Western University

Law and Economics

Lecture 4

Example - property

- A corn **farmer** and a cattle **rancher** live beside one another. In isolation, each business would have $200k (thousand) in profits.
- But if nothing is done, the cattle will walk on the **farmer**'s land and cause $100k worth of damage to her corn.
- The **farmer** could prevent the damage by building a fence around her field at a cost of $50k.
- The **rancher** could prevent the damage by building a fence around his land at a cost of $75k.

Review of Farmer vs. Rancher example

Model

Let x denote whether there is a fence around the farm (if so, x = 1; if not x = 0). Similarly, let y denote the existence of a fence around the ranch.

Let t denote transfer of money from the rancher to the farmer.

- $U^F(x,y) = \pi^F(x,y) + t$: farmer's ulility
- $U^R(x,y) = \pi^R(x,y) - t$: rancher's utility
- Social Welfare = $U^F+U^R = \pi^F+ \pi^R$.

Game representation

Assume the Rancher's right.

		Rancher	
		No Fence	*Fence*
Farmer	*No Fence*	100, 200	200, 125
	Fence	150, 200	150, 125

Non-cooperative game

- A set of players
  - N = {1, 2, ..,n}
- Strategies available for each player
  - S_i for each i in N.
- Payoff for each player as a function of joint strategies
  - $U_i(s_1,s_2, .., s_n)$

Dominant strategy

- A strategy is dominant if, regardless of what any other players do, the strategy earns a player a larger payoff than any other.
- x^d is a dominant strategy for player 1, if $U^1(x^d,y) \geq U^1(x, y)$ for all x and for all y.

Nash Equilibrium

- A Nash equilibrium is a set of strategies, one for each player, such that no player has incentive to unilaterally change her action.

(x*,y*) is a Nash equilibrium
if $U^F(x^*,y^*) \geq U^F(x, y^*)$ for all x and
$U^R(x^*,y^*) \geq U^R(x^*,y)$ for all y.

Analysis

1. Efficient outcome
   (maximize joint payoffs or social welfare)
   Fence around the farm and no fence around the ranch
2. Equilibrium outcome under alternative rules of property
   1) Rancher's right
   2) Farmer's right

How are property rights protected?

- **Damages**
  - A sum of money that compensates the plaintiff for the wrongs inflicted on her by the defendant.
- **Injunction**
  - An order by the court directing the defendant to perform an act or to refrain from acting in a particular manner

Damages and Injunctions

- Compensatory money damages:
  - legal remedy (backward-looking)
  - Liability rule
- Injunction: to enjoin the defendant to do or refrain from acting in a particular manner.
  - equitable remedy (forward-looking)
  - property rule

Laundry and Electric Co.

- The *E* Electric company emits smoke, which dirties the wash at the *L* Laundry. No one else is affected because *E* and *L* are near to each other and far from anyone else.
- *E* can abate this external cost by installing scrubbers on its stack, and *L* can reduce the damage by installing filters on its ventilation system. The installation of scrubbers by *E* or filters by *L* completely eliminates pollution.

Profits before legal action

		Laundry
	No Filter	*Filter*
No Scrubbers	1000, 100	1000, 200
Electric Co.		
Scrubbers	500, 300	500, 200

Rules of law

1) Polluter's right
2) Pollutee's right to Damages
3) Pollutee's right to Injuction

Efficient Remedies

Calabresi and Melamed (1972)

- Where there are obstacles to cooperation, the more efficient remedy is the award of compensatory money damages
- Where there are few obstacles to cooperation, the more efficient remedy is the award of an injunction.