

# Law And Economics

## Property Law

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# Property Rights

- Delineate boundaries: what individuals can (and cannot) do with the *assets under their control*.
  - Tangible assets.
  - Intangible assets.
- Some questions:
  - How are PR defined?
  - What is their impact on economic incentives?
  - How are PR originally assigned?
  - How are PR protected?

# How are Property Rights Defined?

- Bundle of rights:
  - Right to *use, consume*.
  - Right to *develop, transform*.
  - Right to *exclude, destroy*.
  - Right to *lease, loan*.
  - Right to *dispose, sell, donate*.
- Rights are enforced by Law.
  - But sometimes there is conflict: externalities.

# Property Rights and Incentives

- Property rights improve efficiency:
  - Internalize externalities.
  - Incentives for production.
- Even if the ‘final’ allocation is not affected by the initial allocation of property rights, initial allocation affects wealth distribution.

# How are Property Rights Originally Assigned?

- “This morning in a remote meadow in Wyoming, a mule was born. To whom does that mule belong?”
  - The owner of the mule’s mother.
  - The lumber company that has leased the land.
  - The federal government because property is a national forest.

# How are Property Rights Originally Assigned?

- Gold mines in California:
  - When would was first discovered (1848) enforcement was private.
  - 1872: General Mining Law:
    - Individuals allowed to explore federal lands in search of minerals.
    - Might 'stake a claim' (fees to maintain the claim)
    - If perform development of \$500 or more individual might file for a patent to obtain title to surface and mineral rights of the land.
    - Fixed cost of \$ 5 per acre (lode) or \$ 2.5 (placer).

# How are Property Rights Originally Assigned?

- Homestead Laws:
  - ‘First-come, first served’ allocation.
  - Conditions: Promise to reside for 5 years.
  - In all, 10% of US territory was given away in this way to 1.6 million people.
- Are these ways to allocate assets efficient?
- Other potentially interesting cases?
  - Radio Frequency Spectrum.
  - Space.

# First Possession

- ‘Finder’s keepers’
- Inefficient:
  - Tragedy of the commons.
  - Race effect (more on this when we talk about intellectual property rights.)
- Oil example:
  - Rule applied to the stock.
  - Rule applied to the flow (capture).



## How are PR enforced: the Origins of the State

- In most economic models, property rights are assumed.
- *Essential* function of the state:
  - monopoly of violence.
  - Taxation.
  - Protection of the property rights of those taxed.
- ‘Stationary bandits’: not different than the role of the Mafia.
- This was central for modern economic growth.
- Empirical challenge: statistics where first created by states.

# How are States Formed?

- Miners example:
  - Prior to government, private enforcement.
  - Associations.
    - Economies of scale.
    - Free riding problem
  - Turf wars.
  - Eventual transition to monopoly.
    - Efficient (scale and destructive competition).
    - Risk of abuse.

## How are States Formed?

de la Sierra, R. S. (2020). On the origins of the state: Stationary bandits and taxation in eastern congo.

*Journal of Political Economy*, 128

- Eastern Congo:
  - ‘failed state’.
  - Armed groups proliferated in the East.
  - Robberies and control of individual villages.
- Impact of large sudden increases in price of certain minerals.
  - Introduction of Playstation II, increased demand for coltan.
  - If monopolies of violence are more likely to emerge in locations with higher potential revenues from taxation, one would expect positive shocks to cause a rise in use of organized crime in villages with higher concentration of minerals.

# Price of Coltan

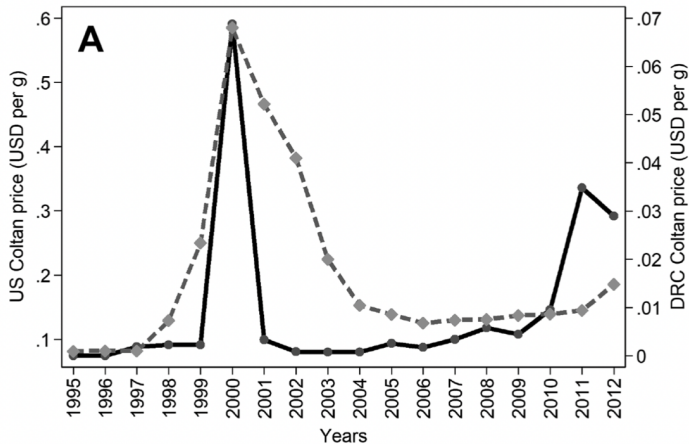
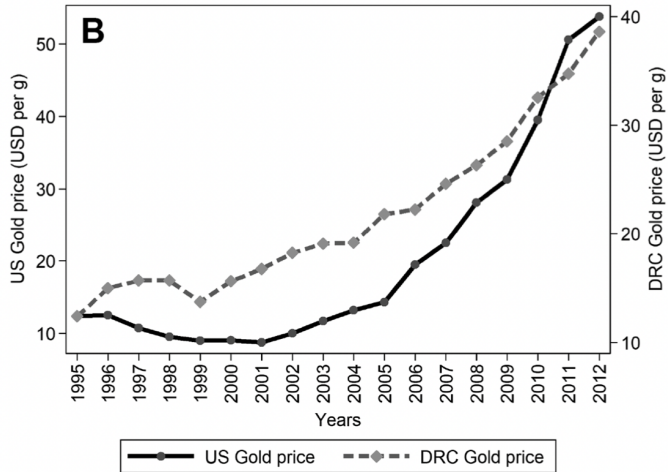


Figure 1: Price of Coltan.

# Price of Gold



**Figure 2:** Price of Gold.

# Findings

- Paper finds that increase in the price of minerals induce the formation of growth-promoting monopolies of violence, but only if these minerals are '*easy to tax*'.
  - Coltan: it is bulky, so it cannot be easily hidden.
  - Gold: Easy to conceal.
- Once established, monopolies started to
  - collect taxes,
  - provide security,
  - administer justice.
- Higher economic activity.

# Findings

VARIABLES	MUNICIPALITY ATTACKED (1)	MINE				
		Customs Tax (2)	Entry Fees (3)	Stationary Bandit (4)	Security Service (5)	Extensive-Margin Index (6)
Coltan <sub>j</sub> × $p_{ct}$	.15*** (.03)	.06** (.02)	.01 (.02)	.07*** (.03)	.06** (.02)	.16*** (.06)
Gold <sub>j</sub> × $p_{gt}$	-.02 (.03)	-.04 (.02)	.04* (.03)	.05 (.04)	.05 (.04)	.10 (.07)
Observations	4,158	4,046	4,052	3,991	4,032	3,903
$R^2$	.39	.59	.69	.60	.62	.65

**Figure 3:** Effects of Price on Mines

# Property Rights as a Solution to the Externality Problem

**Coase Theorem revisited:** *When property rights are well-defined and transaction costs are low, the allocation of resources will be efficient regardless of the initial assignment of property rights.*

- This says that: under these circumstances, final allocation is efficient for any initial allocation of property rights.
- This does not say: the final allocation is efficient independently of whether property rights are assigned or not.



## Hawk and Dove Game with Asymmetric Values

- One way to think about unassigned property rights: Hawk and Dove Game.

	H	D
H	$\frac{1}{2}V_1 - K, \frac{1}{2}V_2 - K$	$V_1, 0$
D	$0, V_2$	$\frac{1}{2}V_1, \frac{1}{2}V_2$

- Three cases:
  - $2K < \min\{V_1, V_2\}$
  - $2K \in (\min\{V_1, V_2\}, \max\{V_1, V_2\})$
  - $2K > \max\{V_1, V_2\}$

# Property Rights and Liability Rules

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# Bargaining

- Suppose that there is a cake to split and we have the same preferences. If we can't agree the cake goes bad.
  - Rubinstein: game-theoretical approach. Alternating offers.
  - Nash: Axiomatic approach. What would be a reasonable outcome?
- **Bargaining Problem:** pair  $(U, d)$  with  $U \subseteq R^2$  and  $d \in U$ .
- A **Bargaining Solution** is a map  $f$  from the set of bargaining problems to  $U$ .

- Nash Axioms:
  - **Pareto Efficiency:**  $f(U, d)$  in the Pareto frontier. (there is no  $u \in U$  such that  $u > f(U, d)$ ).
  - **Symmetry:**  $U$  symmetric and  $d_1 = d_2$ , then  $f_1(U, d) = f_2(U, d)$ .
  - **Invariance to Linear Transformations.** (This reflects the fact that linear transformation of utility maintains the same preferences.) Let  $\alpha_1, \alpha_2 > 0$  and  $\beta_1, \beta_2$ ,  $d'_i = \alpha_i d_i + \beta_i$ ,  $U' = \{(\alpha_1 u_1 + \beta_1, \alpha_2 u_2 + \beta_2) : u \in U\}$

$$f_i(U', d') = \alpha_i f_i(U, d) + \beta_i$$

- **Independence of Irrelevant Alternatives.** Let  $U' \subseteq U$ . If  $f(U, d) \in U'$  then  $f(U', d) = f(U, d)$ .

Let the *Nash solution*  $f^*(U, d)$  be the solution to

$$\max_{u \in U \cap D(d)} (u_1 - d_1) \cdot (u_2 - d_2)$$

Where  $D(d) := \{d' : d' \geq d\}$ .

## Proposition

The Nash Bargaining solution  $f^*$  is the unique bargaining solution that satisfies the four axioms.

# Property Rules and Liability Rules

- Difference lies in consent: permission or forgiveness.
  - Property Rights require ex ante bargaining.
  - Liability involves ex post compensation.
- Deterministic case:
  - ‘Producer’ can pay \$100 to prevent causing a damage of \$120 to the ‘Recipient’.
  - Farmer and Rancher with bridge.

## Numerical Example

- Two enforcement rules and two assignments: four cases.

Enforcement / Assignment	Producer	Recipient
Property Rule	I	II
Liability Rule	III	IV

## Property Rule Cases

- **Case I:** Rancher's property rights are protected.
  - Rancher has no incentives to destroy the bridge.
  - Farmer has incentives to buy the right from the producer.
  - Nash solution: Recipient pays 110 for the right.
  - Allocation is efficient.
- **Case II:** Producer will not be able to buy the right.
  - Will destroy the bridge.



## Liability Cases

- **Case III:** Rancher's right are protected by Liability rule.
  - Rancher does not have incentives to destroy the bridge.
  - Farmer will destroy the bridge and pay the damages (\$ 100) to the rancher.
- **Case IV:** Farmer's rights are protected by Liability rule.
  - If the Rancher does not destroy the bridge, he will have to pay damages for the crops.
  - Rancher will destroy the bridge.

## Property Rule Cases (damage is efficient)

Instead of \$100 the benefit of the bridge for the Rancher is \$ 140.

- **Case I:** Rancher's property rights are protected.
  - Rancher has no incentives to destroy the bridge.
  - Farmer will not be willing to buy the right from the producer.
- **Case II:** Rancher wants to buy the right from the farmer.
  - Nash solution: price of \$ 130.

## Liability Cases (damage is efficient)

- **Case III:** Rancher's right are protected by Liability rule.
  - Rancher does not have incentives to destroy the bridge.
  - Farmer will not be willing to pay the damages (\$ 140), so he doesn't destroy the bridge either.
- **Case IV:** Farmer's rights are protected by Liability rule.
  - If the Rancher does not destroy the bridge, he will have to pay damages for the crops.
  - Rancher will prefer this to destroy the bridge.

# Property Rules and Liability Rules

The previous example abstracts from two important issues:

- Transaction Costs.
- Information Asymmetry.

# Transfers of Property

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# Ownership risk

- Model:
  - $p(c)$  probability that owner will retain title.
  - $p(\cdot)$  increasing, concave in  $c$
  - Owner's problem:

$$\max_c p(c) \cdot V - c$$

- FOC:  $p'(c) = 1/V$
- higher  $V \Rightarrow$  higher  $c^*$

# Eminent Domain

- Many names for the same thing:
  - Eminent Domain,
  - Compulsory Acquisition,
  - Resumption,
  - Expropriation.
- Power to take private property for public use.

# No-Compensation Result

- Model:
  - $V(x)$  value to the owner if makes irreversible investment  $x$ .
  - $V$  increasing and concave.
  - $dB$ : social benefit where  $d$  is a binary variable.
  - $p$  : probability of  $d = 1$ .
  - $C(x)$ : compensation to the owner.



# No-Compensation Result

- Efficient level of investment.

$$\max_x (1 - p)V(x) + pB - x$$

- Problem of the original owner:

$$\max_x (1 - p) \cdot V(x) + p \cdot C(x) - x$$

- **Claim I:**  $C(x) = V(x)$  generates over investment.
- **Claim II:** any  $C(\cdot)$  that is constant implements the first-best level of investment. E.g.  $C(\cdot) = 0$ .

# No-Compensation Result with Non-Benevolent Government

- Model Modification:
  - $B$  is a continuous random variable (cdf  $F$ ).
  - Government is also strategic: takes when  $B > C(x)$  (would be efficient to take when  $B > V(x)$ )
- If  $C(x) = 0$ , the level of investment is optimal given  $p = F(0)$ .
- But the government takes possession inefficiently often.
- Solution:  $C(x) = C(x^*)$ .

## References

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de la Sierra, R. S. (2020). On the origins of the state: Stationary bandits and taxation in eastern congo. *Journal of Political Economy*, 128.