



Moving up the ladder: the spatial determinants of intergenerational occupational mobility in rural India

Kunal Sen¹

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Abstract

In this study, we examine the “geography of mobility” for rural India. We study the spatial determinants of intergenerational occupational mobility across villages in India. Using a nationally representative data set—the Indian Human Development Survey of 2011–2012, which has detailed information on the occupations of fathers and sons as well as data on village-level covariates, we find clear effects of village-level factors in explaining intergenerational occupational mobility. The remoteness of the village, its agro-ecological and climactic conditions, infrastructural public goods and its economic prosperity are important correlates of whether the son is less likely to follow his parent’s occupation in the village.

Keywords Occupational mobility · IHDS · India · Spatial factors

Introduction

A topic of long-standing interest among social scientists is the degree to which an individual’s status in society is determined by the position of one’s parents. In egalitarian societies, where you are in the social and economic status ladder should not be principally determined by your parent’s income, educational level or occupation (Roemer 1998; Bowles and Gintis 2002). Social mobility research has been concerned with intergenerational occupational mobility, but much of this research has concentrated on advanced market economies (Erikson and Goldhorpe 1992; Miles 1999). However, this question is of crucial importance in the developing world, and especially in emerging economies which have undergone modernisation as they have opened up to the world economy in recent decades. Emerging literature has investigated intergenerational occupational mobility in developing countries (Wu and Treiman 2007; Krishna 2013a, b; Azam 2015). Much of this literature has documented the patterns of social mobility for the general population as well as for certain social groups (Motiram and Singh 2012; Reddy 2015)¹. Less understood are what Chetty

¹ For example, the literature on India has tended to look at social mobility patterns among different castes in India and especially the most disadvantaged (see Krishna et al. 2016).

✉ Kunal Sen
sen@wider.unu.edu

¹ UNU-WIDER and Global Development Institute, University of Manchester, Manchester, UK

et al. (2014) call “the geography of intergenerational mobility”—do we see spatial variations in intergenerational occupational mobility, and if so, what are the spatial determinants of social mobility in the developing country context?

We examine the spatial determinants of intergenerational occupational mobility across villages in India. The federal nature of India’s polity, where local governments have an important role to play in the provision of local public goods, provides an ideal setting to examine the role of village-level factors in explaining social mobility. This is also made possible by the systematic differences in agro-ecological conditions, physical infrastructure, human capital, social structure, economic endowments and the remoteness of villages from centres of economic activity. We use a nationally representative data set—the Indian Human Development Survey II of 2011–2012, which provides detailed information on parents and adult age children as well as range of individual and village characteristics of the location of the adult child. Looking at father–son occupational mobility, we find clear effects of village-level factors in explaining intergenerational occupational mobility. The remoteness of the village, its agro-ecological conditions, infrastructural public goods and its economic prosperity serve as important predictors of whether the son is less likely to follow his parent’s occupation in the village.

In the next section, we provide a brief review of the literature. We then discuss measures of social mobility and describe how we have categorised the occupations in measuring occupational mobility. We then present the empirical strategy, followed by the descriptives and the results.

Related literature

A long-standing literature has looked at the spatial determinants of rural poverty in India. In an important contribution to the literature, Datt and Ravallion (1998) link the changes in rural poverty (measured alternately by the head-count ratio, the poverty gap and squared poverty gap) in a particular state to initial conditions that existed in the state in 1960 (the year their analysis began), growth in farm output per acre, growth in per capita non-farm output, changes in the cost of living for agricultural labourers and per capita state development expenditure. They show that cross-state variations in trend rate of growth of average farm yields were important in explaining cross-state variations in the trend rates of rural poverty reduction.

Palmer-Jones and Sen (2003) have highlighted the role of agro-ecological factors in mediating the relationship between agricultural growth and rural poverty; they argued that some Indian states had relatively homogeneous agro-ecological properties that were favourable to agricultural growth. These states, mostly in north-west India, had appropriate supportive policies (in terms of large-scale irrigation and access to the new Borlaug seed-fertiliser technology introduced in the mid-1960s), which largely accounts for their better performance in both agricultural growth and poverty reduction, and hence the associations found in state-level analyses. Other states had diverse agro-ecological conditions, which resulted in poorer average performance, despite impressive performance in some of their regions. Thus, while states which experienced rapid agricultural growth consequently achieved poverty reduction, Palmer-Jones and Sen (2003) show that the success of these states is due to the presence of a high proportion of favourable agro-ecological conditions; and where these conditions are not present, neither poverty reduction nor agricultural growth has been achieved to the same degree.

Krishna and Bajpai (2011) show that there has been a clear spatial pattern in income growth in rural India in 1993–2005. While inflation adjusted per capita incomes grew between 1993 and 2004 in villages located within 5 kms of the nearest town, it decreased in villages situated more than 5 kms of the nearest town (and where more than 80% of India's rural population reside). Iversen et al. (2014) find that Scheduled Caste households in villages where they are the majority have higher incomes and faster poverty reduction than Scheduled Castes living in upper caste dominated villages.

Together, these studies show the importance of agro-ecology, remoteness of location and social structure in explaining spatial patterns in India's poverty reduction and income mobility. No such study thus far has examined the spatial determinants of inter-generational occupational mobility. Our study aims to fill this gap.

Measuring social mobility

Mobility is the lack of association between some characteristics of the parent with an equivalent characteristic of the child. This could be income, occupation or education. Economists have generally focused on income in the developed country context. However, such a practice of using income as the relevant characteristic of the parent and child in understanding mobility has come under some criticism due to the lack of stability in parent–child associations (Chetty et al. 2014). Income as a measure of mobility is particularly problematic in the developing country context, where income data are sparse and it is difficult to accurately determine the permanent income of the parent or child. The use of occupations as a measure of mobility is common in the sociology literature. In the context of a low-income country setting, where occupation is a strong predictor of income, occupation-based measures of social mobility are more appropriate. We focus on the association between the occupation of the father and son to measure social mobility.

The two common measures of social mobility are the intergenerational regression coefficient (IGRC) and the intergenerational coefficient (IGC). To obtain the IGRC, intergenerational mobility in occupation, one should estimate the following equation:

$$Y_1 = \beta_0 + \beta_1 Y_0 + u_i \quad (1)$$

where β_1 is IGRC, Y_0 is occupational rank of the father, and Y_1 is the corresponding category for offspring.

The IGC is given by:

$$\rho = \beta_1 \left(\frac{\sigma_1}{\sigma_0} \right) \quad (2)$$

where σ_1 and σ_0 are standard deviations (dispersions) of occupational categories in the child and parent generation, respectively. The social mobility measures in (1 and 2) overlap if the intra-generational dispersions of occupations are identical for the parent and offspring generation, which is unlikely. Further, a cross-sectional rise in occupational inequality from the parent to the child generation will translate into lower social mobility while a relatively more compressed distribution of occupations in the child generation results in a higher social mobility estimate (Iversen et al. 2017).

Data

The data obtained from the Indian Human Development Survey (2011–2012) are a large-scale household survey that covers most of the territory of India. It was conducted by NCAER on behalf of the University of Maryland. A unique feature of the survey was that the household-level questionnaire featured questions about the parent's occupation and education of the heads of households. Another unique feature of the data was that a village-level questionnaire was administered to 1420 villages in 384 districts, which asked detailed questions about the physical infrastructure, agro-ecological properties, economic conditions and social structure of the village. One limitation of the survey is that village-level GPS coordinates are not released to researchers as it may compromise the confidentiality of information about the village. This implies that we know in which district the village is located, but not its exact location in the village. Furthermore, as the survey was not meant to obtain representative data at the district or state level, aggregating the data to district or state level to obtain spatial maps of social mobility and village characteristics is not possible.

Categorising occupations

To estimate the IGRC and IGC, we need a method of categorising occupations such that they can be rank ordered. The IHDS surveys ask heads of households about the main occupation of their fathers (or fathers of husbands, if the head of household is female). Since we focus on father–son occupational mobility, we restrict our sample to male-headed households, with the head aged 20 years and above and who is not retired or unfit for work². The occupational codes are provided at the two-digit level (as detailed in Appendix). In their analysis of occupational mobility based on IHDS I data, Motiram and Singh (2012) use the Indian National Classification of Occupations (NCO 2004), which draws on ILO's occupational classifications (ISCO88 and its antecedents) with adjustments considered appropriate for the Indian context (*ibid.*). A key feature of ISCO88 is the use of skill requirements as the main principle guiding occupational rank (e.g. Ganzeboom and Treiman 1996). In the Indian context, caste makes the translation of skill requirements into occupational status more intricate, for example, regardless of the skill requirements of their traditional, caste-based occupations, Shudra or Scheduled Caste individuals are likely to have low social status. Following Iversen et al. (2017), we attempt to adjust for this and other relevant empirical facts when converting the IHDS categories into an occupational ranking (Table 1). In our analysis, we use the following six occupational categories (with IHDS occupation codes in brackets).

Higher values of the occupational category variable are associated with higher standing on the social status and plausibly on the earnings ladder. While categories 6 and 5 are quite straightforward, the placement of farmers in category 4 is less clear-cut given

² Accordingly, IHDS data are not subject to the co-residence-related selection bias that affects social mobility estimates using NSS data, e.g. discussions in Azam and Bhatt (2015) and Shahe Emran et al. (2016). Azam (2015) also includes brothers of the male heads of household residing in the household as well as male children over 20 years whose father is residing in the same household. Including only co-resident brothers and not those who reside somewhere else leads to a problem of selection bias. Including male children whose parents live in the same household has a disadvantage of including sons who may be at a point in their life-cycle where occupational status is fluid.

Table 1 Occupational categories and codes

Category 6	Professional (occupation codes 00–29)
Category 5	Clerical and other (occupation codes 30–39, 40–49)
Category 4	Farmers (occupation codes 60–62)
Category 3	Higher status vocational occupations (occupation codes 43, 49, 50–52, 56–59, 79, 84–87)
Category 2	Lower status vocational occupations (often caste based, traditional): 53–55, 68, 71–78, 80–83, 88–93, 96–98)
Category 1	Agricultural and other manual labourers including construction workers (occupation codes 63–67, 94, 95, 99)

the substantive heterogeneity among India's cultivators³. For the main questions that we address and the tables that follow, this simplification is not a major concern.

To address caste and occupational status, we distinguish between categories 2 and 3, capturing low and higher status for a spectrum of vocational and other skills, as done by Iversen et al. (2017). The idea here is to distinguish between occupations that require skill but have low status because of caste connotation and those that are not; new, modern jobs and vocations form a subset of the latter. Examples of low status vocational occupations (category 2) are blacksmiths and shoemakers, higher status occupations include tailors while modern vocational occupations include machinery/electrical fitters, broadcasting station operators and plumbers. Finally, given our focus on sharp ascents, we examine whether the lower end layer within category 6, which we interpret to include nurses (occ code 8) and teachers (occ code 15), accounts for a substantive fraction of the entrants into this topmost category⁴.

To obtain the occupation codes of sons, we first ascertain whether the head of household is a farmer. For those individuals who are not farmers, we use the occupational codes provided in WS4 (for those engaged in wage or salaried work) and in NFIB (for those who have a primary non-farm business). Clearly, any occupational classification includes an element of choice and arbitrariness. Employing a different classification schema did not, however, produce any major changes in the results reported in the following sections.

Empirical strategy

We follow two approaches to assess the spatial correlates of occupational mobility.

The first approach starts off with the workhorse of empirical analysis of intergenerational occupational mobility, as in Eq. (1) earlier:

$$Y_1 = \beta_0 + \beta_1 Y_0 + u_i \quad (3)$$

³ Such cultivator heterogeneity is not unique to India, and the challenge this poses is extensively discussed among historians, see e.g. Armstrong (1972), Appendix C.

⁴ We have included teachers and nurses in the highest occupational category, and there may be an argument for including them in the next highest occupational category (clerical and other workers). However, re-classifying the occupational categories by including these two occupations in the next highest category does not result in a substantially different occupational mobility pattern—only 1.5% of fathers and 3.1% of sons were in these two occupations.

where β_1 is the intergenerational regression coefficient (IGRC): Y_0 is occupational rank of the father and Y_1 is the corresponding category for offspring. To see the role of village characteristics on explaining variations in the IGRC spatially, we augment Eq. (3) with the following specification:

$$Y_1 = \beta_0 + \beta_1 Y_0 + \beta_2 Y_0 * X + \beta_3 Z + u_i \quad (4)$$

where X is a vector of village covariates, X_1 – X_n , and Z is a vector of controls.

For a given village characteristic X_i , we can assess whether X_i positively or negatively affects occupational mobility by looking at the sign of β_2 . We estimate Eqs. (1 and 2) by employing linear probability methods (ordered probit estimates were broadly similar).

Our second approach is to use a multinomial logit to capture individual's constrained choice of one occupation over other occupations, which is the standard approach to modelling occupational choice in the labour economics literature (Abowd and Killingsworth 1984, Constant and Zimmerman 2003). Let us suppose s is the occupational choice (occupational type of the son in our case) variable, which takes values of 0, 1, ..., J for $J+1$ outcomes. The model for determination of s is specified as

$$P_{ij} = \Pr[s_i = j] = \frac{\exp(X_i \beta_j)}{1 + \sum_{j=1}^J \exp(X_i \beta_j)} \quad (5)$$

where i indexes the individual and j indexes the choice or outcome.

We are specifically interested in upward ascents, and we will examine the role of village covariates in explaining probability of the son's mobility to other occupations, where the father is an agricultural or other labourer (the lowest ranked occupation). The advantage of the second approach is that we do not need to make an assumption of rank ordering of occupations, which is the case with the first approach.

Our set of village covariates is derived from the previous literature on social mobility as well as the literature on the spatial determinants of rural poverty and income mobility in India. The literature on social mobility has identified the role of segregation in reducing social mobility by reducing exposure to successful peers and role models, decreasing funding for local public goods such as schools and constraining access to nearby jobs (Wilson 1987, Massey and Denton 1993, Cutler and Glaeser 1997). Our segmentation variable that is appropriate in the Indian context is whether social groups in the village live in separate hamlets. The presence of good quality schools in the area has also been found to be an important correlate of social mobility (Chetty et al. 2014). We do not have data on the quality of schools, and in the Indian context, where many villages lack middle and secondary schools, whether a village has a middle or secondary school is an important marker for the possibility of human capital formation necessary for social mobility in the village. The presence of public goods in the village such as access to electricity and a permanent all-weather road is an important factor in allowing for income diversification possibilities in the village (Binswanger et al. 1989). Agro-ecological and climactic factors such as the vulnerability of the village to droughts or flooding limit the possibilities of rural income growth and limits the variety of jobs in the service sector that may be supported by the village economy (Palmer-Jones and Sen 2004). Among other geographical factors, the remoteness of the village from major towns can hinder the possibility of social mobility in the village as villagers living closer to the towns and cities have opportunities to engage in higher value activities that serve the needs of the residents of towns and cities, which their

counterparts in more remote villages are not able to do (Krishna and Bajpai 2011). Finally, the economic prosperity of the village is an important predictor of the range of occupations that a village economy may support. More prosperous villages, whether the prosperity is due to more productive farming or a flourishing non-agricultural sector, have the incomes to support higher-order occupations in the service and manufacturing sectors.

Our set of controls are drawn from the existing literature on social mobility in India. Caste is an important marker of the possibility of social mobility in rural India, with individuals in socially disadvantaged social groups such as the Scheduled Castes (SC), Scheduled Tribes (ST), Other Backward Classes (OBC) exhibiting lower rates of social mobility than forward castes (Iversen et al. 2016). More educated fathers are expected to have sons who are more likely to move up the occupational ladder. Finally, we also add state fixed effects to control for unobserved state-level factors that may be correlated with social mobility.

Descriptives

Occupational mobility matrices

We begin by providing occupational mobility matrices, first for the combined rural and urban sample, then separately for the rural and urban samples (Table 2). We note that the diagonal terms dominate the off-diagonal terms, which suggests that sons in India are likely to follow the occupations of their fathers. For example, for the all-India sample, 58.6% of the sons of agricultural and other labourers were also in the same occupational category. Such dominance is not a verdict on India per se, since it tells us little about how India compares with other countries. Greater upward occupational mobility would be evident if the off-diagonal elements on the right-hand side of the diagonals dominate the off-diagonal elements on the left-hand side. We do not find evidence of such mobility, independent of rural/urban location and social group.

The matrices point to higher occupational mobility among forward castes than among Other Backward Classes (OBC) and Scheduled Castes (SC) and Scheduled Tribes (STs) (Table 3). Among upper castes, we observe sharp ascents for 24.7% of the sons of agricultural and other labourers who enter the highest two occupational categories—clerical and other workers and professionals. In contrast, in the case of OBC, SC and ST individuals, the respective percentages are 15.7, 10.6 and 9.3%. Also, striking and consistent with Motiram and Singh (2012), we find a much higher prevalence of sharp descents among SC and ST sons.

Intergenerational regression coefficient and intergenerational coefficient by district

We now provide estimates of the IGRC and IGC, where we aggregate the village-level observations of the district⁵. It is important to note here that the villages in the IHDS are not representative of the district. So, the estimates provided here are not “true” measures of intergenerational occupational mobility at the district level. Notwithstanding this, we find

⁵ We drop all estimates where we have less than 20 observations for a particular estimate, as the estimates of IGRC and IGC would not be reliable in such small samples.

Table 2 Occupational mobility matrices, all India, rural and urban samples (percentages), IHDS II

All India, rural and urban combined									No. of observations (<i>n</i>)
Father's occupation/ Son's occupation	Agricultural and other labourers	Lower skilled occupations	Higher skilled occupations	Farmers	Clerical and other workers	Professionals			
Agricultural and other labourers	58.6	13.6	8.0	5.3	10.1	4.5		10,170	
Lower skilled occupations	14.6	50.0	11.3	2.5	12.8	8.8		3224	
Higher skilled *Occupations	11.5	15.4	42.5	4.0	15.3	11.3		2311	
Farmers	32.2	9.7	7.7	32.4	10.7	7.4		15,500	
Clerical and other workers	7.4	12.0	14.7	3.8	48.1	14.0		2830	
Professionals	8.9	9.0	14.1	6.5	23.9	37.6		1692	
<i>Rural</i>									
Agricultural and other labourers	67.1	10.8	5.2	6.5	7.3	3.2		7436	
Lower skilled occupations	24.4	46.5	5.2	6.0	10.8	7.1		1189	
Higher skilled occupations	19.7	11.0	40.7	9.6	10.2	8.9		822	
Farmers	35.9	8.5	5.4	36.6	7.9	5.7		12,797	
Clerical and other workers	15.8	10.5	10.3	10.3	44.3	8.9		719	
Professionals	16.3	8.7	9.4	14.9	16.1	34.6		541	
<i>Urban</i>									
Agricultural and other labourers	33.1	22.3	16.4	1.5	18.5	8.3		2734	
Lower skilled occupations	7.8	52.5	15.6	0.1	14.2	10.0		2035	
Higher skilled occupations	6.6	18.1	43.7	0.6	18.3	12.7		1489	
Farmers	10.7	17.0	20.7	7.9	26.7	16.9		2703	
Clerical and other workers	3.5	12.7	16.8	0.8	49.8	16.4		2111	
Professionals	4.7	9.2	16.7	1.7	28.4	39.3		1151	

All observations adjusted by household weights. Figures in rows add up to 100

Table 3 Occupational mobility matrices, by social group (percentages), IHDS II

Forward caste									
Father's occupation/Son's occupation	Agricultural and other labourers	Lower skilled occupations	Higher skilled occupations	Farmers	Clerical and other workers	Professionals	No. of observations (<i>n</i>)		
Agricultural and other labourers	43.1	13.9	10.4	7.9	17.6	7.1	1546		
Lower skilled occupations	7.7	40.9	14.8	3.4	17.5	15.7	693		
Higher skilled occupations	7.2	15.5	34.9	7.5	19.5	15.6	804		
Farmers	21.7	8.8	8.2	37.1	13.8	10.4	4766		
Clerical and other workers	3.5	10.8	13.6	4.0	49.4	18.8	1330		
Professionals	4.3	6.8	11.5	7.2	28.7	41.5	880		
OBC									
Agricultural and other labourers	52.6	15.0	10.3	6.4	10.6	5.1	3840		
Lower skilled occupations	13.2	51.9	11.5	2.5	13.5	7.5	1586		
Higher skilled occupations	9.5	15.5	48.7	1.9	14.7	9.8	1026		
Farmers	29.5	10.1	8.1	34.9	10.6	6.9	6519		
Clerical and other workers	7.7	12.6	16.4	4.5	48.3	10.6	1050		
Professionals	9.4	11.9	17.3	7.5	21.3	32.6	533		
SC									
Agricultural and other labourers	68.4	12.7	5.7	2.6	7.3	3.3	3627		
Lower skilled occupations	22.7	53.4	7.7	2.5	8.3	5.5	775		
Higher skilled occupations	25.9	14.6	36.9	3.9	10.5	8.3	366		
Farmers	46.4	12.6	7.3	20.7	7.9	5.0	2266		
Clerical and other workers	18.6	13.1	13.2	1.7	42.6	10.8	326		
Professionals	21.9	10.2	16.3	1.6	18.7	31.4	196		
ST ^a									
Agricultural and other labourers	67.5	12.5	3.7	7.1	6.8	2.5	1006		

Table 3 (continued)

Forward caste							
Father's occupation/Son's occupation	Agricultural and other labourers	Lower skilled occupations	Higher skilled occupations	Farmers	Clerical and other workers	Professionals	No. of observations (<i>n</i>)
Lower skilled Occupations	30.4	41.9	9.1	0.2	6.1	12.4	105
Higher skilled Occupations	20.9	18.0	38.9	6.1	9.2	7.0	75
Farmers	51.1	7.0	4.9	25.7	6.7	4.6	1755
Clerical and other workers	18.9	10.0	17.4	4.2	34.5	15.2	67
Professionals	24.2	10.0	9.8	8.2	12.1	35.7	50

All observations adjusted by household weights. Figures in rows add up to 100

^aNote that for STs, the number of observations in some cells is very small

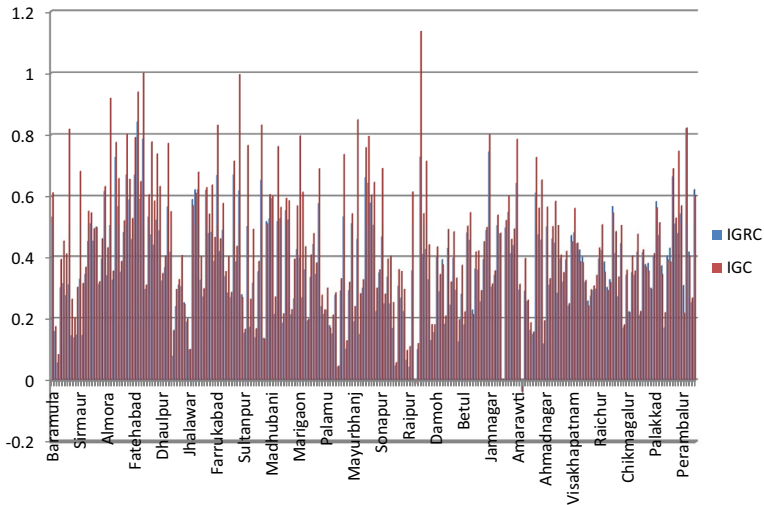


Fig. 1 Estimates of IGRC and IGC across districts in India. *Source* IHDS 2011–2012

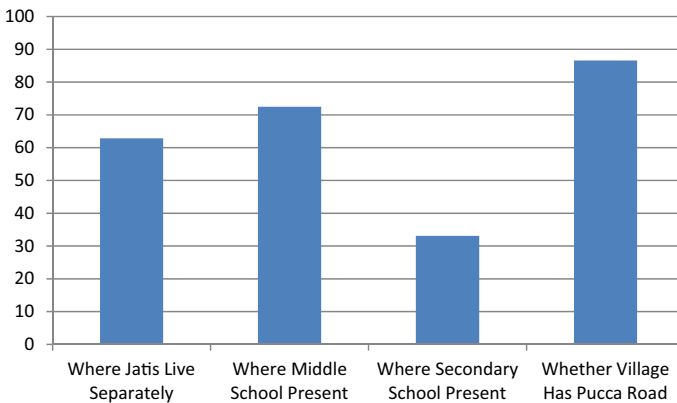


Fig. 2 Social and human capital characteristics of villages (%). *Source* IHDS 2011–2012

clear spatial differences in social mobility across India, as captured by the IGRC and IGC (Fig. 1). For example, Narmada district has an IGRC of 0.001, suggesting that the son’s occupation is very weakly correlated with the father’s occupation. In contrast, we have the district of Hissar where the IGRC is 0.84, suggesting very high persistence of parent–son occupation pairs.

Village covariates

We next provide a sense of how different villages are in their physical, economic and social characteristics in our sample. In Fig. 2, we plot the proportion of villages where jatis live separately, where middle and secondary schools are present, and where there is a pucca (permanent all weather) road. In 63% of villages, jatis live separately; in 73% of villages, a middle school is present, in 33% of villages, a secondary school is present, and in 86% of

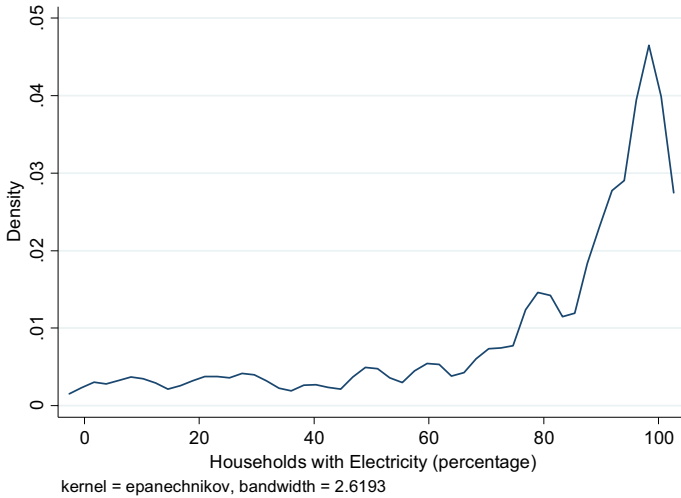


Fig. 3 Village-wise distribution of percentage of households with electricity. *Source* IHDS 2011–2012

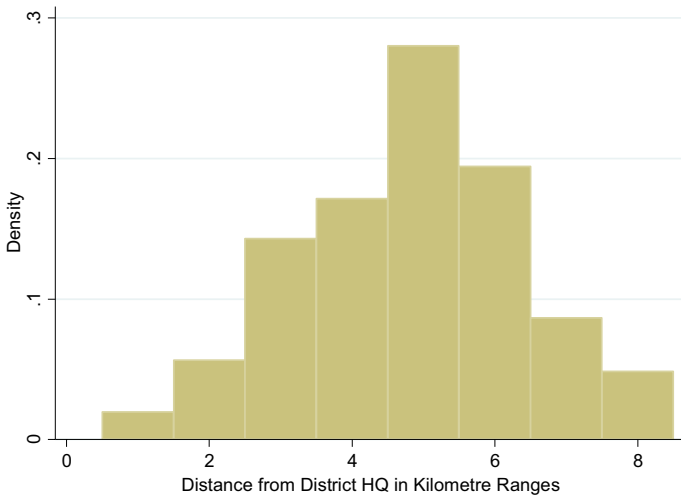


Fig. 4 Distance from district headquarters (kilometre ranges). *Note* Ranges: 1: ≤ 5 km, 2: 6–10 km, 3: 11–20 km, 4: 21–30 km, 5: > 31 –50 km, 6: 51–75 km, 7: 76–100 km, 8: > 100 km. *Source* IHDS 2011–2012

villages, a pucca road is present. Figure 3 shows that while in 22% of the villages, 100% of households receive electricity, in around one-third of villages, the proportion of households receiving electricity is 70% or less. Figure 4 shows distance of the village from the district headquarters. While 40% of the villages are located within 30 kms of the district headquarters, one-third of the villages are located 51 kms or more from the district headquarters.

Agro-ecological conditions also vary significantly across villages. While 53% of villages had no drought for the last 7 years, 15% of villages experienced droughts for at least 2 out of the last 7 years (Fig. 5). Flooding is less prevalent in the villages in our sample, with

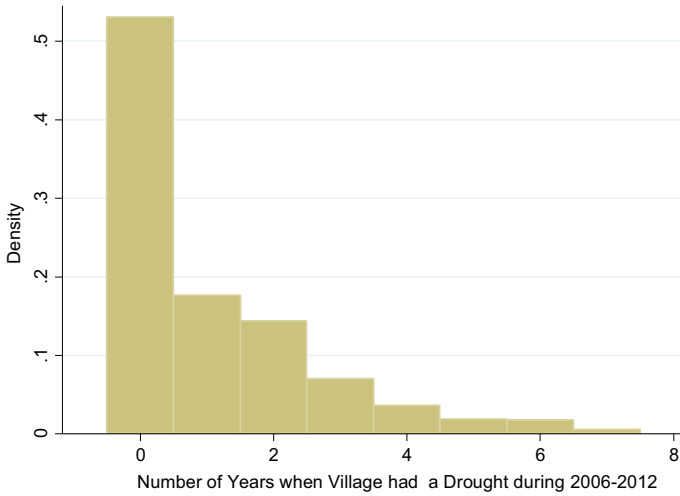


Fig. 5 Number of years when the village experienced a drought during 2006–2012. *Source* IHDS 2011–2012

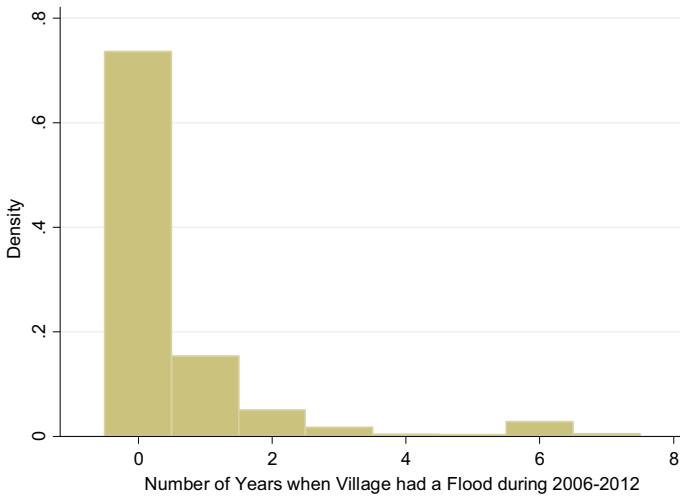


Fig. 6 Number of years when the village experienced a flood during 2006–2012. *Source* IHDS 2011–2012

74% of villages not experiencing flooding in the last 7 years (Fig. 6). Economic prosperity also varies significantly across the sample villages, as is evident from Figs. 7 and 8 in the distribution of mean real agricultural and non-agricultural wages (nominal agricultural and non-agricultural wages divided by the state poverty line).

Overall, we see striking differences in village infrastructure, schooling endowments, social segmentation, agro-ecological/climatic conditions and economic prosperity. We now investigate whether these differences manifest themselves in differential rates of intergenerational occupational mobility.

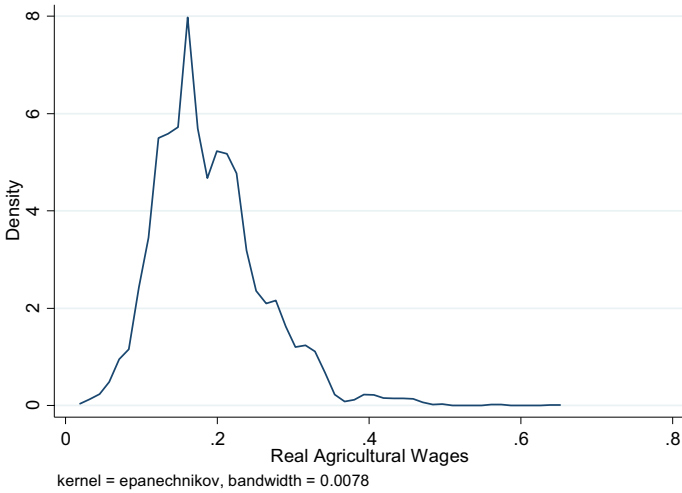


Fig. 7 Village-wise distribution of real agricultural wages. *Source* IHDS 2011–2012

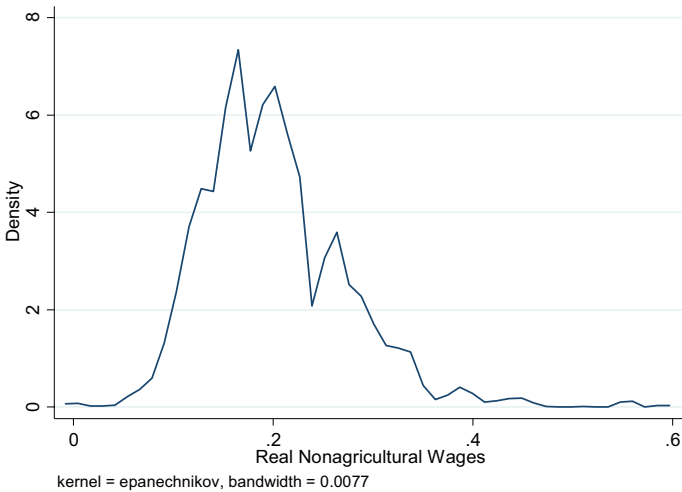


Fig. 8 Village-wise distribution of real non-agricultural wages. *Source* IHDS 2011–2012

Results

We first present estimates of the IGRC augmented with individual and village-level covariates in Table 4, followed by the multinomial logit estimates of son's occupational structure in the case of parents who were agricultural labourers in Table 5. In Col (1) of Table 5, we present estimates of the IGRC without interacting the father's occupational rank with village covariates. In Col. (2), we interact the father's occupational rank with all village characteristics. In Col. (3), we add individual level controls—these are the

Table 4 Regression results, augmented IGRC estimates

	(1)	(2)	(3)	(4)
Intercept	1.49*** (0.025)	1.42*** (0.045)	0.89*** (0.062)	1.11*** (0.126)
IGRC	0.35*** (0.008)	0.28*** (0.058)	0.19*** (0.024)	0.15*** (0.028)
SC	–	–	–0.70*** (0.037)	–0.69*** (0.038)
ST	–	–	–0.64*** (0.047)	–0.61*** (0.049)
OBC	–	–	–0.29*** (0.032)	–0.26*** (0.034)
Father's education (in years)	–	–	0.07*** (0.004)	0.07*** (0.004)
Age of son	–	–	0.02*** (0.001)	0.02*** (0.001)
Jatis stay in separate hamlets	–	0.01 (0.007)	0.003 (0.008)	0.01 (0.008)
Whether village has middle school	–	0.01 (0.009)	0.02 (0.009)	0.01 (0.009)
Whether village has secondary school	–	0.02* (0.009)	0.01 (0.009)	0.02* (0.009)
Percentage of households having electricity	–	0.001*** (0.0001)	0.0002 (0.0001)	0.001*** (0.0001)
Distance to district HQ (in km ranges)	–	–0.02*** (0.002)	–0.02*** (0.0007)	–0.01*** (0.002)
No. of years which village has a drought in 2006–2012	–	–0.02*** (0.003)	–0.01*** (0.003)	–0.01*** (0.003)
No. of years which village has a flood in 2006–2012	–	–0.01* (0.003)	–0.01** (0.003)	–0.01** (0.003)
Whether village has Pucca road	–	0.03*** (0.011)	0.03*** (0.011)	0.02* (0.011)
Real agricultural wages	–	0.51*** (0.073)	0.0004*** (0.0007)	0.0003*** (0.0008)
Real non-agricultural wages	–	0.32*** (0.069)	0.0003*** (0.0001)	0.0002** (0.0001)
Number of observations	20,005	15,214	15,214	15,124
With state fixed effects	No	No	No	Yes
Adjusted <i>R</i> square	0.10	0.12	0.19	0.20

Standard errors in parentheses, ***: significant at 1, 5 and 10% levels. Cols (1 and 2) for all individuals, Cols (3 and 4) for SC individuals

Table 5 Multinomial logit regressions, relative risk ratios, where the father is a labourer. Base category: agricultural and other labourers

Son's occupation	Lower skilled occupations	Higher skilled occupations	Farmers	Clerical workers	Professionals
Jatis stay in separate hamlets	0.80** (-2.24)	0.70*** (-2.90)	0.82 (-1.52)	0.76*** (-2.30)	0.63*** (-2.90)
Whether village has middle school	1.16 (1.11)	1.02 (0.17)	1.35* (1.84)	1.12 (0.76)	1.08 (0.35)
Whether village has secondary school	1.32 (2.48)	1.28 (0.18)	0.81 (-1.35)	1.01 (0.10)	1.34 (0.18)
Percentage of households having electricity	1.00 (0.03)	1.01*** (2.81)	1.00 (1.41)	0.99 (-1.13)	1.01 (1.24)
Distance to district HQ (in km ranges)	0.86** (-5.02)	0.83*** (-4.93)	0.97 (-0.79)	0.89*** (-3.25)	0.90** (-2.11)
No. of years which village has a drought in 2006–2012	1.04 (0.93)	0.95 (-1.09)	1.06 (1.41)	0.99 (-0.12)	0.99 (-0.23)
Number of years which village has a flood in 2006–2012	0.95 (-1.04)	1.02 (0.40)	0.94 (-0.95)	1.02 (0.40)	1.06 (0.87)
Whether village has pucca road	0.99 (-0.08)	0.88 (-0.65)	0.48*** (-4.41)	1.24 (1.05)	0.95 (-0.31)
Real agricultural wages	2.43(1.06)	1.50 (0.40)	0.07** (-2.21)	0.33 (-1.06)	0.54 (-0.44)
Real non-agricultural wages	1.05(0.07)	9.97** (2.54)	9.54* (2.16)	15.57*** (3.07)	0.94 (-0.05)
No. of observations	4904				
Pseudo-	0.017				

z statistics in parentheses, ***,** and *: significant at 1, 5 and 10% levels

caste status of the son (SC, ST, OBC), father's education (in years of education) and the age of the son. Finally in Col. (4), we include state-fixed effects.

We find that remoteness of the village (as captured by the distance from the district headquarters), agro-ecological conditions of the village—whether the village has been repeatedly affected by drought and floods, access of the village to the outside world (captured by the availability of a permanent (pucca) road), and economic conditions of the village (captured by real agricultural and non-agricultural wages) are important in explaining intergenerational occupational mobility in all the estimates—the coefficients for these variables are significant at 10% or less in Cols (1–4). The greater the remoteness of the village and the higher the number of years that a particular village has been affected by droughts or floods, the lower the mobility of sons relative to fathers (or lessens the persistence of occupations from fathers to sons). On the other hand, access to a permanent road and higher real agricultural and non-agricultural wages increases the mobility of sons relative to fathers in the village. This may reflect the possibility of sons accessing higher-income opportunities in these villages and consequently moving out of occupations at the lower end of the scale.

Village characteristics that are significant in some specifications but not in all estimates are whether the village has a secondary school and the percentage of households in the village with electricity. However, these characteristics are significant in Col. (4), where we include all individual-level controls and state-fixed effects. Whether a village has access to a secondary school or whether households in the village have access to electricity has a positive effect on intergenerational mobility. On the other hand, whether households live in separate clusters (jatis) or whether the village has a middle school does not seem to affect social mobility.

With respect to the individual-level controls, we obtain the expected results—SC, ST and OBC male heads are likely to have lower-ranked occupations, and father's education and the son's age has a positive effect on social mobility (the latter capturing life-cycle effects).

Finally, in Table 5, we present multinomial logit estimates when the father's occupation is an agricultural or other labourer. We want to see to what extent village characteristics explain the likelihood that the son will move on to higher order occupations, and in particular, occupations at the top of the social ladder such as clerical workers and professionals. The relative risk ratios presented in the table capture the effects of village characteristics on the likelihood of individuals being in other occupational categories relative to the base category—agricultural/other labourer. We find that social segmentation in the village (that is, whether jatis stay in separate hamlets) decreases the likelihood that the son will move into other higher order occupations (except the move to being a farmer). Remoteness of the village also decreases the likelihood that the son will move into other higher-order occupations (again, except the move to being a farmer). In fact, the nearness of the village to the district headquarters is the only village characteristic that increases the likelihood of a sharp ascent—that is, whether an agricultural labourer's son becomes a professional. Whether the village has a pucca road decreases the likelihood of an agricultural labourer's son being a farmer relative to remaining an agricultural labourer, while the presence of a middle school increases this likelihood. Higher real non-agricultural wages have a very strong positive effect on the likelihood of transition to other occupations, especially more valued occupations such as clerical workers. In villages with a flourishing non-agricultural sector, a wider set of occupational possibilities would be available to the poorer households in the village, including well-paid service sector jobs.

Our results with the multinomial logit models differ somewhat from the IGRC estimates, and this may be due to the limitations of the IGRC in capturing mobility patterns among the households at the bottom of the occupational ladder. While the augmented IGRC estimates have an intuitive simplicity about them, the multinomial logit approach may be the way forward to capture more complex mobility patterns (where mobility may be both upward or downward), and not to make the restrictive assumption of rank ordering of occupations.

Concluding remarks

In this study, we examined the spatial determinants of intergenerational occupational mobility in rural India. In the literature on the spatial determinants of rural poverty and income mobility, we have found clear evidence of the importance of geographical factors such as agro-ecology and remoteness in explaining social mobility patterns in Indian villages. Physical infrastructure such as access to roads and electricity is also an important correlate of occupational mobility. Economic prosperity of the village has a very strong positive association with social mobility. For sons whose parents are agricultural labourers, social segmentation also plays an important role.

Several key policy implications follow from the findings of the study. Firstly, it is important for policymakers to address the geographical and infrastructural disadvantages that several households face in rural India and possibly target investment schemes to remotely located villages. Secondly, policies that promote rural prosperity can also indirectly promote social mobility; hence, growth enhancing policies may have a double benefit of reducing intergenerational inequality. Finally, there needs to be a clear focus on changing social norms that lead to segmentation in Indian villages, where the poorer households are particularly disadvantaged.

Appendix: Occupation codes

00	Physical scientists
01	Physical science technicians
02	Architects, engineers, technologists and surveyors
03	Engineering technicians
04	Aircraft and ships officers
05	Life scientists
06	Life science technicians
07	Physicians and surgeons (allopathic dental and veterinary surgeons)
08	Nursing and other medical and health technicians
09	Scientific, medical and technical persons, other
10	Mathematicians, statisticians and related workers
11	Economists and related workers
12	Accountants, auditors and related workers
13	Social scientists and related workers
14	Jurists

15	Teachers
16	Poets, authors, journalists and related workers
17	Sculptors, painters, photographers and related creative artists
18	Composers and performing artists
19	Professional workers, n.e.c

Administrative, executive and managerial workers

20	Elected and legislative officials
21	Administrative and executive officials government and local bodies
22	Working proprietors, directors and managers, wholesale and retail trade
23	Directors and managers, financial institutions
24	Working proprietors, directors and managers mining, construction, manufacturing and related concerns
25	Working proprietors, directors, managers and related executives, transport, storage and communication
26	Working proprietors, directors and managers, other service
29	Administrative, executive and managerial workers, n.e.c

Clerical and related workers

30	Clerical and other supervisors
31	Village officials
32	Stenographers, typists and card and tape punching operators
33	Book-keepers, cashiers and related workers
34	Computing machine operators
35	Clerical and related workers, n.e.c
36	Transport and communication supervisors
37	Transport conductors and guards
38	Mail distributors and related workers
39	Telephone and telegraph operators

Sales workers

40	Merchants and shopkeepers, wholesale and retail trade
41	Manufacturers, agents
42	Technical salesmen and commercial travellers
43	Salesmen, shop assistants and related workers
44	Insurance, real estate, securities and business service salesmen and auctioneers

45	Money lenders and pawn brokers
49	Sales workers, n.e.c

Service workers

50	Hotel and restaurant keepers
51	House keepers, matron and stewards (domestic and institutional)
52	Cooks, waiters, bartenders and related worker (domestic and institutional)
53	Maids and other house keeping service workers n.e.c
54	Building caretakers, sweepers, cleaners and related workers
55	Launderers, dry-cleaners and pressers
56	Hair dressers, barbers, beauticians and related workers
57	Protective service workers
59	Service workers, n.e.c

Farmers, fishermen, hunters, loggers and related workers

60	Farm plantation, dairy and other managers and supervisors
61	Cultivators
62	Farmers other than cultivators
63	Agricultural labourers
64	Plantation labourers and related workers
65	Other farm workers
66	Forestry workers
67	Hunters and related workers
68	Fishermen and related workers

Production and related workers, transport equipment operators and labourers

71	Miners, quarrymen, well drillers and related workers
72	Metal processors
73	Wood preparation workers and paper makers
74	Chemical processors and related workers
75	Spinners, weavers, knitters, dyers and related workers
76	Tanners, fellmongers and pelt dressers
77	Food and beverage processors
78	Tobacco preparers and tobacco product makers
79	Tailors, dress makers, sewers, upholsterers and related workers
80	Shoe makers and leather goods makers
81	Carpenters, cabinet and related wood workers

82	Stone cutters and carvers
83	Blacksmiths, tool makers and machine tool operators
84	Machinery fitters, machine assemblers and precision instrument makers (except electrical)
85	Electrical fitters and related electrical and electronic workers
86	Broadcasting station and sound equipment operators and cinema projectionists
87	Plumbers, welders, sheet metal and structural metal preparers and erectors
88	Jewellery and precious metal workers and metal engravers (except printing)
89	Glass formers, potters and related workers
90	Rubber and plastic product makers
91	Paper and paper board products makers
92	Printing and related workers
93	Painters
94	Production and related workers, n.e.c
95	Bricklayers and other constructions workers
96	Stationery engines and related equipment operators, oilers and greasers
97	Material handling and related equipment operators, loaders and unloaders
98	Transport equipment operators
99	Labourers, n.e.c

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