

Political Economy in Development

The Kuznets Lectures 2006

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March 2006

Lecture II: Property Rights

## Motivation and Scope

- Provision of property rights is a key issue in development and has received a lot of attention.
  - Cross-country evidence and micro-evidence has all suggested that property rights creation/protection is important.
  - Influential thinkers such as Hernando de Soto have made their name as champions for the creation of property rights.

- There are two key issues:
  - In what ways do property rights affect economic activity?
    - \* What are mechanisms and how does the evidence pan out?
  - How are property rights created and enforced?
    - \* One important set of issues concerns the distinction between de jure and de facto rights
    - \* It is also important to think about the implications of the fact that membership of networks and oligarchies can lead to a world where different individuals enjoy different property rights over their assets.

- The lecture will develop a theoretical framework for looking at these issues which unifies a variety of perspectives on how property rights affect economic decisions.
- We will use this framework to organize the emerging and extensive literature on property rights.
- We will then try build an understanding of the political economy issues.
- There is a natural sense in which imperfect property rights also create restrictions on competition and hence rents.
- The lecture builds on on-going joint work with my colleague Maitreesh Ghatak.

## Plan of the Lecture

- Review models of how property rights affect output/efficiency
  - Build on and extends earlier literature.
- We will then discuss some models of who property rights systems are created and enforced.
  - I will discuss different means of enforcement
  - I will also discuss the relationship between property rights violations and tax systems.

## Three Roles of Property Rights

- Underpinning incentives to invest – a form of limit on taxation and expropriation
  - this argument works even in an autarkic economy
- Underpinning market transactions – trade in assets in objects
- Enhancing contractual possibilities.

- In this lecture, I will set out a simple unifying model to look at all of these arguments and use it to discuss the emergent empirical literature.
- It will also serve as a useful basis for understanding political economy issues.
  - We need a model of the distributional implications of imperfect property rights as a basis for understanding for whom the creation of property rights is optimal

## Evidence on the Importance of Property Rights

- Macro evidence
- Micro evidence

## Macro-evidence

- Acemoglu-Johnson-Robinson (among others) emphasize expropriation risk
- Shleifer and co-authors emphasize role of legal systems in supporting market transactions especially in credit markets.
- In their Unbundling Institutions Paper (JPE, 2005) Acemoglu and Johnson argue that only the expropriation risk argument has a significant effect on output.

## Micro-evidence

- There is a now wide variety of studies many of which look at the impact of formal titles on output, investment or productivity.
- Broadly speaking the literature does find support for property rights being important.
- But there is relatively little evidence that it is working through the credit market.

## The Basic Model

- Consider a producer who undertakes effort  $e$  to produce output using only his labour and a plot of land.
- Output is stochastic and takes the value  $q$  with probability  $e$  and  $0$  with probability  $1 - e$ .
- The producer is risk neutral.

- The producer will choose  $e$  to maximize:

$$\pi(e) = eq - \frac{1}{2}e^2$$

- which yields  $e^* = q$  and  $\pi(e^*) = \frac{1}{2}q^2$ .

- Observe that this is identical to a standard problem of a profit maximizing firm choosing one input: if the production function is  $f(e) = \sqrt{e}$  and the input  $e$  is available in the market at constant per unit price  $w$  then

$$\pi(e) = \sqrt{e} - we$$

which yields  $e^* = \frac{1}{4w^2}$  and  $\pi(e^*) = \frac{1}{4}w$ . Setting  $w = \frac{1}{2\sqrt{q}}$  the two problems yield the same solution.

## Expropriation Risk

- Suppose now that there is some actor in the economy with coercive power – could be the power to tax or banditry.

- Let the tax rate (or probability of expropriation) be  $\tau$ .

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$$e(\tau) = \arg \max (1 - \tau)eq - \frac{1}{2}e^2 = (1 - \tau)q.$$

- Then

$$\pi(e(\tau)) = \frac{1}{2} [(1 - \tau)q]^2$$

with

$$\tau(1 - \tau)q^2$$

to the expropriator.

- The probability of expropriation acts just like a tax.
- It has the usual time-consistency issues associated with it.
- The “optimal” tax from the expropriator’s point of view is  $\tau = 1/2$ , but the expropriator may not be able to commit to this.
- Over the range  $\tau \in \left[\frac{1}{2}, 1\right]$  then protecting property rights is Pareto improving.

## Guard Labor

- One effect of insecure property rights is the use of guard labor to protect against expropriation.
- Suppose the probability  $\tau$  that either the farmer's land, or his output could be lost due to insecure property rights can be affected by putting in effort toward protection of property rights.
- Let  $z$  be effort toward protecting property rights and  $e$  be the effort directed toward farming.
- Let  $\tau(z) = \tau [1 - z]$ .

- Then the farmer chooses:

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$$\max_{e,z} (1 - \tau(1 - z))eq - \left( \frac{1}{2}e^2 + \frac{1}{2}z^2 + \gamma ez \right)$$

where  $0 \leq \gamma \leq 1$ .

- This yields:

$$\begin{aligned} \tau eq &= z + \gamma e \\ (1 - \tau(1 - z))q &= e + \gamma z. \end{aligned}$$

- Solving simultaneously:

$$e = q \frac{1 - \tau}{1 - (\tau q - \gamma)^2}$$
$$z = \tau q^2 \frac{1 - \tau}{1 - (\tau q - \gamma)^2}.$$

- Expected output is higher than before as

$$\frac{1}{1 - (\tau q - \gamma)^2} > 1$$

which is due to the fact that  $q < 1$  and  $\tau < 1$ .

## Guarding an Unproductive Asset

- Suppose that there is a house  $w$  that needs guarding. Then the problem is:

$$\max_{e,z} \left[ qe + (1 - \tau(1 - z))w - \left( \frac{1}{2}e^2 + \frac{1}{2}z^2 + \gamma ez \right) \right]$$

- This maximization implies that:

$$e = \frac{q - \gamma\tau w}{(1 - \gamma^2)}.$$

- So an increase in  $\tau$  reduces productive effort.

## Gains from Trade and Matching

- Economic efficiency is enhanced by having assets managed by those who can use them most productively.
- But this depends on being able to write efficient contracts to trade.
- To study this, we need a simple equilibrium model.
- There is now a continuum of agents divided into landed (a fraction  $\delta$ ) and landless (a fraction  $(1 - \delta)$ ).

- Suppose every period a farmer receives a productivity shock  $\theta \in \{\theta_L, \theta_H\}$  with  $0 \leq \theta_L < \theta_H \leq 1$ .
- Let the probability of  $\theta = \theta_L$  be  $p$ .
- Given  $\theta$ , upon success, output is  $q\theta$ , otherwise it is 0 as before.
- Therefore, for a given  $\theta$ , the farmer chooses:

$$\max \pi(e) = e\theta q - \frac{1}{2}e^2$$

which yields  $e^* = \theta q$  and  $\pi(e^*) = \frac{1}{2}(\theta q)^2$ .

- Both landed and landless farmers face the same distribution of productivity shocks.
- Then each period there is a fraction  $p\delta$  of the population that is landed with low productivity and a fraction  $(1 - p)(1 - \delta)$  that is high productivity and landless.
- Assume that

$$(1 - p)(1 - \delta) > p\delta \text{ or } 1 > \delta + p.$$

- This says land is scarce and so in a competitive market, rents will accrue to land owners.

- Let  $u$  be the outside option of agents (e.g., working in the city)

- Assume that

$$\frac{1}{2}(\theta_H q)^2 > u \gtrless \frac{1}{2}(\theta_L q)^2.$$

- In a perfect rental market land trades at a price

$$r^* = \frac{1}{2}(\theta_H q)^2 - u.$$

- All land is fully utilized and has high productivity.
- Surplus from selling the land accrues to the seller.

- Now suppose that land rights are insecure and the probability that the rent is not paid  $\tau$ .

- Then there is no trade in assets if:

$$u + (1 - \tau) \left[ \frac{1}{2} (\theta_H q)^2 - u \right] < \max \left\{ u, \frac{1}{2} (\theta_L q)^2 \right\}$$

- Land is either held idle or else cultivated by low productivity land-owning farmers.

- In the latter case, the order of the output loss is:

$$\delta p \left[ \frac{1}{2} (\theta_H q)^2 - \frac{1}{2} (\theta_L q)^2 \right].$$

- Observe that a rise in  $\tau$  constitutes a Pareto improvement (ignoring costs of setting up a legal system).
- But whether there are large gains in output/utility from introducing property rights depends on whether there are large gains from matching.
  - There could also be problems due to poor property rights creating distortions in related markets.

## The De Soto effect

- We will now explore the argument that the creation of property rights leads to improvements in the working of contractual relationships, especially in the context of credit.
- In the *Mystery of Capital* Hernando de Soto posits the idea that the key problem in developing viable capital is improving property rights.

“(E)ven those who live under the most grossly unequal regimes possess far more than anybody has ever understood. What they possess, however, is not represented in such a way as to produce additional value. When you step out of the door of the Nile Hilton ..... (w)hat you are really living behind is the world of legally enforceable transactions on property rights.”

- To capture these ideas, suppose that the owner of the asset needs some kind of complementary asset to enhance his productivity:
  - e.g. credit or any other input.
- He can only obtain this asset by contracting with a supplier.
- Suppose  $x \in \{0, 1\}$  is the amount of inputs needed by the farmer and the technology is linear:

$$q(x) = \begin{cases} q_H & \text{if } x = 1 \\ q_L & \text{otherwise.} \end{cases}$$

- Let  $c$  be the cost of a unit of the input.

- Assume that

$$\frac{1}{2}(q_H - q_L)q_H > c.$$

- This will imply that  $x = 1$  in all relevant cases.

## Pledging Assets

- Suppose the farmer has wealth  $w \geq c$ .
  - So, in principal, he can finance the input by pledging his whole wealth as collateral.
- Note that the farmer is not wealth constrained as such – the problem is being able to pledge wealth reliably to support transactions.
- Suppose that if he pledges his land as collateral, the input supplier can realize this value with probability  $(1 - \tau)$ .
  - Thus  $\tau = 0$  is perfect property rights.

- If  $(1 - \tau)w < c$ , then the input supplier only receives full payment if the project is successful.
- An input supply contract is a pair  $(x, i)$  where  $x \in \{0, 1\}$  is whether the input is supplied and  $i$  is the payment that he has to make.

- It will be optimal in any second best contract for the farmer to pledge the maximal wealth that he can credibly do to the supplier.
- The payoff of the farmer is:

$$e[q(x) - i] - (1 - e)(1 - \tau)w - \frac{1}{2}e^2$$

implying an optimal effort level:

$$e = q(x) - i + (1 - \tau)w.$$

## Three components to the De Soto effect:

- Direct effect operating through  $(1 - \tau)w$  – an improvement in property rights leads to an increase in pledgeable assets and hence an increase in effort.
- Two indirect effects:
  - higher  $x$  (not considered here, but possible in richer models).
  - lower  $i$  (the state contingent repayment which blunts effort).

## A Note on Empirical Testing of the DeSoto Effect

- Even if we had  $x \in [0, 1]$  there is a natural non-convexity in this model pushing towards  $x = 1$  from the multiplicative form.
  - Of course, we can write down models without this feature e.g. output is  $\sqrt{ex}$ .
- If  $x = 1$ , then improving  $\tau$  will never lead to an increase in loans being taken out.
- BUT that does not mean that the de Soto effect is not at work since the indirect effect of a fall in  $i$  or the direct effect on effort can still be at work.

## Competitive Input Supply

- This will solve:

$$\text{Max}_{(x,i)} \left[ \frac{1}{2} (q(x) - i + (1 - \tau)w)^2 - (1 - \tau)w \right]$$

- subject to

$$[(q(x) - i + (1 - \tau)w)(i - \tau w) + (1 - \tau)w - cx] = 0.$$

- Solving for  $i$  in the last equation yields:

$$i^*(x) = (1 - \tau)w + \frac{q(x) - \sqrt{(q(x))^2 + 4((1 - \tau)w - cx)}}{2}.$$

- This implies that:

$$e^*(x) = \frac{q(x)}{2} + \frac{\sqrt{q(x)^2 + 4((1-\tau)w - cx)}}{2} < q(x).$$

- Our assumption that

$$\frac{(q_H - q_L) q_H}{2} > c$$

implies that:

$$x^* = 1 \text{ and } i^* > (1 - \tau) w.$$

- Observations:
  - There is no inefficiency level in input supply (partly a reflection of the specific functional form).
  - An improvement in property rights leads to a reduced contingent input repayment.
  - Effort (productivity) is increased if property rights are improved.
- BUT: all these effects are proportional to  $w$ .
  - This has implications for empirical strategies that seek to test for an effect.

- If  $w < c$ , then even with  $\tau = 0$ , there will still be inefficiencies
  - this corresponds to a wealth constrained rather than a property right constrained economy.
- In a competitive economy, improving pledgeability of assets through property rights formalization generates an increase in farmer welfare.

## Non-competitive economy

- We now consider the possibility that there is some kind of restricted supply in the market for inputs which gives bargaining power to the input supplier
  - e.g. a money lender.
  - we can motivate the non-competitive economy by thinking that  $\tau$  is a match specific parameter between a particular farmer and supplier as in a network economy.
  - Match specificity in enforcement can create a rent to the input supplier or farmer relative to an outside option (trade with another supplier)
  - (Relates to de Soto's idea of a Mercantilist economy in his book on Peru: The Other Path.)

- The farmer has an outside option  $u$  which he can realize elsewhere.
- The set of Pareto efficient contracts solves:

$$\text{Max}_{(x,i)} [(q(x) - i + (1 - \tau)w)(i - (1 - \tau)w) + (1 - \tau)w - cx]$$

subject to:

$$\frac{1}{2}(q(x) - i + (1 - \tau)w)^2 - (1 - \tau)w \geq u.$$

- Two cases:
  - The participation constraint of the farmer is binding
  - No binding participation constraint

- This depends on whether

$$\frac{1}{8}(q_H)^2 - (1 - \tau)w \gtrless u.$$

- Participation Constraint is Binding:

- Again, it is easy to see that  $x^* = 1$

- We have

$$i = q_H - \sqrt{2(u + (1 - \tau)w)} + (1 - \tau)w$$

and

$$e = \sqrt{2(u + (1 - \tau)w)}.$$

- As above, there is still a De Soto effect.
- All gains from property rights improvements with the relationship accrue to the input supplier.

- Participation constraint not binding

- Then:

$$i = (1 - \tau) w + \frac{q_H}{2}$$

and

$$e = \frac{q_H}{2}.$$

- Then:

- Effort does not depend on property rights (no De Soto effect)
- The farmer is now worse off when property rights improve since it simply increases the rent extraction instruments available to the input supplier.

## Lessons

- The theory suggests that who gains and who loses from the creation of formal property rights depends a lot on the status quo.
- In on-going work, we are using the above model to see how the existence of match specific property rights enforcement can allow inefficient (high  $c$ ) suppliers to stay in business and earn rents.
- So improving property rights can reduce the rents of supplier and increase competition
- This has implications for in whose interests systems of property rights are run.

## Preconditions for the De Soto Effect

- The economy must be property rights not wealth constrained.
- The economy has to be competitive or the farmer on his participation constraint in a non-competitive economy
- This analysis reveals why farmers may not be keen on titling programs in non-competitive economies.

- In a relations-based environment, property rights are only credible because of some kind of on-going relationship of exchange between the authority and the citizens.
  - The rule of law has the idea that property rights enforcement is a universal good available to all, not just those who are connected to the rulers, network members or with good exit options.
  - In an oligarchic system, property rights enforcement is stronger for the rich than the poor.
  - Social networks also ration access to property rights.

## Are property rights Pareto improving?

- This is important in relating property rights back to ideas of government failure.
- With weak property rights, even a coercive authority will wish to be able to commit to some property rights protection generating “gains from trade”.
- In some of the De Soto style models, those who are trading with those who have weak property rights can be better off when improved property rights generate reduce rents of one trading party by increasing outside options.

## Models of Property Rights Enforcement

- Enforcement through repeated interactions.
  - provides a solution to dynamic time consistency problems
  - requires long-lived players.
  - this would be a problem even if government was benevolent as in the classic Kydland-Prescott model.
  - there is no real difference between property rights violations and taxation.

- This is a form of relation based governance of the kind that is common in trading networks.
  - But it could also be a model of state formation.

## Exit

- Agent's can escape expropriation only by using their exit option either to the informal economy or to an entirely different jurisdiction
  - Weingast's market preserving federalism.
- But leads to arbitrariness in enforcement since not everyone has the same exit options.

## Voice

- Property rights are protected by giving political power to those who need to exercise them
- This often means creating an oligarchical political system
  - Acemoglu and Myerson both have models of such systems
  - But is clearly inefficient when it comes to try to create an upwardly mobile class who may not be able to join the elite.
  - This model would fail in situation where the economic and political elite for not coincide.

## Anonymity (Secrecy)

- Government commits to having limited information about citizens which limits the power to tax
  - Chinese banking secrecy laws are a good example.
- Suggests that a Mirrlees tax system is actually optimal for the enforcement of property rights.

## Property Rights Enforcement and Public Finance

- Kevin Roberts showed that such a tax system could be motivated in terms of three axioms.
- Let  $x_i$  be an allocation,  $\theta_i$  be “exogenous” characteristics (such as ability or tastes)
- Then, Roberts defines tax implementation a situation where there is a budget set  $B$  such that:

$$x_i(\theta_1, \dots, \theta_i, \dots, \theta_N) = \arg \max \{u(\cdot, \theta_i) : x \in B\}.$$

- He shows that tax implementability is equivalent to three properties on the set of allocations:
  - Decentralization:  $x_i$  is independent of  $\theta_{-i}$
  - Horizontal Equity:  $\theta_i = \theta_j$  implies  $x_i = x_j$
  - Vertical Equity:  $u(x_i(\boldsymbol{\theta}), \theta_i) \geq u(x_j(\boldsymbol{\theta}), \theta_i)$  for all  $i, j, \boldsymbol{\theta}$ .
- In dynamic economies, these properties can turn out to be desirable to secure private investments.
- Effectively this rules discriminatory lump-sum taxation.

- When these axioms hold as restrictions on the tax system, this is equivalent to an anonymous tax system.
- But political resource allocation under these constraints guarantees that agents without political power or good investment options are protected.

## Summing Up

- There is still quite a lot to understand both theoretically and empirically in the context of property rights.
- But it is clear that any kind of account of issues in this area will have an important political economy dimension.
- But the way forward is to discuss issues in very specific contexts and to try to merge theory and empirics.