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Article

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Intragenerational labor mobility in the Indian labor market

Abstract

The present study contributes to the limited literature on labor mobility in India using the India Human Development Survey panel data for the years 2004–2005 and 2011–2012. We use three different tools, viz., transition matrices, multinomial logistic regression, and wage regressions for this study. The results show significant mobility across sectors in the economy. Mobility patterns among workers are found to differ significantly along the lines of gender, caste, education, wealth, and family background, among others. There is a distress-driven movement of workers. Significant earnings differentials exist across paid work statuses. The paper concludes with some policy suggestions.

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1 Introduction

The extent of labor market mobility (intergenerational or intragenerational) plays a crucial role in improving overall levels of efficiency and growth in an economy (Paci and Serneels, 2007). Additionally, higher labor mobility also ensures greater motivation for work, reduced social conflicts, and greater equality of opportunity (Motiram and Singh, 2012). A discussion of labor market mobility is especially pertinent in a country such as India given its age-old social stratifications based on caste and religion, as well as the prevalence of large-scale informality (Sahoo and Neog, 2017).

Although economic reforms initiated in the 1990s have been associated with high growth, there has been a concurrent rise in inequalities over time and across space (Motiram and Sarma, 2014; Subramanian and Jayaraj, 2015). As argued by Buchinsky and Hunt (1999) and Jantti and Jenkins (2015), such rising inequality is not much of a concern in a highly mobile labor market, as high mobility would ensure that lifetime earnings will be much more equally distributed than the inequality measured at a point in time. Hence, there is a need to analyze mobility patterns in the country. Given the context, the present study makes a humble attempt to assess the scenario of intragenerational labor mobility in India.

Empirical studies on intragenerational labor market mobility have mainly relied on the examination of the wage gaps and mobility patterns of workers (Duryea et al., 2006; Nguyen et al., 2013; Nordman et al., 2016). However, there is a lack of relevant studies in India and South Asia in general. Most of the studies on mobility in India have been in the field of intergenerational mobility (Azam, 2015; Reddy, 2015).

The few studies in the intragenerational context have mostly studied the mobility of incomes or poverty status (Ranganathan et al., 2017; Thorat et al., 2017). However, income as a measure of well-being has serious drawbacks, especially in rural areas (Pal and Kynch, 2000), highlighting the need to complement studies on intragenerational income mobility with studies on occupational mobility. To the best of our knowledge, Pal and Kynch (2000) and Khandker (1992) are the only authors who dealt with intragenerational occupational mobility in India. However, their studies are based on small samples restricted to a rural/urban context.

The study contributes to the existing literature by discussing the trends, determinants, and consequences of intragenerational occupational mobility across different labor market segments in the Indian economy. Additionally, the study explicitly discusses the multiple-jobholding phenomenon among workers and relates it to existing labor market conditions.

The paper is divided into five sections. Section 2 presents the data and methodology. Section 3 discusses the results. Section 4 provides further robustness checks. Section 5 provides the conclusions and dwells on some policy suggestions.

2 Data and methodology

2.1 Data

The study uses panel data from the India Human Development Survey (IHDS) conducted for the years 2004–2005 (IHDS-I) and 2011–2012 (IHDS-II) (Desai and Reeve, 2015a, 2015b). Both IHDS-I and IHDS-II are representative at the national level. IHDS-I has a sample size of 41554 households (215754 individuals), out of which 83% original and split households were resampled

in IHDS-II. While the rural sample for IHDS is based on stratified random sampling, the urban sample was drawn using a stratified sample of towns and cities within states selected by probability proportional to population sampling.

The focus of the study is on labor mobility characterized by the movement of workers across labor market statuses. We divide the labor force into eight labor market status groups: farmworker,[1] own-account worker (OAW) in nonfarm business, employer in nonfarm business,[2] casual worker, regular worker, unpaid family worker in nonfarm business, student, and "Not in the Labor Force" category. In defining the activity status of a worker, we consider the status where the worker has worked the most hours among all the economic activities that the person has been involved in.[3,4,5,6] In case the person does not work at all in any economic activity, he/she is considered to be outside the workforce.

A person from outside the workforce who is currently enrolled in an educational institution is considered a student. Persons from outside the workforce who are not students comprise the "Unemployed and Not in the Labor Force" (UNLF) category. In the case of self-employed persons, there may be multiple household members engaged in a nonfarm business. In such a scenario, we follow Deshpande and Sharma (2016) and classify the person who has worked the maximum number of hours within the household as the primary decision-maker of the business[7] (i.e., the OAW or employer) and all other household workers as unpaid family workers. However, all household members engaged in farmwork are classified as farmworkers without any distinction of the primary decision-maker in the farm business.

2.2 **Methodology**

Existing attempts in the literature to investigate labor market mobility have mainly relied on the presence of wage gaps, controlling for all available characteristics of workers. However, this approach has been criticized for its inability to control for all the productive characteristics of workers (Rosenzweig, 1988). Further, a significant monetary wage gap across sectors may simply indicate compensatory wage differentials for differences in nonpecuniary rewards to jobs as workers seek to equalize utility across sectors (Maloney, 1999).

Given the criticisms of the wage analysis approach, other studies have relied on evaluation of the transition of workers across sectors over time as a method to evaluate mobility in the

1 The farmworker segment includes workers involved in the cultivation of crops and those involved in animal care.

2 In order to distinguish OAW people from employers, we use information on the cost of paid labor services for a business. Owners of businesses with positive labor cost are considered as employers, whereas those without any labor cost are considered as OAWs.

3 In the IHDS data, respondents were asked about information on multiple wage jobs held by the worker over the survey period. Our study uses information only for the major job, defined as the job where the worker has worked the maximum hours among all the jobs.

4 IHDS asks respondents about information on a maximum of three nonfarm businesses in a household. Our study conducts its analysis using only the business with the highest net earnings among the three.

5 There are a small number of cases in which the total number of hours worked is equal for two or more economic activities. In such cases, we consider information on net income earned from the economic activities and classify the worker to the activity where net earnings are higher.

6 Information on hours of work was not available for persons involved in animal care. However, IHDS provides information on whether the person is involved in animal care. As such, we use the hours of work criterion to classify workers as farmworkers, wage employees, or self-employed. In case the person is not involved in any of the above activities but is engaged in animal care, we consider him/her to be involved in animal care and merge him/her into the "farmworker" category.

7 There are a small number of cases in which the total number of hours worked is similar for two or more workers. In such cases, we use information on age of the worker and identify the more aged worker as the primary decision-maker.

labor market. Some studies have applied both mobility analysis and wage regressions to get a more robust and comprehensive picture (Duryea et al., 2006; Pagés and Stampini, 2009).

Following the empirical literature, the present study relies on three tools to understand the patterns of mobility across sectors and how such mobility is associated with individual characteristics and earnings. First, the study examines the transition probabilities of workers moving across sectors using transition matrices. The study then looks at the characteristics of the movers with reference to stayers using multinomial logistic regression. Finally, the study looks at the consequences of mobility on earnings with reference to the stayers using fixed-effects regression analysis.

2.2.1 **Transition probabilities**

We first examine the transition probabilities for workers across sectors given by the probability of moving to sector j in period t given that the person was in sector i in period t–1. The transition probabilities are displayed in the form of matrix "**P**". Formally, the elements of the **P**-matrix are given by the following expression:

$$p_{ij} = P\left(S_t = j \mid S_{t-1} = i\right) = \frac{N\left(S_{t-1} = i \cap S_t = j\right)}{N\left(S_{t-1} = i\right)} \tag{1}$$

We use the Sison–Glaz method to construct the multinomial confidence intervals for the elements of the **P**-matrix (Sison and Glaz, 1995). The diagonal elements of the **P**-matrix, p_{it}, give us the share of members of a sector who have not moved over that period. Similarly, $(1- p_{it})$ gives us the turnover rate of the sector. However, we are unable to distinguish permanent movers from transitory movers who move to-and-fro between sectors. Further, the transition probabilities from the **P**-matrix are still imperfect measures of mobility as they depend on the size of the initial and terminal statuses and also on the job openings in each of them. Hence, we standardize the **P**-matrix further, which gives us the matrices **V** and **T**.

Following Maloney (1999), the general element of the **V**-matrix is given by the following equation:

$$v_{ij} = \frac{p_{ij} / p_{.j}}{\left(1 - p_{ii}\right)\left(1 - p_{jj}\right)} \tag{2}$$

Here, $p_{.j}$ would indicate the share of the terminal sector j in the population; and v_{ij} would measure the disposition for a worker to move from sector i to sector j. In the case of a symmetric **V**-matrix, v_{ij} and v_{ji} are similar, and workers are equally likely to move between sectors i and j. An asymmetric **V**-matrix, on the other hand, signifies asymmetrical tendencies to move from sector i to j vis-à-vis the movement in the reverse direction.

Similarly, the general element of a **T**-matrix is given by Eq. (3):

$$t_{ij} = \frac{N_{ij} / \left(N_{i.} - N_{ii}\right)}{\left(N_{.j} - N_{jj}\right) / \sum_{k \neq i} \left(N_{.k} - N_{kk}\right)} \tag{3}$$

Here, N_{ij} is the number of individuals moving from sector i to sector j; $N_{i.}$ is the initial size of sector i; and $N_{.j}$ is the final size of sector j. The numerator of t_{ij} is the probability of joining sector j, conditional on having left sector i. The denominator is the probability of joining sector j for a mover from sector i when sector assignment is random. t_{ij} gives us the tendency for a

worker to move from *i* to *j*, with values >1 and <1 indicating a positive and negative tendency, respectively, to make the transition. Since the **V** and the **T** matrices are associated with net flows, no index of mobility can be built for stayers, and the diagonal elements are empty. The information from the **P**, **V,** and **T** matrices provide us with a rough picture of the extent of labor mobility across different sectors.

2.2.2 **Determinants of mobility**

In addition to studying the transition probabilities, we look at the characteristics of the individuals who move from one sector to another vis-à-vis the stayers. If labor mobility is associated with specific worker characteristics, this will give us an idea of the factors excluding workers from the desirable labor market segments. The theoretical framework for our model of worker transition is an extension of the rational agent model of occupational choice (Boskin, 1974).

The model of occupational choice states that a rational worker would choose the sector that maximizes the expected utility from all available sectors. Thus, the individual chooses sector *i* in period *t* if $E(U_{i,t}) > E(U_{k,t})$ and only if $E(U_{i,t}) \geq E(U_{k,t})$, where $k = 1,2,\ldots,K$ indexes the sectoral choices available to the individual and *E* is the expectations operator *ik*. Accordingly, a worker would transit from sector *i* to sector *j* if there is a change in the utilities associated with the sectors so that sector *j* becomes the utility-maximizing sector in the terminal period. That is, a worker would move from sector *i* in period *t* to sector *j* in period $(t + 1)$ if $E(U_{i,t}) > E(U_{k,t})$ and $E(U_{j,t+1}) > E(U_{k,t+1})$.

The expected utility from an occupational choice depends on many factors, including expected lifetime earnings, as well as sectoral and worker-specific characteristics (Rees and Shah, 1986; Uusitalo, 2001). The expected utility function is given below:

$$E(U_i) = f(I_i, Z_i, H) \tag{4}$$

$$I_i = g\left[w_i, p(Z_i, H)\right] \tag{5}$$

Here, I_i denotes the expected lifetime earnings and is a function of two terms, viz., the sum of the discounted stream of earnings from the job over the lifetime (w_i) and the probability of getting the job ($p(Z_i,H)$). I_i is positively related to w_i and $p(Z_i,H)$. Finally, $p(Z_i,H)$ is inversely related to the constraints involved in getting the job, which, in turn, depend on sectoral and worker-specific characteristics (Z_i,H). Our framework is similar to the classic Harris–Todaro approach, where constraints set by the limited availability of formal jobs in the urban sector lowers expected wages in the urban sector (Harris and Todaro, 1970).

Assuming a linear functional structure for our expected utility function, we have the following expression:

$$E(U_i) = f\left(w_i \times p(Z_i, H), Z_i, H\right) \tag{6}$$

It is noteworthy that we extend the framework proposed by Boskin (1974) so that occupational choice depends on the constraints anticipated in the job. Such a framework enables us to study occupational choice by a rational agent given the possibility of a segmented labor market. The constraints that an individual may face in getting a job may be due to his/her human capital levels, credit availability, caste, religion, and so on, and/or due to supply-side factors, such as the availability of adequate, decent formal jobs.

Since information on the given job attributes is not available to us, we proxy them using individual-level worker characteristics for the initial period, as suggested by Rees and Shah (1986). We used multinomial logistic regression to analyze the impact of worker attributes on worker transitions. Since there are very few numbers of transitions from the "Student" group to some sectors, we merge the "Student" and the UNLF groups to form the "Students, Unemployed, and Not in the Labor Force" (SUNLF) category, giving us a total of seven labor market statuses. Following Wooldridge (2010), the multinomial logit model can be formulated as follows:

$$\frac{P\left(S_{t-1}=i \cap S_t=j\right)}{P\left(S_{t-1}=i \cap S_t=i\right)}=X\beta \tag{7}$$

Here, S_{t-1} and S_t denote the employment statuses of the individual in period t-1 and t, respectively, and i and j (i,j = 1,2,…,7) index the initial and the terminal sectors, respectively. We have seven such models, one for each initial sector i. Additionally, X is a vector of factors affecting labor mobility, whose values are considered at the initial time period, i.e., 2004–2005, and β is the vector of the corresponding regression coefficients.

The vector X comprises the set of standard individual-level worker characteristics, including age, gender,[8] education, household wealth, social capital (proxied by membership in various groups/organizations), marital status, dependency ratio, rural–urban residence, caste, dummy for fluency in English, religious affiliation, as well as the education and occupation of the father/husband's father of the household head.[9,10] Finally, we attempt to control macrolevel factors through the inclusion of 18 state dummies.

Although the multinomial logistic regression results can give us an idea of the characteristics of mobility, it tells us nothing about the determinants of the stayers. Hence, we complement the multinomial logistic analysis with a binomial logistic model to analyze the determinants of the probability of survival in a labor market status. The explanatory variables in the model are identical to those used in the multinomial logistic model.

The analysis of transition matrices and multinomial logistic regression models can provide important insights into the trends and characteristics of labor mobility in India. However, such tools can be inadequate as they do not control for observable and unobservable characteristics of the workers (Slonimczyk and Gimpelson, 2015). Transition matrices, for instance, do not consider the observable and unobservable differences in preferences and skills among workers. Although multinomial logistic regression models take into account heterogeneity in observable characteristics of the workers, they cannot account for any unobserved heterogeneity. Thus, we complement our mobility analysis with the study of earnings differentials.

8 There are some minor issues of mismatch in age and gender of a person across years. IHDS documentation suggests that in the event of a mismatch, information from IHDS-II should be given priority. Accordingly, we update the information in IHDS-I (2004–05) on gender and age using information from IHDS-II (2011–12).

9 In the absence of any variable depicting wealth of the parent of the household head, we follow Fairlie (1999) and proxy it by the education of the father/husband's father of the household head. Similarly, following Hout and Rosen (2000), the labor market status of the father/husband's father of the household head is proxied by his/her occupational category.

10 We divide the occupational codes of the father/husband's father of the household head into four groups: Professional and Executive workers; Sales-related workers; Farmers, Loggers, and Fishermen; and finally, Clerical, Sales, and Production workers. Our occupational classification is prepared so as to correspond with the employment status groups. Hence, the "Sales workers" group relates closely with the self-employment group; "Farmers, Loggers, and Fishermen" group corresponds with the farmworkers; and the "Professional and Executive workers" and the "Clerical, Sales, and Production workers" groups closely resemble the wage workers.

2.2.3 **Mobility and earnings**

Our final section looks at the impact of labor mobility on the earnings and poverty levels of workers.[11] To do so, we conduct fixed-effects linear regression on earnings data, controlling for several individual- and job-level characteristics, as well as accounting for unobserved time-invariant worker heterogeneity. Since we have earnings data on four nonfarm sectors (viz., OAW, Employer, Casual worker, and Regular worker), we only consider these four groups for our regression analysis. Including a subsample of observation in the earnings function may generate inconsistent results due to possible selection bias. Assuming that selection bias is not due to time-varying unobserved factors, the fixed-effects model corrects for such bias[12] (Fortin et al., 2011). Further, proper identification in fixed-effects regression relies on a sufficient number of movers across the labor market sectors (Nordman et al., 2016). We verify that this, actually, is the case, as seen from Table 2.

Our fixed-effects model is given by Eq. (8):

$$y_{it} = \alpha_i + x'_{it}\beta + \gamma OAW_{it} + \delta E_{it} + \eta CW_{it} + \varepsilon_{it} \tag{8}$$

Here, i indexes the individuals and t indexes the time. Further, y_{it} is the net hourly earnings of the worker; α_i is the time-invariant individual fixed effect; OAW_{it}, E_{it}, and CW_{it} are dummy variables taking the value "1" if the worker is an OAW, employer, and casual worker, respectively, and zero otherwise; and ε_{it} is the independent identically distributed error term such that $E(\varepsilon \mid x, \alpha, OAW, E, CW) = 0$. We exclude the dummy for regular workers from our model and interpret our results by considering it as the reference category.

The estimated coefficient for OAW (i.e., $\hat{\gamma}$) can thus be interpreted as the earnings penalty/premium for those moving from being a regular worker to an OAW. Moreover, $\hat{\eta}$ and $\hat{\delta}$ can similarly be interpreted. We rerun our model changing our reference category in order to get a picture of the sectoral earnings gap with reference to the other labor market states. Thus, x'_{it} is a vector of individual attributes, which includes the standard variables, such as age, years of education, education of the father of the household head, dummy for urban residence, as well as dummies for household headship and being married. Additional control variables include dummies for computer knowledge, English usage, and occupational and industry dummies.

Finally, we check how the earnings penalty/premium associated with sectoral change varies across gender, caste, and age groups by interacting the sectoral dummies with the worker characteristics. We accordingly extend Eq. (8) as follows:

$$y_{it} = \alpha_i + x'_{it}\beta + \gamma_1 OAW_{it} + \delta_1 E_{it} + \eta_1 CW_{it} + \gamma_2 OAW_{it} * z_{it} + \delta_2 E_{it} * z_{it} + \eta_2 CW_{it} * z_{it} + \varepsilon_{it} \tag{9}$$

Here, γ_2, δ_2, and η_2 give us the extents by which the earnings penalty/premium of sectoral change varies by worker characteristics, proxied by z_{it}, relative to the reference group, i.e., regular worker.

Earnings differentials are important as they provide a useful measure of the monetary differentials that other job attributes need to compensate for even if they are an inadequate measure of the utility differential (Pagés and Stampini, 2009). However, there is a need

11 Earnings for OAWs and employers are obtained by deducting the costs incurred in running the business from the gross business earnings. Wage earnings include both cash wages and income earned as bonus from the job. Earnings of the workers are then divided by number of hours worked in that activity to arrive at the hourly earnings figures.

12 Attrition bias can be considered as a special case of sample selection bias and, as such, our results are robust to possible attrition bias under the given assumptions (Verbeek and Nijman, 2008).

to be cautious while comparing the earnings differentials between the wage-employed and the self-employed groups since the earnings for the latter may include capital returns (Pagés and Stampini, 2009). Earnings for the self-employed may also be inflated as many businesses in our study are family based, and their earnings may include the remuneration for unpaid family workers.

3 Results and discussion

3.1 Descriptive statistics

We discuss below the characteristics of the workers engaged in the different employment sectors.

Table 1 shows that farmworkers as a group have the largest share in the workforce, closely followed by casual workers. Employment sectors such as employers and regular workers are concentrated in urban areas relative to other groups. The age composition of the workforce shows that unpaid workers, students, and the UNLF categories are significantly younger than the other groups. OAW, employer, and regular worker have the most aged workforce in the sample (Table 1). The gender composition of the employment groups shows the OAW, employer, regular worker, and casual worker groups being considerably male dominated, with the females mostly concentrated in the UNLF and farmworker groups.

The education profiles of the workers over both the periods show regular workers and employers doing significantly better, followed by the OAWs and unpaid family workers, with the remaining groups having the most inferior educational outcomes (Table 1). Our results dispel the notion of self-employed having a significantly lower education status than their wage-employed peers (Robinson and Sexton, 1994). The caste composition shows that the General and Other backward castes (OBC) category workers have a higher representation in better employment outcomes such as employers and regular workers, whereas the Scheduled castes/Scheduled tribes (SC/ST) groups are involved mostly in casual work. Similarly, we find considerable variation in the distribution of workers by religion and marital status.

Finally, judging in terms of incomes and assets, we find employers and regular workers doing significantly better, followed by OAWs and unpaid family workers, with the casual workers doing the worst in this regard (Table 1). In line with the literature, we also find variability in earnings to be much higher among the self-employed group relative to the wage-employed peers (Åstebro and Chen, 2014). Consistent with the international literature, we also find the number of work hours to be quite high among the self-employed (Blanchflower, 2004) and regular workers, whereas they are found to be lower among the casual workers.

An interesting feature of the Indian labor market is the large share of workers who are involved in >1 job. Table A1 in Appendix shows that >10% of the workers in the workforce are involved in >1 job, and that this number has increased over the investigated period. Further, we find that a majority of such multiple jobholders are involved in farm and wage work. The phenomenon of multiple jobholdings is seen to be more common among casual workers and OAW, being quite rare for farm and regular workers (Table A1 in Appendix). This issue is discussed further in the next few sections.

Table 1 Descriptive statistics

	Farmworker	OAW	Employer	Casual worker	Regular worker	Unpaid family worker	Student	UNLF
Urban[a]	0.05	0.40	0.54	0.21	0.55	0.44	0.30	0.35
Age	36.97	41.05	40.95	36.84	40.23	32.75	11.22	32.55
Years of education	4.63	6.93	9.27	4.29	9.93	7.07	5.06	3.84
Male[a]	0.47	0.84	0.94	0.69	0.81	0.61	0.54	0.31
Caste groups[a] (column totals for all caste groups sum up to 1.0)								
General	0.28	0.32	0.47	0.17	0.38	0.34	0.29	0.31
OBC	0.46	0.48	0.42	0.39	0.35	0.50	0.42	0.43
SC/ST	0.26	0.20	0.11	0.44	0.27	0.17	0.29	0.26
Hindu[a]	0.86	0.79	0.77	0.84	0.82	0.77	0.81	0.79
Married[a]	0.74	0.89	0.90	0.82	0.85	0.61	0.01	0.62
Household poor[a,b]	0.26	0.20	0.07	0.36	0.10	0.18	0.31	0.33
Monthly per capita household real income	735.03	1002.44	2295.59	717.36	2158.56	1127.21	851.91	941.65
Assets	11.51	14.53	18.55	10.49	17.89	15.87	13.16	13.26
Mean real earnings per hour (standard deviation)	187.36	628.94	129.70	9.49	26.16			
Annual number of hours worked	729.60	2104.67	2328.13	1529.99	2472.93	1163.93		
Observations								
Total	67928	9202	2964	58498	14225	5787	64867	77895
2004–2005	30037	3987	1311	26437	5245	2293	33126	48247
2011–2012	37891	5215	1653	32061	8980	3494	31741	29648

Notes: [a]Values indicate proportionate shares of the variable among the total population of the different groups.

[b]The poverty rates are calculated using per capita household consumption and the official poverty lines (Tendulkar Committee poverty lines) (Planning Commission, 2009). Estimated results are calculated using sampling weights (2004–2005). Figures shown are the mean values of the variables, unless otherwise mentioned.

OAW = Own-account workers; UNLF = Unemployed and Not in the Labor Force; OBC = Other backward castes; SC/ST = Scheduled castes and Scheduled tribes.

Source: Authors' calculations based on Indian Human Development Survey data.

3.2 **Transition matrices**

We now look at the transition matrices of the workers across the various employee groups.

A first look at the **P**-matrix shows that all the transition probabilities are significant at the 1% significance level. The corresponding 95% multinomial confidence intervals are reported in Table A8 in Appendix. The diagonal elements of the **P**-matrix show labor turnover to be very high for the self-employed groups, whereas it is very low for the wage-employed group and farmworkers (Table 2). We also find high two-way mobility between farmwork and casual work, which may signify the seasonal nature of agricultural work as workers move intermittently between agriculture and casual work to eke out a living. We look at this issue further in the next section.

Considerable two-way mobility is also noticeable among the wage-employment groups (between casual and regular workers) and the self-employment groups (among OAWs, employers, and unpaid family workers) (Table 2). Finally, the significant movement of people from outside the workforce (composed of students and UNLF) into the farmworker and casual worker groups signifies the role that these groups serve as points of entry for new entrants into the workforce (Table 2). Such a phenomenon may imply that workers move into such sectors to gain work experience (either voluntarily or due to the limited supply of formal [or regular] job opportunities) before moving into better-paying activities.

Looking at the **T**-matrices, we observe that most of the $\boldsymbol{t}$ indices have near-unity values, signifying random worker transition (Table 4). The indices from the **V**-matrix also indicate, in most cases, a high level of symmetry among the various sectoral flows (Table 3). However, in some instances, we also notice a high tendency of workers to move between the self-employed categories of employer, OAW, and unpaid family worker (Table 4). The $\boldsymbol{v}$ indices in such cases are not very symmetric, especially with reference to movements associated with unpaid family

Table 2 Transition probabilities (**P**-matrix)

Initial sector	Terminal sector							
	Farmworker	**OAW**	**Employer**	**Casual worker**	**Regular worker**	**Unpaid family worker**	**Student**	**UNLF**
Farmworker	57.30	2.11	0.48	19.48	2.11	1.23	1.84	15.45
OAW	14.65	27.36	6.37	25.74	5.23	6.75	0.19	13.71
Employer	10.87	26.32	20.84	15.99	8.35	7.14	0.11	10.37
Casual worker	17.37	4.42	0.85	58.08	8.09	1.10	0.16	9.92
Regular worker	6.79	3.53	1.45	20.63	52.16	0.70	0.05	14.69
Unpaid family worker	11.63	16.65	4.94	19.14	4.35	19.87	2.35	21.07
Student	22.71	0.82	0.29	11.92	2.93	2.72	49.90	8.72
UNLF	17.16	1.74	0.47	10.64	2.62	1.72	31.53	34.13

Notes: All transition probabilities are significant at the 1% level of significance. The test of significance is based on the Sison–Glaz method (Sison and Glaz, 1995). The corresponding 95% multinomial confidence intervals are available in Table A8 in Appendix.

Estimated coefficients are calculated using sampling weights (2004–2005).

OAW = Own-account workers; UNLF = Unemployed and Not in the Labor Force.

Source: Authors' calculations based on Indian Human Development Survey data.

workers (Table 3). A high tendency of mobility for workers is also noticeable among the casual and regular worker categories, with the ν indices being asymmetric (Tables 3 and 4).

3.3 Mobility and individual characteristics

Although the analysis of mobility until this point has provided us with a good idea of the extent of movement of workers across different employment groups, it does not tell us anything about the characteristics of workers making a move to other job categories. Hence, we use the multinomial logistic regression results to get a better idea of the different attributes of workers associated with mobility. We complement the discussion of the results from

Table 3 Transition probabilities (**V**-matrix)

Initial sector	Terminal sector							
	Farmworker	OAW	Employer	Casual worker	Regular worker	Unpaid family worker	Student	UNLF
Farmwork		2.09	1.55	4.87	1.99	1.69	0.41	2.91
OAW	1.81		12.19	3.78	2.90	5.44	0.02	1.52
Employer	1.23	14.07		2.16	4.25	5.28	0.01	1.05
Casual worker	3.72	4.46	2.82		7.77	1.54	0.04	1.90
Regular worker	1.28	3.12	4.20	4.60		0.86	0.01	2.47
Unpaid family worker	1.30	8.79	8.56	2.55	2.19		0.28	2.11
Student	4.07	0.69	0.80	2.54	2.36	3.18		1.40
UNLF	2.34	1.12	0.98	1.72	1.60	1.53	4.51	

Note: See Notes in Table 2.

Source: Authors' calculations based on Indian Human Development Survey data.

Table 4 Transition probabilities (**T**-matrix)

Initial sector	Terminal sector							
	Farmworker	OAW	Employer	Casual worker	Regular worker	Unpaid family worker	Student	UNLF
Farmwork		0.76	0.58	1.53	0.53	0.61	0.16	1.75
OAW	0.71		5.95	1.55	1.00	2.56	0.01	1.19
Employer	0.50	6.92		0.91	1.52	2.58	0.01	0.86
Casual worker	1.20	1.74	1.13		2.20	0.60	0.02	1.23
Regular worker	0.49	1.45	2.00	1.84		0.40	0.00	1.90
Unpaid family worker	0.52	4.24	4.23	1.06	0.76		0.14	1.68
Student	1.35	0.28	0.33	0.88	0.68	1.26		0.93
UNLF	0.82	0.47	0.43	0.63	0.49	0.64	2.07	

Note: See Notes in Table 2.

Source: Authors' calculations based on Indian Human Development Survey data.

the multinomial logistic regression with the logistic regression results illustrating the characteristics of the stayers.

Given the large movements of workers from farmwork to casual work, we first look at the characteristics of such movers (Table 2). We find that with reference to staying in farmwork, movements into casual work is mainly undertaken by the young, the less educated, males, the poor, and the backward castes (Table 5). Given the relatively high poverty rates for such movers before and after moving (as seen from Table A4 in Appendix) and the attributes of the workers moving from the former to the latter, movements out of agriculture into casual work is likely to be driven by distress, undertaken mainly by workers to supplement their meager family incomes.

Looking at the issue further, we find that most of the movers from farmwork to casual work hold multiple jobs, simultaneously working in the farm and in casual work in both the periods. At the same time, the number of such multiple jobholders almost tripled over the period (Table A7 in Appendix). Further, most of such movement from farmwork to casual work is not into work provided under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), but private casual work, indicating that such work is not due to the lure of relatively better MGNREGA work.[13] This fact, together with our earlier findings of high poverty rates among movers from farmwork to casual work, may indicate agrarian distress as people move into casual work alongside farming activities to supplement their meager agricultural incomes (Binswanger-Mkhize, 2013).

Interestingly, around 17% of the workers undertake the opposite movement, from casual work to farmwork. Such movers are generally better off in terms of education, caste affiliation, and assets (Table 6). The incidence of multiple jobholdings also falls dramatically among such movers (Table A7 in Appendix). Such differences in the characteristics of the movers from farmwork to casual work, and vice versa, offer some argument against the possibility that movements between farmwork and casual work are random and that the movement from the former to the latter represents genuine symptoms of distress among the farmers.

The findings tally with those in the literature, which finds evidence of declining profitability as well as rising risks and indebtedness in Indian agriculture. This is despite the silver lining of rising agricultural productivity in recent years (Binswanger-Mkhize, 2013; Deokar and Shetty, 2014; Mishra and Reddy, 2010). Our findings are also in line with the global trend of rising diversification of farm-based households into nonfarm activities (Davis et al., 2010; Deere, 2005; J. Lanjouw and Lanjouw, 2001). Our results are also similar to those of Lanjouw and Shariff (2004), who find that much of the diversification into nonfarmwork by the poor is into casual work.

Given the high t indices between OAW and employers, we take a look at the attributes of movers into employer jobs. We see that relative to staying in OAW, moving into employer category is mainly undertaken by the young, those with better educational background, and the wealthy (Table 5). This may be an indication of the presence of liquidity constraints in the economy, as small well-to-do businesses with enough financial capital undertake investments to enlarge their business (Table 5). The very low initial poverty rates among the OAWs undertaking the move into employer category further corroborates this contention (Table A4

13 We do not present the results in regard to this contention. Results are available upon request.

Table 5 Mobility and individual characteristics

	Status of destination						
Status of departure	**Farmworker**	**OAW**	**Employer**	**Casual worker**	**Regular worker**	**Unpaid family worker**	**UNLF and student**
Farmworker							
Urban[a]		1.56***	1.58**	1.51***	2.70***	3.20***	2.53***
Age		0.98**	0.97***	0.97***	0.99***	1.01	1.05***
Years of education		1.05***	1.07***	0.98**	1.18***	1.01	0.98**
Speaks English[b]		1.14	2.08**	1.01	1.28*	0.7	1.1
Education of father of household head		1.01	1.01	0.95***	0.95***	0.98	0.99
Gender[c]		3.43***	8.75***	2.36***	1.43***	0.57***	0.28***
Other backward castes		1.52***	0.79	1.31**	1.01	1.02	0.81**
SC/ST		0.98	0.8	2.16***	1.59*	1.07	0.96
Religion[d]		1.18	0.64	1.01	1.18	1.2	0.93
Marital status[e]		1.29	1.93**	1.12	0.52***	0.22***	0.08***
Assets		1.04**	1.17***	0.90***	1.01	1.07***	1.03***
Member of employee union/business group[f]		1.08	1.41	1.04	1.22	1.44	1.05
Member of SHG[f]		1.17	1.67	1.12	1.62**	0.75	0.98
Member of savings group[f]		0.93	0.78	1.03	1.17	1.06	0.96
Dependency ratio		1.01	0.29**	1.36	1.67	1.81**	2.51***
Occupational group of the father of the household head (Base: Farmers, service workers, and production workers)							
Professional and executive workers		1.58	1.05	1.08	1.63**	0.96	1.29
Sales workers		5.12***	2.29	1.03	2.74**	5.29***	2.01***
Clerical, service, and production workers		1.91***	1.27	1.50**	1.76***	1.51**	1.37***
Own-account worker (OAW)							
Urban[a]	0.15***		1.29	0.89	1.63**	0.82	1.22
Age	1.02***		0.99**	0.97***	0.96***	1.01	1.06***
Years of education	1.01		1.03	0.96	1.04	0.97	0.98

(*continued*)

Table 5 (Continued)

	Status of destination						
Status of departure	**Farmworker**	**OAW**	**Employer**	**Casual worker**	**Regular worker**	**Unpaid family worker**	**UNLF and student**
Speaks English[b]	1.19		1.05	0.79	1.09	0.8	0.93
Education of father of household head	1.02		1.05**	1.02	1.01	0.98	0.98
Gender[c]	0.31***		0.97	0.94	1.19	0.36***	0.08***
Dummy for caste affiliation (Base: General category)							
Other backward castes	0.83		0.8	0.99	0.82	0.62**	0.79
SC/ST	0.62**		0.85	1.41	0.94	0.62	0.70*
Religion[d]	1.28		0.69*	1.18	1.05	1.40**	1.23
Marital status[e]	0.39**		1.75***	0.93	0.65	0.34***	0.15***
Assets	0.96***		1.05**	0.91***	1.04	1.08***	1.02
Member of employee union/business group[f]	1.79		1.19	1.04	0.89	1.38	0.79
Member of SHG[f]	1.86*		0.87	1.26	0.5	0.76	0.9
Member of savings group[f]	0.82		1.41	0.97	1.65	1.16	1.02
Dependency ratio	1.22		1.8	0.72	0.58	0.9	1.14
Occupational group of the father of the household head (Base: Farmers, service workers, and production workers)							
Professional and executive workers	0.51		0.9	1.36	2.09	2.96***	1.67
Sales workers	0.21***		1.26	0.56***	0.66	2.36***	1.26
Clerical, service, and production workers	0.47***		1.04	1.11	1.08	2.32***	1.16

Notes: [a] Urban is equal to 1.0 if the individual resides in an urban location, and zero otherwise; [b] Speaks English equals 1.0 if the individual can converse in English, and zero otherwise; [c] Gender is equal to 1.0 if male, and zero otherwise; [d] Religion is equal to 1.0 if Hindu, and zero otherwise; [e] Marital status is equal to 1.0 if married, and zero otherwise; [f] The variable takes the value 1.0 if anyone in the household is a member of the respective group, and zero otherwise.

Significance levels: *** 1%; ** 5%, and * 10%.

Additional controls used in the model include 18 dummies for state regions, with Uttar Pradesh as the reference category.

Estimated coefficients are calculated using sampling weights (2004–2005).

Estimated coefficients reported are odds ratios.

Standard errors are clustered by 34 state regions.

SC/ST = Scheduled castes and Scheduled tribes; SHG = self-help group.

Source: Authors' calculations based on Indian Human Development Survey data.

Table 6 Mobility and individual characteristics

	Status of destination						
Status of departure	**Farm worker**	**OAW**	**Employer**	**Casual worker**	**Regular worker**	**Unpaid family worker**	**UNLF and student**
Casual worker							
Urban[a]	0.15***	1.35**	0.99		1.64***	1.71**	1.26
Age	1.03***	1.02***	1.02**		1.01	1.01	1.08***
Years of education	1.03***	1.06***	1.08***		1.16***	1.01	1.03***
Speaks English[b]	0.9	1.08	0.8		1.40***	1.32	0.99
Education of father of household head	1.01	1.01	0.99		1.02**	1.01	1.04
Gender[c]	0.49***	1.56**	4.14***		0.83	0.41***	0.14***
Dummy for caste affiliation (Base: General category)							
Other backward castes	0.77**	0.89	0.66**		0.81	1.18	0.73**
SC/ST	0.54***	0.62***	0.58**		0.65***	0.48**	0.67***
Religion[d]	1.22	0.87	0.87		1.50***	0.77	1.06
Marital status[e]	0.84*	1.13	0.94		0.99	0.56*	0.18***
Assets	1.05***	1.11***	1.20***		1.12***	1.10***	1.09***
Member of employee union/business group[f]	0.56***	0.8	1.66*		1.56***	1.43	1.68***
Member of SHG[f]	0.91	0.68*	0.59*		0.93	0.52**	0.77*
Member of savings group[f]	1.04	0.92	0.98		0.96	1.08	0.86*
Dependency ratio	1.38	1.09	2.24		1.61*	0.25**	1.22
Occupational group of the father of the household head (Base: Farmers, service workers, and production workers)							
Professional and executive workers	0.62**	1.37**	1.52		1.01	1.78	0.99
Sales workers	0.83	2.27***	2.83***		1.02	2.17*	1.25
Clerical, service and production workers	0.39***	1.03	1.38		1.07	1.76	1.07
Regular worker							
Urban[a]	0.12***	1.28	1.08	0.95		1.08	1.19
Age	1.11***	1.01	0.98	0.99		1.01	1.16***
Years of education	0.94*	0.94*	0.93**	0.89***		1.04	0.99
Speaks English[b]	0.68	0.94	0.64	1.04		0.33***	0.85
Education of father of household head	0.98	1.01	1.02	1.04		1.06	0.95***
Gender[c]	0.62**	4.00***	7.95**	1.75***		0.53	0.23***
Dummy for caste affiliation (Base: General category)							
Other backward castes	0.52**	1.27	1.66	0.91		2.36*	0.84
SC/ST	0.67	0.44***	0.62	0.54***		1.65	0.70**
Religion[d]	0.86	0.62	1.01	0.78**		1.48	0.73
Marital status[e]	0.20***	1.94	1.02	0.57		0.13***	0.16***
Assets	0.97	0.99	1.05	0.89***		1.13***	1.02
Member of employee union/business group[f]	0.62	0.7	0.41*	0.60*		0.4	0.78*

(*continued*)

Table 6 (Continued)

Status of departure	Status of destination						
	Farm worker	OAW	Employer	Casual worker	Regular worker	Unpaid family worker	UNLF and student
Member of SHG[f]	1.12	1.28	0.51	1.25		0.27	1.55*
Member of savings group[f]	2.25***	1.7	1.46	1.11		1.01	1.14
Dependency ratio	3.76***	0.63	0.99	2.12		4.89	1.19
Occupational group of the father of the household head (Base: Farmers, service workers, and production workers)							
Professional and executive workers	0.65	0.48**	0.62	0.64*		0.64	0.94
Sales workers	1.13	0.89	0.94	1.3		2.25	1.22
Clerical, service and production workers	0.49**	0.89	0.73	1.11		0.79	1.25

Notes: See Notes in Table 5.

SC/ST = Scheduled castes and Scheduled tribes; SHG = self-help group.

Source: Authors' calculations based on Indian Human Development Survey data.

in Appendix). Such presence of liquidity constraints can also be seen as an evidence of the limited role of microfinance programs in promoting entrepreneurial growth. This is corroborated by our finding of the limited impact of social capital – proxied by memberships in self-help groups (SHGs) and savings groups – on labor mobility, as discussed below.

We also notice high mobility of workers from casual work into regular work. We see that movers from casual work to regular work have better endowments in terms of higher education, fluency in the English language, as well as being more likely to be rich, from urban areas, and belonging to privileged castes and religions (Table 6). The scenario of low turnover for regular workers, the high tendency for casual workers to move into regular work, and the superior characteristics of such movers points to a situation where casual workers queue for scarce well-paying regular jobs, and it is mainly the better endowed of the casual workers who get to move into regular work.

Consistent with this view, we find that the reverse movements of workers from regular work into casual work are mainly associated with the less educated and the poor (Table 6). Looking at the persistence in casual or regular work, we find that, consistent with our earlier conjecture, education, fluency in English, and household wealth are positively associated with survival in regular work but negatively related with survival in casual work (Table A5 in Appendix).

We conclude the section with a few general remarks:

First, our results, in general, show a consistent pattern wherein the occupational status of the father/husband's father of the household head has a significant influence on the mobility patterns of the workers (Tables 5 and 6; Tables A2, A3, and A5 in Appendix). In general, workers within a family tend to move into or persist in the employment status related to the occupation of the father/husband's father of the household head. Hence, workers whose father/husband's father of the household head were in sales-related occupations are more likely to move into (or persist in) self-employment work (Tables 5 and 6; Tables A3 and

Table 7 Fixed-effects regression results

Fixed-effects regression coefficients	Column 1	Column 2	Column 3	Column 4
	Reference categories			
	OAW	Employer	Casual worker	Regular worker
OAW		–12.43***	5.78***	3.63*
Employer	12.43***		18.21***	16.06***
Casual worker	–5.78***	–18.21***		–2.15**
Regular worker	–3.63*	–16.06***	2.15**	

Notes: Additional control variables included in the model include age, years of education, education of the father of household head, dummy for urban residence, dummies for knowledge of computer and English usage, occupational dummies, industry dummies, as well as dummies for household headship and being married.

Significance levels: ***1%; **5%; and *10%.

Estimated coefficients are calculated using sampling weights (2004–2005)

Estimations have been conducted using real earnings at 2004–2005 price levels.

Standard errors are clustered by 34 state regions.

The different columns report coefficients for separate regressions with different reference categories.

Source: Authors' calculations based on Indian Human Development Survey data.

A5 in Appendix). Similar results are evident for the farmwork and wage work groups. The results corroborate the literature on the impact of parental occupations on self-employment entry and survival (Parker, 2009; Simoes et al., 2016). The results also support the literature on limited intergenerational occupational mobility in India (Reddy, 2015).

Second, the mobility patterns display a definite gender pattern, with males more likely to move into (or persist in) paid work categories such as OAW, employer, casual worker, and regular worker, whereas females are more likely to move into (or persist in) unpaid family work or outside the workforce (Tables 5 and 6; Tables A2 and A3 in Appendix). This is consistent with the literature, which finds high mobility within the workforce for men and high mobility into joblessness for women (Royalty, 1998; Theodossiou and Zangelidis, 2009).

Third, we fail to find any general impact of social capital, proxied by membership in sociopolitical institutions such as SHGs, savings groups, and so on, on labor market mobility (Tables 5 and 6; Tables A2 and A3 in Appendix). This is also borne out by the existing literature, which finds a limited impact of microfinance programs on income growth and employment prospects (Gopalaswamy et al., 2016; Mohapatra and Sahoo, 2016).

Fourth, we also find that in line with the findings in the literature, SCs/STs are more likely to be exiting self-employment and less likely to be entering and surviving in self-employment (Table 6; Table A5 in Appendix) (Ahn, 2011; Fairlie, 1999). The results show that despite the rhetoric on Dalit capitalism and some stray success stories, the scenario on SC/ST-owned businesses looks bleak (Iyer et al., 2013; Kapur et al., 2014). Our results tally with the existing literature, which shows that relative to the rest of the economy, SC/ST-owned businesses continue to fare poorly in their entrepreneurial pursuits (Deshpande and Sharma, 2016; Iyer et al., 2013). Lastly, education is found to positively affect mobility and survival in the more-favorable-outcome groups, such as employer and regular worker (Tables 5 and 6; Tables A2, A3, and A5 in Appendix).

3.4 **Mobility and earnings**

We finally take a look at the impact of labor mobility on individual earnings. Taking a look at Tables A4 and A6 in Appendix, we find that movements into statuses, such as OAW, employer, and regular worker, from other sectors (such as farmwork and casual work) are associated with positive changes in household consumption levels and wage levels. The aggregate statistics on consumption and wage changes associated with worker mobility, however, do not control for individual-level attributes. To look at the impact of worker mobility on earnings, controlling for observable and time-invariant unobservable worker attributes, we look at the results of the fixed-effects regression analysis.

As can be seen from Table 7, earnings are significantly higher in the employer group as compared to all other sectors. The finding that employers earn significantly more than OAWs, along with our earlier observation about the attributes of the movers from the OAW group into the employer category, offer further support to our earlier inference on employer category being the more-desired employment status. Our findings are also similar to those found in Vietnam and Madagascar (Nguyen et al., 2013; Nordman et al., 2016). Similarly, casual workers fare the worst in terms of wages in comparison to all other segments. OAWs and regular workers are positioned in between the extreme cases of casual workers and employers (Table 7).

We see that regular workers earn significantly better than their casual worker counterparts (Table 7: Column 4). This result, in combination with our earlier evidence on a lower turnover in regular work, as well as the superior attributes of the workers moving from casual to regular work, provides ample evidence in favor of the conjecture that regular work is a more-favorable outcome vis-à-vis casual work. Our findings are synonymous with the literature on Latin America, Vietnam, Madagascar, and South Africa, which finds overwhelming evidence of a formal wage premium over the informal-sector wage workers (Duryea et al., 2006; Nguyen et al., 2013; Nordman et al., 2016; Pagés and Stampini, 2009).

Lastly, we find significant heterogeneity in the earnings penalty/premium from sectoral change by education groups. Specifically, the earnings penalty/premium from sectoral change is found to be more prominent for the highly educated (Table A10 in Appendix). On the other hand, we find the earnings penalty/premium from moving across the self-employment groups to be muted for the SC/ST castes (Table A12 in Appendix). However, we fail to find much heterogeneity in the earnings changes of workers from sectoral change by gender and age groups (Tables A9 and A11 in Appendix). The results emphasize the moderating role of education in influencing the earnings gains/losses from sectoral mobility.

4 **Robustness checks**

The authors conclude the discussion with a few robustness checks.

First, we consider the issue of possible endogeneity in our earnings regression model. Specifically, proper identification of the regression coefficients relies on the fact that movers do not change their employment states systematically for better earnings, i.e., transition is random. We follow Nordman et al. (2016) and check whether mobility is systematically associated with earnings increase (or decrease) relative to the stayers. Out of the 12 cases in which workers change employment status, earnings increase with regard to the stayers in five cases, whereas

we find earnings decreasing compared to the stayers in six cases (Table A6 in Appendix). This provides some argument against the endogeneity concerns in the earnings function.

Second, it might be argued that the multinomial logistic regression results, as well as the results from the transition matrices, are biased due to nonrandom attrition of individuals from the sample. We accordingly model the attrition process and attempt to correct for any attrition bias under the assumption of selection on observables (Wooldridge, 2010). Following Wooldridge (2010), let y be the dependent variable or outcome of interest and X be the vector of independent variables, as discussed earlier. We define A to be the attrition dummy equal to 1.0 if y is nonmissing in both the periods, and zero otherwise. Additionally, Z is a vector of auxiliary variables affecting the probability of attrition such that,

$$P\left(A=1 \mid y, X, Z\right)=P\left(A=1 \mid Z\right) \tag{10}$$

Assumption (10) is referred to in the econometrics literature as "selection on observables" (Wooldridge, 2010). Under the assumption of "selection on observables", possible bias due to nonrandom attrition can be corrected through the inverse probability weighting (IPW) estimation. IPW estimation relies on the presence (in Z) of variables that are good predictors of attrition. We include in Z variables, such as dummies for the relationship with the household head as well as the person identifier.[14] Additionally, Fitzgerald et al. (1998) suggest that Z should also include lagged values of the dependent variable. Hence, we also include in Z dummies for the employment status in the initial period. All the above variables are found to have a significant influence on A.

Under IPW estimation, we estimate a probit model of A on X and Z and generate the fitted probabilities p. In the second step, the outcome model is weighted by the inverse of p, i.e., $1/p$, to give us our attrition-bias-corrected estimates. Accordingly, we estimate our multinomial logistic regression model as well as the transition matrices after correcting for possible attrition bias and compare our results with the uncorrected models. Our results are effectively similar and our conclusions remain the same under the attrition-corrected case. The attrition-adjusted results are not presented here but are available upon request.

Third, fixed-effects estimates are highly sensitive to measurement errors (Card, 1996). Even small misclassification errors can lead to a large bias if the true mobility between sectors is low (Bargain and Kwenda, 2014). We had shown earlier in Table 2 that the number of movers across sectors is sufficiently large in all cases. However, we still check for any potential errors in detecting sectoral change by looking at the changes in industrial and occupational affiliations as workers move across sectors.[15] The results show that of all sectoral moves among the self-employed and the wage-employed peers, around 88% are accompanied by a change in industrial and occupational affiliations. Such results are similar to those found by Bargain and Kwenda (2014). Despite limited information on industrial and occupational affiliations, such results provide some comfort against misclassification errors in our data.[16]

14 Person identifiers are numbers assigned to the family member by the interviewer. We posit that persons interviewed first have a lesser probability of attrition than others.

15 We restrict our analysis to the self-employed and the wage-employed groups, viz., OAW, employer, casual worker, regular worker, and unpaid family worker groups.

16 The industrial and occupational affiliations of workers are available only at the two-digit levels, limiting our ability to detect changes in these characteristics across time periods.

Finally, the analysis of our study is conducted considering all members of the household irrespective of age. In developing countries such as India, defining a working-age group is difficult as large-scale poverty and informality mean that a significant section of the population outside the conventionally defined age groups is engaged in economic activities. As such, restricting our sample to a particular working-age group may lead to bias emanating from the arbitrary selection of cutoffs for the working-age group. However, we check for the robustness of our results by experimenting with different working-age group samples and find that the results are similar across the different specifications. Results for the alternative specifications of working-age groups are not shown but are available upon request.

5 Conclusion

The present study contributes to the limited literature on the patterns and consequences of labor mobility in India. Our study finds significant mobility across sectors in the economy. Characteristics such as gender, caste, education, marital status, wealth, as well as the occupation of the father/husband's father of the household head are found to influence mobility significantly. Further, our study finds evidence of significant earnings differentials across paid-work statuses. We also notice large-scale distress-driven movements of workers, especially from the OAW and farmworker groups into casual work.

Given the distress-driven nature of movement from the OAW and farmworker categories into casual work, policy measures need to be taken to identify and alleviate the nature of the problems in such activities. Further, adequate measures need to be taken to improve the growth prospects of small businesses, enabling them to enlarge and generate decent employment. In this regard, policy efforts need to be made, especially toward alleviating capital constraints in small businesses, given the vital role of capital availability in facilitating business growth. Efforts also need to be taken to improve the educational outcomes of workers – both general and vocational. Furthermore, given the gender-specific patterns of job mobility, policy measures need to be undertaken to improve the workforce participation of females and their mobility into paid work statuses. Finally, policy efforts should be directed to improve the self-employment prospects among the SCs/STs.

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Appendix

Table A1 Multiple jobholdings across sectors[a]

	Single job	F and S[b]	F and W[b]	S and W[b]	FSW[b]
2004–2005					
Farmworker	87.19	1.56	10.83		0.42
Own-account worker	65.76	26.37		4.11	3.76
Employer	76.84	20.28		1.93	0.95
Casual worker	60.11		37.40	1.12	1.36
Regular worker	81.07		17.38	1.11	0.44
Unpaid family worker	77.98	19.33		1.64	1.05
2011–2012					
Farmworker	85.46	1.57	12.61		0.37
Own-account worker	66.77	23.40		4.61	5.22
Employer	77.59	18.19		1.79	2.43
Casual worker	56.83		41.06	1.11	1.00
Regular worker	80.91		17.32	1.12	0.65
Unpaid family worker	73.68		21.82	1.46	3.03

Notes: [a]Table shows the share of workers employed across various multiple-jobholding groups for each sector. [b]F, S, and W denote Farmwork, Self-employment, and Wage employment, respectively.

Row totals sum up to 100.

Source: Authors' calculations based on Indian Human Development Survey data.

Table A2 Mobility and individual characteristics

	Status of destination						
Status of departure	**Farmwork**	**OAW**	**Employer**	**Casual worker**	**Regular worker**	**Unpaid family worker**	**UNLF and Student**
Employer							
Urban[a]	0.17***	1.37		1.11	1.84**	0.96	1.90**
Age	1.02	1.01		0.98	0.98	1.01	1.04***
Years of education	0.97	0.97		0.86***	1.02	0.89***	0.87***
Speaks English[b]	0.48	0.49***		0.72	1.19	0.78	0.86
Education of father of household head	0.99	1.01		1.03	1.05*	1.04	1.11***
Gender[c]	0.09*	0.82		0.46	3.81	0.07**	0.05***
Dummy for caste affiliation (Base: General category)							
Other backward castes	1.02	0.96		1.08	1.35	1.91***	0.93
SC/ST	4.60***	3.53***		6.27***	2.76	2.02	2.59***
Religion[d]	1.63	2.54***		1.01	1.14	1.11	1.33
Marital status[e]	0.33**	0.58		0.43**	0.29**	0.18**	0.43
Assets	0.91***	0.96		0.90**	0.91	1.02	1.01
Member of employee union/ business group[f]	5.16***	1.19		0.99	1.8	1.43	0.81

(*continued*)

Table A2 (Continued)

	Status of destination						
Status of departure	**Farmwork**	**OAW**	**Employer**	**Casual worker**	**Regular worker**	**Unpaid family worker**	**UNLF and Student**
Member of SHG[f]	1.18	1.05		0.52**	1.24	0.27	0.15***
Member of savings group[f]	0.7	0.52*		0.98	0.51	0.51	1.38
Dependency ratio	2.49	1.35		0.55	3	0.6	0.18***
Occupational group of the father of the household head (Base: Farmers, service workers, and production workers)							
Professional and executive workers	0.27	0.49**		0.39**	0.49	0.57	0.26***
Sales workers	0.25**	0.74		0.56*	0.29***	1.32	0.51***
Clerical, service and production workers	0.23***	0.57**		0.62*	0.56	0.43**	0.39***
Unpaid family worker							
Urban[a]	0.12***	0.76	0.87	0.73	0.87		0.94
Age	1.03***	0.99	1.01	0.99	0.98		1.05***
Years of education	1.01	0.98	1.08	0.97*	1.19***		0.97
Speaks English[b]	0.85	1.18	0.94	0.94	1.51		1.58**
Education of father of household head	1.02	0.99	1.04	0.96	0.99		1.03
Gender[c]	0.59	3.19***	6.60***	2.96***	1.68		0.31***
Dummy for caste affiliation (Base: General category)							
Other backward castes	0.48**	0.91	1.36	0.96	0.56		0.77
SC/ST	1.2	1.54	0.54*	2.39*	3.31***		2.06
Religion[d]	1.61	1.18	0.99	0.78	2.15*		1.12
Marital status[e]	0.86	2.59***	2.13***	1.4	1.5		0.36***
Assets	0.92***	0.95***	1.02	0.86***	0.95		0.94***
Member of employee union/ business group[f]	1.35	0.83	1.1	0.78	0.55		1.51
Member of SHG[f]	2.61**	1.25	0.73	1.52	1.33		0.66
Member of savings group[f]	0.92	1.62	2.80***	2.51**	1.82		1.96**
Dependency ratio	5.24**	0.49	3.94	2.06	2.77		1.68
Occupational group of the father of the household head (Base: Farmers, service workers, and production workers)							
Professional and executive workers	0.29***	1.5	0.66	0.72	1.39		0.6
Sales workers	0.14***	1.39*	0.89	0.30***	0.37**		0.82
Clerical, service, and production workers	0.46***	1.12	1.13	0.81	1.22		0.44***

Notes: See Notes in Table 5.

SC/ST = Scheduled castes and Scheduled tribes; SHG = self-help group.

Source: Authors' calculations based on Indian Human Development Survey data.

Table A3 Mobility and individual characteristics

	Status of destination						
Status of departure	**Farmworker**	**OAW**	**Employer**	**Casual worker**	**Regular worker**	**Unpaid family worker**	**UNLF and Student**
Students, unemployed, and not in the labor force							
Urban[a]	0.14***	1.08	1.03	0.84*	1.44***	0.79***	
Age	1.00**	1.01	0.99**	1.01	0.99*	0.99*	
Years of education	1.14***	1.23***	1.32***	1.22***	1.39***	1.14***	
Speaks English[b]	0.81**	0.73**	0.59**	0.9	1.11	0.79	
Education of father of household head	0.97***	0.93***	0.93***	0.92***	0.96***	0.95***	
Gender[c]	1.33***	6.75***	19.72***	3.21***	3.98***	2.14***	
Dummy for caste affiliation (Base: General category)							
Other backward castes	1.12	1.37**	0.99	1.37***	1.14	1.32***	
SC/ST	0.97	0.92	0.89	2.03***	1.73***	0.97	
Religion[d]	1.06	0.83*	0.75	0.62***	0.92	0.83*	
Marital status[e]	2.17***	4.80***	6.39***	3.19***	1.77***	1.43***	
Assets	0.93***	0.93***	1.06***	0.84***	0.93***	0.99	
Member of employee union/business group[f]	0.80**	0.91	0.85	1.38	1.17	0.94	
Member of SHG[f]	1.05	0.91	0.35**	0.98	1.1	0.57**	
Member of savings group[f]	0.96	1.17	0.96	1.01	0.82	1.02	
Dependency ratio	0.19***	0.13***	0.11***	0.05***	0.12***	0.08***	
Occupational group of the father of the household head (Base: Farmers, service workers, and production workers)							
Professional and executive workers	0.84	2.01***	1.15	1.27	1.45***	1.74***	
Sales workers	0.52***	2.48***	2.09***	1.02	0.9	3.09***	
Clerical, service, and production workers	0.59***	1.76***	1.23	1.27***	1.35**	1.89***	

Notes: See Notes in Table 5.

SC/ST = Scheduled castes and Scheduled tribes; SHG = self-help group.

Source: Authors' calculations based on Indian Human Development Survey data.

Table A4 Mobility and poverty

Status of departure	Status of destination						
	Farmworker	OAW	Employer	Casual worker	Regular worker	Unpaid family worker	UNLF and student
Farmworker							
Household poor (2005)	0.33	0.30	0.13	0.46	0.26	0.33	0.31
Household poor (2011)	0.17	0.16	0.02	0.31	0.13	0.13	0.22
OAW							
Household poor (2005)	0.29	0.28	0.17	0.34	0.17	0.23	0.27
Household poor (2011)	0.19	0.13	0.04	0.21	0.09	0.11	0.17
Employer							
Household poor (2005)	0.17	0.11	0.09	0.14	0.11	0.08	0.11
Household poor (2011)	0.16	0.08	0.04	0.18	0.09	0.10	0.08
Casual worker							
Household poor (2005)	0.53	0.45	0.31	0.49	0.29	0.48	0.40
Household poor (2011)	0.26	0.14	0.04	0.28	0.11	0.20	0.22
Regular worker							
Household poor (2005)	0.25	0.13	0.10	0.25	0.09	0.14	0.10
Household poor (2011)	0.11	0.05	0	0.16	0.04	0.06	0.07
Unpaid family worker							
Household poor (2005)	0.39	0.24	0.19	0.35	0.26	0.16	0.23
Household poor (2011)	0.23	0.14	0.12	0.23	0.15	0.15	0.19
Students, Unemployed, and Not in the Labor Force							
Household poor (2005)	0.47	0.33	0.13	0.50	0.24	0.36	0.37
Household poor (2011)	0.21	0.15	0.04	0.23	0.08	0.12	0.20

Notes: The numbers reported are the shares of poor individuals under different groups. See Notes in Table 1.

Source: Authors' calculations based on Indian Human Development Survey data.

Table A5 Persistence in labor market status and individual characteristics

	Farmworker	OAW	Employer	Casual worker	Regular worker	Unpaid family worker	UNLF and student
Urban[a]	0.47***	1.25	0.86	1.1	1.14	1.48	2.15***
Age	0.99*	0.99	0.99	0.96***	0.94***	0.98**	1.01
Years of education	1.01	1.02	1.08**	0.94***	1.07***	1.01	0.84***
Speaks English[b]	0.88	0.99	1.45	0.79***	1.18*	0.81	1.05
Education of father of household head	1.02**	0.99	0.97*	0.98*	0.99	0.99	1.05***
Gender[c]	0.99	2.70***	4.12	2.41***	1.30*	0.81	0.50***
Dummy for caste affiliation (Base: General category)							
Other backward castes	0.99	1.19	0.91	1.27***	1.11	1.22	0.84***
SC/ST	0.68***	1.06	0.27***	1.66***	1.65***	0.57	0.80***
Religion[d]	0.99	0.87	0.66**	0.87	1.29**	0.89	1.12*
Marital status[e]	2.64***	2.07***	2.80***	1.64***	3.16***	0.85	0.47***
Assets	1.02**	1.02*	1.06	0.92***	1.05***	1.08***	1.10***
Member of employee union/business group[f]	0.9	0.88	0.69	0.87*	1.52**	0.93	0.96
Member of SHG[f]	0.92	0.89	1.34	1.22**	0.76*	0.89	1.03
Member of savings group[f]	0.99	0.93	1.49	1.05	0.76**	0.52***	1.03
Dependency ratio	0.48***	0.85	0.93	0.70**	0.39***	0.55	7.12***
Occupational group of the father of the household head (Base: Farmers, service workers, and production workers)							
Professional and executive workers	0.79*	0.81	2.48***	1.12	1.41***	1.31	0.96
Sales workers	0.50***	1.29	1.71***	0.83	0.83	1.51***	1.09
Clerical, service and production workers	0.67***	1.01	2.10***	1.28***	1.03	1.39*	1.11*

Notes: See Notes in Table 5.

SC/ST = Scheduled castes and Scheduled tribes; SHG = self-help group.

Source: Authors' calculations based on Indian Human Development Survey data.

Table A6 Mobility and earnings change

	Terminal sector			
Initial sector	**OAW**	**Employer**	**Casual worker**	**Regular worker**
OAW	14.48	47.89	–16.29	3.02
Employer	–5.03	22.90	–85.63	–12.68
Casual worker	52.13	71.88	33.30	34.17
Regular worker	7.57	61.07	22.40	22.40

Notes: See Notes in Table 2.

The numbers reported are percentage changes in real earnings associated with changes in the employment status.

Source: Authors' calculations based on Indian Human Development Survey data.

Table A7 Multiple jobholdings among movers between farm and casual work

	Farmwork to casual work		Casual work to farmwork	
	2004–2005	**2011–2012**	**2004–2005**	**2011–2012**
Single job	76.14	29.17	30.97	61.42
F and S	1.55			1.56
F and W	21.33	68.79	65.55	36.10
S and W		0.43	0.89	
F, S and W	0.98	1.61	2.58	0.92

Notes: See Notes in Table A1.

The column totals add up to 100.

Source: Authors calculations based on Indian Human Development Survey data.

Table A8 Multinomial confidence intervals for the transition probabilities

	Terminal sector							
Initial sector	**Farmworker**	**OAW**	**Employer**	**Casual worker**	**Regular worker**	**Unpaid family worker**	**Student**	**UNLF**
Farmworker	57.29–57.30	2.10–2.11	0.47–0.48	19.47–19.48	2.10–2.11	1.22–1.23	1.83–1.84	15.44–15.45
OAW	14.62–14.67	27.34–27.39	6.35–6.40	25.71–25.76	5.21–5.25	6.72–6.77	0.17–0.22	13.69–13.73
Employer	10.83–10.92	26.28–26.36	20.80–20.88	15.95–16.04	8.31–8.39	7.10–7.18	0.07–0.15	10.33–10.41
Casual worker	17.36–17.37	4.41–4.42	0.84–0.85	58.07–58.08	8.08–8.09	1.09–1.10	0.15–0.16	9.91–9.92
Regular worker	6.77–6.81	3.51–3.55	1.42–1.47	20.61–20.65	52.14–52.18	0.68–0.73	0.03–0.07	14.67–14.71
Unpaid family worker	11.60–11.66	16.62–16.68	4.91–4.97	19.11–19.17	4.32–4.38	19.84–19.90	2.31–2.38	21.04–21.10
Student	22.70–22.71	0.81–0.82	0.28–0.29	11.91–11.92	2.92–2.93	2.71–2.72	49.89–49.90	8.71–8.72
UNLF	17.15–17.16	1.73–1.74	0.46–0.47	10.63–10.64	2.61–2.62	1.71–1.72	31.52–31.53	34.12–34.13

The estimated multinomial confidence intervals are based on the Simon–Graz method (Sison and Glaz, 1995).

Estimated coefficients are calculated using sampling weights (2004–2005).

Notes: OAW = Own-account workers; UNLF = Unemployed and Not in the Labor Force.

Source: Authors' calculations based on Indian Human Development Survey data.

Table A9 Fixed-effects regression coefficients for the interaction between sectoral choice and age

Fixed-effects regression coefficients	Column 1	Column 2	Column 3	Column 4
	Reference categories			
	OAW	Employer	Casual worker	Regular worker
OAW*Age		−0.38	0.15	−0.13
Employer*Age	0.38		0.53	0.25
Casual worker*Age	−0.15	−0.53		−0.28***
Regular worker*Age	0.13	−0.25	0.28***	

Notes: Additional control variables included in the model include age, years of education, education of the father of household head, dummy for urban residence, dummies for knowledge of computer and English usage, occupational dummies, industry dummies, as well as dummies for household headship and being married.

Significance levels: *** 1%; ** 5%; and * 10%.

Estimated coefficients are calculated using sampling weights (2004–2005).

Estimations have been conducted using real earnings at 2004–2005 price levels.

Standard errors are clustered by 34 state regions.

The different columns report the coefficients of the interaction term between sectoral dummies and age.

The different columns report the coefficients for separate regressions with different reference categories.

Source: Authors' calculations based on Indian Human Development Survey data

Table A10 Fixed-effects regression coefficients for the interaction between sectoral choice and education

Fixed-effects regression coefficients	Column 1	Column 2	Column 3	Column 4
	Reference categories			
	OAW	Employer	Casual worker	Regular worker
OAW*Years of education		−1.41*	0.50*	−0.02
Employer*Years of education	1.41*		1.91**	1.39
Casual worker*Years of education	−0.50*	−1.91**		−0.51***
Regular worker*Years of education	0.02	−1.39	0.51***	

Notes: Additional control variables included in the model include age, years of education, education of the father of household head, dummy for urban residence, dummies for knowledge of computer and English usage, occupational dummies, industry dummies, as well as dummies for household headship and being married.

Significance levels: *** 1%; ** 5%; and * 10%.

Estimated coefficients are calculated using sampling weights (2004–2005).

Estimations have been conducted using real earnings at 2004–2005 price levels.

Standard errors are clustered by 34 state regions.

The different columns report the coefficients of the interaction term between sectoral dummies and the years of education.

The different columns report the coefficients for separate regressions with different reference categories.

Source: Authors' calculations based on Indian Human Development Survey data.

Table A11 Fixed-effects regression coefficients of the interaction between sectoral choice and gender

Fixed-effects regression coefficients	Column 1	Column 2	Column 3	Column 4
	Reference categories			
	OAW	Employer	Casual worker	Regular worker
OAW*Dummy for male		18.60	0.88	–1.31
Employer* Dummy for male	–18.60		–17.71	–19.91
Casual worker* Dummy for male	–0.88	17.71		–2.20**
Regular worker* Dummy for male	1.31	19.91	2.20**	

Notes: Additional control variables included in the model include age, years of education, education of the father of household head, dummy for urban residence, dummies for knowledge of computer and English usage, occupational dummies, industry dummies, as well as dummies for household headship and being married.

Significance levels: *** 1%; ** 5%; and * 10%.

Estimated coefficients are calculated using sampling weights (2004–2005).

Estimations have been conducted using real earnings at 2004–2005 price levels.

Standard errors are clustered by 34 state regions.

Dummy for male equals 1.0 if the worker is male, and zero otherwise.

The different columns report the coefficients of the interaction term between sectoral dummies and the male dummy.

The different columns report the coefficients for separate regressions with different reference categories.

Source: Authors' calculations based on Indian Human Development Survey data.

Table A12 Fixed-effects regression coefficients of the interaction between sectoral choice and caste

Fixed-effects regression coefficients	Column 1	Column 2	Column 3	Column 4
	Reference categories			
	OAW	Employer	Casual worker	Regular worker
OAW*Dummy for SC/ST		10.82**	–2.48	–1.25
Employer* Dummy for SC/ST	–10.82**		–13.30***	–12.07***
Casual worker* Dummy for SC/ST	2.48	13.30***		1.23
Regular worker* Dummy for SC/ST	1.25	12.07***	–1.23	

Notes: Additional control variables included in the model include age, years of education, education of the father of household head, dummy for urban residence, dummies for knowledge of computer and English usage, occupational dummies, industry dummies, as well as dummies for household headship and being married.

Significance levels: *** 1%; ** 5%; and * 10%.

Estimated coefficients are calculated using sampling weights (2004–2005).

Estimations have been conducted using real earnings at 2004–2005 price levels.

Standard errors are clustered by 34 state regions.

Dummy for SC/ST equals 1.0 if the worker belongs to the SC/ST caste group, and zero otherwise.

The different columns report the coefficients of the interaction term between sectoral dummies and the dummy for SC/ST affiliation.

The different columns report the coefficients for separate regressions with different reference categories.

SC/ST = Scheduled castes and Scheduled tribes.

Source: Authors' calculations based on Indian Human Development Survey data.