

- Let ψ be the damages that the seller must pay in the event of breach.

$$\begin{aligned} \text{Seller:} \quad & a(P - C) - (1 - a)\psi \\ \text{Buyer:} \quad & a(V - P) + (1 - a)\psi - R \\ \text{Society:} \quad & a(V - C) - R \end{aligned}$$

- **Goal**: determine the value of ψ that induces the seller to breach efficiently.
  - Only efficient to breach when $C > V$.
- What can ψ depend on? C, P.

Seller's Decision

- The seller will choose to breach ($a = 0$) when:

$$P - C < -\psi \qquad \Rightarrow \qquad \underbrace{C}_{\text{cost of perform}} > \underbrace{P + \psi}_{\text{cost of breach}}$$

Trivial Implementation

- The seller is *“killed”* if she breaches inefficiently.

$$\psi = \begin{cases} \infty & C < V \\ 0 & C \geq V. \end{cases}$$

- Efficiency is achieved!
- Issue: Depends on C.
    - Might be unobservable.
    - Seller might inflate costs.

Damages in Practice

- **Expectation damages**: ψ leaves the promisee as well of as if the contract had been performed.

$$\underbrace{V - P - R}_{\text{contract performed}} = \underbrace{\psi - R}_{\text{breach}} \quad \Rightarrow \quad \psi^{ED} = V - P$$

- **Reliance damages**: ψ that leaves the promisee as well of as if contract was never made.

$$\underbrace{\psi - R}_{breach} = \underbrace{0}_{nocontract} \quad \Rightarrow \quad \psi^{R} = R$$

No Damages

$\psi^{ND} = 0$.

- Seller chooses breach ($a = 0$) iff

$$C > P + \psi^{ND} \quad \Rightarrow \quad C > P$$

- Efficiency is, in general, not achieved.
  - $P \leq V$. Why?
  - Whenever breach is efficient, the seller will breach.
  - Seller does breach inefficiently often.

Expectation Damages

$\psi^{ED} = V - P.$

- Seller chooses breach ($a = 0$) iff

$$C > P + \psi^{ED} \qquad \Rightarrow \qquad C > P + V - P = V$$

- Efficiency is achieved!
- Rule does not depend on C.

Reliance Damages

$\psi^R = R$.

- Seller chooses breach ($a = 0$) iff

$$C > P + \psi^R \qquad \Rightarrow \qquad C > P + R$$

- Efficiency is, in general, not achieved.
- $P + R \leq V$. Why?
- Whenever breach is efficient, the seller will breach.
- The Seller does breach inefficiently often (although less than with no damages).
- Rule does not depend on C or V.

Incentives for Efficient Reliance

- Value V depends on the *level* of Reliance.
  - Value for Buyer $V(R)$ (deterministic concave function).
  - Cost for Seller C (random variable cdf F).

- Timing:
  - Parties contract: decide a price P.
  - **Reliance**: Buyer makes investment R that is not *salvageable*.
  - C is realized and publicly observable.
  - Seller decides if goes ahead with production $(a = 1)$ or not $(a = 0)$.

Buyer's Decision

- If performance was certain:

$$\max_{R} \quad V(R) - P - R$$

- $V'(R) = 1$.
- When perfomance is uncertain (Probability p), the Buyer's investment is lower.

$$\max_{\hat{R}} \quad p[V(R) - P] - R$$

- $V'(R) = 1/p$.

Efficient Reliance

- Efficient decisions:

$$a^* = 1_{\{C \leq V\}} \qquad R^* = \frac{1}{F(V)}$$

- Would Expectation Damages achieve efficiency in this case?

(Unlimited) Expectation Damages

$\psi^{ED} = V(R) - P$

- Assume efficient breach, so $p = F(V)$. Buyer's decision:

$$\max_R \quad F(V)[V(R) - P] + (1 - F(V))[\underbrace{\psi^{ED}}_{V(R)-P}] - R$$

- Solution: $\hat{R}$.

- There is over-investment in reliance.

Limited Expectation Damages

$$\psi^{LED} = V(R^*) - P$$

- Again, we assume efficient breach, so $p = F(V)$. Buyer's decision:

$$\max_R \quad F(V)[V(R) - P] + (1 - F(V))[\underbrace{\psi^{LED}}_{V(R^*)-P}] - R$$

- It achieves efficiency!
  - It does not depend on R.
  - It does depend on R^*, so implementation requires knowing something about distribution of costs $F(V)$.

Hard information disclosure

Hard Information Model

- Model
  - Players: 1 seller and multiple potential buyers.
  - Quality of the good $\theta \in \{0, 1, 2, ..., 10\}$
  - Uniform distribution. $E[\theta] = 5$
  - Seller knows the quality of the good.
- Timing
  - Seller discloses information about the good.
  - Buyers observe disclosure and simoultanoeuly offer a price (Bertrand competition). Let p be the highest one.
  - Final payoffs are:

$$\begin{aligned} \text{Buyer :} \quad & \theta - p \\ \text{Seller :} \quad & p \end{aligned}$$

Full Disclosure Theorem

- Disclosure technology: Report $r \in \{\emptyset, \theta\}$
  - This is 'hard information'. If $r = 4$ then the buyers know that $\theta = 4$.
  - With $r = \emptyset$ not so clear.
- Equilibrium price: $p(r) = E[\theta|r]$

$$p(r) = r \qquad \text{for } r \neq \emptyset.$$

- What about $p(\emptyset)$?

Full Disclosure Theorem

- Suppose that $p(\emptyset) > 0$. Then
  - All $\theta > p(\emptyset)$ disclose.
  - All $\theta < p(\emptyset)$ do not disclose.
- But then,
$$E[\theta|\emptyset] < p(\emptyset)$$
- It cannot be an equilibrium. It must be that $p(\emptyset) = 0$.

Intuition

- Start from $\theta = 10$. He prefers to disclose (since $E[\theta|r = \emptyset] \leq 10$.
- So if a seller does not disclose, his quality must be at most 9.
- Then $E[\theta|r = \emptyset] \leq 9$.
- Consider $\theta = 9$. He prefers to disclose.
- and so on...
-
    - This is known as *unraveling*.
    - There is full disclosure of the private information.
    - ($\theta = 0$ is indifferent between revealing or not, but he is identified independently of that.)
    - Then there is no need for disclosure laws!
    - Two variants:
        - Imperfectly informed sellers.
        - Disclosure costs.

Imperfectly Informed Sellers

- Two changes:
  - $\theta \sim U_{[0,10]}$
  - With probability γ, the sellers are uninformed.
    - This is independent of product quality.
    - Uninformed sellers can only send the message $\emptyset$.

Imperfectly Informed Sellers

- Let $\bar{\theta}$ be the highest type that does not disclose information.
- $E[\theta|r=\emptyset] = \gamma \cdot 5 + (1-\gamma)\frac{\bar{\theta}}{2}$
- In equilibrium, it has to be that $p(\emptyset) = E[\theta|r=\emptyset] = \bar{\theta}$.
- Solving,

$$\bar{\theta} = \frac{10\gamma}{1+\gamma}$$

Effect of Mandatory Disclosure

- **Buyers**: unaffected (in expectation).
- **Sellers**:
  - Uninformed types are better off.
  - Informed types above $\bar{\theta}$ are unaffected.
  - Informed types below $\bar{\theta}$ are worse off.
  - Unaffected in expectation!

- Reason: the object is always sold, and this is always efficient.

Model with Inefficiencies

- **Assumption**: Seller values the object 2 independently of the type.
- Efficient to sell iff $\theta > 2$ and keep otherwise.
- Two cases:
  - $\gamma \leq 1/4$:
  $$\frac{10\gamma}{1+\gamma} \leq 2 \qquad \Rightarrow \qquad \text{Voluntary disclosure is efficient.}$$
  - $\gamma > 1/4$:
  $$\frac{10\gamma}{1+\gamma} > 2 \qquad \Rightarrow \qquad \text{Voluntary disclosure is inefficient.}$$
- Mandatory disclosure leads to a better allocation when γ is high enough.

Cost of Information

- In order to be informed, the seller needs to pay a cost $c > 0$.

- Efficient to acquire information when:

$$5 < \frac{1}{5} \cdot 2 + \frac{4}{5} \cdot 6 - c$$

- $c < \frac{1}{5}$.

Mandatory Disclosure

- When seller is informed he has to disclose. $p(\theta) = \theta$.
- When seller is uninformed, $p(\emptyset) = 5$.
- The private value of information is 0.

Voluntary Disclosure: $c < 1/5$

Consider $c < 1/5$:

- Is everyone acquiring information an equilibrium?
- If everyone acquires information, we are in the case with $\gamma = 0$. Everyone discloses.
- $p(\emptyset) \leq 2$. So, disclose and sell iff $\theta \geq 2$.
- Private value of information:

$$\frac{1}{5} \cdot 2 + \frac{4}{5} \cdot 6 - p(\emptyset) > \frac{1}{5} \cdot 2 + \frac{4}{5} \cdot 6 - 5 > c$$

- Thus, it is an equilibrium.
- Is it unique?

Voluntary Disclosure: $c > 1/5$

Consider $c > 1/5$:

- Is no-one acquiring information an equilibrium?
- If no-one acquires information, we are in the case with $\gamma = 1$.
- $p(\emptyset) = 5$.
- Private value of information:

$$\frac{1}{2} \cdot 5 + \frac{1}{2} \cdot 7.5 - p(\emptyset) = \frac{1}{5} \cdot 2 + \frac{4}{5} \cdot 6 - 5 = 1.25$$

- Thus, it is not an equilibrium for $c \in (1/5, 5/4)$

Conclusion

- When information is acquired casually, mandatory disclosure achieves a more efficient outcome when the probability of uninformed is high enough.

- When information is deliberately acquired and
    - it is efficient that information is acquired, voluntary disclosure achieves efficiency.
    - it is efficient that information is not acquired, mandatory disclosure achieves efficiency.