Land Acquisition and Compensation in Singur: What Really Happened?*

Maitreesh Ghatak[†], Sandip Mitra[‡], Dilip Mookherjee[§] and Anusha Nath[¶]

March 29, 2012

Abstract

This paper reports results of a household survey in Singur, West Bengal concerning compensation offered by the state government to owners of land acquired to make way for a car factory. While on average compensations offered were close to the reported market valuations of land, owners of high grade multi-cropped (Sona) lands were under-compensated, which balanced over-compensation of low grade mono-cropped (Sali) lands. This occurred owing to misclassification of most Sona land as Sali land in the official land records. Under-compensation relative to market values significantly raised the chance of compensation offers being rejected by owners. There is considerable evidence of the role of financial considerations in rejection decisions. Land acquisition significantly reduced incomes of owner cultivator and tenant households, despite their efforts to increase incomes from other sources. Agricultural workers were more adversely affected relative to non-agricultural workers, while the average impact on workers as a whole was insignificant. Adverse wealth effects associated with under-compensation significantly lowered household accumulation of consumer durables, while effects on other assets were not perceptible. Most households expressed preferences for non-cash forms of compensation, with diverse preferences across different forms of non-cash compensation depending on occupation and time preferences.

*We are grateful to Mr. Atmaram Saraogi of International Centre, Kolkata for sharing with us relevant documents, and the International Growth Centre for financial support under Research Award RA-2009-11-025 (RST-U145). We also thank Mr Nirupam Sen and Mr Rabindranath Bhattacharjee for sharing with us their views, and Mr. Mithun Bhattacharjee for helping us understand various aspects of land and agriculture in the Singur area, besides leading the household survey team.

[†]London School of Economics

[‡]Indian Statistical Institute, Kolkata

[§]Boston University

[¶]Boston University

1 Introduction

In the second half of 2006, the West Bengal government acquired 997 acres of prime agricultural land in order to enable Tata, a leading industry house in India, to build a factory for Nano, its new model for a small and cheap car. In order to do so, the state government used its power of eminent domain under the aegis of the 1894 Land Acquisition Act, which was inherited from colonial times. It was hoping the new car factory and the expected boost it would provide to small firms producing ancillary car parts would jumpstart a new phase of industrial development in the state, promoting much needed job growth in the non-agricultural sector. In order to woo Tata away from other Indian states offering favorable tax concessions, the West Bengal government allowed Tata to specify the location of its factory, and offered it a long lease on favorable terms. Tata chose an area called Singur located on the Durgapur Expressway about 90 Km from Kolkata, the neighboring urban metropolis and transport hub in Eastern India. The West Bengal government subsequently decided to acquire the area required for the factory and offer compensation to those whose lands were being acquired as required by the 1894 Act.

The local community of Singur was incensed by this action, generating resistance from households facing forced acquisition. This resistance soon snowballed into a protest movement, which the Trinamul Congress (TMC) subsequently galvanized. The TMC party, a breakaway faction from the Indian National Congress party, had evolved over the past decade into the main opposition of the Left Front, the principal partner in the state government for over three decades. The state government subsequently offered to improve the terms of compensation, including 25% compensation for tenant farmers engaged in cultivation of acquired plots. No plans were offered to compensate agricultural workers claiming to have lost employment on acquired lands. Some of the acquired plot owners accepted the government's compensation offer. Others refused, and continued to protest under the TMC umbrella. As time went by and Tata started building its factory, some of those who had originally agreed to the compensation changed their mind and joined the ranks of the protesters. The TMC demanded that the government return the lands of those who refused the compensation. Local outbreaks of violence occurred, and the protests acquired national and international media attention. Eventually two years later, Tata decided to withdraw from West Bengal, and took the Nano car factory to the western state of Gujrat.

An earlier episode with similar features occurred in Nandigram, an area in a different district of West Bengal, in which the confrontation between the police and cadres of the Left Front with protesters took an even more violent turn. The events in Singur and Nandigram were instrumental in lowering the popularity of the Left Front, and raising that of the TMC. Eventually in the 2011 elections to the state assembly, the Left Front lost its majority to the TMC decisively, leading to a new government in the state controlled by the TMC.

Disputes over compensation of rural communities that are displaced for the purpose of industrialization have arisen lately in many other parts of India as well. It is widely perceived that displacement and inadequate efforts to compensate and rehabilitate scheduled tribes displaced by various infrastructure projects and mining concessions have fuelled a Maoist insurgency in various parts of India, which the Indian Prime Minister has referred to as the

gravest threat to the internal security of the country.[1] A new Bill to replace the 1894 Land Acquisition Act is currently pending in the national Parliament, while different states have been drafting respective legislations. These have given rise to widespread debates concerning what the provisions of a new law to regulate land acquisition ought to be.

Similar issues have arisen in a number of other countries in Asia and Sub-Saharan Africa as well. An FAO (2009) report stated that large-scale land acquisitions of farmland in Africa, Latin America, Central Asia and Southeast Asia had made headlines in the preceding year in a flurry of media reports across the world.The report focuses on Ethiopia, Tanzania, Ghana, Mozambique, Madagascar, Mali and Sudan. It points to a sharp increase in FDI flows in sub-Saharan Africa (32% of GDP in 2007 compared to 6% in 2000), an increase in land-based investment which puts pressure on land that is already under use by the local population. For example, in Ethiopia 1.4% of agricultural land was allocated to investors during the period 2004-2009. The land deals were mostly through the private sector, often with strong financial and other support from the government. Given the informal nature of property rights and corruption, there has been increasing concern about how to put in legal and procedural mechanisms to protect local interests and livelihoods. A key issue highlighted in the report is that of compensation, in particular, on what it should be based on as well as who should be entitled to it in the presence of multiple and overlapping land rights that are often held through diverse blends of individual and collective rights.

In terms of what economic theory suggests concerning compensation, earlier work by Ghatak and Mookherjee (2011) makes an argument for over-compensation of displaced farmers (in the sense that they ought to be better off after acquisition). On grounds of economic efficiency, this is justified by the argument that reducing under-compensation induces higher investments by both farmers and governments in raising agricultural productivity, and reduces the tendency for governments to over-industrialize at the expense of farmers. These efficiency improvements go hand in hand with more equitable sharing of the gains from industrialization, resulting in greater political sustainability.

The Ghatak-Mookherjee analysis however abstracted from issues of possible heterogeneity of lands and of farmer preferences. While delineating a lower bound for compensation, it does not address the question of exactly how compensations ought to be set. Also neglected were questions concerning the specific form of compensations, whether they should be in the form of cash, or in-kind, or accompanied by rehabilitation and training programs. These issues have arisen in recent discussions of land acquisition policy (e.g., see the symposium in Economic and Political Weekly, or Bardhan (2011)).

The primary purpose of this paper is to ascertain the facts of the Singur experience, with regard to the inadequacy of compensation for land acquisition, and its subsequent effect on decisions taken by owners to accept the compensation, as well as on their incomes and assets. We conducted a household survey in the six villages in which land was acquired, including both households whose lands were and were not acquired. We also conducted similar surveys in six neighboring villages not subject to any land acquisition. The purpose of including households and villages not directly affected by the acquisition is to use a standard of comparison to assess the impact on those whose lands were acquired. We additionally include tenant households and those whose primary occupation is agricultural and non-

[1] See cover story in the *India Today*, Oct 26 2009.

agricultural work, in order to gauge the effect of the acquisition of these groups as well.

The surveys were designed to address the following questions:

(a) Were offered compensations adequate? What is the appropriate standard to assess adequacy?

(b) Was perceived inadequacy of compensation a determinant of owners' decisions to reject the government's offer? What were other determinants of the decision to reject?

(c) What was the impact of the acquisition on subsequent incomes and assets of those affected? Besides effects on owners of acquired plots, what was the impact on tenants and workers directly affected?

(d) What do households prefer in terms of the *form* of suitable compensation, specifically alternatives to cash compensation such as pensions, alternative lands in neighboring areas or shop areas in the factory premises?

Section 2 provides details concerning the design of the survey and the nature of the data collected. Subsequent sections describe what we learnt with regard to each of the four questions listed above. Section 7 concludes with a summary of the main findings, and implications for design of future land acquisition policy.

2 Survey Design and Data

The survey was conducted in the year 2011 in 12 villages in the census town of Singur in West Bengal. Six of these villages were affected by the land acquisition for building the Tata Nano factory: Bajemelia, Beraberi, Gopal Nagar, Joymolla, Khaserbheri and Singherberi. The unaffected villages were: Anandnagar, Baharampur, Ghanshyampur, Jompukur, Raghunathpur, and Simulpukur. Appendix II provides a GPS map which plots the location of these villages.

At the first step, we carried out a household listing exercise, enumerating all households in a door-to-door survey and asking some questions concerning demographic details of the the household, its landholdings and whether it had been affected directly by the land acquisition. Table 1a provides some aggregate statistics from the listing data for the six affected villages. There were 5056 households residing in these villages. The large majority of these households were headed by people whose principal occupation was either agricultural or non-agricultural work. Only about one-tenth were headed by someone who was a 'pure owner cultivator', i.e., someone engaged in cultivation and not leasing in any land. A large fraction of households in other categories owned land and were also engaged in cultivation. For instance, approximately one fourth of households headed by workers owned agricultural land that was subject to acquisition.

With regard to the incidence of tenancy, 49 households were headed by someone cultivating land that was wholly or partially leased in. Households headed by workers also included other members who leased in land. Nevertheless there were only 146 households in all that leased in some land, so the incidence of tenancy was quite low.

A total of 1588 households were directly affected in the sense that agricultural land they owned was acquired. This amounted to roughly one third of all resident households. The amount of agricultural land acquired from residents amounted to 622 acres, in contrast to a total of 820 acres of land that they owned in 2011. In addition there were 124 households that had been leasing in lands that were acquired, and the amount of such land amounted to 182 acres. There is likely to be some double counting involved if we were to add these figures for owned lands and leased in lands that were subject to acquisition, since some of the lands were likely to be leased in from other residents. Nevertheless, even if we use the lower bound of 622 acres reported by owners as having been acquired, we see that approximately two-thirds of the total 997 acres reportedly acquired by the government for the Tata factory consisted of agricultural land. The acquired agricultural land comprised over two fifth of the total agricultural land in the area. And despite the small proportion of tenants, tenanted land accounted for about one fifth of the total land area acquired. Clearly, a substantial proportion of people and land in these villages were directly affected by the acquisition. In this report we shall focus only on compensation of agricultural plots.

The household sample was drawn using multistage stratified random sampling without replacement. The plan was to select a total of 600 cultivators and 200 non-cultivators in the acquired villages, using the principal occupation of the household head. The 600 cultivators in turn were going to be divided between owner cultivators and tenants in a 4:1 ratio, similar to their ratio in the population. Within each category, half were to be selected from those directly affected by the acquisition, and the remaining half from those unaffected directly. These were stratified according to the landownership distribution across size classes in the population.

The actual sample ended up including 436 owner cultivators (with 227 affected and 209 unaffected) and 98 tenants (60 affected, and 38 unaffected), as against the targets of 480 and 120 respectively. There was undersampling of unaffected tenants in particular because of a shortage of such households in particular villages. Other reasons for lower numbers surveyed included difficulty in locating a suitable household representative to answer the detailed survey questions.

The sample plan was to additionally include 200 households headed by non-cultivators, divided equally into 100 affected and 100 unaffected, with two thirds of each group drawn from agricultural workers and one thirds from non-agricultural workers. This target was achieved almost perfectly. These groups were deliberately under-sampled relative to their weight in the population owing to the expectation that such groups would be less affected by the land acquisition. The definition of 'affected' for these groups used the criterion whether anyone in the household had their residence or workplace displaced owing to the acquisition.

Table 1.a: Distribution of Households in Acquired Villages: Summary from Listing Data

Occupation of Head of Household	Total Number of Households	Total Land Owned Currently	No. HH Who *Currently* Have Atleast One Member as Bargadar	No. of Households Affected	If Owned Agricultural Land Affected		If Barga Land Affected		No. Households for Which Homestead Area Affected	No. of Households for Which Hired Workers Affected
					No. of Households Affected	Total Area Affected (Acres)	No. of Households Affected	Total Area Affected (Acres)		
Pure Owner Cultivator	568	321.49	0	321	300	159	3	0	2	127
Pure Tenant Cultivator	7	1.68	4	4	3	0.4	3	0.18	0	2
Mixed Tenant Cultivator	42	28.03	42	40	27	10.0	25	14.86	0	22
Agricultural Wage Laborer	1577	98	58	888	394	149	45	45.37	16	734
Non-agricultural Wage Laborer	1361	129	19	551	437	136	24	62.64	7	303
Other	1501	240.99	23	495	427	168	24	58.82	1	161
Total	5056	819.56	146	2299	1588	622.46	124	181.87	26	1349

Note: The total agricultural land acquired for the above population is 804.33 acres

In the unacquired villages we included 125 households from a previous survey, and 225 newly surveyed households, yielding a total of 350. Both samples were stratified by landholdings. In total we ended up with a sample of 1101 households, approximately three fourths of which were from the acquired villages (where they constituted one-sixth of the entire resident population). The sample households completed a detailed survey of their demographics; household consumer durables, farm and livestock assets, incomes from various sources, wage rates and cost of various consumption items, all of these both currently and in 2005. In addition they provided details of ownership, use, acquisition and disposition of agricultural plots since 1995; details of plots acquired by the government, compensation offered and subsequent decision of household whether to accept or refuse; details of other co-owners of plots; compensation deemed reasonable by the household; uses of compensation money; responses to hypothetical questions designed to reveal preference for spending on different items, rates and nature of time discount, and preferences for alternative forms of compensation.

Table 1b provides a summary of the sample data. There are 733 households from the affected villages. Of these 311 had some plots acquired while 71 had been leasing in plots that were acquired. There are a total of 1127 plots that were acquired, covering 178 acres (18% of total land acquired in these villages). In approximately 60% of these, the compensation offers were rejected.

Table 1.b: Distribution of Households in Acquired Villages: Summary from SampleData

Main Occupation of Head of Household		No. of Households	If Owned Agricultural Land		If Leased in Agricultural Land		Number of Agricultural Plots Acquired (Owner-Cultivated and Leased-in)	Number of Agricultural Plots for Which HH Reported Whether They Accepted or Rejected Compensation Offer	Number of Agricultural Plots for Which Offered Compensation Accepted
			No. of Households Affected	Total Area Affected (acres)	No. of Households Affected	Total Area Affected (acres)			
Cultivator	Classification of HH According to Current Land Holdings	372	190	88.92	21	15.74	696	696	318
	Pure Owner Cultivator	320	160	81.43	13	10.73	601	601	284
	Pure Tenant Cultivator	4	4	0	0	0	0	0	0
	Mixed Tenant Cultivator	45	23	7.49	8	5.01	95	95	34
	Unknown	3	3	0	0	0	0	0	0
Laborer	Classification of HH According to Principle Source of Wage Earnings	201	51	13.44	28	11.48	159	157	58
	Agricultural Laborer	139	26	6.96	24	9.92	97	97	26
	Non-agricultural Laborer	62	25	6.48	4	1.56	62	60	32
Other		160	70	34.54	22	14.3	272	265	94
Total		733	311	136.9	71	41.52	1127	1118	470

Next we check similarities between households that were and were not affected by the acquisition. The location of the Tata factory was on one side of the Durgapur Expressway, with a boundary drawn that cut through six different villages. Those areas falling within the factory site were acquired. Our inspection of the premises did not indicate any distinct features of the areas included in the site, compared with neighboring farm areas. Table 2.a compares demographic characteristics and plot characteristics of affected and non-affected households in the six affected villages. The last column indicates no significant differences in terms of the distribution of household sizes, education, religion, caste and occupation of the head. These results suggest that differences in the fortunes of the affected and non-affected households since 2006 within the same villages should be indicative of the impact of the acquisition on the former group. With regards to plot characteristics, the acquired plots tended to be somewhat bigger (an average of 0.18 acre against 0.12 acres), slightly less irrigated (84% rather than 89%), and with slightly lower rice yields (1346 kg/acre compared with 1376). This probably reflects locational characteristics of the area acquired, as the acquired area was right next to the expressway.

Table 2.b examines differences of household characteristics between acquired and un-acquired villages. Here we do see some significant differences: the acquired villages have more scheduled tribes (5% rather than 2.5%), other backward castes (OBCs, 5% rather than 1.4%), more Hindus (97% rather than 81%). Indeed, we shall later see significant differences in wage rates across villages. Hence cross-village comparisons are more tenuous than within-village differences.

Table 2.c gives characteristics of landlords in the sample. The majority of landlords reside inside the village. The average size of the plot that these land-lords lease out are larger by about 0.12 acres compared to average size of owner cultivated plots seen in tables 2.a and 2.b. Also, the predominant form of contract between landlords and tenants is share-cropping with majority of share croppers reporting to be unregistered.

Table 2.a: Comparing Household Characteristics Within Villages from Sample Data

Variable	Acquired Villages										Testing for Differences in Average Between Columns (5) and (10) (T- statistic)
	Affected Households					Unaffected Households					
	Owner Cultivator (1)	Mixed Tenant (2)	Agri Labor (3)	Non-agri Labor (4)	All HH (5)	Owner Cultivator (6)	Mixed Tenant (7)	Agri Labor (8)	Non-agri Labor (9)	All HH (10)	
Household Characteristics											
Number of Households	167	21	87	30	389	153	24	52	32	346	
Household Size											
Number of Adults in HH	3.1 (1.04)	3.1 (1.15)	2.7 (0.97)	2.7 (0.71)	3.0 (1.05)	3.1 (1.04)	3.6 (1.97)	2.7 (0.93)	2.7 (0.99)	3.1 (1.17)	-1.2
Number of Children	0.6 (0.86)	0.8 (0.89)	1.2 (0.98)	0.8 (0.82)	0.7 (.92)	0.6 (0.85)	0.7 (0.96)	1.3 (1.09)	1.0 (1.14)	0.7 (0.96)	0.0
Education Level of Head of Household	8.64 (3.95)	6.9 (3.3)	9.75 (6.95)	8.57 (6.29)	9.26 (5.5)	7.96 (4.49)	6.54 (2.94)	7.63 (5.69)	8.5 (5.89)	8.61 (5.46)	1.6
Religion: % of HH that are Hindu	0.97 0.17	0.95 0.29	0.97 (0.18)	0.97 0.18	0.97 (0.17)	0.986 (0.11)	0.92 (0.28)	0.96 0.19	0.97 (0.18)	0.98 (0.15)	-0.8
Caste											
% of HH that are SC	0.05 (0.21)	0.14 (0.36)	0.43 (0.5)	0.23 (0.43)	0.18 (0.39)	0.06 (0.23)	0.29 (0.46)	0.46 (0.5)	0.22 (0.42)	0.2 (0.4)	-0.7
% of HH that are ST	0	0	0.08 (0.27)	0	0.08 (0.27)	0	0	0	0	0	-
% of HH that are OBC	0.06 (0.24)	0.05 (0.22)	0	0.07 (0.25)	0.05 (.23)	0.05 (0.2)	0	0.02 (0.14)	0.06 (0.25)	0.04 (0.19)	0.6
Plot Characteristics											
No. of Current Owner Cultivated Plots	162	6	0	15	215	1332	143	73	50	2045	
Average Size of Current Owner Cultivated Plots	0.164 (0.15)	0.08 (0.02)	0	0.3 (0.25)	0.18 (0.16)	0.12 (0.1)	0.12 (0.15)	0.09 (0.07)	0.08 (0.05)	0.12 (0.11)	7.4
Percentage of Plots that are Irrigated	0.81 (0.39)	1 0	0	0.93 (0.25)	0.84 (0.37)	0.91 (0.28)	0.78 (0.41)	0.88 (0.32)	0.9 (0.3)	0.89 (0.21)	-2.3
Percentage of Plots that are Sali	0.42 (0.5)	1 0	0	0.6 (0.5)	0.47 (0.5)	0.42 (0.49)	0.49 (0.5)	0.37 (0.48)	0.42 (0.5)	0.44 (0.5)	1.0
Average Yield Per Acre of Aman Crop	1342.5 (205)	1500 0	0	1308 (106.9)	1346.2 (190.4)	1371 (156)	1406.573 (222.4)	1369.9 (152.3)	1359.8 (137.4)	1376.2 (157.9)	-2.6

Table 2.b: Comparing Household Characteristics Across Villages from Sample Data

Variable	Acquired Villages					Unacquired Villages					Testing for Differences in Average Between Columns (5) and (10) (T- statistic)
	Owner Cultivator	Mixed Tenant	Agri Labor	Non-agri Labor	All HH	Owner Cultivator	Mixed Tenant	Agri Labor	Non-agri Labor	All HH	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
Household Characteristics											
Number of Households	320	45	139	62	735	149	29	40	44	366	
Household Size											
Number of Adults in HH	3.1	3.4	2.7	2.7	3.0	3.1	3.1	2.9	2.6	3.0	0.0
	(1.04)	(1.6)	(0.95)	(0.86)	(1.11)	(1.07)	(0.86)	(0.98)	(0.69)	(1.08)	
Number of Children	0.6	0.7	1.2	0.9	0.7	0.8	0.8	1.0	1.4	0.9	-3.0
	(0.85)	(0.92)	(1.02)	(0.99)	(0.94)	(1.12)	(0.94)	(1.14)	(1.43)	(1.18)	
Education Level of Head of Household	8.32	6.7	8.96	8.53	8.95	7.39	10.45	9.85	7.14	8.85	0.3
	(4.22)	(3.08)	(6.57)	(6.04)	(5.49)	(5.12)	(7.17)	(7.31)	(5.03)	(6.24)	
Religion: % of HH that are Hindu	0.98	0.93	0.96	0.97	0.97	0.79	0.83	0.83	0.77	0.81	9.4
	(0.15)	(0.25)	(0.19)	(0.18)	(0.16)	(0.41)	(0.38)	(0.38)	(0.42)	(0.4)	
Caste											
% of HH that are SC	0.05	0.22	0.44	0.23	0.19	0.14	0.34	0.3	0.09	0.17	0.8
	(0.22)	(0.42)	(0.5)	(0.42)	(0.39)	(0.35)	(0.48)	(0.46)	(0.29)	(0.38)	
% of HH that are ST	0	0	0.05	0	0.05	0	0	0.025	0	0.025	1.9
			(0.22)		(0.22)			(0.16)		(0.16)	
% of HH that are OBC	0.05	0.022	0.007	0.065	0.05	0.013	0	0	0.02	0.014	3.0
	(0.22)	(0.149)	(0.08)	(0.25)	(0.21)	(0.12)			(0.15)	(0.12)	
Plot Characteristics											
No. of Current Owner Cultivated Plots	1494	149	73	65	2260	566	67	16	51	911	
Average Size of Current Owner Cultivated Plots	0.12	0.12	0.09	0.13	0.13	0.14	0.12	0.11	0.11	0.14	-3.3
	(0.10)	(0.14)	(0.07)	(0.16)	(0.12)	(0.10)	(0.07)	(0.05)	(0.07)	(0.11)	
Percentage of Plots that are Irrigated	0.91	0.79	0.88	0.91	0.89	0.93	0.91	0.94	0.98	0.94	-4.6
	(0.29)	(0.4)	(.33)	(0.29)	(0.32)	(0.26)	(0.29)	(0.23)	(0.12)	(0.24)	
Percentage of Plots that are Sali	0.42	0.51	0.37	0.46	0.44	0.50	0.57	0.88	0.58	0.53	-5.1
	(0.5)	(0.5)	(0.49)	(0.5)	(0.5)	(0.5)	(0.5)	(0.32)	(0.5)	(0.5)	
Average Yield Per Acre of Aman Crop	1367.9	1410.3	1369.9	1347.9	1373.4	1316.0	1264.2	1327.5	1300.2	1316.1	8.6
	(162.3)	(218.7)	(152.3)	(132)	(161.5)	(185)	(211.8)	(117)	(163)	(187.4)	

Table 2.c: Characteristics of Landlords in Sample

Variable	Affected Land-lords		Unaffected Current Land-lords	
	LL Resides Outside Village	LL Resides Inside Village	LL Resides Outside Village	LL Resides Inside Village
No. of Plots	27	92	47	132
Total Land Owned by LL	2.76	2.68	1.38	2.06
	(3.25)	(2.28)	(1.3)	(3.94)
Average Size of the Plot Leased-in	0.28	0.25	0.24	0.2
	(0.16)	(0.19)	(0.15)	(0.14)
Main Occupation (% of HH)				
Cultivation	29.63	53.26	27.66	30.3
Business	14.81	18.48	12.77	6.82
Private Service Service	29.63	9.78	19.15	27.27
Government Service	25.93	17.39	40.43	31.06
Housework	0	1.09	0	0.76
Labor	0	0	0	3.79
Contract Form				
No. of Plots with Fixed Lease	1	1	4	42
No. of Plots with Share Cropping	26	91	43	90
If Sharecropper, is Tenant Registered?				
No. Plots where Tenant Registered	1	25	8	12
No. Plots where Tenant Unregistered	25	66	29	79
If Sharecropper, Share of Tenant in Output (Average)	44.63	65.39	62.98	67.06
	(17.9)	(14)	(29.77)	(19.37)

3 Offered Compensations

In this section we examine the evidence concerning compensations offered by the government for the acquired plots. We use two sources of evidence here: (i) the state government's own statements and records of compensation offered, and (ii) household reports of the compensation offers they received. For (i) we use compensation policies specified in state government orders, and records of the Special Land Acquisition Officer at Hooghly District concerning compensations and relevant characteristics of all plots acquired.[2] For (ii) we rely on responses of households in our survey, concerning characteristics of their plots that had been acquired and the compensations they had been offered. Unfortunately we have not been able to match the two sources of data for plot-wise compensation. We shall therefore compare the corresponding averages for compensation of different grades and check if they are consistent.

3.1 The Government's Stated Compensation Policy

Under the provisions of the 1894 Land Acquisition Bill, compensations are to be based on the market value of land at the time of acquisition. The West Bengal Government's order G.O. No. 1705-LA-3M-07/06 gives "guidelines to be followed in the matter of assessment of market value of land." This order is dated 6th June, 2006 and clearly points out factors to consider when assessing the market value of land for any kind of land acquisition the

[2]These detailed plot-wise records were procured by Mr. Atmaran Saraogi using the Right to Information Act. We are grateful to Mr. Saraogi for sharing these documents with us.

government may undertake. On page 6, paragraph 3 of this order, they prescribe standard average prices of land that are classified according to [1] whether land is irrigated or not [2] Whether it is single crop or double/triple crop agricultural land [3] whether it is homestead land or fallow land or whether there are water bodies etc. [4] proximity to state/national highways or other strategic locations (Schedule 1).

Using these principles the government approved a set of market-based rates for different categories of land. These are provided in Table 3. The two kinds of agricultural land are called *Sali* and *Sona* respectively. There is considerable ambiguity concerning the definition of these terms. The official definition of Sali land is that it is single-cropped, whereas Sona is multi-cropped. However, local farmers when asked about the type of plots gave a similar but slightly different definition: according to them Sali means single-cropped low-land that does not receive assured irrigation from state canals. And they consider Sona to be multi-cropped land on a higher level receiving assured irrigation. As we shall see there are further gradations within Sali and Sona plots with regard to elevation. These definitions of the type of land are far from watertight, in more senses than one. As Table 8.c below shows, plots reported by owners to be Sona tended only *on average* to be more irrigated and multi-cropped than Sali plots. More importantly, the type of plot is not immutable: it can be changed over time with suitable investments in water access and multi-cropping arrangements. The land records describe whether any given plot is Sali or Sona, but this is presumably based on an inspection carried out by land assessors. According to the local residents as well as government officials, the official classification of plot types originates in land surveys carried out prior to Independence, under the British colonial administration. The land records are therefore likely to be out of date, as land that was previously Sali may have been converted to Sona as a result of investments made by the owner. The owner is supposed to requisition for a redesignation of the plot from Sali to Sona in such cases, but in practice this is often not done owing to the time and cost associated with any such redesignation.

In what follows, we shall use the terms Sona and Sali as reported by the owners themselves, for two reasons. First, the assessment of owners is likely to be more accurate than that of the official land records dating back to British times. And second, we are interested in understanding perceptions of under-compensation among owners and the extent to which this may have accounted for their reaction.

Table 3

Land Rates approved by the Government of West Bengal

Classification of Land	Approved Rate
Sali land	Rs 6,01,718 per acre
Sona Land	Rs 8,80,029 per acre
Homestead	Rs 18,04,431 per acre
Shop or Cold Storage	Rs 14,43,545 per acre
Bamboo Garden	Rs 7,04,023 per acre
Temple	Rs 6,01,718 per acre
Burial Ground	Rs 6,01,718 per acre
Canal	Rs 3,61,030 per acre

In any case, the government order stated rates payable on compensation of Sali and Sona lands at different rates, with Sona lands to be paid a considerable premium. The order did not describe how these rates were decided. The government order also mentioned a number of possible modifications to these rates: [1] Compensation for the value of structures built on the land; [2] Solatium of 30% on and over the basic market value of the land and value of things attached to land; [3] Tree value according to age and kind of trees on the property; [4] Damages for the standing crop at the time the land was acquired; and [5] Additional Compensation at the rate of 12 % p.a. for the period from the date of notification till the award was declared. These components were to be paid over and above the land value.

The Governor's Order G.O. No.1703-LA-3M-07/06 additionally detailed procedures to be followed by those who have ownership rights for the land acquired and file a claim for compensation. It asked claimants to make claims about the market value of their land, incorporating details such as distance, irrigation, the solatium of 30% (plus interest at 12% p.a. for delayed award payments in paragraph 9), and then allowing scope for bargaining across the table.[3]

Hence the government order allowed scope for variations in the actual compensations based on claims made by affected owners. But all such modifications would have served, if at all, to raise actual compensations offered. An examination of the detailed plot-wise records of the Special Land Acquisition Office in Hooghly district reveals that most Sali and Sona plots were paid as per the stated rates in Table 3. These records are summarized in Table 4. Approximately one quarter of all plots were not assessed a positive land value at all, so these owners were offered zero compensation. However, handwritten corrections were later inserted for some of these, perhaps as a result of appeals made by the concerned owners. On the three quarter of the plots that were assessed at a positive value, land rate was paid at declared rate for Sali. Solatiums were offered for the vast majority of these at the stated 30% rate. So we see from the government land records that compensations were not offered to one quarter of the plots acquired, for reasons having to do with inability to assess the area and/or market value of the land.

Table 4: Summary of Land Rates According to Official Land Acquisition Records

Type of land	Total Area of Land Acquired (Acres)	Total Number of Plots	Total Compensation Offered by Government (Rs. Crores)	Plots for which Land Value Assessed					Plots for which Positive Solatium Paid	
				Number of Plots	Mean (Rs. Lakhs)	Median (Rs. Lakhs)	Standard Deviation (Rs. lakhs)	Amountthat was Declared by the Government (Rs. lakhs)	Number of Plots	Proportion (%) of Plots where Government Paid Solatium @ 30% as Declared
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Sali	873.2	16925	68.8	12851	6.0	6.0	1.8	6.0	12837	97
Sali Plots Near Highway	21.2	453	2.1	330	6.6	6.6	0.5		328	95
Sona	35.4	1030	3.5	779	8.6	8.8	2.5	8.8	779	95
Sona Plots Near Highway	1.0	53	0.2	26	9.7	9.7	0.0		26	100

Note:
[a] For columns 1 and two, we look at those observations for which the size of plot is less than 50 acres as observations with size greater than 50 acres are clearly outliers.
Also, we only look at those plots for which a non-zero land value compensation is offered.
[b] In columns 3-10, in addition to above, we exclude the plots (For both sona and sali plots) where compensation per acre was above 40 lakhs per acre as these are outliers.

Concerns are frequently expressed concerning the quality of official land records. In later sections we shall see many other discrepancies between these records and compensations or

[3]See paragraph 11 of the Order.

other details of acquired plots reported by households. This complicates our ability to assess the adequacy of the compensations offered.

3.2 What Was the True Market Value of Land?

The first step in evaluating the government's stated compensation policy is: how did the stated valuations of Sona and Sali land relate to their true market prices? Some critics of compensation policies based on market valuation assert the difficulties in assessing true market values, owing to a variety of reasons. First, land markets are believed to be thin in developing countries, so data concerning market prices are not readily available. Second, officially recorded market prices may deviate from true market prices owing to transaction costs involved in recording market transactions. Many market transactions are never recorded officially, and even for those that are recorded the stated price understates the true price in order to reduce stamp and registration duties payable to the government. Third, the exact time at which market prices are assessed can matter in periods of substantial inflation in real estate values. Going by past transactions may then understate the true market price at the time of acquisition.

To assess these problems, we examine land transactions reported by households since 1995. To avoid the second problem listed above, we rely on the prices reported by the households themselves, rather than rely on official data on land transactions. Table 5a examines frequency and extent of land market transactions between 2005 and 2010 from the listing data (i.e., for the entire population), while Table 5b examines transactions reported by sample households since 1995. The former shows that 3.8% of all households engaged in market transactions in the five years preceding 2010. The area involved was 6.3% of the agricultural land owned in 2010, and between 3-4% of the land owned in 2005 prior to the land acquisition. These rates match the rates of market transactions reported for all of rural West Bengal for the period 1967-2004 by Bardhan et al (2011).[4]

[4]They find 23–25% of all households had engaged in land market transactions over this period, with average amounts of land bought or sold amounting to 0.5 acre per household, compared with 2.8 acres owned per household in 1967 and 1.4 acres owned in 2004. Hence aproximately a quarter of households and agricultural land area were involved in market transactions over a 37 year period, which translates into a 3-4% rate for every five years.

Table 5.a: Land Transactions Since 2005 in Acquired Villages (from Listing Data)

Type of Transaction	No. Plots	Total Area	Average Size of Plot
Agricultural Land Bought Within Village	41	9.36	0.228
Agricultural Land Bought Outside Village	24	8.59	0.36
Agricultural Land Sold Within Village	82	23.86	0.29
Agricultural Land Sold Outside Village	44	9.98	0.23
Total	191	51.79	

Note: From table 1.a and above table, we get the following facts for acquired villages:

[a] 3.8 % of all households transacted in land market since 2005 in acquired villages
[b] Amount of land that was transacted upon in the last 5 years is 6.3% of all currently owned agricultural land

Table 5.b: Plot Characteristics of Land Currently Owned or Recently Transacted

	Land Bought Since 1995			Land Sold Since 2005			Land Currently Owned (Excluding Bought Since 1995)		
Variable	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Size of Plot (acres)	250	0.15	0.15	37	0.14	0.18	3146	0.13	0.11
Distance from Highway	159	3.10	2.72	19	2.61	1.22	1970	2.91	1.95
Yield Rate of Aman crop (Kg/acre)	219	1368	186.13	34	1386	232.09	2932	1356	170.26
Dummy Variable	**Obs**	**% of Plots**		**Obs**	**% of Plots**		**Obs**	**% of Plots**	
Irrigation Status	250	87.20		25	84.00		3145	90.42	
Whether Rice Grown More than One Season	255	47.10		37	81.10		3238	3.64	
Type of Land									
Sona High	68	27.20		8	21.62		1023	32.52	
Sona Low	54	21.60		1	2.70		669	21.27	
Sali High	95	38.00		19	51.35		1142	36.30	
Sali Low	33	13.20		9	24.32		312	9.92	

Notes:
[a] Irrigation status is a dummy that takes value 1 if a plot is irrigated. The plot may either be partially of fully irrigated
[b] The distance variable looks only at those plots that are within 10 minutes walking distance of the homestead

Table 5b shows details of land market transactions from households in the sample for a longer period (since 1995), which provides additional information concerning the nature of plots transacted. Approximately 8% of plots owned in 2010 were bought since 1995, with the area also roughly in the same proportion. The sold plots resemble plots owned in 2010 with respect to size, distance from the highway, rice yield, irrigation status and type of land (with

approximately half being Sona and half being Sali). However, they differ in one respect: whether rice was grown more than once. While 3.6% of all plots owned in 2010 grew rice more than once, 47% and 81% of plots transacted since 1995 and 2005 respectively grew rice more than once. Hence market transactions were biased in favor of more productive plots with regard to ability to grow rice more than once a year, though not with regard to other measures of quality.

The sample data allows us to examine market prices for transacted plots. Here reliance on transactions since 2005 means examining a fairly small number of transactions, implying lack of any statistical reliability. On the other hand, looking at transactions since 1995 allows us to examine a larger number of transactions, at the cost of increasing problems of recall and non-comparability of prices across years owing to inflation. In only 97 transactions out of 250 do the households report prices, and inclusion of various plot characteristics lowers the size of the sample to 74. These problems of attrition could well be non-random, rendering more difficult the problem of statistical inference. Additional problems arise from selection bias, in which plots or households with specific characteristics may have been engaged in market transactions, so that the prices of those plots may be unrepresentative of plots acquired by the government (which were not transacted in the market). Hence the problems of thin markets is an important one, a problem compounded by substantial heterogeneity of plots and households involved in past market transactions.

Nevertheless, having stated all these provisos, market prices on past transactions are useful at least from a descriptive point of view. Table 6 compares mean prices of Sali and Sona plots transacted in the five years preceding 2005. Plots reported as Sona by the households transacted at a premium of over Rs 2 lakhs per acre during this period. Sona prices ranged between Rs 4 and 6 lakhs per acre, while Sali between Rs 2 and 3 lakhs per acre. To be useful one needs some estimates of rates of inflation of market prices over time, which necessitates more data. Table 6 pertains to a small sample of only 18 Sona and 26 Sali plots. To control for village and year dummies, one needs to use a larger sample.

Column 1 in Table 7 reports a regression of prices of 97 plots transacted since 1995 on whether the plot was Sali or Sona and on high or low land, besides village and year dummies. The Sona premium relative to Sali plots was Rs 1.26 lakhs per acre indicating that the premium was growing over time. The premium for high land was approximately Rs 0.6 lakhs per acre. Column 2 of Table 7 expands the set of regressors to include irrigation status, distance from highway and railway line, and paddy yield, factors which did not seem to differ markedly from the stock of all plots owned in 2010 (i.e., whose estimated coefficients are unlikely to be biased owing to selection problems). This lowers the number of data points in the regression to 74. Irrigation status differed markedly between high and low plots, so its inclusion affects the estimated premium for elevation. The Sona premium for high land over Sali is now approximately Rs 1.5 lakh per acre, though it is no longer statistically significant. of over Rs 1 lakh per acre. Proximity to railway stations and highway mattered significantly, while the coefficients of irrigation and rice yields were positive but insignificant. Controlling for these factors, we obtain from the estimated time dummies an estimate of inflation of property values since 1995. These are plotted in Figure 1. We see a smoothly rising time trend, until 2006 when there is a sharp spike upwards, followed by a sharp drop in 2008, and another sharp rise in 2010. The sudden changes in 2006 and 2008 are consistent with the land acquisition occurring in 2006 and the exit of Tata in 2008.

Table 6: Transaction Price of Land Bought During 2000–2005

Type of Land	Nominal Transaction Price (Rs. Lakhs)		
	No. of Plots	Average	Std. Dev
Sona High	9	4.29	2.35
Sona Low	9	5.49	2.31
Sali High	15	2.22	1.23
Sali Low	11	2.39	1.49

Table 7: Regression of Market Prices of Plots Transacted 1995-2010

	(1)	(2)
VARIABLES	Dependant Variable: Market Price of Land	
Sona Low	-68,550	29,004
	(105,486)	(75,836)
Sali High	-126,134***	-147,855
	(39,814)	(84,461)
Sali Low	-182,012	56,566
	(104,400)	(74,087)
Partial Irrigation		63,831
		(48,518)
Complete Irrigation		31,472
		(83,899)
Distance from Highway		-112,716*
		(61,162)
Distance from Railway Line		-161,192***
		(22,386)
Paddy (Aman) Yield per Acre		21.66
		(87.11)
Constant	233,908**	1.286e+06**
	(80,726)	(416,983)
Observations	97	74
R-squared	0.745	0.845
VilLage FE	YES	YES
Year FE	YES	YES

Village-Clustered Standard Errors at Village Level in Parentheses
*** p<0.01, ** p<0.05, * p<0.1

Note: Gopalnagar (Acquired Village) is the Base Village Dummy and the Base Time Dummy is 1995.

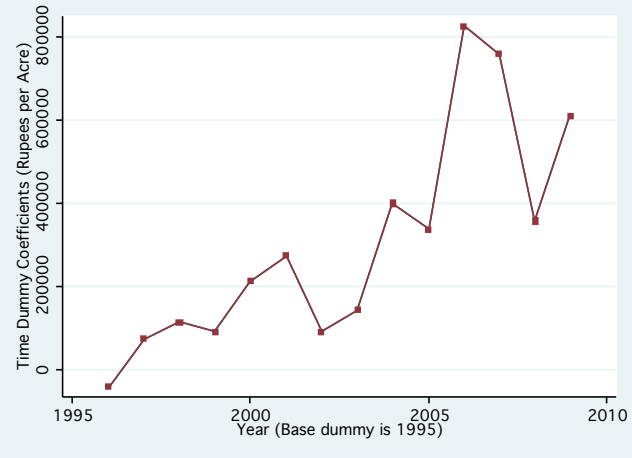


Figure 1: Estimated Change in Land Prices since 1995

One could use the regression in Table 7 to predict prices of Sali and Sona land in 2006. But for the reasons explained above, such an estimate would be unreliable. The regression is also based on the assumption that the Sona premium did not vary over time, in contrast to the rise in the premium witnessed between 1995 and 2005. The paucity of data does not permit inclusion of an interaction of the Sona premium with year dummies in the regression.

We believe a better way to estimate market prices is to use the market valuations reported by the households themselves. We turn to this next.

3.3 Market Values and Compensation Offers Reported By Households

Surveyed households whose lands were acquired were asked what the market value of their acquired properties were at the time of acquisition. These assessments were on the basis of their knowledge of comparable properties that had been transacted recently. While there may be some bias and imprecision in owners' own beliefs concerning what their properties would have commanded on the market, it has a number of advantages over relying on prices of actually transacted properties. First, data is available on all plots rather than just those which were actually transacted. This avoids the bias associated with selection of properties that were actually transacted. It expands the number of observations considerably, relieving the problem of market thinness and smallness of the sample. Moreoever these valuations are assessed for the same year 2006 of acquisition, obviating the need to extrapolate from past years and adjust for inflation in property values. Nevertheless, one should be aware of a general tendency for owners to exaggerate the market value of their properties, especially following an incident of forced acquisition of these properties by the government which generated so much protest.

Another advantage of using this data is that it provides us an idea of what landowners *perceived* concerning the valuation of the acquired properties, which may help explaining how they reacted to the compensations offered. For this purpose it is useful to combine owners'

perceptions of market valuations with the compensation offers they received for their specific properties. Table 8a provides averages of market values and compensation offers reported by households, classified into the four different types of land (also self-reported). We see that high lands commanded a premium of about Rs 30,000 per acre among both Sali and Sona lands. The average reported market value of Sona high land is Rs 9 lakhs per acre, and for Sali high land is Rs 8.6 lakhs per acre.[5] This implies that the government's offered rate (inclusive of the 30% solatium) were substantially above the market value of Sona land, but somewhat below that of Sali lands. Inclusive of solatium, Sona lands were offered Rs 11.44 lakhs per acre, while Sali was offered Rs 7.8 lakhs per acre. This implies that Sona land was over-compensated while Sali was undercompensated relative to market values.

However, *looking at the compensation offers reported by the households themselves, we obtain exactly the opposite conclusion.* Table 8a shows that both Sona and Sali high land owners reported receiving compensation offers of Rs 8.8 lakhs per acre, in contrast to the Rs 11.4 and Rs 7.8 lakh figures contained in the government order and in the official land documents. Comparing the reported compensation offers with the reported market valuations we see that Sona high owners were under-compensated (average offer of Rs 8.8 lakh as against market valuation of Rs 9 lakh per acre) and Sali high owners were over-compensated (average offer of Rs 8.8 lakh compared with a market value of Rs 8.6 lakh per acre.)

Table 8.a: Avg. Market Valuations and Compensation Offers Reported, by Land Type

Variable	Land Type	Observations	Mean	Std. Deviation
Compensation Offered (Rs. Lakhs)	All Land types	681	8.8	1.5
	Sona High	174	8.8	0.5
	Sona Low	71	8.3	1.6
	Sali High	266	8.8	1.3
	Sali Low	170	9.0	2.4
Reported Mkt. Price at the time of acquisition (Rs. Lakhs)	All Land types	681	8.6	4.2
	Sona High	174	9.0	3.2
	Sona Low	71	8.7	2.6
	Sali High	266	8.6	5.7
	Sali Low	170	8.3	2.7

3.4 Discrepancy between Compensation Offers Reported by Households and Government Records

The huge magnitude of the discrepancy between official documents and household reports of compensations offered is striking. It is not just a case of households tending to under-report compensations offered generally, since Sali owners report compensation offers are larger (Rs 8.8 lakh per acre) than what the government records (Rs 7.8 lakh, inclusive of solatium) indicate. Perhaps this was a result of additional adjustments over the announced rates made on the basis of structures, trees, location of Sali properties, and some degree of bargaining that the government order allowed. But then why would the same not happen in

[5] A lakh is Rs 100,000.

the case of owners of Sona lands, who reported being offered Rs 8.8 lakh on average rather than the Rs 11.4 mandated by the government order inclusive of solatium? The standard deviation of reported compensation offers is Rs 0.5 lakh per acre, so it is very unlikely that the discrepancy of Rs 2.6 lakh arose on account of sampling error. Indeed, a formal statistical test of the hypothesis that the discrepancy arose owing to sampling error is decisively rejected at practically any level of significance. For Sona plots the associated t-statistic is greater than 40, irrespective of whether solatium is included in the compensation. For Sali plots we reject the hypothesis (in the opposite direction) if solatium is included (t-statistic of 12) but not if it is excluded (t-statistic of 1.2).

In order to unearth the source of this discrepancy, we subsequently interviewed local farmers, residents and government officials. It seems the most likely explanation is that the government land records and household responses disagree substantially about the classification of land type. The definition of Sona land provided us by local residents is that there should be assured access to water from state canals, and the land should be capable of being multi-cropped. Neither of these characteristics are immutable. Farmers can make investments to connecting their plots to feeders from state canals, and in soil preparation needed to plant different kinds of crops. Government land records are based on plot characteristics at some past point of time, following inspection by land assessors. In the meantime farmers may have upgraded their lands from Sali to Sona, but may not have succeeded in getting this change to be noted in the official land records. This is a process which involves petitioning land officers for a re-assessment which is time-consuming and non-straightforward.

It is therefore possible that many plots that were historically Sali have been converted into Sona by farmers, but this did not get incorporated in the official land records. So plots that the owners reported as Sona, were actually recorded as Sali on official documents, and offered compensation at Sali rates.

To check the plausibility of this hypothesis, we compare the proportions of lands acquired that were listed as Sona on government records, with what households reported as Sona. Table 8b provides the results of this comparison. We restrict attention to 96% of the agricultural plots that were assessed a positive market value in the government records. It turns out that 4% of acquired areas (and 5% of such plots) were listed as Sona in the government records. But in the household sample, 37% of areas acquired (and 32% of plots acquired) were described by their owners as Sona.

A back-of-the-envelope calculation indicates that this can account for most of the discrepancy in compensation offers. The hypothesis suggests that plots classified by owners as Sali must also be classified as Sali in the land records. If all plots listed as Sali in the official records were offered compensation at the same average rate, then 96% of areas acquired were offered Rs 8.9 lakh per acre on average by the government. With the remaining 4% being officially classified as Sona and offered Rs 11.4 lakh per acre, the average compensation across all agricultural plots according to the official documents was Rs 9.0 lakh per acre. Whereas the compensation reported by owners when averaged across all types of land amounts to Rs 8.75 lakh per acre. The discrepancy is well within one standard deviation of the reported compensations.

Table 8b: Comparing Government Records and Household Responses

Type of Land	Official Land Records Data: Agricultural Plots				Sample: Owned Agricultural Plots			
	Number of plots acquired		Area acquired		Number of plots acquired		Area acquired	
	No. Plots	% of total	Area	% of total	No. Plots	% of total	Area	% of total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sali	12980	89.3	873.2	91.6	571	50.7	87.75	62.9
Sona	788	5.4	35.4	3.7	366	32.5	51.83	37.1
Total in data source	14532	100	953.6	100	1127	100	139.58	100

Note:
[a] For Official Land Records data, we look at only those plots that are less than 50 acres and non-zero land value compensation was offered.
[b] Due to lack of data on soil type for leased in land, we only look at owner cultivated plots from the sample

Table 8c: Land Types and Plot Characteristics Reported By Households

Type of land	Total Plots	No. of plots				% of plots that were improved in last 10 years
		Irrigated and Multi-crop	Irrigated and Single crop	Non-irrigated and Multicrop	Non-irrigated and single crop	
Sona high	239	234	3	1	1	58.3
Sona low	120	114	6	0	0	25.8
Sali high	364	186	127	4	47	12.9
Sali low	202	14	52	1	135	3.9

Are the owners' declaration of their land types as Sona consistent with their reports of irrigation and multi-cropping status (referring to whether crops apart from rice such as potatoes, jute and sesame are grown) of the acquired plots? The answer is yes. Table 8c provides data concerning irrigation and multi-cropping status of acquired plots. 97% of Sona plots are both irrigated and multi-cropped. In comparison about half of Sali high plots and less than 7% of Sali low plots have this feature. The majority of Sali high plots are irrigated, but it is possible that the irrigation source for these is not state canals.[6] Consistent with the hypothesis that the mis-classification arose owing to land improvements made by owners, 58% of Sona high lands were improved since 2000, with the corresponding proportions for Sona low and Sali lands being 25 and 10% respectively.

We conclude that *averaging across all types of plots, compensations offered by the government for agricultural plots were close to their market values, but there was systematic under-compensation for Sona plots and over-compensation for Sali plots.* Sona plots which were under-compensated accounted for about one third of the land acquired and of owners affected. The most likely explanation for this is the failure of the official land records to incorporate accurate information concerning plot characteristics, in particular failing to identify their irrigation and multi-cropping status correctly.

[6]Bardhan et al (2010) find in a land survey for all rural West Bengal villages in 2004 that the most frequent source of irrigation was tubewells, followed by riverlift and ponds, with state canals being the least important. Our questionnaire did not incude questions regarding the source of irrigation.

3.5 Inability of Compensation Offers to Incorporate Land Heterogeneity

The preceding results indicate the need to focus on heterogeneity of market values of plots acquired, and the inability of government compensation offers to incorporate this heterogeneity. This is the pertinent question rather than how the average compensation offered related to market values.

Table 9 reports regressions of reported land values on their types as well as a number of other characteristics. Column 1 includes dummies for different villages, besides the land types. We see considerable dispersion of land values across the different villages, ranging to Rs 2.3 lakh per acre higher in Bajemelia over Gopalnagar, and Rs 1.6 lakh per acre lower in Khaserberi. Quite likely the Sali/Sona and high/low classifications do not include all the relevant characteristics. Table 8c already showed that these classifications do not correlate perfectly with irrigation and multi-cropping status. Column 3 in Table 9 accordingly includes irrigation, multi-cropping status, whether rice is grown more than once per year, and whether the land had been improved in the previous decade. Column 5 additionally includes distance from the highway, the nearest railway station, rice yield, whether the owner had exclusive selling rights, besides total land owned by the household, education and occupation of the owner. We see significant positive effects of selling rights, rice yields and whether rice is grown more than once. Total other lands owned by the household have a negative effect. These are broadly consistent with the hypothesis that investments made by owners in the quality of the plot matter, apart from soil characteristics that affect yields and multi-cropping capabilities for rice, the main crop in the area. However, despite controlling for these, the Sona premium continues to be of the order of Rs 1.5 lakh per acre. Inter-village differences also persist. Hence there are other characteristics of plots that still matter that we have not yet picked up.

Columns 2, 4 and 6 provide corresponding regressions for compensation offers received for these plots. *What is notable is the absence of significant variation of compensation offers with any of the relevant characteristics of plots or owners that affect market values.* The R-squared of the compensation regressions are .02, .02 and .13, against .13,.17 and .24 for the market value regressions. In other words, compensation offers largely failed to incorporate heterogeneity of market values. Table 10 regresses the perceived under-compensation, defined by the extent to which the market price exceeded the compensation offer as reported by each owner on different plot types, after controlling for village dummies in column 1, additionally for plot and owner characteristics in columns 2 and 3. Particularly after controlling for plot characteristics, we see a significant difference in the extent to which Sona plots were under-compensated compared with Sali plots, by approximately Rs 1.5 lakh per acre. Hence compensation offers failed both to incorporate soil types that ought in principle to have been observed by government authorities, as well as other characteristics of plots and owners that are harder to incorporate in calculations of market land values used in governmental compensation formulae.

Table 9: Heterogeneity of Reported Market Values and Compensation Offers

VARIABLES	(1) Reported Market Value at time of Acquisition	(2) Compensation Offered	(3) Reported Market Value at time of Acquisition	(4) Compensation Offered	(5) Reported Market Value at time of Acquisition	(6) Compensation Offered
Sona Low	-33,300	-48,598	-15,583	-53,281	21,895	-77,687
	(101,681)	(34,016)	(114,047)	(38,799)	(151,381)	(55,081)
Sali High	-123,964	-4,909	-155,892*	-6,680	-131,415	-29,460
	(67,396)	(18,060)	(70,205)	(20,320)	(97,454)	(27,970)
Sali Low	-94,563*	18,819	-133,625	24,091	-167,930**	61,526
	(46,339)	(31,612)	(80,578)	(36,678)	(47,281)	(56,098)
Whether Plot is Irrigated			64,535	-3,089	-80,246	-7,096
			(43,587)	(14,660)	(75,609)	(14,122)
Whether Rice Grown for More Than One Season			170,377	20,887	403,712**	53,466
			(155,602)	(34,799)	(139,009)	(45,299)
If Multiple Crops Grown in a Year			-138,717**	16,966	-35,143	6,879
			(42,372)	(28,314)	(96,450)	(12,844)
Land Improvement			69,452	-13,845	70,303	-5,127
			(85,183)	(26,357)	(96,977)	(30,754)
Distance from Highway					231,173	53,524
					(151,022)	(100,731)
Distance from Closest Railway Station					-46,269	-5,229
					(63,200)	(9,286)
Paddy (Aman) Yield per Acre					197.7	-52.12
					(201.6)	(45.38)
Selling Rights					109,017*	-22,431
					(50,226)	(12,680)
Total Land Owned by HH					-31,451*	-16,905
					(13,881)	(14,017)
Education Level of HOH					1,928	8,743
					(3,458)	(9,313)
Whether HOH Owns a Business					1,866	-120,102
					(88,037)	(75,117)
Bajemelia	-233,268***	-10,637**	-237,058***	-14,457**	-10,751	16,560
	(6,512)	(3,306)	(18,523)	(4,603)	(92,273)	(40,789)
Beraberi	14,342	9,392*	-17,599	9,820*	266,096*	7,013
	(11,985)	(4,477)	(21,068)	(4,163)	(116,533)	(31,274)
Gopalnagar_KGD	-130,445***	-1,888	-132,100***	255.6	-189,117**	-17,846
	(7,809)	(4,367)	(21,855)	(9,007)	(76,245)	(34,616)
Joymolla	-7,492	16,408	-3,636	18,358	247,092	31,379
	(17,948)	(9,005)	(32,812)	(10,572)	(226,879)	(51,530)
Khaserbheri	159,374***	14,776	174,699***	8,649	579,558**	61,493
	(17,217)	(7,803)	(23,073)	(5,925)	(208,881)	(105,940)
Singherbheri	141,693***	-22,505**	161,968***	-25,282***	459,451*	57,195
	(14,568)	(8,508)	(13,649)	(3,342)	(214,250)	(114,081)
Constant	960,474***	881,718***	984,746***	877,930***	247,587	812,066**
	(40,821)	(3,708)	(97,616)	(13,786)	(345,614)	(311,752)
Observations	679	679	679	679	446	446
R-squared	0.133	0.020	0.171	0.021	0.240	0.131
VilLage FE	YES	YES	YES	YES	YES	YES

Village-Clustered Standard Errors in Parentheses, Base Dummy is Gopalnagar
*** p<0.01, ** p<0.05, * p<0.1

Table 10: Patterns of Under-compensation Across Soil Types

VARIABLES	(1)	(2)	(3)
	Dependant Variable: Reported Market Value - Portion of Compensation Given for Land Value		
Sona Low	-5,113	30,043	34,355
	(111,126)	(120,595)	(113,308)
Sali High	-121,117	-143,896*	-146,149*
	(66,708)	(69,349)	(66,117)
Sali Low	-105,479*	-151,747*	-153,337**
	(45,679)	(65,556)	(56,140)
Constant	457,972***	481,326	433,549
	(51,900)	(471,617)	(530,706)
Observations	679	673	666
R-squared	0.125	0.175	0.197
Other Plot Characteristics	NO	YES	YES
Household Characteristics	NO	NO	YES
Village FE	YES	YES	YES

Village-Clustered standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

3.6 Is Market Land Value an Adequate Basis of Compensation?

These observations motivate a conceptual issue concerning what it means for compensation to be adequate. In particular, would tying them to market valuations result in adequate compensation? Theoretically, an 'adequate' compensation would be the reservation price for the owner, i.e., the price at which the owner would be indifferent between selling and not selling. Imperfections in land and financial markets create gaps between market prices and reservation prices. These gaps can arise owing to transaction costs associated with selling a property. Even more importantly, agents value land for many reasons apart from the wealth these assets represent. These include financial security, complementarity with productive skills, and limited susceptibility to erosion owing to temptation to indulge in temporary consumption expenditures. Insurance markets are almost universally incomplete, and particularly so in rural areas of LDCs. Opportunities to save are also limited owing to limited financial development in these areas. Land acquires an additional premium over and above its market value as a hedge against inflation and as an instrument of saving. Many farmers have productive skills tied up in farming activities, creating an additional complementarity between land and their human capital. A farmer typically invests in improving land quality of plots he owns in ways that are not observeable or verifiable by others, wherein such investments are not rewarded in the form of a market premium for better quality land. Moreover, land is less prone (compared with divisible financial assets such as cash or bank deposits with easy withdrawal facilities) to erosion over time owing to temptation for agents to indulge in temporary consumption needs, or difficulty denying help to relatives or friends when asked for. Land is relatively less prone to such erosion, since there is a minimal size of a plot that can be transacted, owing to fixed transaction costs and difficulty in chopping up land parcels into arbitrarily small bits sold to different people. Many farmers in the Singur area that we interviewed expressed concerns that cash compensations would erode for reasons that would be hard for them to control.

Sociological consideration may also play a role. The connection between land and social status has been argued by some scholars as a reason for thinness of land markets in developing countries. Notions of social identity may also create reluctance among those who see themselves as farmers and lacking alternative ownership of land to sell their lands as this will undermine their traditional identity and require a transition to new roles in society. Such considerations may be stronger for those engaged in cultivation and own few other lands. However, it is difficult to empirically distinguish this hypothesis from the economic arguments based on risk aversion and complementarity with farming skills.

For these reasons, many farmers might have reservation prices for land that may exceed its market value. Indeed, the fact that many owners had been holding on to these lands for some time reveals that their reservation values exceeded the market price they could have sold it at. Hence the market price for land is not the appropriate standard of adequacy of compensation for long standing land holders. *Even if it were possible for all relevant plot characteristics to be correctly observed and incorporated in calculation of market values, compensations set equal to these values would be inadequate for those who had held on to the property consistently over time.* One would expect risk attitudes, complementarity of land with human capital and concern for temptation-proneness to vary from household to household. These represent additional sources of heterogeneity of owner characteristics that

matter in defining the standard for adequate compensations. It is inherently difficult to incorporate such factors in market-value-based compensation formulae. One could view the 30% solatium offered by the West Bengal government as an adjustment made to incorporate these factors. Such an amount is arbitrary, and could well result in inadequate compensation for many land owners. Indeed, as we saw above, owners of Sona land were under-compensated relative even to the market value standard, even after incorporating the solatium. For long standing owners their reservation prices were higher than market values, so such owners were definitely under-compensated.

4 Determinants of Household Decisions to Accept Compensation Offers

The preceding arguments suggest that a significant proportion of owners were under-compensated, and this may have been a prominent reason for many of them deciding to reject the government's offer. We now test this hypothesis. Table 11a presents marginal effects of various determinants of the likelihood of an owner accepting a compensation offer, based on probit and logit regressions (with village fixed effects, i.e., these are based on within-village variations of acceptance decisions). Column 1 shows an increase in under-compensation (relative to market value) by Rs 1 lakh per acre resulted in a 3.2% lower likelihood of acceptance. We have seen earlier (e.g., Table 10) that under-compensation was greatest for Sona high plots, followed by Sona low plots. Sali plots were over-compensated, especially Sali low plots. We would expect then that the probability of acceptance would be highest for Sali low, followed by Sali high, then Sona low, with Sona high plots least likely to be accepted. This prediction is borne out, as shown in Columns 2 and 3. Sali low plots were more likely to be accepted by about 29% than Sona high plots in the same village. Sali high and Sona low plots were about 6-7% more likely to be accepted than Sona high plots; this difference is not statistically significant. Column 4 adds various plot characteristics that are potentially verifiable by government authorities. The effect of under-compensation continues to be about 3% and highly significant; Sali low plots in the same village were 30% more likely to be accepted.

But factors other than perceived under-compensation also mattered. Sona low plots were also about 15% more likely to be accepted than Sona high plots, after controlling for under-compensation relative to market value and various plot characteristics. Plots that were irrigated, located closer to a railway station, and on which rice was cultivated more than once, were less likely to be accepted, after controlling for soil type and under-compensation relative to market value. Irrigation and location of plots could affect reservation values of owners in ways not captured in market values. For instance, irrigation increases predictability of yields in the face of uncertain rainfall, which would make farmers that are particularly risk-averse value irrigated plots more compared with less risk-averse farmers, even after controlling for their market values. Or households with a higher valuation of proximity to a railway station compared with other farmers in the region would place a higher reservation value on plots close to a railway station.

These considerations suggest the role of other owner characteristics that would affect their reservation values and consequently their acceptance decisions, after controlling for

under-compensation relative to market values. The last two columns of Table 11a includes as additional determinants measures of education, occupation, total land owned (apart from acquired plots), fraction of total household income accounted by agricultural income, whether the household owns exclusive selling rights, whether the land was inherited, and whether the household head exhibited hyperbolic time discount rates characterized by current impatience and patience for future periods (as revealed by responses to hypothetical choices concerning timing of cash receipts).[7] The results show that some of these characteristics played a significant role in their decisions to accept, controlling for the extent of under-compensation relative to market value, and plot characteristics. 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. Somewhat surprisingly, those who inherited the plot were more likely to accept, compared with those who purchased the plot. Selling rights, education, other land owned, or hyperbolic discounting preferences did not significantly affect acceptance decisions.

In popular discussions of what happened in Singur, it is frequently asserted that landlords were more willing to accept compensations, as they were stuck with tenants covered by sharecropper-friendly legislation, and had only a financial interest in the land. To check this, Table 11b includes dummies for whether the plot owner of leased out plots played any role in cultivation of the leased plot, and whether owner and tenant lived in the same village. In the sample, 180 leased-in plots had been acquired. Out of these, 110 plots involved owners residing within the village and in only 17 plots did the landlord monitor the cultivation process. From table 11.b, we see a strong negative effect on landlords that were either not monitoring or resided outside the village, controlling for all other plot and owner characteristics. Hence landlords that were not directly involved were *less* likely to accept. Those who stayed within the same village but did not monitor were 25% less likely to accept and those who did not monitor and stayed outside the village were 35% less likely to accept. This is contrary to the common impression, or the view that those whose occupation was linked to the acquired lands were the ones more likely to reject. It is consistent with the view that financial considerations played an important role, as owners of leased out plots are likely to treat them purely as a form of financial asset. A corroborating fact is that thoe who purchased plots were less likely to accept compensation than those who inherited them. Hence considerations of financial security or speculation is likely to explain their reluctance to accept the government's compensation offer.

[7] This last variable is explained further later in the paper: see the discussion of Table 18.a below.

Table 11.a: Determinants of Probability of Owners Accepting Compensation Offer

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependant Variable : Whether Compensation Offer was Accepted						
VARIABLES	Probit	Probit	Logit	Probit	Logit	Probit	Logit
Reported Market Value less Compensation Offered	-0.0319**			-0.0329***	-0.0340**	-0.0315*	-0.0326*
	(0.0140)			(0.0126)	(0.0137)	(0.0165)	(0.0191)
Sona Low		0.0605	0.0579	0.162**	0.154**	0.198***	0.187**
		(0.152)	(0.154)	(0.0813)	(0.0783)	(0.0677)	(0.0756)
Sali High		0.0797	0.0746	0.157	0.154	0.189	0.189
		(0.0905)	(0.0911)	(0.111)	(0.118)	(0.141)	(0.155)
Sali Low		0.297***	0.288***	0.259**	0.249**	0.310***	0.305***
		(0.0786)	(0.0744)	(0.116)	(0.115)	(0.119)	(0.117)
Whether Owned in Land was Irrigated				-0.169*	-0.168*	-0.161**	-0.164*
				(0.0944)	(0.0952)	(0.0813)	(0.0851)
Whether Rice Grown for More than One Season				-0.352**	-0.355***	-0.368***	-0.389***
				(0.138)	(0.138)	(0.125)	(0.133)
Whether Land Improvement Done				0.147	0.146	0.135	0.127
				(0.127)	(0.128)	(0.155)	(0.163)
Distance from Highway				0.0544	0.0533	0.0820	0.0751
				(0.143)	(0.152)	(0.181)	(0.193)
Distance from Nearest Railway Station				-0.206***	-0.211***	-0.297**	-0.304**
				(0.0770)	(0.0796)	(0.140)	(0.138)
Percentage Contribution of Agric in HH Income						-0.593***	-0.634***
						(0.150)	(0.189)
Value of Land Currently owned (Rs. Lakhs)						-0.00517	-0.00582
						(0.00443)	(0.00461)
Education Level of HOH						-0.00119	-0.00198
						(0.0133)	(0.0147)
If Land was Inherited						0.246**	0.253**
						(0.107)	(0.112)
Whether Owner had Selling Rights						-0.0728	-0.0666
						(0.0995)	(0.104)
Hyperbolic Discounting						0.104	0.100
						(0.0858)	(0.0869)
Percentage of Adult Members of HH Engaged in Cultivation						-1.559	-1.702
						(1.593)	(1.726)
Percentage of Adult Members of HH Engaged in Labor						-3.299***	-3.407***
						(1.231)	(1.292)
Percentage of Adult Members of HH Engaged in Business						-1.419	-1.531
						(1.379)	(1.411)
Observations	687	687	687	686	686	675	675
VilLage FE	YES	YES	YES	YES	YES	YES	YES

Village-Clustered Standard Errors in Parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11.b: Were Absentee Landlords More Likely to Accept Compensation?

VARIABLES	(1) Probit	(2) Logit	(3) Linear Probability Model
Landlord Who Monitors and Stays Inside Village	-0.00619	-0.0171	-0.00782
	(0.224)	(0.220)	(0.211)
LL Who Does Not Monitor but Stays Inside Village	-0.255***	-0.250***	-0.243**
	(0.0903)	(0.0888)	(0.0930)
LL Who Does Not Monitor and Stays Outside Village	-0.352***	-0.338***	-0.351***
	(0.0563)	(0.0571)	(0.0697)
Whether Land was Irrigated	-0.242***	-0.251***	-0.208**
	(0.0807)	(0.0818)	(0.0756)
Distance from Highway	0.196*	0.202*	0.186*
	(0.111)	(0.112)	(0.0934)
Distance from Nearest Railway Station	-0.112**	-0.107**	-0.0994*
	(0.0548)	(0.0544)	(0.0423)
Constant			0.518**
			(0.200)
Observations	1,124	1,124	1,124
R-squared			0.180
VilLage FE	YES	YES	YES

Village-Clustered standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: observations here refer to number of plots

5 Impact on Subsequent Incomes and Assets of Those Affected

Table 12.a examines the impact of the acquisition on incomes of different households classified according to the principal occupation of the household head, and whether or not they were directly affected by the acquisition (of lands they owned or cultivated). All regressions control for village dummies and household characteristics; we assess impacts for each occupation category for the household head by comparing differences in reported incomes between the year 2010 and 2005, between those directly affected and not affected.

Column 1 shows that the change in incomes of affected owner cultivators was 33% smaller compared with non-affected owner-cultivator headed households. Column 2 shows that crop incomes declined by 17% more for the former group relative to the latter. Column 4 shows that most of this adverse impact is accounted by the proportion of land they owned in 2005 that was subsequently acquired. Controlling for acquired land, column 5 shows that crop incomes of those affected grew by 17% compared with the non-affected.

Those affected by the acquisition thus responded either by acquiring or leasing in more land, or increasing yields on lands that they continued to cultivate. Data limitations prevent us from exploring the latter channel, while we explore the former channel further in Table

12.b. Excluding acquired lands, changes in land owned by affected owner cultivators exceeded those for unaffected owner cultivators, as did the changes in lands they leased in, though each was statistically insignificant. But changes in total land cultivated were significantly higher for affected owner cultivators, by about 0.04 acres.

Returning to the question of impact of acquisitions on incomes, consider next households with some tenancy (referred to as mixed tenants, since most households leasing in land also owned some land). Table 12.a shows the change in incomes for affected tenants was also smaller compared with unaffected tenants, being smaller by 16%. So the magnitude of this difference is about half the corresponding difference for owner cultivators, which is what we would expect given the nature of sharecropping. This difference is however marginally significant (with a p-value of 14%), so it is somewhat imprecisely estimated, which is not surprising considering the relatively smaller number of tenants in the sample. We also see evidence that tenants whose leased in plots were acquired responded to the acquisition. Controlling for the proportion of the land they cultivated in 2005 that was acquired, column 5 of table 12.a shows that their incomes grew 25% relative to non-affected mixed tenant households. The relevant F-test shows that this difference is statistically significant at 1%. Table 12.b shows a lower change in leased-in land and total land area cultivated for the affected tenants, but this difference is not statistically significant. So we don't really know how the tenants responded.

Incomes of affected households headed by agricultural workers grew 16% lower compared with corresponding unaffected households, but this difference was statistically insignificant. The lack of statistical significance may owe to the fewer households headed by workers in our sample. For this group as well, most of this adverse impact is accounted by the proportion of their owned lands that were acquired. Controlling for lands acquired, their incomes rose by 22% more compared with unaffected agricultural worker headed households. Just like owner cultivators and tenants, affected agricultural workers responded to acquisition of their lands by raising incomes elsewhere.

Finally agricultural workers were adversely impacted, compared with non-agricultural workers. Column 1 of table 12.a shows that incomes of unaffected agricultural workers grew 24% slower than for unaffected non-agricultural workers. Most of this occurred owing to slower growth of labor earnings, by about 40%. These results apply irrespective of whether or not we control for lands acquired, as indicated by the last three columns. So it applies equally to comparisons between affected agricultural and non-agricultural workers.

Table 12.a: Impact of Acquisition on Income of households

VARIABLES	(1) % Change in total income	(2) % Change in Crop income	(3) % Change in total labor income	(4) % Change in total income	(5) % Change in Crop income	(6) % Change in total labor income
Affected owner cultivator	0.0399	0.0318	0.0191	0.229**	0.230**	-0.0141
	(0.112)	(0.113)	(0.137)	(0.0881)	(0.0879)	(0.121)
Affected mixed tenant	0.0587	0.160	-0.220	0.242**	0.359***	-0.250
	(0.169)	(0.109)	(0.216)	(0.108)	(0.0874)	(0.213)
Affected agricultural labor	-0.400	0.131	-0.428***	-0.0731	0.442	-0.498***
	(0.267)	(0.444)	(0.109)	(0.291)	(0.428)	(0.143)
Affected Non-agricultural Labor	-0.169	-0.299**	-0.0352	0.207	0.0856	-0.107
	(0.153)	(0.136)	(0.112)	(0.142)	(0.0642)	(0.157)
Unaffected owner cultivator	0.374**	0.200**	0.0119	0.240	0.0643	0.0230
	(0.166)	(0.0677)	(0.0773)	(0.136)	(0.0406)	(0.0715)
Unaffected mixed tenant	0.224	0.231*	-0.183	0.113	0.118	-0.177
	(0.128)	(0.110)	(0.247)	(0.133)	(0.113)	(0.252)
Unffected agricultural labor	-0.237**	0.0595	-0.405**	-0.293***	-0.00145	-0.405**
	(0.0836)	(0.0348)	(0.150)	(0.0811)	(0.0457)	(0.151)
Proportion of land acquired				-0.952***	-0.987***	0.155
				(0.118)	(0.0546)	(0.163)
Constant	-0.319	-0.312	0.420*	0.0823	0.0913	0.303**
	(0.261)	(0.181)	(0.194)	(0.247)	(0.156)	(0.104)
Observations	902	892	384	902	892	384
R-squared	0.063	0.126	0.125	0.095	0.218	0.128
VilLage FE	YES	YES	YES	YES	YES	YES
Control for HH Characterisitcs	YES	YES	YES	YES	YES	YES
	F-test for comparing effects on affected and unaffected HH (p-values in parenthesis)					
Null Hypothesis	F-statistic	F-statistic	F-statistic	F-statistic	F-statistic	F-statistic
Affected owner cultivator = Unaffected owner cultivator	14.94 (0.002)	3.05 (0.11)	0 (0.97)	0.02 (0.88)	6.05 (0.03)	0.08 (0.79)
Affected mixed tenant = Unaffected mixed tenant	2.48 (0.14)	0.84 (0.38)	0.03 (0.86)	3.37 (0.09)	9.54 (0.01)	0.13 (0.72)
Affected agricultural labor = Unffected agricultural labor	0.57 (0.46)	0.02 (0.88)	0.01 (0.91)	0.75 (0.40)	0.96 (0.35)	0.19 (0.67)

Village-Clustered standard errors in parentheses for regressions and p-values for F-test
*** p<0.01, ** p<0.05, * p<0.1

Notes:
[a] Total income = agricultural income + labor income+ remittances + rental income from farm assets
[b] labor income = agricultural and non-agricultural wage income
[c] agricultural income= income from crops
[d] Household characteristics include: percentage of household in cultivation, business, labor; education; caste; religion

Table 12.b: Changes in Land Holdings (Except due to Acquisition)

VARIABLES	(1) Change in Land Ownership (Excluding Due to Acquisition)	(2) Change in Leased-in Land (Excluding Due to Acquisition)	(3) Change in Total Land Cultivated (Excluding Due to Acquisition)
Affected Owner Cultivator	0.0321	-0.0530**	-0.00915
	(0.0251)	(0.0201)	(0.0320)
Affected Mixed Tenant	-0.0420**	0.301***	0.306***
	(0.0153)	(0.0701)	(0.0735)
Affected Agricultural Labor	-0.0161*	-0.0272	-0.0412*
	(0.00898)	(0.0166)	(0.0219)
Affected Non-agricultural Labor	-0.0177*	-0.0281	-0.0368**
	(0.00827)	(0.0173)	(0.0141)
Unaffected Owner Cultivator	0.00504	-0.0609**	-0.0523*
	(0.00863)	(0.0215)	(0.0248)
Unaffected Mixed Tenant	0.00652	0.421***	0.434***
	(0.0393)	(0.0757)	(0.0907)
Unffected Agricultural Labor	-0.0105	-0.00118	0.000128
	(0.00757)	(0.0233)	(0.0243)
Constant	0.0132	0.0333	0.0179
	(0.0488)	(0.0372)	(0.0480)
Observations	1,101	1,101	1,101
R-squared	0.034	0.321	0.222
VilLage FE	YES	YES	YES
Control for HH Characterisitcs	YES	YES	YES
	F-test for Comparing Effects on Affected and Unaffected HH (P-values in Parenthesis)		
Null Hypothesis	F-statistic	F-statistic	F-statistic
Affected Owner Cultivator = Unaffected Owner Cultivator	1.88 (0.20)	1.18 (0.3)	4.3 (0.06)
Affected Mixed Tenant = Unaffected Mixed Tenant	1.52 (0.24)	1.7 (0.22)	1.07 (0.32)
Affected Agricultural Labor = Unffected Agricultural Labor	0.55 (0.47)	1.29 (0.28)	2 (0.18)

Village-Clustered Standard Errors in Parentheses for Regressions and P-values for F-test
*** p<0.01, ** p<0.05, * p<0.1

Impacts on local labor markets cannot fully be understood by looking at within-village variations in earnings or wage rates between workers whose lands were and were not acquired, or even those who were and were not employed on acquired plots. The replacement of agricultural employment by employment in construction of the Tata factory may have resulted in a net reduction in the aggregate demand for hired workers in the neighboring area. This could have impacted wage rates and employment for all workers in that area, simply as a consequence of an integrated labor market in the local area. However, we shall see below that wage rate changes vary across villages quite markedly, and there is limited movement of workers across villages. So the labor market is not fully integrated across all the villages in our sample. We can therefore evaluate the impact of the acquisition on wage rates and earnings by comparing changes in each across acquired and unacquired villages.

Table 13.a gives results of regression changes in agricultural wage rates between 2005 and 2010 in different villages located at differing distances from the factory. Table 13.b compares corresponding changes in total labor earnings for agricultural and non-agricultural laborers separately. These regressions are run at the level of households, restricted to those headed by either agricultural or non-agricultural workers.

Focusing initially on the wage rate effects, column 1 shows no significant difference in changes in wage rates between six acquired villages and four unacquired villages not located

close to the factory. But it shows a significantly lower growth by about 13% in the two unacquired villages (Anandnagar and Jompukur) located close to the factory.

Could this be attributed to the land acquisition?

We argue the answer is no, for the following reasons.

First, if it were a consequence of the land acquisition, one would expect the effect to be sharpest in acquired villages as they are likely to be located closest to the factory location. To check this more carefully, we add as arguments the distance of the household residence from the factory (using GPS coordinates), as well as from the nearest railway station. Column 2 of table 13.a shows that proximity to the factory has a negative effect on wage growth, but this effect is statistically insignificant. Proximity to a railway station has a positive effect but this is also statistically insignificant. Controlling additionally for household characteristics, proximity to a railway station becomes statistically significant, but proximity to the factory continues to be insignificant.

The results for changes in agricultural earnings in the first three columns of table 13.b are similar, except that proximity to the factory now has a positive effect on earnings growth. This could conceivably owe to increase in non-agricultural employment opportunities following construction of the Tata factory, which could also explain why earnings of non-agricultural workers rose relative to those of agricultural workers (as seen in Table 12.a and columns 4-6 of table 13.b).

Second, there was very little mobility of workers across villages, as seen in Table 14. Hence the adverse impact on unacquired villages close to the acquired villages is unlikely to have been impacted by the acquisition.

Table 13a: Impact of Acquisition on Wages of Agricultural Laborers

VARIABLES	(1) % Change in wage rate	(2) % Change in wage rate	(3) % Change in wage rate
If village acquired	0.0284	0.0289	-0.0291
	(0.0510)	(0.0520)	(0.0550)
Af unacquired village is close to acquired village	-0.129**	-0.124**	-0.139**
	(0.0588)	(0.0608)	(0.0676)
If HH is close to the factory		-0.0237	-0.00717
		(0.0372)	(0.0434)
If HH is close to a railway station		0.0451	0.130**
		(0.0534)	(0.0562)
Constant	0.591***	0.591***	0.534***
	(0.0479)	(0.0481)	(0.168)
Observations	284	284	215
R-squared	0.048	0.050	0.104
VilLage FE	NO	NO	NO
Control for HH Characterisitcs	NO	NO	YES

Robust standard errors in parentheses, clustered for columns (4) and (8)
*** p<0.01, ** p<0.05, * p<0.1

Table 13b: Impact of Acquisition on Earnings of Agricultural Laborers

	(1)	(2)	(3)	(4)	(5)	(6)
	Agricultural Laborers			Non-agricultural Laborers		
VARIABLES	% Change in earnings	% Change in earnings	% Change in earnings	% Change in non-agricultural wage earnings	% Change in non-agricultural wage earnings	% Change in non-agricultural wage earnings
If village acquired	0.0357	-0.0104	-0.0506	0.126	0.0950	0.309
	(0.0809)	(0.0792)	(0.0846)	(0.105)	(0.119)	(0.338)
Af unacquired village is close to acquired village	-0.125	-0.188**	-0.156	0.122	0.0848	0.230
	(0.0822)	(0.0901)	(0.103)	(0.128)	(0.143)	(0.392)
If HH is close to the factory		0.277*	0.243		0.110	0.0786
		(0.145)	(0.157)		(0.144)	(0.149)
If HH is close to a railway station		0.0945	0.213		-0.159*	-0.328
		(0.143)	(0.148)		(0.0897)	(0.243)
Constant	0.432***	0.432***	0.556**	0.350***	0.350***	0.288
	(0.0688)	(0.0690)	(0.269)	(0.0773)	(0.0789)	(0.351)
Observations	284	284	215	52	52	52
R-squared	0.011	0.041	0.115	0.006	0.022	0.149
VilLage FE	NO	NO	NO	NO	NO	NO
Control for HH Characterisitcs	NO	NO	YES	NO	NO	YES

Robust standard errors in parentheses, clustered for columns (4) and (8)
*** p<0.01, ** p<0.05, * p<0.1

Notes:
[a] A household is said to be close to a railway station if it is within one std. dev. of average distance (avg for all households).
[b] A household in acquired village is said to be close to the factory if it lies within one std. dev. of the average for all HH in acquired villages. Similarly households are classified for unacquired villages.
[c] HH characteristics include: age of laborer, gender of laborer, percentage of HH engaged in labor, percentage of HH engaged in business, land holdings in 2005, average education in HH, caste, religion

Table 14: Inter-village Labor Flows, 2005 and 2010

Village	Status	No. days employed Outside the Village					No. days employed Inside the Village					
		2005			2010		2005			2010		Difference in means (T-statistic)
		Obs	Mean	Std. Dev	Mean	Std. Dev	Obs	Mean	Std. Dev	Mean	Std. Dev	
Anandanagar	Unacquired near acquired	93	0	0	0	0	93	32	71	28	66	0.40
Baharampur	Unacquired	70	0	0	0	0	70	34	68	34	68	0.00
Bajemelia	Acquired	132	1	8	2	13	132	31	61	28	56	0.42
Beraberi	Acquired	165	0	6	2	12	165	52	85	46	74	0.68
Ghanshyampur	Unacquired	60	0	0	0	0	60	21	55	18	46	0.32
Gopalnagar	Acquired	225	0	0	0	0	225	34	72	28	60	0.96
Gopalnagar_KGI	Acquired	90	0	0	0	4	90	53	80	49	73	0.35
Jompukur	Unacquired near acquired	48	0	0	0	0	48	91	88	85	80	0.35
Joymolla	Acquired	28	4	19	3	14	28	58	83	49	73	0.43
Khaserbheri	Acquired	28	0	0	5	16	28	32	60	34	54	-0.13
Raghunathpur	Unacquired	47	0	0	0	0	47	25	67	20	57	0.39
Simulpukur	Unacquired	48	0	0	0	0	48	30	67	21	48	0.76
Singherbheri	Acquired	67	1	5	0	0	67	18	30	15	26	0.62

5.1 Impact on Assets

Table 15 examines the impact of the acquisition on growth in the value of various kinds of household assets between 2005 and 2010. The survey asked respondents to list household assets owned in 2005 and subsequent changes in these over the subsequent five year period. These assets were valued using prices prevailing in each village in 2010. The main regressor

here is the wealth shock associated with the acquisition, defined as the difference between the compensation offered and the market value of the lands acquired. We use the compensation offered rather than actually received, because the latter was an endogenous response of the household to the offer. Those that refused the offer presumably had some expectation of a higher compensation offer that the government may subsequently make, or they may have expected the lands acquired to be returned to them at some future stage if the protest movement succeeded. Even if we had some estimate of what these households may have expected, these expectations may have been correlated with their asset accumulation trajectories, which would induce a bias in the estimated effects of the acquisition. Hence the right measure of the exogenous wealth shock experienced by households is the difference between the compensation offer and the market value of their lands. One can view these as reduced form regressions which average the impacts on assets of those who decided to accept and not accept the compensation offers.

Columns 1,3, 5 and 7 show that the only significant impact of this wealth shock was on acquisition of consumer durables, the value of which increased by 25% more following a Rs 1 lakh (positive) wealth shock. Farm assets owned also increased by 18-19% but this is imprecisely estimated. The point estimate for effect on value of business assets and on livestock is negative and statistically insignificant. These results remain when asset impact is measured in Rs. Lakhs rather than percentage change.

Columns 2,4,6 and 8 show these results are unaffected when we include the amount of compensation money received, which esimates the joint effect of the liquidity associated with the infusion of cash and of the characteristics of households who decided to accept the compensation. This variable by itself has an insignificant effect on asset accumulation, while the estimates of the weath effect are unaffected (except that the effect on consumer durables rises even further to 33%).

Table 15: Impact of Acquisition on Change in Asset Holdings 2005-2010

VARIABLES	(1) Percentage change in value of livestock	(2) Percentage change in value of livestock	(3) Percentage change in value of farm machines	(4) Percentage change in value of farm machines	(5) Percentage change in value of consumer durables	(6) Percentage change in value of consumer durables	(7) Percentage change in value of business assets	(8) Percentage change in value of business assets
Wealth Shock	-0.00273	-0.000840	0.0107	0.00936	0.0129*	0.0168**	-0.000784	-0.000805
	(0.00221)	(0.00256)	(0.0109)	(0.00977)	(0.00637)	(0.00556)	(0.000550)	(0.000634)
Total compensation received		-0.0200		0.0139		-0.0413		0.000217
		(0.0267)		(0.0161)		(0.0474)		(0.00247)
Constant	0.591	0.577	0.0219	0.0318	2.072**	2.043**	0.0724*	0.0725*
	(0.501)	(0.490)	(0.0554)	(0.0631)	(0.693)	(0.686)	(0.0368)	(0.0365)
Observations	1,101	1,101	1,101	1,101	1,101	1,101	1,101	1,101
R-squared	0.050	0.051	0.077	0.078	0.092	0.092	0.085	0.085
VilLage FE	YES	YES	YES	YES	YES	YES	YES	YES
Control for HH Characterisitcs	YES	YES	YES	YES	YES	YES	NO	YES

Village-Clustered standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Notes:
[a] Wealth shock is defined as Compensation offered - market value of land
[b] Wealth shock and total compensation are in Rs. Lakhs

6 Uses of Compensation Money

The asset impact results relate to our final question: what did households receiving compensation money do with it? What are their expressed preferences regarding uses of windfall cash gains, the timing of such gains, and alternative forms of non-cash compensation?

In the sample survey, 179 households reported to have *received* compensation from the government and on an average, they reported to have received Rs. 7.9 lakhs per acre. Calculations based on survey responses reveal that the tenants received Rs. 2.8 lakhs per acre on the leased in lands, which amounts to about 36% of the reported per acre compensation received on an average by households.

Table 16 summarizes the main uses of the money received by those in the sample who accepted the compensation offer. The most common use was financial investment, chosen by 40% of the recipients. This was followed by expenditures on buying new houses or house renovations, chosen by 32% of the recipients. Of those choosing to invest the money, 88% deposited the money in a bank.

Table 17 describes responses of all the households concerning how they would want to spend a hypothetical windfall earning of Rs 1 lakh, and how these contrasted with what they actually did (for actual recipients). The average proportion the households wanted to spend on financial investments was 60%, on housing renovation was 13%, on starting a new business was 15%, and on daughter's wedding was 8%. 54% of the households wanted to spend the money entirely on financial investments, contrasted with 3% on buying land, 7% on house renovation, 11% on business and 6% on daughters wedding. The actual proportions of recipients who used all the money in financial investments was 32% , and in house renovation was 15%. 3% spent it all on consumer durables, 2% on lending to others, and 2% in repaying debts, higher than expressed preferences. We do not have data on exactly how much the households actually spent on each item, only what categories they spent on. Hence, we cannot account for the gaps between columns 2 and 3.

Table 16: How Compensation Money Was Used

[a] Use of compensation money

Use of comensation money	Number of individuals
Agriculture	7
House	80
Buying goods for the house	20
Repayment of debt	12
Investment	104
Others	34
Total	257

[b] If investment done, what scheme invested in?

Name of scheme	% of individuals
Pension scheme	3.6
Insurance	7.2
Deposit in a bank	88.3
Other investment	0.9
Total	100

Note: some individuals put their money in more than one source.
Since we do not have data on how much money was put in each scheme, we count them twice, one for each reported scheme.

Table 17: Preferences and Utilization of Compensation Money

Possible Expenditures	(1) Mean proportion that households are willing to spend on the mentioned items if they get Rs. 100000	(2) Percentage of household who are willing to spend all of one lakh in only one item mentioned below	(3) Percentage of households who reported to use all of their compensation money in only one item mentioned below
Savings or investment	0.60	54%	32%
Consumer Durables	0.00	0	3%
Invest in or buy land	0.03	3%	
Renovate House	0.13	7%	15%
Children's education	0.01	0	
Lend to others	0.00	0	
Agricultural assets	0.00	0	2%
Medical Treatment	0.00	0	
Daughter's arriage	0.08	6%	
Start new business	0.13	11%	
Repayment of debt			2%
Observations	175	175	175

Table 18 summarizes household responses to questions concerning the form of compensation. In part (i), 39% of the households said they were aware of annuity/insurance products, and 37% said these were available in their neighborhoods. Of those with access to such products, most (96%) said they would purchase such a product with any cash windfalls they might enjoy. However we have seen in Table 16 above that most of those who invested their cash compensations in financial investments chose to do so by depositing the money in a bank. Only 11% acquired pensions or insurance, as against the one-third ratio we might have expected from the responses reported in Table 18.a.

Part (ii) of Table 18.a describes responses to questions concerning preferences across three alternative modes of non-cash compensation: a pension paying Rs 1500 per month in perpetuity (which corresponds to the interest on a post office fixed deposit of Rs 2 lakh paying 9% per annum interest), a shop valued at Rs 2 lakh, and land in the neighborhood valued at Rs 2 lakh. 51% preferred a pension, 28% preferred a shop, and the remaining 21% preferred to acquire land.

Part (iii) of Table 18.a summarizes responses given to a series of hypothetical choices between receiving a cash windfall of Rs 2 lakh at different points of time, in order to estimate the degree of patience as well as possible inconsistencies between choices in the immediate future (between receiving money now against 4 months later) and in the more distant future (the same choices deferred a year later). 11% were consistently patient (in the sense of preferring a larger reward 4 months later), while 9% were consistently impatient (preferring the smaller but earlier reward) in both sets of choices. 69% exhibited hyperbolic discounting (preferring the immediate reward now over the larger reward 4 months later, but choosing to wait for the larger reward for next year). The remaining 11% exhibited future-biased preferences (patient now, impatient later). Hence we see substantial proportions of households exhibiting the kind of time preferences associated with temptation and over-consumption. As the literature on hyperbolic discounting has observed, those aware of these tendencies may be 'sophisticated' and express a preference for forms of compensation that make it harder to indulge in such forms of temptation. Accordingly they may have a preference for pensions, shops or land over cash compensations, as the former are harder to erode owing to temptation-induced consumption. Moreover, they are likely to prefer shops or land to pensions, as the former offer less opportunity for cashing in and consuming. But if they are 'naive' hyperbolic discounters, they would exhibit the opposite preference: pensions will generate cash soon, whereas shops or land would require upfront investments the returns to which are likely to accrue later. Hence the effects of hyperbolic discounting are difficult to predict. An additional source of ambiguity arises from the fact that shops and land require immediate upfront investments and delayed profit, but they can be resold allowing the owner to procure a large amount of cash at any time. In contrast pensions pay money at a steady rate in the future and are typically not possible to resell. The same reason makes it difficult to predict the effects of patience among those with consistent preferences.

Out of 175 affected households responding to utilization of compensation, two-thirds said they were aware of the insurance or pension schemes. Table 18.b examines what household characteristics determine whether a household has knowledge about such schemes. Columns 1 and 3 use all households to predict probability of awareness while columns 2 and 4 look at only the affected households that responded to the questions about utilization of compensation money. For the affected households, the time preference is a significant predictor of awareness of insurance and annuity schemes. Those with hyperbolic discounting are 50% more likely to be aware of such schemes. The ones who are patient or display future biased inconsistency are 22% and 32% more likely to be aware than impatient ones.

Table 19 examines the effect of various household characteristics on reported preferences between the three alternative forms of non-cash compensation described above (the table displays marginal effects from a probit regression). Business owners express a preference for shops, those belonging to scheduled tribes are more likely to opt for land. Hyperbolic discounters were 21% more likely to opt for pensions compared with consistently impatient

households. Those consistently patient were between 14 and 16% more likely to opt for pensions.

These results show considerable diversity of preferences between different forms on non-cash compensation. At the same time there seems to be a general preference for non-cash compensation over cash compensation. However it is a bit of a puzzle why those with access to annuity or insurance products chose to deposit the compensation money in banks instead.

Table 18.a: Preferences for Form of Compensation

[i]

Scheme in lieu of compensation of Rs. 2 lakhs in cash	Percentage of respondents opting for the scheme
Plot of land worth Rs 2 lakhs	21%
Shop worth Rs 2 lakhs	28%
Pension for head and heirs of Rs 1500 forever	51%
No. respondents	1090

[ii]

Time Preference	Percentage of respondents with the given time preferences
Impatient	11%
Hyperbolic Discounting	69%
Future Biased Inconsistency	11%
Patient	9%
No. respondents	1090

[iii]

Question posed	Number of HH	
	Yes	No
Are you aware of annuity/ insurance products?	426	675
Are such schemes available in your village?	409	28
If yes, would you use it?	394	15

Table 18.b: Determinants of Awareness of Insurance Products

VARIABLES	(1) If HH was aware of insurance	(2) If HH was aware of insurance	(3) If HH was aware of insurance	(4) If HH was aware of insurance
Hyperbolic Discounting	0.208***	0.530***	0.192**	0.505***
	(0.0680)	(0.129)	(0.0767)	(0.128)
Patience	0.118	0.251***	0.158**	0.216**
	(0.0734)	(0.0821)	(0.0777)	(0.0852)
Future Biased Inconsistency	0.140**	0.322***	0.137**	0.319***
	(0.0610)	(0.0613)	(0.0599)	(0.0595)
Percentage of adult members of HH enganged in cultivation			0.00484	-0.00465
			(0.00400)	(0.00962)
Percentage of adult members of HH enganged in labor			-0.0101**	-0.00348
			(0.00474)	(0.0169)
Percentage of adult members of HH enganged in business			0.0123	-0.00643
			(0.00981)	(0.0165)
Number of adults			0.0273**	-0.0193
			(0.0138)	(0.0259)
Age HOH			-0.00246**	-0.00163
			(0.00122)	(0.00439)
Average Education Level of HH			0.0486***	0.0250
			(0.00777)	(0.0223)
Scheduled Caste			0.0111	0.0426
			(0.0430)	(0.104)
Scheduled Tribe			-0.0677	
			(0.239)	
OBC			-0.0589	-0.0399
			(0.0545)	(0.162)
Hindu			-0.179***	-0.0413
			(0.0327)	(0.234)
Observations	1,101	175	1,099	174
VilLage FE	YES	YES	YES	YES

Village-Clustered standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 19. Preferences over Alternative Forms of Non-Cash Compensation

VARIABLES	(1) If want pension	(2) If want pension	(3) If want shop	(4) If want land
Patience	0.141***	0.161***	-0.0492	-0.0627
	(0.0516)	(0.0520)	(0.0585)	(0.0402)
Hyperbolic Discounting	0.202***	0.210***	-0.0708	-0.100
	(0.0488)	(0.0516)	(0.0684)	(0.0616)
Future Biased Inconsistency	0.175**	0.194**	-0.103	-0.0337
	(0.0726)	(0.0761)	(0.0676)	(0.0653)
If head of household is female	-0.0550	-0.0624	0.0802	-0.0195
	(0.0723)	(0.0708)	(0.0553)	(0.0422)
If primary occupation is own cultivation	-0.0178	-0.0144	0.0314	-0.0245
	(0.0551)	(0.0559)	(0.0339)	(0.0420)
If primary occupation is business	-0.288***	-0.276***	0.329***	-0.0506
	(0.0688)	(0.0740)	(0.101)	(0.0630)
If primary occupation is Laborer	-0.0823	-0.0966	0.0731	0.0212
	(0.0648)	(0.0664)	(0.0511)	(0.0379)
Average Education Level of HH	0.0107	0.00732	0.00550	-0.0112*
	(0.00718)	(0.00747)	(0.00675)	(0.00578)
Scheduled Caste	-0.0254	-0.0255	0.00410	0.0323
	(0.0462)	(0.0530)	(0.0448)	(0.0497)
Scheduled Tribe	-0.288***	-0.322***	-0.164	0.427***
	(0.110)	(0.0886)	(0.114)	(0.155)
OBC	0.0641*	0.0560	-0.0391	0.00803
	(0.0352)	(0.0480)	(0.0863)	(0.0857)
Hindu	0.0960	0.0372	-0.0769	0.0479
	(0.0619)	(0.0854)	(0.0837)	(0.0521)
Observations	1,101	1,101	1,101	1,101
VilLage FE	NO	YES	YES	YES
Control for HH Characterisitcs	YES	YES	YES	YES

Village-Clustered standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

7 Conclusion

7.1 Summary of Principal Findings

Our main findings concerning the four questions posed in the Introduction can be summarized as follows.

(a) Adequacy of Offered Compensation. Averaging over all types of plots acquired, offered compensations were quite close to market valuations reported by their owners. However, owners of superior grade (Sona) lands were under-compensated relative to market value, while inferior grade (Sali) land was under-compensated. This arose on account of misclassification of grade of land in the official land records. One third of all agricultural land and one third of plot owners of Sona land was officially classified as Sali land and were compensated at Sali rates.

Nevertheless, market values of land are not the right benchmarks to judge adequacy of compensation for many owners who have held on to their properties consistently owing to greater than average emphasis on financial security, complementarity with farming skills, or locational preferences. These concerns are not reflected in market values and need to be additionally compensated.

(b) Decisions to Reject Compensation Offers. Under-compensation relative to market value significantly raised the likelihood of rejecting the compensation offer. Occupational skills and financial considerations additionally played a role, as those relying more on agriculture as a source of their income, those with large numbers of adults in the household, and those leasing out their land were more likely to reject, controlling for under-compensation, soil grade and other household characteristics.

(c) Impact of Acquisition on Incomes and Assets. Acquisition of land resulted in sizeable reduction in income growth of those whose plots were acquired, with the effect on owner cultivators almost double that on tenants. A large part of this arose from reduced growth of cultivation incomes. Both types of households responded by raising cultivation incomes from non-acquired plots, but not by enough to offset the initial adverse impact. There were no discernible average impacts on wage rates or earnings of workers, but agricultural workers appeared to have been adversely affected compared with non-agricultural workers. There were no statistically significant effects of the acquisition on accumulation of various kinds of household assets, with the exception of consumer durables.

(d) Uses of Compensation, and Preferences over Form of Compensation. The two main uses of compensation money by recipients were financial investments (mostly in the form of bank deposits) and house renovations. Those with access to financial products offering greater security such as insurance or pension expressed a preference for such products over cash, in apparent contrast to actual patterns of financial investments. Reported preferences across different forms of non-cash compensation such as land, shop on the factory premises and pensions showed considerable diversity: approximately half preferred pensions, and a quarter each preferring land or a shop.

7.2 Policy Implications

Our results have a number of implications for design of compensation policies.

There are two kinds of practical difficulties in ensuring that compensations are adequate, using market values as the standard of adequacy. One is deciding on what is the correct market price for any particular grade of land, owing to thinness of land markets, problems of obtaining correct data on market transactions, and adjusting for endogenous selection of which properties do and do not get sold. The second is identifying the grade of land for any given plot. In the context of Singur, the government ran into the second kind of problem in particular. This resulted in considerable under-compensation of owners of superior grades of land, constituting about one-third of land area and of affected owners. This played a role in decisions of owners to reject the offered compensations. Getting the soil grade right would therefore have reduced the chances of rejection and subsequent protest significantly.

There are also deeper problems inherent in basing compensations on market values: many owners value their land more than their market values on account of other attributes of land, such as financial security, complementarity with their farming skills, locational factors, or considerations of identity or social prestige. That is precisely why long standing owners have not exercised the option to sell their land at market prices. To ensure that such owners are adequately compensated would require raising compensations above market values. What makes this difficult to achieve in practice is that valuations of land have an inherently subjective nature varying from owner to owner. Current land acquisition bills in the Indian national Parliament and state legislatures have pegged compensations at arbitrary ratios of market value: four times in the case of acquired rural properties in the former.

These ratios have been pulled out of thin air. Yet getting them right is critical. Setting them too low risks providing inadequate compensation to large numbers of owners, with an induced bias in favor of excessive industrialization at the expense of expropriated farmers, and the likelihood of a political backlash of the kind witnessed in Singur. Setting them too high risks unduly lowering the pace of industrialization and overall economic growth.

These problems should motivate an alternative use of auction-based methods, in which land owners are asked to submit bids for what they are willing to sell their lands at. The design of such auctions can incorporate ways to minimize incentives for owners to overstate their true valuations, while ensuring voluntary participation for all but a minority of owners. This alternative has been discussed by Ghatak and Ghosh (2011). The results of this paper highlight the need to consider such approaches as an alternative to basing compensations at some ad hoc ratio of market prices.

Even if market values are used, our results indicate greater need to carry out surveys of the affected properties to evaluate their current characteristics, and use the results of such surveys to value the lands, instead of relying on official land records which are typically in terrible shape in many parts of India and other developing countries. Such surveys could be combined with compensation offers for a random sample of owners, in order to estimate the sensitivity of their acceptance decisions to the offers made. The results of such studies could be used to estimate the compensation offers that need to be made to increase the likelihood that a large majority of the owners would be inclined to accept. Attempts to gather such information could significantly minimize the risks of setting either too high or too low a compensation rate.

Our results indicate the need to design the appropriate form of compensation. Households in our survey exhibited considerable preference in being compensated in alternative ways that incorporate their concern for financial security, time preference, and pattern of skills. These

concerns exhibit considerable diversity, with a corresponding diversity of preferences over alternative forms of non-cash compensation. Hence a menu of alternative compensation packages ought to be offered, to cater to this diversity. Creating a more well-informed and flexible way of compensating displaced landowners can go a long way in ensuring fast growth along with an equitable distribution of its benefits.

Finally, the whole *process* of acquisition and compensation mattered. Consistent with the legal framework for acquisition inherited from colonial times, the process was very top down. Local residents of the area repeatedly mentioned their sense of outrage at this. The state government did not consult the local community in choosing the area for the Tata factory. Only after protests snowballed did it offer to negotiate the compensations offered. Throughout there was a sense that compensations offered were inadequate to offset the losses incurred by many of those directly affected, something our survey results corroborate. Tenants were offered 25% compensation, in contrast to tenant shares exceeding 50% under the existing sharecropper protection laws. The politicization of the compensation process followed. Clearly there is much room for a more consultative process, in which local communities are consulted and involved in selecting areas to be acquired, and in the design and implementation of compensations.

References

Bardhan, Pranab (2011), "Land Acquisition: Currently A Major Stumbling Block for Development Policy", forthcoming in Development Outreach, World Bank. Downloadable at http://emlab.berkeley.edu/users/webfac/bardhan/papers/WBILand%20Acquisition.pdf.

Ghatak, Maitreesh and Parikshit Ghosh (2011), "The Land Acquisition Bill: A Critique and a Proposal", Economic and Political Weekly, Vol 46 No. 41 October 08 - October 14, 2011, pp 65-72, Special Issue on The Land Acquisition and Resettlement Bill.

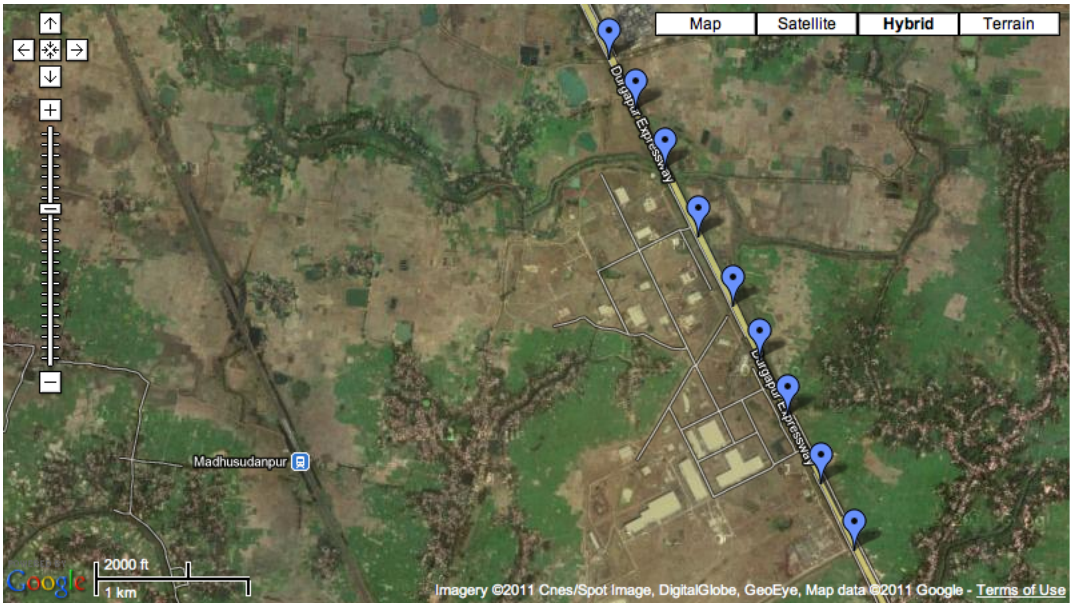
Economic and Political Weekly (2011), Special Issue on The Land Acquisition and Resettlement Bill, Vol 46 No. 41 October 08 - October 14, 2011, pp 65-72.

Ghatak, Maitreesh and Dilip Mookherjee (2011), Land Acquisition for Industrialization and Compensation of Displaced Farmers, Working paper, Institute for Economic Development, Boston University. http://people.bu.edu/dilipm/wkpap/land%20acquisitionOct2.pdf.

8 Appendix I

To measure the distance of the household from the highway, we use the following steps:

Step 1: Take 9 points on the highway that are along the boundary of the factory and are close to the villages in question. These 9 points chosen are shown in the picture below:



Step 2: Find GPS co-ordinates of these 9 points.

Step 3: Use Haversine formula to calculate the distance in kilometers. For each plot, the distance is calculated from each of the 9 points on the highway.

$a = \sin^2(\Delta lat/2) + \cos(lat1).\cos(lat2).\sin_2(\Delta long/2)$

$c = 2 * \arctan 2 * (\sqrt(a), \sqrt(1-a))$

$d = R.c$

where R is earth's radius (mean radius = 6371 km).

Step 4: Find the minimum distance between the plot and the highway by taking min of the distances calculated from the 9 points in the above step. This variable is then used as an explanatory variable.

9 Appendix II: Village GPS