Poverty Dynamics in Rural Orissa: Transitions in Assets and Occupations over Generations

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by

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Abstract: Family histories are collected for a random sample of 800 households. Households are classified into social groups according to the assets-occupations mix at present and at grandfather's time. Transitions are described, and to some extent explained, by random events at grandfather's time as well as the interaction between initial land and social identity. Fifty percent of the households are trapped at the bottom of the social hierarchy for three generations. In particular scheduled tribes, in contrast to scheduled castes, are trapped in poverty. Early natural disasters have a negative effect, but only for the few households with large land holdings.

Keywords: Poverty trap, occupational choice, India

JEL-classification: D310, D910, O120

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1. Introduction

Banerjee and Newman (1993) describe how borrowing constraints play an important role in shaping the long run distribution of assets and thus occupational composition of a society. Asset poor households will tend to end up as wage laborers not only in the present generation, but also in future generations, while the initial distribution of assets among the more well off will determine what type of economy develops in the long run, that is whether there will be extensive self-employment, or factories with more demand for wage labor. In the present paper we apply this model to describe the development over generations in the rural areas of two districts of Orissa, one relatively developed (Cuttack), and one less developed (Kalahandi). Based on recall data on assets (land and education) and occupations for three generations of a household we discuss to what extent these village economies fit in with the typologies described by Banerjee and Newman. In the model there is random movement between occupational classes. In the paper we also describe these individual movements and discuss to what extent they are random (result of natural disasters such as cyclones and floods, or other random variables such as the gender of children) or results of investment-occupational strategies (education, migration, land-purchases, number of children, land-fragmentation, which is related to number of sons).

The paper adds to a growing literature on poverty dynamics that can be separated into three strands. Economists tend to use panel data for large samples but over a relatively short time-horizon, see Krishna and Shariff (2010) on India, and Dercon and Shapiro (2007) for a survey of the literature. Some economists have also studied village or state panels, see Lanjouw and Murgai (2009), Ravallion and Datt (2002), Eswaran et al. (2009), and Deaton and Dreze (2002), while others have done more detailed village studies, see in particular Jayaraman and Lanjouw (1999). For reviews of the literature on poverty dynamics see Baulch and Hoddinott (2000) and Addison, Hulme and Kanbur (2009). The study most similar to ours

is Baulch and Davis (2007), as they also use recall to collect family histories, but from what we can see they do not collect information on previous generations. In contrast to this literature we describe, and attempt to explain, the life-trajectories over three generations for a large random sample of households. We are not aware of any previous study of this kind, and we believe the approach is useful for analysis of the deep mechanisms that may explain why some households stay poor, while others climb the ladder.

2. Theoretical and empirical approach

We base the empirical analysis on an underlying model, such as the one by Banerjee and Newman (1993), where a household's assets today, and thus occupational choice, is a function of assets at an earlier point in time (as assets can be used as collateral for loans and thus allow for accumulation also in the case of lumpy investments), as well as random shocks and an indicator (we will use social identity as measured by caste) of the household's ability to accumulate assets. An unequal initial distribution can in such a model explain separation into different economic classes not only initially, but also at a later stage.

In the model by Banerjee and Newman (1993) credit constraints explain a separation of households into different classes, where workers own no capital, while entrepreneurs own capital and have larger incomes. The model allows for (random) transition between classes over time. We take the model to data collected by ourselves in two districts of Orissa. We investigate (1) to what extent initial conditions two generations ago determine the present class position, and (2) to what extent the transitions appear to be random, or whether they can be explained by particular events that in turn may be more or less random.

We have collected family histories over three generations for a large random sample. As discussed above, similar studies have been done, either on small samples, on villages in

stead of households, or on large samples but on relatively short panels. But we do not know any previous study of family histories over multiple generations on large samples.

3. Data and descriptive statistics

We collected retrospective life-histories for 800 households in Cuttack and Kalahandi districts of Orissa. The poverty level of Kalahandi is among the highest in the world, Lanjouw and Murgai (2009) report 73% poverty in the Southern districts of Orissa, and Kalahandi is likely to have poverty in the same range. Kalahandi is 600 km by road from the state capital of Bhubaneswar, while Cuttack is adjacent to Bhubaneswar, and some of the selected villages were only 30 minutes drive from the city. Still, we find that we can pool the data. The classes are defined in the same way for the two districts, only the class composition differs. We shall see that at the aggregate level the main difference in development over time is the decline in the largest landholdings in Kalahandi district.

We selected at random 40 households from two random villages in five randomly selected blocks in each of the two districts, in total 800 households. Households that were not found were randomly replaced (19 households, which is slightly more than 2%). We also had to (randomly) replace one village in Cuttack as the locals protested against any outside intervention (which would include our survey according to our field supervisors) because of a conflict regarding a power-plant. And we had to (randomly) replace a block in Kalahandi for security reasons, as it was expected to be under Maoist control. The random selection is self-weighted with probabilities according to number of households, except that we have 400 from each district, and probability weights are used to adjust for different district populations. We correct all standard errors for intra-village dependency[1].

[1] We use survey commands in Stata with village being the cluster, or primary sampling unit (PSU), and the districts being separate strata. In some villages there were very few households, so that most households were in

We did one interview in each household but allowed more than one person to participate in the interview. The interview started out with one respondent, preferably the household head, but quite often the spouse, son or another relative or household member participated. If the household head was male and at least 30 years old, then we defined him as the focal point for the family history, whether he was interviewed, or not. If the household head was a woman (or a male below 30), then we identified the husband (or father of the male below 30). If that person again was below 30, then we identified the father as the focal point. The last person in this sequence of logical checks would be a man of at least 30 years old that was defined as the focal point. In collecting the family history we asked detailed questions about him, his father and grandfather, allowing for the possibility that they were not alive. In addition to the family history we collected information on present day occupation of household and family members as well as a number of different assets. The questionnaire is available on request.

The family history was collected using basically one page of the questionnaire. Here we listed the names of the three generations, grandfather, father and son. Then their education, main and secondary occupation during the decade between age 30 and 40, land holding in acres at age 40, migration periods during their life, and an open ended question on events that changed the life of each of the three persons. The answers were coded after the survey by the field supervisors into 56 codes. We have made 16 broader categories of events that will be presented below. The recall problem is minimized by focusing on major events that people remember, including how much land they owned and their main occupation, we do not focus on the particular year of any event, only whether it happened at grandfather's time.

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the sample. Many of these have common fathers and grandfathers. The cluster option will correct for correlation between these households as well.

As the father and son tend to be economically active at the same time we will focus on the transition from the grandfather's economic position to the son. We investigate to what extent initial endowments and events at grandfather's time can explain the present economic position of the household. We classify households at grandfather's time based on his occupation and landholdings. For each occupational group we calculate the mean landholding and rank the groups accordingly. Based on the means and confidence intervals for these means we have identified four major classes that are described in Table 1. Note that we have combined some categories that are similar, even though they have significantly different landholdings, just to reduce the number of classes to four.

Table 1. Class-ranking at grandfather's time

Class	Sub-groups	N	Mean ha sub-groups	Mean ha class
1	Landlords (10+ ha)	65	30.98 (11.47-50.48)	11.57 (6.66-16.48)
	Large farmers (2-10 ha)	164	4.14 (3.84-4.43)	
2	Self-employed	75	1.49 (0.75-2.24)	1.23 (1.01-1.44)
	Medium farmers (1-2 ha)	95	1.44 (1.38-1.50)	
	Salaried work	10	1.42 (0.68-2.16)	
	Small farmers (0.5-1 ha)	84	0.74 (0.69-0.78)	
3	Marginal farmers (less than 0.5 ha)	82	0.26 (0.22-0.30)	0.25 (0.20-0.31)
	Laborers	27	0.22 (0.06-0.38)	
4	Farm-laborers	178	0.14 (0.05-0.23)	0.14 (0.05-0.23)
0	Inactive	20	1.19 (0.61-1.78)	1.19 (0.61-1.78)
		800	N=791	N=791

95%-confidence intervals (cluster corrected) in parenthesis

Grandfathers who worked as farm laborers as their main occupation when they were 30-40 years old had on average 0.14 hectare of land at age 40. While the next class of marginal farmers and non-farm laborers had on average 0.25 hectare. The third class, that we may term as the middle class of medium size farmers and the self employed and salaried employees, had on average 1.23 hectare of land. While social group one of large land owners had on average 11.6 hectare of land. Now, some households in social group two may have had higher incomes than some of the farmers in social group 1, but on average we believe this to be a

useful categorization in a predominantly farming society (only 14% had the main occupation outside agriculture). However, while interpreting the results below we must keep in mind that households with large non-farm incomes are classified in social group 2.

Now we want to study the transitions from this traditional farming society to the present day rural society. As many as 93% of the grandfathers were born in the same village where we did the interview, so what we study here is the development over generations of households that have been living in the same village.

For the present generation we want to go beyond land in classifying and ranking the households. And we will take into consideration the occupation of all household members. So we classify each member of the household based on their main occupation. Then we add land to split those who report farming as the main occupation into different groups based on the size of the household land. For salaried work we split the group at the 75-percentile of monthly income, which is 7000 rupees, and we do not include those who earn less than 1000 rupees in the salaried category. Factory and construction workers have on average higher daily wages than "other" non-farm workers and we separate these two group.

The self-employed is a large group, and potentially very diverse. So we have decided to split the group based on an asset index. We also use the same asset index, which now includes more than land, to rank the individual occupations that we have just described[2]. Based on this ranking we define each household's class position based on the individual with the highest ranking. Then we can calculate the average value of the asset index for each class, which is reported in Table 2. This table is similar to Table 1, just that the ranking procedure is more complex.

We have information on many assets for the present day generation, including monetary values. But it is our impression that these values are not very precise, in particular at

[2] Here we do not use the survey commands as we consider this just a ranking of the observations in the data and not a description of the population.

the upper end. In particular for landholdings and house and houseplot there are some very high values for households that otherwise do not have many assets[3]. So we have decided not to use the aggregate monetary value of assets. In stead we use principal component analysis (PCA), and use the score for the first principal component as an asset index. The self-employed individuals we separate into two groups at the value zero of the PCA-index[4]. Based on Filmer and Pritchett (2001) the PCA-index has in particular been used on DHS data, which also have asset data but not income or expenditure data.

The first principal component is basically an underlying variable (which we interpret as the asset index) that is perfectly determined by the assets in the data and in such a way that it explains as much of the variation in the data as possible. So together the assets determine the index, and some of the assets will be more correlated with the index than other assets. In our case some luxury goods have a very high correlation (correlation of 0.9 for ceiling fan, followed by a number of other electrical appliances), but also major assets such as land and house characteristics are highly correlated with the index (in the range of 0.5).

[3] For rainfed land the median value per acre for landholdings of size 1-2 acres is 60 000 rupees. In such a village the land price for rainfed land will tend to vary from 40 to 80 000 rupees, which is reasonable. For irrigated land the corresponding median is in the range of 90 000 rupees, with variation in those villages from 80 to 100 000 rupees. However, in particular for irrigated land it seems to be important outliers. Among the 9 households with land value at or above 1 million rupees, 4 report a price per acre of irrigated land above 500 000 rupees. Also for house value there are 14 outliers with a house value at or above 1 million rupee. And for other assets there are again two vehicles with value above 1 million rupees. To avoid that such large values dominate the analysis, we decided to construct an asset index. There is, however, a 0.8 correlation between the monetary value of all assets and the asset index. When we look at the cases where wealthy households are classified as smallholders, their wealth consists of land and in particular the houseplot, where the value in both cases can be over-reported. So the construction of the asset index is to avoid outliers that may be due to measurement problems.

[4] Although there is strong overlap in wealth between the two groups, we find also for this group a 0.8 correlation between wealth and the asset index.

Table 2. Class-ranking at present time

Class	Sub-groups	N	Mean pca sub-groups	Mean pca class
1	High salary	68	4.71 (3.56; 5.87)	4.10 (3.41; 4.79)
	Large business	53	3.31 (2.23; 4.38)	
2	Large farmers (2+ ha)	24	1.08 (-0.19; 2.34)	0.18 (-0.32; 0.67)
	Low salary	85	0.47 (-0.43; 1.36)	
	Medium farmers (1-2 ha)	51	0.26 (-0.58; 1.10)	
	Small farmers (0.5-1 ha)	79	-0.50 (-0.91; -0.01)	
3	Marginal farmers (less than 0.5 ha)	145	-0.79 (-1.10; -0.48)	-0.92 (-1.15; -0.70)
	Factory/const. laborers	38	-1.02 (-1.35; -0.68)	
	Small business	44	-1.29 (-1.48; -1.11)	
4	Other laborers	42	-1.58 (-1.78; -1.38)	-1.50 (-1.58; -1.42)
	Farm-laborers	143	-1.48 (-1.58; -1.38)	
0	Inactive	28	-1.00 (-1.37; -0.64)	-1.00 (-1.37; -0.64)
		800	N=800	N=800

Robust to clustering 95%-confidence intervals in parenthesis

When we rank households based on the highest ranked individual occupation there is a switch of position of farm-workers. This is because some of the farm workers live in households with people of higher rank, for example people who reported farming as the main occupation in households with some land. So marginal farm households where there are some farm-workers in the household have slightly (but not significant) higher rank than the non-farm laborers.

As for Table 1, we make four classes based on the asset index. There is no overlap in the confidence intervals for the mean asset index for each group, but for the sub-groups there is overlap, so the grouping is not clear-cut, but ex post it is fine based on the confidence intervals. And furthermore, the social classes have intuitive interpretations with businessmen and salaried people in social group one, farmers and low salary people in social group two, marginal farmers, factory and construction workers and petty traders in social group three, and other laborers including farm laborers at the bottom of the hierarchy.

4. Results

The main focus of our analysis will be on research question (1) discussed above, that is, to what extent does the initial conditions two generations ago determine the present class

position (defined by an asset-occupation mix) of a household. We start in Table 3 describing the households' transition from Table 1 to Table 2. Later we will also investigate the role of other initial conditions, that is, other than the physical capital and occupations. These are other forms of capital, i.e. human capital (whether the grandfather was literate) and social identity (caste). And we will investigate research question (2), that is, the role of more or less random events at grandfather's time.

For social identity we use the official categorization of people in India into scheduled caste (SC), scheduled tribe (ST), other backward castes (OBC) and others who are named as general caste. Now the classification of a particular group into these broad caste categories may change over time. We will however use the present categorization as reported by the households themselves, and thus assume that low ranked groups were low ranked also two generations ago. It is beyond the scope of the paper to reclassify castes at grandfather's time. Also note that the sample is representative for the present generation, and not the grandfather's generation. At grandfather's time there were households that no longer exist, and some of the present day households are the offspring of the same household at grandfather's time. As a result we so we base all percentages on the present generation, so the transition table shows column sums, in stead of row-sums which would be the standard in a transition matrix. Note that 46 households are inactive in at least one of the two periods, and are not included in the table.

Table 3. Transition from grandfather's time to present generation

	Class present generation			
Class grandfather	1	2	3	4
1	28 (23.5)	119 (51.3)	47 (21.2)	29 (16.0)
2	62 (52.1)	62 (26.7)	90 (40.5)	38 (21.0)
3	20 (16.8)	19 (8.2)	43 (19.4)	24 (13.3)
4	9 (7.6)	32 (13.8)	42 (18.9)	90 (49.7)
N=754	119 (100)	232 (100)	222 (100)	181 (100)

Percentages in parenthesis

Here we can immediately see that 50% of the lowest class today (farm and other laborers) had a grandfather who was also a farm-laborer. So 50% of the present poor are in a poverty trap that has lasted for generations. But there is obviously another side to this coin, the 90 poverty trapped households are matched by another 83 households (the left poverty group below) with a grandfather who was a farm labor, but where the present generation is in a higher ranked social group.

We now reduce the 16 cell transition table into six transition categories that are summarized in Table 4. Note that the numbers in Table 4 are derived directly from Table 3. The into-poverty group is for example the sum of the three first entries in the last column of Table 3 (29+38+24=91).

Table 4. Transition categories

Transition	Table 3	N	%
Poverty trap	Always in 4	90	12%
Into poverty	1-3 into 4	91	12%
Left poverty	4 into 1-3	83	11%
Stagnated	Always in 1, 2 or 3	133	18%
Improved	3 to 2,1 or 2 to 1	101	13%
Declined	1 to 2, 3 or 2 to 3	256	34%
		754	100%

So while there are 50% of the poor being in a poverty trap, there are equally many households that have entered into poverty, and in fact there are about as many households that have left poverty, indicating that the social group four of farm and other low paid workers have been relatively stable over the generations at the aggregate, but with transition in and out of poverty. With a 50% split the reader may focus on the large share of the poor that is trapped in poverty, or the large transition in and out of poverty.

The largest group, though, is the 34% that are sliding down the social ladder. Within this group the largest sub-group is the 119 households that started out in social group one (farmers with at least two hectare land) and ended up in social group two, which is dominated

by low salaried households and farmers with less than two hectare land. This is a general trend we see in the data, household sell or split land between sons, and they transfer into relatively low paid non-farm jobs. However, we have to keep in mind that these ladders are relative, there has been economic growth in Orissa over the two generations, so a low salaried employee, or a small farmer today may have a living standard that is comparable to a large farmer 50 years ago[5].

When we study the role of initial conditions on the present position, we may either focus on the transitions in Table 4, or only on the final position. In the regression analysis reported below the focus will be on the final positions. But first we split Table 4 according to the social identity of the households, as shown in Table 5.

Table 5. Transitions and social identity

	Caste			
Transition	SC	ST	OBC	General
Poverty trap	26 (15.8)	20 (**20.6**)	42 (9.5)	2 (2.8)
Into poverty	22 (12.9)	10 (10.3)	56 (12.9)	3 (**4.7**)
Left poverty	37 (**22.1**)	4 (4.1)	42 (9.6)	0 (**0.0**)
Stagnated	34 (20.3)	12 (12.4)	65 (16.0)	22 (**34.2**)
Improved	16 (**9.7**)	0 (**0.0**)	65 (16.0)	20 (**32.0**)
Declined	33 (**19.3**)	51 (**52.6**)	155 (36.0)	17 (26.3)
N=754	168 (100)	97 (100)	425 (100)	64 (100)

Percentages in parenthesis are probability weighted. Bold means significantly different from OBC

Maybe surprisingly we find that the schedule caste category is overrepresented only in the left-poverty category, while the scheduled tribes are overrepresented in the poverty-trap category as well as in the decline category. As we may expect, the general category is overrepresented in the stagnated and improve categories, which both imply that they are well off today.

[5] The mean reported birth year of the grandfathers in the sample is 1905, while the mean birth year for their grandsons is 1961. Now we believe that the respondents have overstated the age difference, so the average gap between the generations is probably well below 28 years, probably closer to 20.

We now go on to research question 2), that is, whether there are particular events at grandfather's time that may explain the transitions. Now, for 492 of the 800 households no event is reported for the grandfathers. For the remaining 308 households there are reported 540 events, so 1.75 events per grandfather. Now, the low number of households reporting on events at grandfather's time is not explained by lack of a willingness to respond, for events at father's time as many as 725 households report in total 1872 events, so almost all households and 2.6 events per father. So probably they just did not know of important events at grandfather's time. We will still use the data below, assuming that the events that are reported were essential for the development of the household. Among the 540 events, the most frequent are land sales (85), family separated (81), health problems (78), natural disaster (74), and started economic activity (60).

That the family separated is, in our mind, not important as that will happen at a certain point in time for all households, and some households decided to report this, others not. Furthermore, land sales and upstart of an economic activity (this includes starting a business, or in a new job, or labor migration) are in our mind important descriptions of the transition, rather than events that nay explain the transitions. This contrasts with natural disasters and health problems that are more likely to be random, and are thus events that may explain rather than describe the transitions. In Table 6 we split Table 4 according to whether the households report one or more of these events (except family separated) at grandfather's time. Note that some households are represented in more than one column as 30 households report two of these events, and one household report three of them.

Table 6. Transitions and events at grandfather's time

	Early events				
Transition	No event	Natural disaster	Health shock	Land sale	Economic activity
Poverty trap	74 (13.2)	6 (10.6)	3 (5.1)	3 (4.0)	4 (7.5)
Into poverty	49 (8.8)	9 (15.3)	14 (**22.7**)	15 (**21.2**)	15 (**28.8**)
Left poverty	67 (12.1)	3 (5.2)	6 (10.4)	2 (2.9)	7 (14.3)
Stagnated	93 (17.4)	9 (16.0)	12 (20.1)	17 (25.4)	8 (16.5)
Improved	77 (14.7)	10 (18.0)	3 (5.3)	5 (7.7)	10 (21.1)
Declined	188 (33.8)	21 (35.0)	22 (36.3)	28 (38.9)	6 (11.9)
N=754	548 (100)	58 (100)	60 (100)	70 (100)	50 (100)

Percentages in parenthesis are probability weighted. Bold means significantly different from no event

There is one robust finding here, those who have transferred into poverty report many more events than any other group. They basically report all types of events, although natural disasters are not significantly over-represented. One may believe that the poor just had more time available, or more respect for the enumerators, but the poverty trapped households do not report many events. So it is likely to be a real phenomenon. So the households that have declined into poverty had to a larger extent negative health shocks at the grandfather's time. And they also sold land and started a new economic activity to a larger extent than other households during the grandfather's generation. It is tempting to argue that the logical sequence is that the health problems implied that they had to sell land, and find another occupation. But in most cases only one of these events are reported, and in case more than one event is reported the health problems happen later in life.

So we rather conclude that sale of land is an indicator that the household is not doing so well, and health problems may tip the household towards a declining trajectory in the following generations. It also appears that starting new economic activities are indications of a downward sloping trend, which in turns indicate that the grandfather's were forced into new occupations. Or it may be the case that it is risky to start a new economic activity, but in that case we should expect this activity to be overrepresented also in the improve category. It appears overrepresented but there are only ten observations in this cell and thus no significant

difference can be found. But, there is some indication that events at grandfather's time matter, and we will thus include in particular those events that may be considered as exogenous, natural disasters and health shocks, when we now turn to the regression analysis.

We go back to research question 1) and investigate to what extent the present situation, measured by the land holdings, can be explained by the initial condition as measured by land at grandfather's time, his social identity as measured by caste status, and whether he was exposed to negative shocks, i.e. a natural disaster or health problems. Before we report the regression analysis, we report the initial landholdings by caste in Table 7, and similarly the present landholdings in Table 8.

Table 7. Land at grandfather's time

	Caste			
	SC	ST	OBC	General
Landless	45.7%	25.5%	18.8%	6.9%
Median	0.11 ha	2.23 ha	0.99 ha	2.43 ha
Mean	0.77 ha	5.18 ha	2.65 ha	16.34 ha
N=791	175	98	450	68

We see that the land distribution at grandfather's time was very skewed, with large discrepancies between the median and mean land holding. The relative discrepancy has declined for all groups over the generations. So basically all groups have lost land, but more so for the largest land holdings, which is why we include a second-order term in the regression analysis to allow for a concave function.

Table 8. Land today

	Caste			
	SC	ST	OBC	General
Landless	40.1%	23.5%	25.5%	14.8%
Median	0.10 ha	0.40 ha	0.24 ha	0.66 ha
Mean	0.32 ha	0.66 ha	0.45 ha	1.07 ha
N=791	175	98	450	68

We now turn to the regression analysis. The first regression in Table 9 includes the independent variables in the simplest linear form. We have, however, found that the parameters for the social identity variables are not robust to exclusion of large landholdings. In stead of excluding the large holdings we estimate a more complex interaction form, with a concave function of land interacted with the caste dummies. We also interact land with the shock dummies (but here the second order effects were not significant are omitted). And we add a dummy for zero land at grandfather's time. This more complex function appears to be robust and is reported in the second column of Table 9.

Table 9. Land dynamics

dependent:	hectarenow	hectarenow
indepvars:	svyreg	svyreg
hectareg=0		-0.106*
		(0.052)
hectareg	0.015**	0.053***
	(0.006)	(0.008)
hectareg-squared		-0.000***
		(0.000)
natural disasterg	-0.064	0.034
	(0.069)	(0.065)
health problemg	0.066	-0.023
	(0.102)	(0.080)
SC	-0.525***	-0.391***
	(0.177)	(0.127)
ST	-0.257	-0.233
	(0.190)	(0.137)
OBC	-0.425**	-0.372***
	(0.184)	(0.108)
hectareg*natural-dis		-0.042**
		(0.017)
hectareg*health-prob		0.028
		(0.018)
hectareg*SC		0.226**
		(0.081)
hectareg*ST		0.049*
		(0.024)
hectareg*OBC		0.085***
		(0.018)
hectareg-sq*SC		-0.018**
		(0.007)
hectareg-sq*ST		-0.002***
		(0.000)
hectareg-sq*OBC		-0.004***
		(0.001)
constant		0.605***
		(0.103)
Observations	791	791
R-squared	0.2047	0.4220

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In Table 10 we have calculated the marginal effects at the median (0.8 hectare), mean (3.7 hectare), 90-percentile (7.3 hectare) and 95-percentile (13 hectare) of land at grandfather's time. We see that for the so-called upper castes, and also the tribal groups that also started out with more land, the marginal effect is basically independent of land-holdings, only very high land-holdings, in the range of 200 hectare, can explain the significant second-order term.

While for scheduled castes there is a large decline in the marginal effect of land as initial landholdings increase. This means that most Dalits, who did not have so much land at grandfather's time, have not lost much land over the generations, while a few Dalits with more land lost relatively more. The so-called other backword castes are in an intermediate position.

Table 10. Marginal effects

	Simple	Complex	Complex	Complex	Complex
Marginal change:	linear	median 0.8 hectare	mean 3.7 hectare	90-percentile 7.3 hectare	95-percentile 13 hectare
No shocks:					
hectareg (Gen=1)	0.015	0.052	0.052	0.051	0.050
hectareg (SC=1)	0.015	0.249	0.141	0.010	-0.198
hectareg (ST=1)	0.015	0.099	0.089	0.077	0.058
hectareg (OBC=1)	0.015	0.131	0.106	0.077	0.029
Effect of shocks:					
Natural disaster	-0.064	0.000	-0.121	-0.269	-0.505
Health problem	0.066	0.000	0.083	0.183	0.344
Effect of caste					
SC	-0.525	-0.220	0.198	0.286	-0.531
ST	-0.257	-0.195	-0.073	0.040	0.138
OBC	-0.425	-0.306	-0.113	0.030	0.046

For all castes we see that people with more land at grandfather's time have more land today, but these measures are relative in the sense that households with a large marginal effect, such as scheduled castes with land around the median of 0.8 hectare have lost less land the other households. The median amount of land today is 0.5 hectare.

For health shocks there is no significant effect on land today. For natural disasters the interaction effect with land is significant, which means that most households that were exposed to some natural calamity (cyclone, flood, fire) at grandfather's time cannot feel any effect of that today, but the few households with lots of land at grandfather's time have lost more than normal amounts of land. When we look at the detailed data it seems to be a tendency that the land sales take place in the next generation, so if this is a real effect it seems like it take time before they go to the drastic measure of selling land. However, we must keep

in mind that there are few observations in this upper end of the land distribution, so even though those few households among the large landowners that were hit by a cyclone, flood or fire have lost relatively more land the external validity of this finding may be limited. And we must also keep in mind that there may be a reverse causality even for natural disasters as the wealthy are have more properties to lose and thus are more likely to remember those losses some generations later.

The simple regression indicates that Dalit and OBC households have lost relatively more land than others, when we control for initial landholding. This is not because they had more land initially, on the contrary, they had much less land. The complex functional form indicates that the caste-specific losses depend on the amount of initial land. These findings mirror the findings discussed above as they reflect the significant interaction effects. So in particular scheduled castes with large land-holdings have lost more, while there seems to be some intermediate landholdings for scheduled castes where less land is lost. If we compare OBCs to upper-castes with similar landholdings, then we find that the few OBCs with lots of land are doing relatively well, maybe because they use land to maintain their political influence.

Next we go on to the transitions, which is a similar way of analyzing the same data. In particular we will identify the determinants of being in the left-poverty group subject to having a grandfather who was a farm laborer. There are only two upper-caste households in this group, and both left poverty and thus perfectly determines that choice, so in the analysis we combine these two with the OBCs. So Table 11 is similar to Table 9 just that the sample is limited to farmworkers at grandfather's time, the reference group is basically OBC, and the dependent variable is not landholdings today, but whether the households have left the lowest social group.

Table 11. Determinants of transition out of poverty

dependent:	left-poverty	left-poverty
indepvars:	svyreg	svyreg
hectareg=0		-0.291*
		(0.139)
hectareg	0.110*	-1.609***
	(0.064)	(0.463)
hectareg-squared		0.697***
		(0.175)
natural disasterg	-0.239	-0.298
	(0.146)	(0.212)
health problemg	0.185*	0.273**
	(0.090)	(0.106)
SC	0.103	0.023
	(0.065)	(0.076)
ST	-0.336**	-0.306**
	(0.140)	(0.146)
hectareg*natural-dis		1.849
		(5.145)
hectareg*health-prob		0.310
		(0.193)
hectareg*SC		1.529***
		(0.508)
hectareg*ST		0.578
		(0.472)
hectareg-sq*SC		-0.606**
		(0.223)
hectareg-sq*ST		-0.216
		(0.214)
constant	0.474***	0.780***
	(0.059)	(0.145)
Observations	172	172
R-squared	0.0963	0.1540

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Here we see that natural disasters have no significant effect, probably because these households do not have land, or very little land. The few of them who actually have land, but

worker as farm laborers on other people's land, they are more likely to have climbed the latter. More surprising is a positive effect of health problems, maybe this is a reverse causality. If you worked hard to, let us say finance your son's education, then you may end up with health problems and a more affluent next generation. But only nine of these households have met a negative health shock so again the external validity is limited.

Scheduled tribes are less likely to have left poverty, as compared to OBC. This is independent of their land-holdings. While scheduled castes are more similar to the OBC. These findings mirror Tables 6 and 9. But again we see that for the scheduled castes there seem to be an intermediate range of landholdings where they are more likely to leave poverty. But we have to keep in mind that 78% of these farm laborers had no land, so there are only 15 SC households with land among the farm-laborers at grandfather's time, so again the external validity for the SC-land interaction effect is limited.

In conclusion, for transition out of poverty we should focus on the simple regression in Table 11, and also recall that there are very few observations behind the significant health-shock and land findings. So the main result here is the same as in Table 6, the scheduled tribes are under-represented in the left-poverty group. If we go into the detailed data we find a few grandfathers with some education among those who have left poverty, but again the sample is very small as most grandfathers are illiterate in both the poverty trapped and the left-poverty groups[6]. But we recall that most of the households that leave poverty do not climb high on the social ladder, two generations later they work as factory and construction workers or in low-salaried positions.

[6] Four out of the 156 had grandfathers with 1-5 years of schooling, and all four households climbed the ladder some steps and ended up either in the first or second social group.

5. Conclusions

We find that half of the households that base their income on low paid unskilled labor today had a grandfather of the household head who was an unskilled farm laborer. These households are in a poverty trap that may be explained by few initial assets. However, we also have poor farm laborers at grandfather's time who now have grandsons that have been able to climb the economic ladder, and work as factory or construction workers, or in low-salaried jobs. But we also have grandfathers who were small and marginal farmers, and now have grandsons with barely any land left who work as farm laborers. We find that in particular the scheduled tribes are over-represented among the poverty trapped households, while the scheduled castes are overrepresented among the households that have left poverty. This may reflect that India has given priority to Dalits in social programs including affirmative action, while scheduled tribes, who normally live more concentrated in remote villages, have not benefitted as much, probably because it is harder to find non-agricultural employment in remote areas, which would otherwise allow unskilled labor to climb the ladder. This lack of economic progress may in turn explain the increase in Maoist activities in these areas.

The regression analysis reveals interaction effects between initial landholdings and caste. For all broad caste categories we find that land today is a function of land at grandfather's time, but for Dalits we find that the few households with relatively large initial land holdings have lost more than others. Furthermore, we do find some effect of natural calamities at grandfather's time, but only for the few households with large landholdings, which may also be the result of a reverse causality in the sense that the wealthy are more likely to remember these events as their losses were presumably higher.

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