

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.
 - “Externalities exist when property rights are not completely defined.”
 - Incentives for efficient production.
 - Investment.
 - Tragedy of the commons.

- 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 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

- **First possession:** dominant method for establishing property rights.
- 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 were 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?

- Eastern DRC:
 - '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

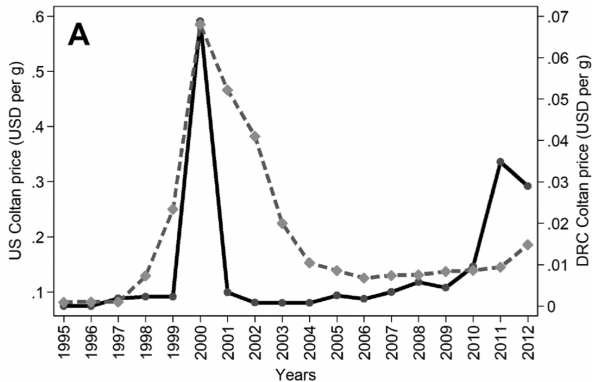


Figure: Price of Coltan.

Price of Gold

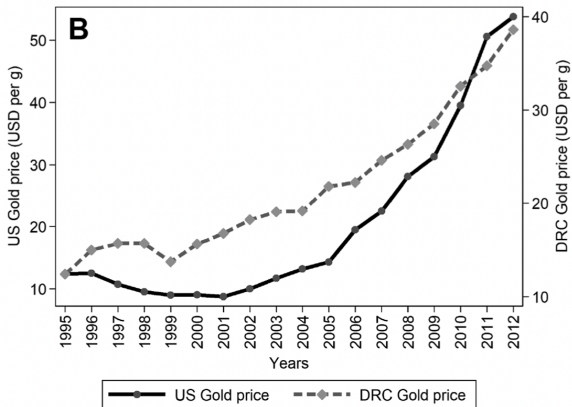


Figure: Price of Gold.

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	MINE					
	MUNICIPALITY ATTACKED (1)	Customs Tax (2)	Entry Fees (3)	Stationary Bandit (4)	Security Service (5)	Extensive-Margin Index (6)
Coltan _j × p_{ct}	.15*** (.03)	.06** (.02)	.01 (.02)	.07*** (.03)	.06** (.02)	.16*** (.06)
Gold _j × 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: 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:
 - $2K < \min\{V_1, V_2\}$
 - $2K \in (\min\{V_1, V_2\}, \max\{V_1, V_2\})$
 - $2K > \max\{V_1, V_2\}$

Overview

1 Property Rights and Liability Rules

2 Eminent Domain

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 .

Bargaining

- 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 $f(U', d) = f(U, d)$.

Bargaining

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'.
 - Example: 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. (He 'owns' the bridge)
 - Rancher has no incentives to destroy the bridge.
 - Farmer has incentives to buy the bridge from the producer.
 - Nash solution: Recipient pays 110 for the bridge and destroys it.
 - Allocation is efficient.

- **Case II:** The bridge is owned by the Farmer.
 - Producer will not be able to buy the bridge.
 - The Farmer destroys the bridge.

Liability Cases

- **Case III:** Rancher's rights are protected by a 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 a 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 (owns the bridge).
 - Rancher has no incentives to destroy the bridge.
 - Farmer will not be willing to buy the right from the Rancher.

- **Case II:** Farmer owns the bridge.
 - 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 a 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 a 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.

Overview

1 Property Rights and Liability Rules

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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.

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

- 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 $p = 1 - F(0)$.
- But the government takes possession inefficiently often.
- Solution: $C(x) = V(x^*)$.

