Litigation: Market Value Vs Awards

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Model: Features

We

- allow litigation efforts to be endogenous choices.
- allow for informational asymmetry between litigant.

Our results apply to any bargaining situation where:
The disagreement payoffs are

- stochastic.
- interdependent - the higher are payoffs for one party, the lower will be the payoffs of the other.
- endogenously determined by each party's effort.
- asymmetric information.

Examples

Consider dispute/bargaining between

- Govt (G) and Land owners (L) over compensation for land acquired by G
- Injurer and Victim on an accident. Negotiating over
    - compensation for the harm suffered by the victim,
    - or the income forgone due to injury.
- Tax authority and Tax-payee. Negotiating over
    - the amount of undeclared income
    - or tax rate applicable to the declared income.

Model: Basics I

Suppose,

- The law entitles O to compensation equal to r. That is,
- Compensation equal to market value at the time of acquisition - not when court makes its decision.
- Fixed cost of litigation efforts is x_0 and y_0.
- The cost of effort function is given by $\psi(.)$. Assume $\psi'(.) > 0$ and $\psi''(.) > 0$. Let,

$$\psi(x) = \frac{x^2}{2} \text{ and } \psi(y) = \frac{y^2}{2}$$

- At $t = 1$, uncertainty about the court awards. Why?
- So, r^c is a random variable with support $[\underline{r}^c(r), \overline{r}^c(r)]$

Model: Basics II

Let,

- The expected court award be
$$E(r^c|r,x,y).$$
- Plausibly $\frac{\partial E(r^c|r,x,y)}{\partial x} > 0$ and $\frac{\partial E(r^c|r,x,y)}{\partial y} < 0$.
- Marginal gains from litigation effort decrease with effort levels, i.e., $\frac{\partial^2 E(r^c|r,x,y)}{\partial^2 x} < 0$ and $\frac{\partial^2 E(r^c|r,x,y)}{\partial^2 y} > 0$.

Question

Can we assume that $\frac{\partial E(r^c|r,x,y)}{\partial r} > 0$?

Model: Basics III

Note

$$E(r^c|r,x,y) = \int_{\underline{r}^c(r)}^{\overline{r}^c(r)} r^c f(r^c|r,x,y)\, dr^c$$

where

- $f(r^c|r,x,y)$ is the conditional density function.
- $F(r^c|r,x,y)$ is the conditional distribution function.
- As yet, we have imposed no restriction relative magnitude of $E_x(.)$ Versus $E_Y(.)$

Equilibrium I

Suppose,

- during litigation each party is represented by a lawyer
- λ_O is the incentive power of the contract/agreement b/w the O and his lawyer
- λ_G is the incentive power of the contract/agreement b/w the O and his lawyer

Given y and r, the lawyer of O will solve:

$$\max_x \left\{\lambda_O[E(r^c|r,x,y) - x_0] - \psi(x)\right\}, i.e.,$$

For given x, the lawyer of G solves:

$$\min_y \ \left\{\lambda_G \left[E(r^c \mid r,x,y) + y_0\right] + \psi(y)\right\}$$

Equilibrium II

Clearly, $\lambda_O > \lambda_G$. Suppose,

- λ_O is normalized to 1.
- $$\lambda = \frac{\lambda_G}{\lambda_O} = \lambda_G < 1, i.e.,$$

  λ denoted the relative incentive for the lawyer of G.

So, given y and r, the O will solve:

$$\max_x \{E(r^c|r,x,y) - \psi(x) - x_0\}, i.e.,$$

$$E_x(r^c|r,x,y) - \psi'(x) = 0.$$

Equilibrium III

For given x, G solves:

$$\min_{y} \left\{\lambda \left[E(r^c \mid r, x, y) + y_0\right] + \psi(y)\right\}, i.e.,$$

$$-\lambda \frac{\partial E(r^c \mid r, x, y)}{\partial y} - \psi'(y) = 0;$$

Suppose, the above FOCs give the solution to be:

$$(x^*(r, \lambda), y^*(r, \lambda))$$

The Multiplier and Equilibrium I

Generally,

- Compensation is market value Plus a solatium, i.e.,
- Compensation is M Times r, where $M \geq 1$
- Under LAA 1894, $M = 1.3$ - market value plus 30% solatium
- Under LARR 2013 $M \geq 2$

So, given y and r, the O will solve:

$$\max_{x} \left\{ ME(r^c | r, x, y) - \psi(x) - x_0 \right\}, i.e., \tag{1.1}$$

$$ME_x(r^c | r, x, y) - \psi'(x) = 0. \tag{1.2}$$

For given x, G solves:

$$\min_{y} \ \{\lambda \left[ME(r^c \mid r, x, y) + y_0 \right] + \psi(y)\}, i.e., \tag{1.3}$$

The Multiplier and Equilibrium II

$$-\lambda M \frac{\partial E(r^c \mid r, x, y)}{\partial y} - \psi'(y) = 0; \tag{1.4}$$

where

Let the solution be:

$$(x^*(r, M, \lambda), y^*(r, M, \lambda))$$

Expected Court Awards

For symmetry and simplicity, let

$$\frac{\partial^2 E(r^c \mid x, y)}{\partial y \partial x} = 0.$$

$$E(r^c \mid r, x, y) = \phi(r)(ax^{\frac{1}{k}} - by^{\frac{1}{j}}),$$

where $j, k > 1$. Note:

- $k = j$ and $a = b$: lawyers of O and G are equally capable.
- $k = j$ and $a > b$: lawyer of O is more capable than that of G.
- $k = j$ and $a < b$: lawyer of G is more capable than that of O.
- $a = b$ and $j > k$: lawyer of O is more capable than that of G.
- $a = b$ and $j < k$: lawyer of G is more capable than that of O.

Market Value Vs Awards I

Simple Case: Suppose

- $E(r^c \mid r, x, y) = \phi(r)E(r \mid x, y)$, where $\phi'(r) > 0$.
- $\lambda = 0$

$\lambda = 0$ means

$$y^*(r, 0, x^*) = \underline{y}, \tag{1.5}$$

But $x^*(r, y^*)$ will satisfy

$$M\phi(r)\frac{\partial E(r \mid \underline{y}, x^*)}{\partial x} = x^*, \tag{1.6}$$

From (1.6), it can be seen that

$$\frac{dx^*}{dr} = \frac{M\phi'(r)E_x}{1 - M\phi(r)E_{xx}} > 0$$

That is, the following will hold:

Market Value Vs Awards II

Lemma

(i) $\frac{dy^*(M,0,x^*)}{dr} = 0$, (ii) $\frac{dx^*(M,y^*)}{dr} > 0$ *and* (iii) $\frac{dE(r|x^*,y^*)}{dr} > 0$.

Note that

$$\begin{aligned} \frac{dE(r^c \mid r, x^*(r), y^*(r))}{dr} &= \frac{\partial E(r^c \mid r, x^*, y^*)}{\partial r} + \frac{\partial E(r^c \mid r, x^*, y^*)}{\partial x^*}\frac{dx^*(r)}{dr} \\ &> \phi'(r)E(r^c \mid r, x^*, y^*). \end{aligned}$$

That is, the total effect of increase in r on $E(r \mid r^{m'}, x^*(r^{m'}), y^*(r^{m'}))$ is greater than its direct effect.

Consider $E(r \mid r, x, y)) = rE(x, y)$.

$$\frac{E(r \mid r, x^*(r), y^*(r))}{r} = \frac{r}{r}E(x^*(r), y^*(r))$$

Now,

Market Value Vs Awards III

$$\frac{d\frac{E(r|r,x^*(r),y^*(r))}{r}}{dr} = \frac{dE(x^*(r),y^*(r))}{dr} > 0$$

Moreover, for the owner, the optimum value function is

$$V^* = M\phi(r)E(r \mid y^*(r,0,x^*),x^*(r,y^*)) - \frac{{x^*}^2(r,y^*)}{2} - x_0. \qquad (1.7)$$

So, $\frac{dV^*}{dr} = \phi'(r)E(r \mid y^*(r,0,x^*),x^*(r,y^*)) > 0$. That is,

Proposition

$\frac{dV^*}{dr} > 0$.