

Keynote Lecture

Land Acquisition: Some Analytical Issues

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Research Agenda

- Motivated by the land acquisition controversy in West Bengal
- A widespread phenomenon - elsewhere in India, China, Africa etc
- Ongoing research project
- Joint work with
 - ▶ Sanjay Banerji (ongoing)
 - ▶ Dilip Mookherjee (ongoing)
 - ▶ Dilip Mookherjee (2012, forthcoming, JDE)
 - ▶ Parikshit Ghosh (2011, EPW)
 - ▶ Dilip Mookherjee, Sandip Mitra, Anusha Nath (2012, Working Paper)
- Today's talk will draw on mostly the first project

The Land Acquisition Debate

- Even as parts of the global economy is becoming "weightless" in developing countries such as India and China, industrial development has been weighed down by land scarcity
- In very land scarce environments, land price will be high
- This will dampen the incentive to acquire land for industry, but unless some distortions are present, there is no inefficiency involved

Models of Industrialization

- Perhaps this is why models of industrialization (e.g., Solow, Lewis) did not pay much attention to land but more on capital accumulation and surplus labour
- The premise is industry offers a much higher expected return than agriculture, and so buying and selling of land would be smoothly mediated through the market
- It is true that political forces vitiated the atmosphere and interfered with the buying and selling of land that is normally expected to be mediated through the market.
- But even then, what was the basis of the reluctance (resistance) to sell the land that necessitated coercive acquisition?

Existing Literature - Hold Out Problem

- Grossman-Hart (1980): takeover problem by a bidder who wants to buy shares from dispersed shareholders
- The shareholders in the Grossman Hart model or small landowners in Singur have a resistance to selling land due to free rider problem because if everyone sells land, it pays a landowner not to sell because h/she can benefit later as the industrialization leads an increased land price.
- Muller and Panunzi (2004), QJE for the takeover problem of a firm and more recently Roy Chowdhury and Sengupta (2012), Games and economic Behaviour (2012)

A Simple Supply-Demand Story with Market Frictions

- Such a resistance to selling land can emerge even without the presence of hold out.
- Land is valuable as an asset, and this value is higher in the absence of well functioning capital, insurance markets & social safety nets
 - ▶ Many view the income from land (or opportunity to consume crops grown) as a form of valuable security against various risks of high inflation or economic recession.
 - ▶ Others may value land as it can serve as collateral for bank loans.
 - ▶ It is also a secure form of holding wealth, and provides some insurance value, as well as old-age support to its owners.
 - ▶ Farmers have developed special skills in farming which are of no use in other occupations.
 - ▶ Other reasons: land as a source of social status, prestige or ancestral identity

Field Interviews

- From our field interviews we were told:
 - ▶ A large chunk of cash was not very useful to them because they do not have the skills and temperament to invest it profitably in non-agricultural uses.
 - ▶ Second, even if theoretically the money can earn a higher return in the bank compared to agriculture, they are worried that inflation would eat into their savings, and interest rates could go down.
 - ▶ Third, agriculture has the big advantage of offering them the guarantee of subsistence.
 - ▶ Fourth, they are worried that a lump sum received from selling land might be frittered away by themselves or family members (the “son buying a motorcycle” was a phrase often heard), leaving nothing for emergencies or provision for old-age.

- Therefore, land scarcity is accentuated by other market frictions
- **Implication 1:** true price of land is much higher than what would be dictated by a simple calculation of availability and current market prices.
- This has nothing to do with the relative profitability of industry or agriculture or the physical scarcity of land.
- Rather, it is driven by the absence of good insurance mechanisms and financial instruments, and low levels of human capital, all of which make switching to alternative occupations costly.

- Survey results as well as field interviews suggest that it is the poorer farmers who are most reluctant to sell
- Personal characteristics of landowners were correlated with their decisions whether to accept the offered compensation.
- Households for whom agriculture played a larger role in income, or those with a larger fraction of adult members who were workers, were less likely to accept.

- This points to the role of income security as an important consideration, and the role of complementarity of land with farming skills.
- This sounds somewhat paradoxical because one expects that cash strapped poorer farmers would rather sell land immediately if offered higher prices.
- In contrast, the reservation price is lower for richer farmers, who tend to be more educated and exposed to the world outside agriculture, especially the younger generation
- They felt that agriculture was not profitable and industry was the way of the future.

- **Implication 2:** the distribution of land is important in determining the average reservation price of land. If there is a substantial group of small and poor farmers are reluctant to sell, then the price that would be needed to acquire land for industry would be much higher.
- Therefore, in the context of West Bengal, the success in implementing limited land reform may have, ironically enough, created a distribution of land that makes industrialisation more difficult.

- As a result of these forces, the economy appears to be stuck in a vicious circle.
 - ▶ Because of poverty and low levels of human capital, farmers have a high reservation price for land as their alternative earning options are limited.
 - ▶ The resulting scarcity of land is a major constraint on industrialisation, thereby keeping productivity in alternative occupations low, and keeping the economy at a low level equilibrium.

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Model

- We begin with the premise that there is no imperfection in the land market.
- People can lease in or lease out buy or sell land, and these transactions are not subject to any opportunism.
- Similarly, people can borrow money by posting land as collateral.
- We can view it like this, or view it as a transaction where someone sells or rents out some land against some income, and has the option of buying it back.

- However, transactions in the credit markets are imperfect and cash transactions not backed by a tangible collateral cannot be enforced.
- This gives rise to the role of land both as an input of production as well as collateral whenever agents need to borrow money.
- A farmer i owns an amount \bar{L}_i of land. Land can be sold or rented out at a given price p .
- There is one period, and so there is no distinction between land sales and rental.
- There is a production function $f(L)$ with the standard properties, and every farmer can cultivate land on their own.

Analysis

- Their decision problem is

$$f(L) + p(\bar{L}_i - L).$$

- That is, a farmer can rent out or sell any surplus land. He can also rent in or buy land if he wants. There is no labour market and everyone is self-employed.
- The amount a farmer will cultivate is given by

$$f'(L) = pL$$

- Let us denote this by $L^*(p)$ which is decreasing in p
- Therefore, a farmer's supply of land is

$$L_i^s = L_i - L^*(p)$$

- This is increasing in p
- The total money income of the agent is: $Y_i = f(L^*) + p(L_i - L^*)$.

Analysis

- The agent however may need credit in between in order to meet liquidity requirements.
- The sudden demand for cash may be due unexpected illness or for meeting working capital requirements.
- With probability λ a farmer is hit with a negative shock.
- Requires a fixed monetary expenditure of M .
- This happens before output is realized and assume farmers have no money to start with.
- If this money is not available to a farmer, even by a small margin, then the disutility is $-D$ where $D > M$.
- Therefore, if you can, you would set aside land value worth M , i.e., $\frac{M}{p}$

Analysis

- Let there be three groups of farmers with land endowments \bar{L}_R , \bar{L}_M , and \bar{L}_P
- Let they have probability mass q_R , q_M and $q_P = 1 - q_R - q_M$
- Therefore, (per capita) land endowment is
$$q_R \bar{L}_R + q_M \bar{L}_M + (1 - q_R - q_M) \bar{L}_P \equiv \bar{L}$$

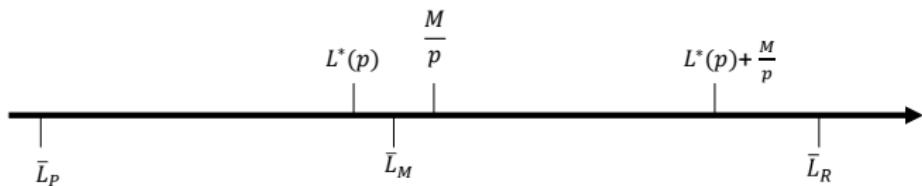
Analysis

Case 1: $L^*(p) < \bar{L}_M < \frac{M}{p}$

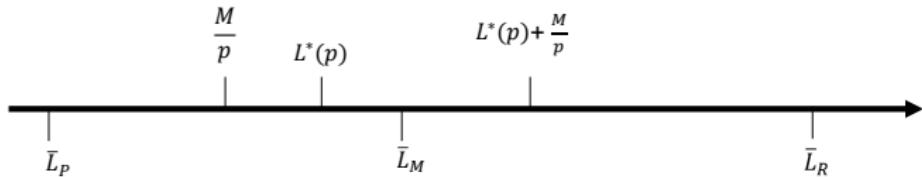
- The rich who have $\bar{L}_R \geq L^*(p) + \frac{M}{p}$ who are net sellers
- The middle who have $L^*(p) < \bar{L}_M < \frac{M}{p}$ cannot insure, but have enough surplus land to rent out or sell who are net sellers.
- The poor who have $\bar{L}_P < \frac{M}{p}$ will lease in land for cultivation only and will not be able to insure who are net buyers
- Therefore, net supply of land is $\bar{L} - L^*(p) - \frac{M}{p} q_R$

Distribution of Land

Figure 1: The Two Cases



Case 1: Low p , $L^*(p) < \frac{M}{p}$



Case 2: High p , $L^*(p) > \frac{M}{p}$

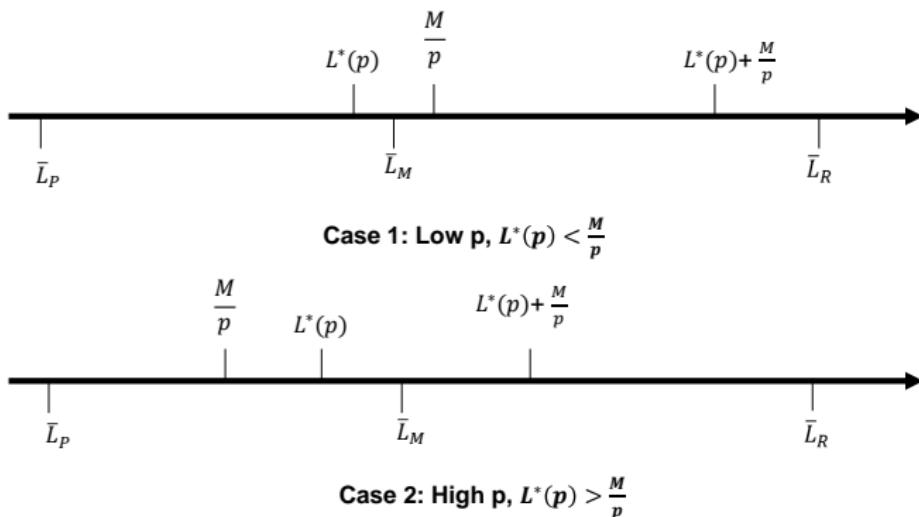
Analysis

Case 2: $L^*(p) < \frac{M}{p} < \bar{L}_M$

- As before, the rich who have $\bar{L}_R \geq L^*(p) + \frac{M}{p}$ will be net sellers
- Similarly, the poor who have $\bar{L}_P < \frac{M}{p}$ will be net buyers
- However, the middle who have $\frac{M}{p} < \bar{L}_M < L^*(p) + \frac{M}{p}$ will be net buyers
- They have to set aside $\frac{M}{p}$ (no one will lease you land to support precautionary savings) and then lease in the amount needed to push operational size to $L^*(p)$.
- Therefore, net supply of land is $\bar{L} - L^*(p) - \frac{M}{p} (q_R + q_M)$

Distribution of Land

Figure 1: The Two Cases



Supply

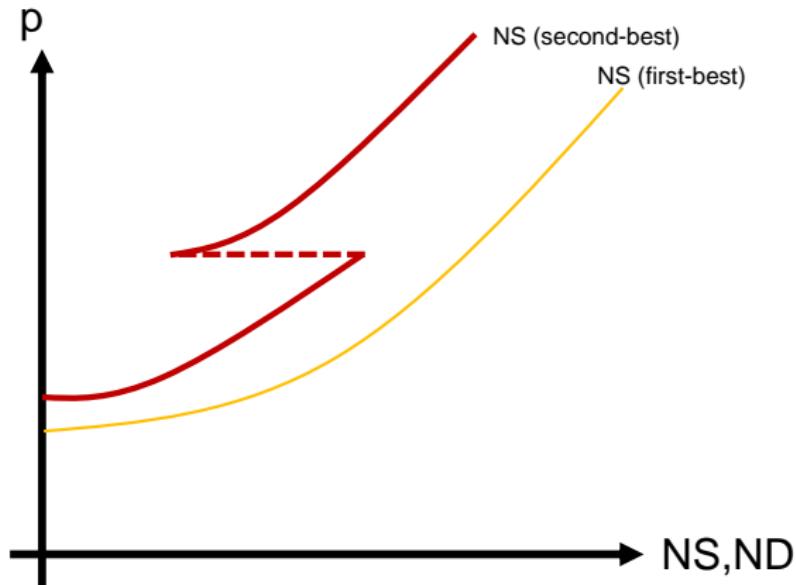
- For p low enough Case 2 will happen, and for p high enough, Case 1.
- The difference between the two cases is for high values of p , net supply of land goes down as the middle farmers now can afford to set aside some land for insurance reasons.
- The net supply of land is $\bar{L} - L^*(p) - \frac{M}{p} (q_R + q_M)$ for high p (case 1)
- The net supply of land is $\bar{L} - L^*(p) - \frac{M}{p} q_R$ for low p (case 2)

Supply

- At $\bar{L}_M = \frac{M}{p}$ middle farmers can just about set aside land for precautionary reasons
- This gives the dashed horizontal stretch
- Figure 2 shows the net supply curve
- Figure 3 shows the same for a continuous distribution of land endowments
- Also, in both figures, we show the net supply curve that will result if insurance/capital markets existed that would eliminate the need for precautionary holdings $\frac{M}{p}$

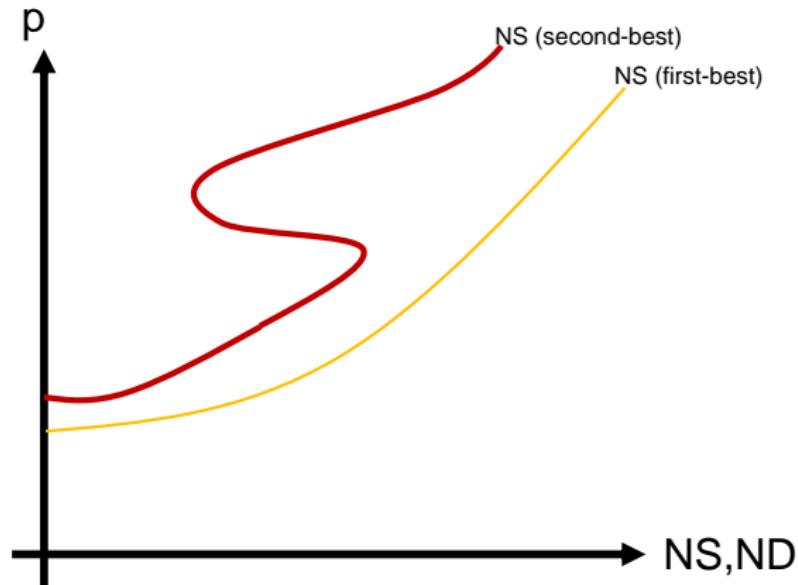
Net Land Supply - Discrete Distribution

Figure 2: Net Land Supply - Discrete Distribution



Net Land Supply - Continuous Distribution

Figure 3: Net Land Supply - Continuous Distribution



Demand for Land from Industry

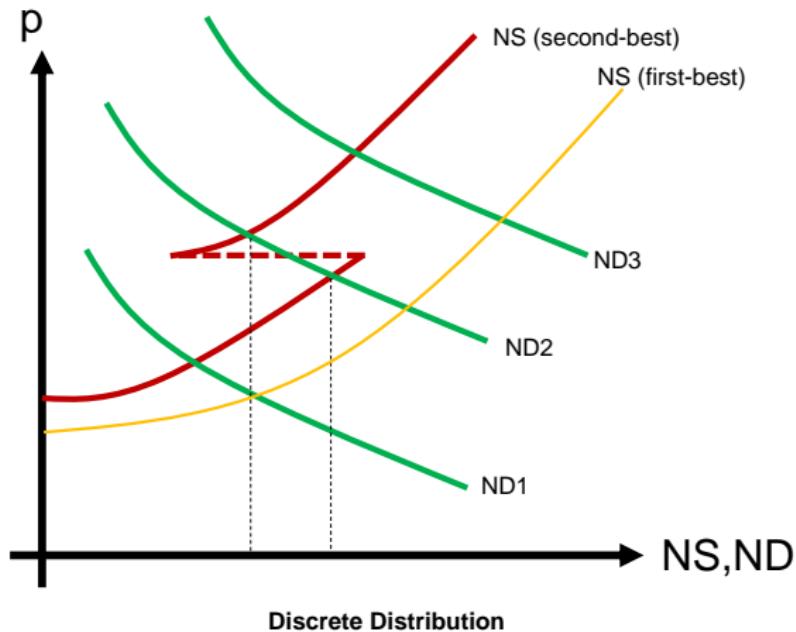
- Let $A(p)$ be the demand for land from industry
- Can be obtained by having a distribution of profitability of industrial projects: $\pi \in [\underline{\pi}, \bar{\pi}]$ and the indifference condition $\pi \geq p$.
- If $G(\pi)$ is the CDF, then the demand function is $1 - G(p)$ plus a shift parameter a

$$A(p) = a + 1 - G(p).$$

- We depict the demand for land for non-agricultural use by a standard negatively sloped demand curve in Figure 4, together with the net supply (for discrete distribution)
- In Figure 5 we do the same, but with a continuous distribution

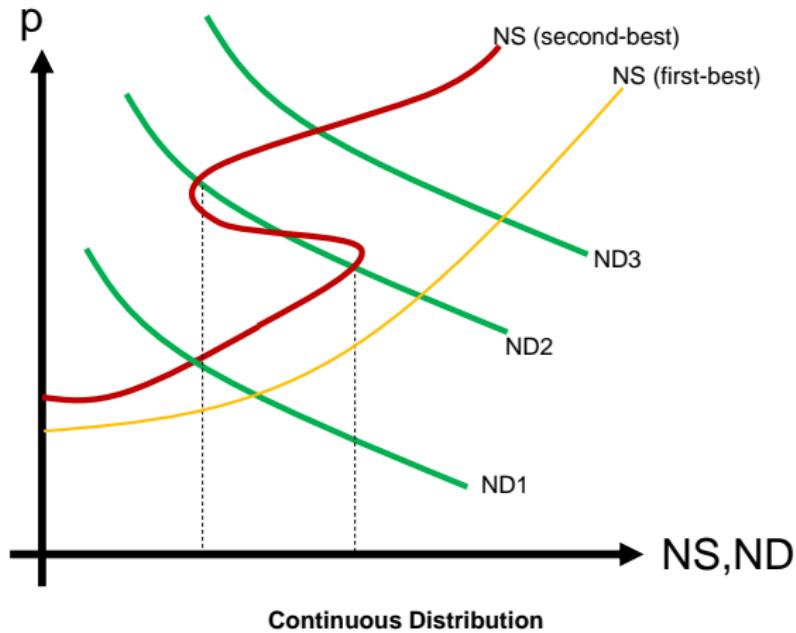
Net Land Supply and Demand - Equilibrium

Figure 4: Net Land Supply & Demand for Industrial Use



Net Land Supply and Demand - Equilibrium

Figure 5: Net Land Supply & Demand for Industrial Use

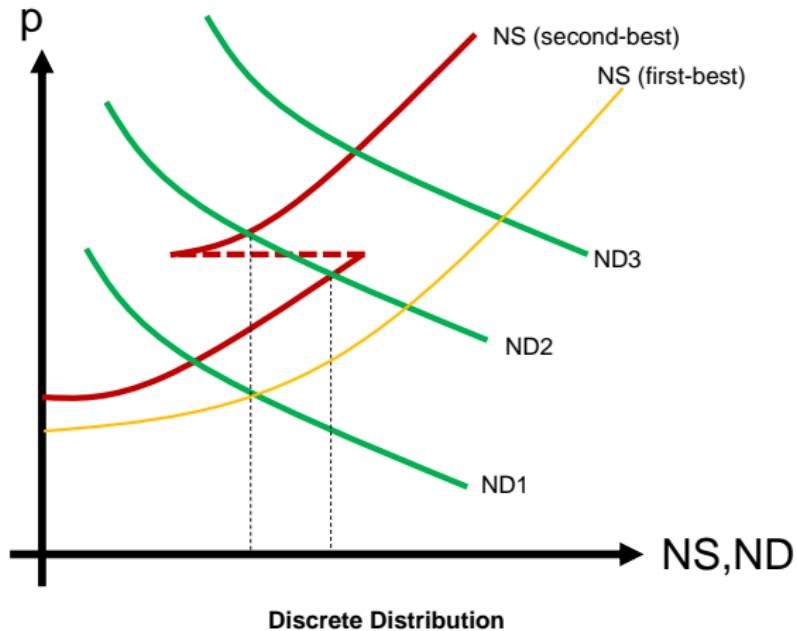


Implications

- Now we are ready to look at some of the analytical issues more formally
- As can be seen from Figure 2, under the first-best there is no precautionary demand for land
- Net land supply to industry shifts to the right
- Therefore, equilibrium price will be lower
- In an "institution-constrained" economy the extent of industrialization will be higher
- Case for a corrective subsidy

Net Land Supply and Demand - Equilibrium

Figure 4: Net Land Supply & Demand for Industrial Use

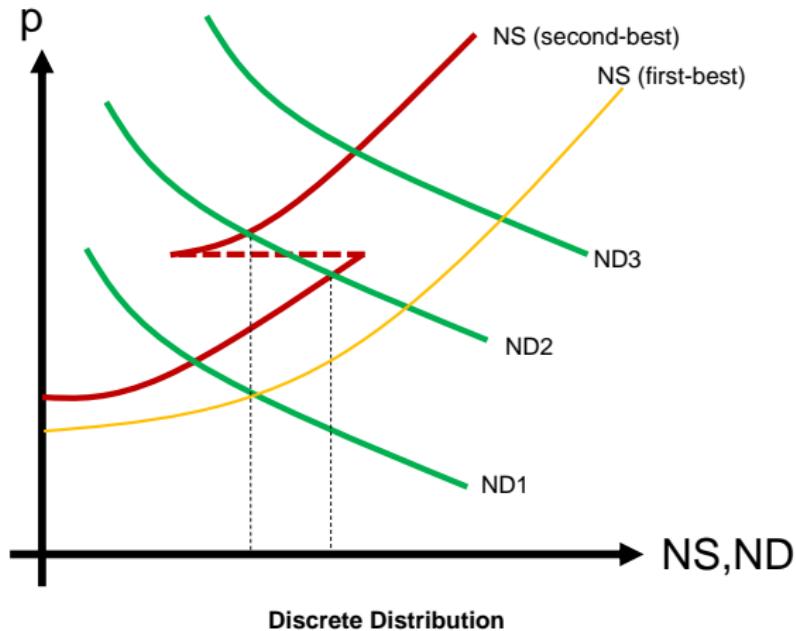


Implications

- More interestingly, an increase in prices may reduce supply
- Due to the backward-bending part of the net supply curve to industry
- An income effect analogous to procurement prices for foodgrains
- In fact, there can be multiple equilibria

Net Land Supply and Demand - Equilibrium

Figure 4: Net Land Supply & Demand for Industrial Use



Implications

- With the demand curve ND_2 , there are two stable equilibria
- One has lower prices, and higher land supply
- The other has higher prices, and lower land supply
- In the latter case, the middle farmers can afford to set aside land for precautionary reasons

Implications

- By standard arguments an increase in land prices benefits net sellers and hurts net buyers:
- In the high price equilibrium rich and middle farmers are better off, but poor farmers are worse off
- Also, with higher prices middle farmers can afford to have precautionary holding of land
- Therefore, the poorer farmers will be the most opposed to increase land prices
- Can block reform if they are sufficiently strong

Implications

- In West Bengal due to redistribution of land, there is a large group of small farmers who are opposed to industrialization
- With a large group of middle and rich farmers, the opposite would hold
- Also, if land productivity is higher (modern agriculture) $L^*(p)$ will be large compared to $\frac{M}{p}$ unless p is very small
- So the backward bending part of the supply curve is not important and the standard logic applies

Implications

- We have not modeled occupational choice
- Suppose the outside option of a farmer is to work in the non-agricultural sector
- Now we have the makings of another vicious circle
- Low levels of industry implies low wages
- More people stay in agriculture, especially the poorer farmers
- This creates more land scarcity
- This implies low levels of industrial investment
- A one-shot big push for industrialization can overcome this

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Compensation - The Land Acquisition Bill

- Good reasons to insist on compensation of displaced landowners at above market rates in cases where eminent domain clauses are applied.
- True even if arguments of distributive justice or political sustainability are ignored, and the law is designed only with economic efficiency in mind.

Compensation - The Land Acquisition Bill

- Those who do not choose to sell land at the current market price by definition value their asset at more than the market price and therefore, will naturally be unhappy if compensated at the market price.
- If land markets are thin and in general financial markets are not well functioning, then the current price of land is unlikely to reflect future price of land before an industrial project is set up, and therefore, this creates an additional reason for owners to be resistant to be compensated at the current market price.

Compensation Policy and its Implications

- Compensation policy affects growth and economic efficiency in two significant ways.
- First, it affects the incentives of state governments to acquire land under eminent domain clauses, by altering the cost of acquisition they incur.
- A stronger compensation requirement will slow down the pace of industrialization by raising the cost of land acquisition.
- There is a natural inclination to overlook the costs imposed by such industrialization on farmers who stand to lose their livelihoods.
- Mandating compensation at least at market rates ensures that state governments internalize these costs adequately.

Compensation Policy and its Implications

- A second set of effects concerns investments made by farmers and governments in enhancing agricultural productivity of rural land.
- Stronger compensation mandates reduce the likelihood that any given piece of agricultural land will be acquired in the future.
- This enhances incentives to invest by farmers in improving soil quality or developing local irrigation facilities.

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Concluding remarks: How to set Compensation Policy?

- Various land acquisition bills have settled on arbitrary ratios for mandated compensations to market values.
- The problem is that getting this ratio correct is crucial.
- If it is set too high, the cost of acquiring land will become prohibitively large and industrialization will slow down too much.
- If it is set too low, the problems seen in Singur will re-emerge.

Concluding remarks

- Given the evidence of heterogeneity in land valuations, and the difficulty of eliciting the true valuation of an owner, this is a particularly difficult problem
- The economists preferred solution to elicit private asset valuations is to use auctions.
- This approach has been put forward by Ghatak and Ghosh (2011)
- Each community where an industrial interest in acquiring land exists can conduct a land procurement auction, wherein each landowner submits a bid at which he is willing to give up the land.

Concluding remarks

- The offered bids can be arrayed against the quantities of land offered, to determine a supply of land as a function of the highest bid submitted.
- Fixing any given quantity of land procured, offering the corresponding bid of the last parcel to all those bidding less will constitute a voluntary process by which landowners will relinquish their land.
- When the number of landowners is large, such a process will provide them with an incentive to report their personal valuations truthfully.

Concluding remarks

- A market-like process can thus be used to elicit the personal valuations of landowners, ensuring that the cost of land acquisition is equal to the true cost of displacement of farmers.
- There is then no need for a government to set an arbitrary ratio of mandated compensation to market value.
- Non-contiguity of lands offered may be overcome by acquiring more land than is needed for industrial purposes, creating contiguous areas for building necessary factories or shops, and offering lands acquired outside this area to those whose lands fall within the area and who submit too high a bid.

Concluding remarks

- The choice of location of a factory can also be decided by extending the auction to a multi-stage process.
- At the first stage, the industry in question or government could set a reserve price and minimum quantity of land needed.
- Next, different communities can be asked to bid for the factory to be located in their respective regions.
- These bids are set equal to the minimum price at which they can in turn procure the necessary amount of land from landowners within their areas (as elicited by a local auction).
- There are of course problems: collusion, speculative behavior by land intermediaries