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Tushar Agrawal, S Chandrasekhar

Indira Gandhi Institute of Development Research, Mumbai
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Tushar Agrawal, S Chandrasekhar
Indira Gandhi Institute of Development Research (IGIDR)
General Arun Kumar Vaidya Marg
Goregaon (E), Mumbai- 400065, INDIA
Email(corresponding author): chandra@igidr.ac.in

Abstract

With 53 percent of India's labour force still engaged in agriculture it is apparent that India has not witnessed a reduction in the share of population working in agriculture. This is primarily because in the two decades of economic reforms, beginning the nineties, adequate new jobs were not created in other sectors of the economy. With rural unemployment rates being sticky, the phenomenon of short term migration has become important in rural India. This paper uses a nationally representative data on migration to examine the characteristics of short term migrants. Since the spatial distribution of jobs is an important determinant of the decision of migrate we compute the location quotient to identify whether a district has a higher concentration of workers in agriculture, manufacturing, construction and services sector. After controlling for household and individual characteristics, we find that an individual is more likely to be a short term migrant if the individual is from a district with a higher concentration of workers in the construction industry. Using instrumental variable model, we find that short term migrants earn low wages compared to non-short term migrant. Following this we model the transition of short term migrant workers across industries drawing on the literature on transition measures developed to measure income and occupational mobility.

Keywords: Short Term Migration, Wages,

JEL Code: O1, R23

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Short Term Migrants in India: Characteristics, Wages and Work Transition

1. Introduction

An important result stemming from the Harris-Todaro framework is that over the course of a country's economic development there is a transition of workers from the agricultural sector to the non-agricultural sector (Harris and Todaro, 1970). Many would argue that a transformation of any significant magnitude is probably not evident in rural India. In a recent article reviewing India's growth performance, Kotwal *et al.* (2011) point out that one distinct aspect of India's experience is the slow rate of decline in the share of workforce employed in agriculture. The share of agriculture in value added as a percent of gross domestic product decreased from 39% in 1983-84 to 20% in 2004-05 while the share of agriculture in total employment declined from 68% to 58%. They argue that "an important component of growth-moving labor from low to high productivity activities- has been conspicuous by its absence in India. Also, as the labor to land ratio grows, it becomes that much more difficult to increase agricultural wages and reduce poverty" (p. 1195).

In fact the findings from a survey conducted by the National Sample Survey Organisation (NSSO) in 2003 revealed that 27% of the farmers did not find farming profitable and given an option 40% of the farmers would not wish to continue farming and instead pursue other opportunities (Government of India, 2005). In addition to the fact that in 2004-05, the rural unemployment rate was sticky at 8.2%, the level of underemployment was also sizable. Among those aged 15 years and above, about 11% of usually employed rural males and 7% of usually employed rural females sought or were available for additional work. The proportion of person-days of the usually employed utilised for work, in the rural areas, was estimated at about 66% for females and 89% for males (Government of India, 2006).

Given this scenario, while theory would predict a shift from agriculture, in reality, exiting from agriculture has proved to be difficult since adequate number of jobs have not been created in other sectors. Consequently, it is but inevitable that, India would witness an increase in the number of itinerant workers or short term migrants. In 2007-08, based on a survey conducted by NSSO, we estimate that there are 12.58 million short term migrant workers residing in rural India. The phenomenon of short term migration is not new and there is a large literature with

many of them being localized studies. Today, what is new about the phenomenon of short term migration is the size of short migrant in the workforce.

Using a nationally representative survey on employment unemployment and migration conducted in 2007-08 in India, this paper focuses on two outcomes in the context of short term migrants - wages and change in the sector (industry) of employment at the time of short term migration. To begin with, we examine the characteristics of short term migrants using a logistic regression analysis. Of particular interest is how spatial agglomeration of industries (concentration of specific types of industries in a district or a region) affects the probability of being a short term migrant. Following this, we analyze the wage differentials between short term migrants and individuals who are not short term migrants. We use an instrumental variable approach recognizing that the variable capturing status of a short term migrant could be an endogenous variable. Finally, we examine transition of short term migrants from one sector to another, i.e., we compare the industry of work of short term migrants based on their usual status during the year preceding the survey with the industry of work when they were away from home.

2. Literature Review

A reading of the empirical literature on migration clearly brings out three strands. The first strand looks at the characteristics of households with a seasonal migrant or return migrant or the individual characteristics of such migrants. The second strand looks at how certain indicators of household well-being (consumption expenditure, food expenditure or nutrition outcomes) vary across households with and without migrants. The third strand looks at occupational mobility of migrants.

We now turn to a brief description of the findings from three strands of the literature. Haberfeld *et al.* (1999) examine the characteristics of rural Indian households with at least one seasonal migrant. They find that households with more educated members or households with fewer working members or households with higher income from agriculture or livestock are less likely to have an individual seasonal migrant. They also find that households living in less developed regions are more likely to have a short term migrant as a household member. Other studies in the Indian context find that households from socially disadvantaged communities are more likely to have short term migrants (Deshingkar, 2008). In the context of Bangladesh, Khandker *et al.* (2012) find that the probability of a seasonal migrant being a household member

is higher for households with more dependents, or not possessing land, and dependent on wage employment in agriculture. Among other studies on similar lines in the context of other countries is the work by Görlich and Trebesch (2008) who seek to understand the determinants of migration and in particular the determinants of seasonal migrants in Moldova. They find that household size, presence of educated adults and the household's perception of poverty are important correlates of presence of a migrant in a household.

The second strand of the literature identifies the role of seasonal migration on living standards. De Haan (1999) provides a review of literature on the role of migration on livelihoods and poverty from a policy perspective. He argues that migration of workers, between and within urban and rural areas, has to be seen as a critical element in the livelihoods of many households in developing countries, poor as well as rich. A study for rural Vietnam by De Brauw and Harigaya (2007) find that in Vietnam seasonal migration plays an important role in improving a household's per capita expenditure. Their study also suggests that seasonal migration reduces poverty without affecting inequality within rural areas. In another study, De Brauw (2010) examines the effects of seasonal migration on agricultural production and finds that migrant households move out of rice production and shift into more land-intensive crops. In a recent paper, Nguyen and Winters (2011) find that short term migration has a positive effect on overall per capita food expenditures, per capita calorie consumption and food diversity in Vietnam.

The third strand in the literature focusing on occupational mobility basically looks at whether a migrant stays in the same occupation group, moves to a higher rank occupation, or moves to a lower rank occupation (Carletto and Kilic, 2011). The classification is generated based on either the observed wages of the migrant before and after migration or by examining the wage data across occupations and accordingly ranking them. The occupational mobility of individuals is modeled within the framework of a multinomial logit or ordered probit. Another empirical approach which is not regression based is the literature on transition measures developed to measure income and occupational mobility by Shorrocks (1978), and Sommers and Conlisk (1979). Formby *et al.* (2004) have developed statistical inference procedures for the measures used in this literature. Drawing on this literature, a recent contribution by Motiram and Singh (2012) examines the mobility in occupation across generations in rural and urban India by comparing the outcome of the sons with their fathers. They find "substantial intergenerational persistence, particularly in the case of low-skilled and low-paying occupations, e.g., almost half

the children of agricultural labourers end up becoming agricultural labourers" (p. 56). Their result implies the persistence of inequality of opportunity.

3. Data and Summary Statistics

The data on migration used in this paper comes from India's National Sample Survey Organisation's (NSSO) socio-economic survey on employment, unemployment and migration conducted over the period July 2007- June 2008 (64th round). The sampling frame for the survey is Census of India. The NSSO adopts a stratified multi-stage design. The first stage sampling unit (FSU) is the lowest geographical unit. There are 7,984 FSUs (villages) in rural India and 4,704 FSUs (urban blocks) in urban India. From each FSU households were chosen along these criteria: two households having at least one out-migrant and received at least one remittance from him/ her during last 365 days, four households having at least one other type of migrants, including temporary out-migrants, for employment purpose and four other households.[1]

Information was canvassed from 79,091 rural and 46,487 urban households covering 374,294 rural and 197,960 urban residents. The data set is not only nationally representative for all India but also for each of its 35 states and union territories. The survey has detailed information on household characteristics, demographic and usual activity particulars of household members and wages for those working and not self-employed.

For each individual, information is available on whether he or she is a short term migrant, a return migrant, or a migrant. A short term migrant is an individual who stayed away from village or town for one month or more but less than six months[2] during last 365 days for employment or in search of employment. The cutoff of six months is used to determine the usual place of residence of individual.

[1] Please refer Government of India (2010) for further details on issues relating to sampling.

[2] Due to the use of the six month criteria to define place of residence, the estimate of number of seasonal migrants has proven to be contentious (Deshingkar, 2006). The survey manual of NSSO defines a household and its members as follows: "A group of persons normally living together and taking food from a common kitchen will constitute a household. It will include temporary stay-aways (those whose total period of absence from the household is expected to be less than 6 months) but exclude temporary visitors and guests (expected total period of stay less than 6 months)". Some would argue that it is not uncommon to have an individual who is considered as a member of the household but has spent over six months away from home and this individual should be counted as short term migrant. However, based on the NSSO criteria this individual is not a member of the household and hence not a short term migrant. In the NSSO survey, this individual would be enumerated where he or she spent more than six months of the year working. Further, in the survey these individuals would be classified as out-migrants by NSSO. So the debate is over how many out-migrants are likely to be short term migrants if one did not use the criteria of six months used by NSSO for deciding place of residence.

Before we proceed further we should note that in the literature the identification of a short term migrant is not based on a uniform definition. Nguyen and Winters (2011) define a short term migrant as an "individual who stays in the household for a cumulative period of less than or equal to 6 months in the past twelve months prior to the survey, but was gone the remaining part of the year" (p. 74). De Brauw (2010) defines "seasonal migrants as members of the household who left for part of the year to work, but are still considered household members" (p. 116). At a conceptual level Carletto *et al.* (2012) argue that the following five individual characteristics can help researchers to determine who is a migrant: place of birth, whether or not the individual resides in the place of birth, household membership, duration of any stays away from the residence, and time period of reference. The NSSO data set identifies a short term migrant based on the last three characteristics. Instead of place of birth and whether or not the individual resides in the place of birth we have an indicator for the individual's usual place of residence in the 365 days preceding the survey. Hence the NSSO survey has a reliable indicator of short term migrant that meets the basic requirement outlined by Carletto *et al.* (2012).

In case of a short term migrant, we have information on his or her current industry of work and industry of work when he or she had migrated for more than one month but less than six months. For individuals who had multiple spells of migration this information is available for the spell with the longest duration away from the usual place of residence. The industry of work is coded as per the National Classification of Industry-2004 (NIC-2004). The NIC-2004 can be grouped into 17 sections coded A to Q (Government of India, 2010, pp. 17-18). These 17 sections can be collapsed into four broad sectors: primary, secondary, construction and services.[3]

In 2007-08, a total of 12.58 million short term migrants lived in rural India and they constituted slightly over 4% of the rural workforce. A total of 9.25 million rural households had a household member who was a short term migrant. Of the 159 million rural households, 76% had only one short term migrant while 17% of them had two short term migrants.

There are six streams of short term migration – intra district rural, intra district urban, intra state rural, intra state urban, interstate rural and interstate urban – evident in the data. Less

[3] The four sectors are classified as follows: 1. Primary Sector: agriculture, hunting and forestry; fishing; and mining and quarrying, 2. Secondary Sector: manufacturing; and electricity, gas and water supply, 3. Construction Sector: construction, and 4. Services Sector: wholesale and retail trade; hotels and restaurants; transport, storage, and communications; financial intermediation; real estate, renting and business activities; public administration and defence; education; health and social work; other community, social and personal service activities; activities of private households as employers and undifferentiated production activities of private households; and extraterritorial organizations and bodies.

than 20% of short term migration is of intra-district in nature while nearly 46% is in the nature of inter-state (Table 1).

Around 36% of individuals reside in households classified as rural labour households, i.e., households for whom 50% or more of the total income comes from working as agricultural labour or other labour. However, 58% of short term migrants are from rural labour households, i.e., they are over represented compared to their share in the population. This is not surprising since rural labour households are typically landless and the incidence of poverty is highest among these households. Further, their share in total poor is higher than their share in the total population. We find that about 51% of the short term migrant households possess land less than 0.21 hectare, and 85% of the households possess land less than one hectare.[4] These summary statistics are consistent with the findings that lack of land and low levels of income are important push factors in rural India.

4. Characteristics of Short Term Migrants

4.1 Empirical Model

In order to identify the characteristics of short term migrants, we estimate a logit model where the outcome variable STM takes the value 1 if the individual is a short term migrant and 0 otherwise, and X is a vector of household, individual characteristics, and other controls.

$$P(STM = 1|X) = G(X\beta) \quad (1)$$

Among the household characteristics we include as explanatory variables are social group (scheduled caste, scheduled tribe, other backward class, and others), religion (Hindu, Muslim, Christian, and others), household size and number of children. The household's main source of income (determined on the basis of at least 50% coming from a particular source) is captured by the variable household type. There are five types of households: self-employed in non-agriculture, agriculture labour, other labour, self-employed in agriculture and others. We also control for the size of land possessed by the household (less than 0.21 hectare, 0.21 to 1 hectare, 1.01 to 3 hectare, 3.01 to 6 hectare, and more than 6.01 hectare). Among the individual characteristics are industry of work (primary, secondary, construction, and services), skill level

[4] One hectare is equal to 10,000 square meters.

(skill level 1, 2, 3 and 4)[5], age, age squared, educational level (illiterate and below primary, primary, middle, secondary, higher secondary, and graduate and above), gender (male and female), and marital status (married and unmarried). In order to control for geographic variations, we include dummies to reflect the state of residence.

In addition to these characteristics, we control for the concentration of workers in any particular sector in a district. We calculate location quotient for four broad sectors: primary, manufacturing, construction and services in each district of the country.[6] For a sector in a district the location quotient is the ratio of the district's share of total employment in that sector to its share of aggregate employment. While computing employment share of each industry in a district and total employment in the district, we use the concept of spatial contiguity (proximity). For each district of the country, we identify all contiguous districts including districts that are neighbors across state boundaries. While calculating location quotient for that district, we pool the numbers for all the contiguous districts. Clustering the data in this manner and calculating the location quotient takes care of spillover effects. If the location quotient for a sector takes the value more than one it means that the district has a concentration of workers in that sector. We convert each location quotient into a dummy variable. The dummy takes a value of 1 if the value of a location quotient is equal or greater than one otherwise it takes a value 0. We construct the location quotients using the data from the NSSO's employment and unemployment survey conducted in 2004-05 since past patterns in concentration of jobs will influence the current behavior. Table 2 provides the mean and the standard deviation of variables used in the logit analysis.

4.2 Findings

Now we turn to a discussion of characteristics of short term migrants. The odds ratios are reported in Table 3. We begin by focusing on the location quotient, household type and land

[5] Skill levels capture the occupation of individuals. Skill level 1 includes elementary occupations, level 2 includes clerks, service workers, and shop and market sales workers; skilled agricultural and fishery workers; craft and related trades workers; and plant, and machine operators and assemblers, level 3 includes technicians and associate professionals, and level 4 includes professionals. Skills are not defined for legislators, senior officials and managers.

[6] We could have used the proportion of individuals engaged in each sector in each district as an explanatory variable. However, the advantage of the location quotient is that it measures concentration of workers relative to the districts share in total workforce. The use of location quotient is pretty standard in the literature that examines the geographic concentration or spatial distribution of economic activities at the sub-national level. The motivation for these studies stems from the empirical observation that industries and jobs tend to cluster.

possessed by the household. These variables are important push and pull factors that contribute to migration.

Although it is well known that geographic concentration of jobs is pervasive, we do not know enough about the relationship between concentration of jobs in a sector and short term migration. The odds of an individual being a short term migrant is greater than one if the individual resides in a district with concentration of workers in the construction sector. An individual residing in a district with concentration of jobs in secondary or service sector is less likely to be a short term migrant. We return to a discussion of the importance of the construction sector later in the paper in the context of transition of workers across sectors/ industries.

In line with the literature, we find that the household's primary source of income is an important determinant of whether an individual is a short term migrant. The odds ratios for all household types relative to agricultural labour are less than one. This implies that individuals from agricultural labour households are more likely to be short term migrants than individuals from other types of households. Not only is the incidence of poverty among agricultural labour households higher than the national average it is also true that most of these households hardly own any land. Around 41% of agricultural labour households in rural areas were below the poverty line in 2004-05 (Government of India, 2008).

The effect of land possession is also statistically significant. The odds ratios corresponding to the land dummies are greater than one for the first two categories and less than one for the remaining categories. This shows that the probability of a short term migrant being present in households with large amounts of land is low. This finding is consistent with other studies that have shown that workers belonging to land scarce households have a higher probability of migration. Land holding is considered to be a significant determinant of rural agricultural income, and reduced land size may result in a reduction of rural income which may turn in increase motivation to migrate (Zhao, 1999). Households with smaller landholdings try to diversify their activities through seasonal migration in order to supplement rural income (Vanwey, 2003).

Across industry groups, individuals working in agriculture, manufacturing and services industries are less likely to migrate than those in construction industry. This result should be interpreted in conjunction with our findings on location quotient. This is not surprising given the expansion of construction sector; the sector accounted for 8.1% share of gross domestic product

in 2007-08 and since then has been growing at well above over 5% per annum (Government of India, 2013). The skill levels of individuals can be inferred from their occupation. We find that individuals working in skill level 2 (clerks, service workers, and shop and market sales workers; skilled agricultural and fishery workers; craft and related trades workers; and plant, and machine operators and assemblers), 3 (technicians and associate professionals) and 4 (professionals) are less likely to migrate than those in skill level 1 (unskilled agriculture and elementary occupations).

Individuals from scheduled tribes, scheduled castes, and other backward classes are more likely to migrate compared to 'others'. Among these, scheduled tribes and scheduled castes are considered to be two historically disadvantaged groups. Scheduled tribes have the highest level of poverty followed by scheduled castes, other backward classes and 'others' in rural areas. The head count ratio for scheduled tribes and scheduled castes were 47% and 36%, respectively in 2004-05 (Government of India, 2008). Earlier studies have documented that farmers from tribal communities travel to nearby regions of commercial agriculture for harvesting or urban construction sites as opportunities for work from forest labour, on local canals or other public works are scarce. A study by Mosse *et al.* (2005) based on a survey conducted in 1996-97 in 42 'bhil' villages found that about 65% of households and 48% of the adult population were involved in seasonal migration. These families were involved in casual urban construction work which was the primary source of their cash income. Among religious groups, Muslims are likely to migrate more than Hindus. Muslims are also considered to be a disadvantaged group. About 33% Muslim population in the country was below the poverty line in 2004-05.

The odds of an individual being a short term migrant is negatively related to household size and positively related to the number of children in a household. All the dummies reflecting educational attainment are statistically significant. Not only are the odd ratios for education dummies less than one, they also decline as we move up the education ladder. This suggests that individuals with higher levels of education are less likely to be short term migrants than the less educated ones. Haberfeld *et al*. (1999) observe that the chances of temporary migration decline with an increasing level of education in the Indian context. Görlich and Trebesch (2008) find that low-skilled workers migrate seasonally.

5. Wages of Short Term Migrants

5.1 Empirical Model

To study the earnings differential between short term and non-short term migrants we use the standard wage function which is given as follows:

$$\ln W_i = \alpha + \beta STM_i + \delta X_i + \varepsilon_i \quad (2)$$

The dependent variable is the natural logarithm of daily wages (in Rupees), *STM* is a dummy variable which take a value of 1 if an individual is a short term migrant and a value 0 otherwise, *X* is a vector of household and individual characteristics likely to affect the wages of individuals, and ε is the error term. The coefficient β reflects earnings advantage or penalties associated with short term migrants. The independent variables are the same as those included in the regression to model the probability of an individual being a short term migrant.

The variable STM in the wage equation could be an endogenous variable. This is because there could be some unobserved characteristics that affect the decision to migrate and the migrants' wages. In this case, estimating the wage equation by ordinary least squares may give inconsistent estimates. However, by using an instrumental variable (IV) approach one can obtain consistent estimates. The instrument (z) needs to satisfy the following two conditions. It needs to be correlated with the endogenous variable (instrument relevance: corr (z_i, STM_i) $\neq 0$) and uncorrelated with the error term (instrument exogeneity: corr (z_i, ε_i) = 0). In short, we need to identify potential candidate instruments for STM that affect short term migration but not directly affect wages.

In the literature some authors have used variables reflecting informational factors and network effects as instruments. We construct two potential instruments at the level of the national sample survey region. The national sample survey region is a collection of group of districts within the same state. We calculate the number of census towns in the national sample survey region in which the household resides. We also calculate the share of population living in the urban and peripheral urban area for each national sample survey region.

Census towns are locations with a minimum population of 5000, density of population of at least 400 per square kilometer and at least 75% of the male main working population engaged in non-agricultural work. These towns can be thought of as intermediaries between large cities and rural areas and hence influence short term migration patterns. The size of the population living in peripheral urban areas is not available as part of official statistics. Peripheral urban refers to an area around a city or town, is rural in nature, with diverse land-use and some or many

of its residents commuting to work in the nearby urban area. Estimates of size of the peripheral urban area have been generated by geographers and for India they are available as part of the India e-geopolis data set.[7] The reason this is a candidate as an instrument for the dummy variable STM is that districts with large peripheral urban areas probably have higher rural-urban connectedness, and hence affect the decision to migrate. Both the number of census towns and size of the peripheral urban area do not directly affect wages but are channels through which rural and urban areas interact and hence affect the probability of migration.

5.2 Findings

Table 4 reports the estimates of the IV estimation. Before we proceed to discuss the results, we need to establish the validity of the instruments that we used based on the results of the statistical tests. STM is instrumented with two variables: census towns and urban share neither of which is likely to affect STM directly. First, we test whether the variable STM is endogenous or not.[8] We find that the test rejects the null that the variable is exogenous.[9] The null hypothesis is that the variable STM is exogenous and under the null hypothesis the specified endogenous regressor can actually be treated as exogenous. In the first stage estimation, we notice that both the instrumented variables are statistically significant at the 1% level of significance.[10] Therefore, the two variables can be considered as reasonable instruments.

Since STM is being instrumented by two variables, next we test for over-identification to examine the exogeneity of the instruments using the Sargan-Hansen test. The joint null hypothesis is that the instruments are valid instruments, i.e., uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation.[11] The Sargan statistic confirms that the test of overidentifying restrictions cannot reject its null hypothesis

[7] http://www.ifpindia.org/Built-Up-Areas-in-India-e-GEOPOLIS.html

[8] This is test for the exogeneity of the regressor STM and not for the exogeneity of the instruments.

[9] Under the null hypothesis, the test statistic is distributed as chi-squared with degrees of freedom equal to the number of regressors tested.

[10] The first stage regressions are reduced form regressions of the endogenous variables on the full set of instruments. As discussed, one of the requirements than an instrumental variable must satisfy is that it must be correlated with the included endogenous variable. This assumption that the excluded instruments are sufficiently correlated with the included endogenous regressors (STM) may be tested by using the *F*-test of the joint significance of the instruments in the first-stage regression. The *F*-statistic on the exclusion of the instrument from the first stage is 70.46. One rule of thumb is that for a single endogenous regressor, an *F*-statistic below 10 is cause for concern.

[11] The Sargan-Hansen test is a test of overidentifying restrictions. Under the null hypothesis, the test statistic is distributed as chi-squared in the number of overidentifying restrictions. A rejection of null hypothesis casts doubt on the validity of the instruments.

suggesting that the instruments appear to be correctly excluded from the main equation. These tests suggest that our instrument set is valid.[12] One should also note that the IV attempts to improve over OLS but by no means is resistant to concerns related to bias and model specification.

We find that the coefficient on STM dummy is negative and statistically significant at the 1% level of significance. This shows that short term migrants earn less than non-short term migrants. Seasonal migrants whether in agriculture, industry, construction or forestry engaged in manual labour and poorly paid (Rogaly, 1998). Manual workers, based in rural areas, are informally contracted and sometimes through intermediaries. They do not have effective collective bargaining mechanism or legal security from harsh employment practices. The lack of effective regulations enforcing the rights of construction workers is also a fact.[13] All the above mentioned factors contribute to lower wages of short term migrants.

Turning to other variables, the location quotients for primary and secondary sectors are statistically insignificant. These are however statistically significant for construction sector and services sector at the one and 10% level of significance respectively. Individuals residing in areas with concentration of workers in the construction sector earn higher wages than areas without a concentration of construction workers. In the context of service sector it should be noted that the sector does not offer attractive livelihood opportunities. A concentration of workers in the service sector need not translate into higher wages in that region. These results should be interpreted jointly with our next set of findings. Industry specific dummies show that wage returns for workers in primary, secondary and services industries are significantly low compared to workers in the construction sector. The wage premium of workers with higher occupational skill is significantly high relative to low skill level workers. Workers in higher skill

[12] In addition to these tests, we also check for underidentification and weak instruments. Under the null of underidentification, the statistic is distributed as chi-squared with degrees of freedom = (L-K+1) where L= number of instruments (included + excluded). A rejection of the null indicates that the model is identified. The test statistics shows that the null can be rejected. Even if we reject the null of underidentification, we can still face a weak-instruments problem. The problem of weak instruments arises when either the instruments are weakly correlated with the endogenous regressor (STM), or the number of instruments is too large. The Cragg-Donald Wald *F*-statistic indicates that our instruments are strongly correlated to STM and do not suffer from weak-IV problem. The Cragg-Donald statistic is a closely related test of the rank of a matrix.

[13] In a recent judgment, the Supreme Court of India directed governments of state and Union Territories to force implementation of construction worker welfare law. The court has ordered for full implementation of the Building and Other Construction Workers (Regulation of Employment and Condition of Service) Act, 1996, and the Building and Other Construction Workers Welfare Cess Act, 1996.

levels are employed in professional and associate professional occupations and the higher wage premium thus reflects higher skill content of such occupations.

Education of individuals has significant and positive effect on wages. The marginal wage effects of education are significantly positive and monotonically increasing in education level. Existing literature on returns to education in India has documented this fact very well (Agrawal, 2012; Duraisamy, 2002; Kingdon, 2008). Females earn less than their male counterparts. Women are generally discriminated against in the labour market, and it has also been found that women at the lower end of the wage-distribution spectrum face more discrimination than those at the higher end of the range. They also have less bargaining power than their male counterparts. We find significant wage differentials across social groups; individuals from scheduled caste, scheduled tribe, and other backward classes earn significantly low wages compared to those belonging to 'others' group. The large wage differentials across these groups are also due to differences in human capital endowments among them (Madheswaran and Attewell, 2007). A large proportion of scheduled caste and scheduled tribe populations do not have formal schooling. The above findings are broadly in line with studies examining wage determinants in the Indian labour market (Duraisamy, 2002; Madheswaran and Attewell, 2007; Kingdon, 2008).

6. Work Transition of Short Term Migrants

6.1 Transitions across Sector of Work

We draw upon the literature on transition measures developed to compute mobility across sector of industry of work. As a first step, the transition matrix for the short term migrants living in rural India is constructed using the four level classification of NIC- 2004 (primary, secondary, construction and services) based on his/her current industry of work and industry of work when he or she had migrated for more than one month but less than six months. The reason we opt for a coarser classification rather than examine transitions across 17 sectors described in the data section earlier is because we will not observe transition across each and every sector, i.e., a matrix of dimension 17 * 17 will have many cells with a value of zero. Therefore, we construct a transition matrix of dimension 4 * 4.

While 35.9% of individuals working in agriculture move to the construction sector when working as short term migrants, 14.4% move to the secondary sector (Table 5). While over 50% of individuals working in the primary sector move out in the short run, we do not observe such

large movement out from manufacturing or construction. We do observe that nearly 10% of individuals working in the service sector move to construction. It is important to understand why short term migrants move from agriculture to construction sector during their longest spell away from home. As it turns out during the period 2004-05 and 2009-10, around 18.1 million jobs were created in the construction sector (Thomas, 2012).[14] Hence it is not surprising when we observe short term migrants change their sector of work to the construction sector.

For every state of India we can generate statistics reported in Table 5. However, it is difficult to compare the degree of relative mobility for different samples (across states) only on the basis of the underlying transition matrices. Therefore, we need a metric to be able to compare the tables in a tractable manner. For this it would be ideal if we can collapse each of the tables describing the transition into one number. This is where computing measures of mobility serves as a useful tool.

6.2 Mobility Measurement

Let the dimension of the transition matrix (P) be *m* and the elements of the matrix be denoted by p_{ij} where *i, j = 1, 2, …., m*. The elements of the matrix show the probability that the individual's industry of work is *j* when he/she had migrated given that his/her current industry of work is *i*. We briefly describe two measures used to measure mobility based on transition matrices (Shorrocks, 1978; Formby *et al.*, 2004).[15]

$$M_1(P) = \frac{1}{m}\sum_{i=1}^{m}\sum_{\substack{j=1 \\ i\neq j}}^{m} p_{ij} = \left(1 - \frac{1}{m}\sum_{i=1}^{m} p_{ii}\right) \tag{3}$$

$$M_2(P) = \frac{1}{m(m-1)}\sum_{i=1}^{m}\sum_{j=1}^{m} p_{ij}|i-j| \tag{4}$$

These measures have an easy and intuitive interpretation of persistence in occupations. The simplest measure $\mathrm{M}_1(\mathrm{P})$, known as the Prais index or the trace index of mobility, relies on

[14] Between 2004-05 and 2009-10, only 1.25 million new jobs were generated in the country and more than 21 million jobs were lost in agriculture and related activities.

[15] There are some other measures that are based on the eigenvalues of the transition matrix. Since these measures do not reflect persistence we do not use them. A detailed discussion of these measures can be found in Sommers and Conlisk (1979).

the diagonal elements of the transition matrix.[16] The value of this measure lies between zero and one. It takes the value 0 when $p_{ii} = 1$ for all i (i.e., stickiness in the sector of work or no one moves from their industries of work) and takes the value 1 when $p_{ii} = 0$ for all i (i.e., there is absolutely no stickiness in the sector of work or when all individuals move away). This measure can also be interpreted as the normalised distance between the transition matrix and the identity matrix of order *m*. However, the measure is insensitive to any moves that take place aside from diagonals. The second measure $M_2(P)$, also known as the Bartholomew index, is a mean crossing measure that captures the average number of classes crossed by individuals. It takes into account the "distance" between the two industries of work of individuals (i.e., the current industry of work and the industry of work during migration). The value of this measure depends on the order of the transition matrix. This measure does not have upper bound. Greater values of both the measures indicate greater movement mobility.

6.3 Findings

In Table 6 we present mobility measures for rural India and for the major states of India (for rural population).[17] We find that the states with the highest mobility (according to the M_1) in rural India are Uttarakhand, Orissa, Jharkhand, Uttar Pradesh, Karnataka, Madhya Pradesh, Himachal Pradesh, Jammu and Kashmir and Bihar. The fact that the states of Bihar, Rajasthan, and Uttar Pradesh which also account for a large proportion of rural labour households have a higher index of mobility should not come as a surprise since they account for the largest share of the jobs created in rural construction sector. The states of Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa, Uttar Pradesh and Uttarakhand have higher incidence of poverty in rural areas and many of them also happen to be among the most populous states of the country (Government of India, 2008). Thomas (2012) has worked out that "almost the entire increase of non-agricultural jobs in UP [Uttar Pradesh], Rajasthan and Bihar between 2004-05 and 2009-10 occurred in rural construction. Notably, the new employment generated during the second half of the 2000s in construction in these three states alone numbered close to nine million. This was

[16] This measure can also be written as: $M_1(P) = 1 - trace(P)/m$. If everyone stays in the same cell, the trace of the matrix is m.

[17] The two mobility measures can yield different ranking of states. We, therefore, compute the Spearman's rank correlation coefficient to test the strength of association between the two ranked measures (M_1 and M_2). We find that the correlation is as high as 0.82.

almost half of all non-agricultural jobs (22.4 million) generated in the entire country during this period" (p. 46).

In order to understand the differences in mobility across the states we examine the transition matrix for each state. If we use the yardstick of at least 20% of those engaged in agriculture moving to manufacturing the states of Bihar, Jharkhand, Orissa, Uttar Pradesh and Uttarakhand make the list. The shift from agriculture to service is observed in the states of Assam, Himachal Pradesh, Jammu and Kashmir and Uttar Pradesh. Notably, the first three states are the states with Hilly regions. On the other side, if we use the same yardstick for those engaged in the agricultural sector moving to the construction sector we find that there are 15 states (Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttarakhand, and West Bengal) where this movement is taking place. In fact, many of these states recorded the largest expansion of non-agricultural employment predominately in the rural construction sector between 2004-05 and 2009-10. Notably the net increase in employment in construction jobs was very high in the states of Andhra Pradesh, Bihar, Jharkhand, Madhya Pradesh, Rajasthan, Tamil Nadu and Uttar Pradesh (Thomas, 2012).

An important factor that determines mobility across sectors is the nature of movement, i.e., does the short term migrant move within the same district he or she resides in, or within same state or to another state. The transition matrix for each of the short term migration streams (by source and destination) is given in Table 7 and the corresponding mobility measures are reported in Table 8. Mobility across the sector is the least among those who migrate within the same rural area of the district or to another rural area of the same state (according to both the measures). This is also evident from the corresponding transition matrices (Table 7) since we do not observe large movement from primary to either construction or services sector. The migrants stay in the primary sector when they migrate from rural areas to rural areas, but transit from primary sector to construction sector when migration takes place from rural areas to urban areas. For instance, more than 80% individuals work in the primary sector in the case of inter or intra district (rural) migration in the same state. Among individuals working in the primary sector and migrating to the rural area of another state nearly 28% do not work in the primary sector and instead work in secondary, construction or services sector. In the context of short term migrants

who move to urban areas the shift to the construction sector is pronounced and consequently the mobility measures for these streams are higher.

7. Discussion

With 53% of India's labour force still engaged in agriculture, India has not witnessed a reduction in the share of population working in agriculture. With rural unemployment rates being sticky, the phenomenon of short term migration has become important in rural India. Similar to many other developing countries, India has hit a bottleneck when it comes to the creation of new jobs in the non-farm sector or in urban areas. India's Economic Survey for the year 2012-13 asks the pointed question "where will the good jobs come from"? In this scenario, it is inevitable that short term migration will gather steam in this decade. Short term migration is a response to substantial spatial and sectoral differences in distribution of economic activity and employment opportunities within India. These flows are typically from areas in which there has been little investment and development toward regions with high investment. In India, it is a story about construction sector driving short term migration flows. India's Eleventh Five Year Plan (2007-12) period saw a significant expansion of infrastructure investment. Large scale projects like the construction of airports, flyovers, metros, national highways and express ways along with private development of housing need huge manpower in construction.

In this paper, we study characteristics and wages of short term migrants using data from NSSO's survey on employment, unemployment and migration. First we use a logistic regression to study characteristics of migrants. We find that short term migrants are more likely to reside in areas with a concentration of workers in the construction sector. The construction sector has been the single largest generator of new jobs in the period 2004-05 and 2009-10. Our overall findings on characteristics of short term migrants are consistent with the literature. We find that short term migrants are likely to have lower wages than those who are not short term migrants. In order to understand why short term migrants might earn lower wages we construct transition matrices reflecting movement from usual industry of work to industry of work during migration. We observe that short term migrants move out of agriculture in all the major states of the country into the construction sector. Such transitions are observed to a limited extent among those working in the manufacturing or construction sectors. We highlight the fact that the rights of short term migrants and construction workers are not enforced.

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Table 1: Destination of Migrants during Longest Spell of Short Term Migration

Destination during Longest Spell	Percent
Same district: Rural	9.99
Same District: Urban	8.64
Same State but another District: Rural	13.63
Same State but another District: Urban	21.84
Another State Rural	8.89
Another State Urban	37.01
Total	100.00

Source: Authors' computation using NSSO (2007-08).

Table 2: Means and Standard Deviation of Variables used in the Logistic Regression

Variable	Mean
Short term migrant	0.100
Location Quotient (LQ)	
LQ primary>1	0.583
LQ secondary >1	0.341
LQ construction>1	0.365
LQ services>1	0.421
Household Type:	
Agriculture labour	0.256
Self-employed in non-agriculture	0.124
Other labour	0.112
Self-employed in agriculture	0.429
Others	0.080
Land Possession:	
< 0.21 hectare	0.415
0.21 to 1 hectare	0.334
1.01 to 3 hectare	0.201
3.01 to 6 hectare	0.034
> 6.01 hectare	0.015
Industry:	
Construction	0.070
Primary	0.707
Secondary	0.073
Services	0.150
Occupational Skill:	
Skill Level 1	0.340
Skill Level 2	0.610
Skill Level 3	0.023
Skill Level 4	0.026
Social Groups:	
Others	0.220
STs	0.198
SCs	0.189
OBCs	0.393
Religion:	
Hindus	0.790
Muslims	0.091
Christians	0.077
Others	0.041
Household Size	5.511

Table 2: Means and Standard Deviation of Variables used in the Logistic Regression

Variable	Mean
	(2.646)
Number of Children	1.203
	(1.404)
Educational Level:	
Illiterate & below primary	0.486
Primary	0.162
Middle	0.174
Secondary	0.090
Higher Secondary	0.052
Graduate and above	0.037
Age	37.073
	(13.110)
Age squared	1546.304
	(1034.664)
Female	0.283
Married	0.809

Notes: The sample consists of individuals aged 15- 65 in NSSO (2007-08) data. Standard deviation appears in parentheses, and is not reported for dummy variables.

Table 3: Characteristics of Short Term Migration: Results of Logistic Regression

Variable	Odds Ratio	Std. Err.	*t*-statistics
Location Quotients (LQs):			
(Reference: LQ primary<1)			
LQ primary>1	0.931	0.038	-1.770
(Ref: LQ secondary <1)			
LQ secondary >1	0.797	0.026	-6.960
(Ref: LQ construction<1)			
LQ construction>1	1.248	0.034	8.040
(Ref: LQ services<1)			
LQ services>1	0.757	0.025	-8.550
Household Type(Ref: Agriculture labour)			
Self-employed in non-agriculture	0.499	0.022	-15.490
Other labour	0.682	0.028	-9.370
Self-employed in agriculture	0.622	0.024	-12.360
Others	0.512	0.029	-11.950
Land Possession Dummy(Ref: < 0.21 hectare)			
0.21 to 1 hectare	1.315	0.034	10.440
1.01 to 3 hectare	1.122	0.043	3.000
3.01 to 6 hectare	0.785	0.065	-2.910
> 6.01 hectare	0.683	0.091	-2.860
Industry(Ref: Construction)			
Primary	0.251	0.010	-35.660
Secondary	0.547	0.024	-13.930
Services	0.508	0.021	-16.220
Occupational Skill (Ref: Skill Level 1)			
Skill Level 2	0.798	0.023	-7.890
Skill Level 3	0.467	0.046	-7.770
Skill Level 4	0.430	0.039	-9.290
Social Group(Ref: Others)			
Scheduled Tribe	1.461	0.058	9.540
Scheduled Caste	1.211	0.043	5.410
Other Backward Classes	1.145	0.036	4.330
Religion(Ref: Hindus)			
Muslims	1.145	0.040	3.860
Christians	0.857	0.070	-1.900
Others	0.993	0.080	-0.080
Household Size	0.982	0.005	-3.330
Number of Children	1.058	0.011	5.640
Educational Level(Ref: Illiterate & below primary)			
Primary	0.910	0.025	-3.360
Middle	0.859	0.025	-5.310
Secondary	0.775	0.030	-6.500

Table 3: Characteristics of Short Term Migration: Results of Logistic Regression

Variable	Odds Ratio	Std. Err.	*t*-statistics
Higher Secondary	0.798	0.041	-4.420
Graduate	0.781	0.053	-3.630
Age	1.062	0.007	9.220
Age squared	0.999	0.000	-16.320
Gender (Ref: Male)			
Female	0.264	0.008	-41.350
Marital Status (Ref: Unmarried)			
Married	0.903	0.030	-3.080
Constant	2.828	0.437	6.730
State Dummies		Yes	
LR chi-squared		13995.500	
Pseudo R-squared		0.162	
Observations		133147	

Note: The dependent variable of logit model is whether an individual is a short term migrant (value 1) or not (0).
Source: Authors' computation for individuals aged 15-65 using data from NSSO (2007-08).

Table 4: Results of the Wage Equation- Instrumental Variable Model

Variable	Coefficient	Std. Error
Short term migrant	-1.360***	0.165
Location Quotients (LQs):		
(Reference: LQ agriculture<1)		
LQ agriculture>1	0.013	0.012
(Ref: LQ manufacturing<1)		
LQ manufacturing>1	0.000	0.010
(Ref: LQ construction<1)		
LQ construction>1	0.094***	0.011
(Ref: LQ services<1)		
LQ services>1	-0.022*	0.011
Household Type (Ref: Agriculture labour)		
Self-employed in non-agriculture	-0.031*	0.015
Other labour	0.026*	0.012
Self-employed in agriculture	-0.034**	0.012
Others	0.281***	0.016
Land Possession Dummy (Ref: < 0.21 hectare)		
0.21 to 1 hectare	0.045***	0.009
1.01 to 3 hectare	0.116***	0.014
3.01 to 6 hectare	0.182***	0.032
> 6.01 hectare	0.366***	0.056
Industry (Ref: Construction)		
Agriculture	-0.394***	0.028
Manufacturing	-0.243***	0.020
Services	-0.239***	0.021
Occupational Skill (Ref: Skill Level 1)		
Skill Level 2	0.110***	0.009
Skill Level 3	0.246***	0.019
Skill Level 4	0.369***	0.022
Social Group (Ref: Others)		
ST	-0.033**	0.012
SC	-0.038***	0.010
OBC	-0.020*	0.009
Religion (Ref: Hindus)		
Muslims	0.015	0.011
Christians	0.005	0.018
Others	0.015	0.019
Household Size	0.006***	0.002
Number of Children	0.001	0.003
Educational Level (Ref: Illiterate & below primary)		
Primary	0.051***	0.008

Middle	0.074***	0.009
Secondary	0.154***	0.013
Higher Secondary	0.319***	0.016
Graduate	0.504***	0.019
Age	0.013***	0.002
Age squared	-0.000***	0.000
Gender (Ref: Male)		
Female	-0.472***	0.016
Marital Status (Ref: Unmarried)		
Married	0.061***	0.010
Constant	5.336***	0.095
State Dummies	Yes	
Number of observations	55632	
R-squared or centered R-squared	0.012	
Over-identification test: Sargan test	0.460	
p-value: Sargan statistic	0.498	
Endogeneity test (H_0: The variable is exogenous)	166.052	
p-value: Endogeneity test	0.000	
Under identification test: Anderson canonical correlation LM statistic	140.744	
Chi-squared p-value: Under identification test	0.000	
Weak identification test: Cragg-Donald Wald F-statistic	70.459	

Notes: The dependent variable is the natural logarithm of daily wages in Indian rupees. *, **, *** indicate significance levels at 10, 5 and 1% levels of significance, respectively. Instrumented variables regression results are generated using the Baum *et al*. (2003), ivreg2.ado programme for Stata.
Source: Authors' computation for individuals aged 15-65 using data from NSSO (2007-08).

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Table 5: Transition Matrix: Rural India

Industry of work (usual status)	Industry of work when working as short term migrant			
	P	S	C	T
Primary (P)	37.92	14.41	35.84	11.83
Secondary (S)	6.36	85.35	5.77	2.51
Construction (C)	3.43	3.13	91.39	2.05
Services (T)	4.65	5.97	9.99	79.39

Note: Each row adds up to 100.
Source: Authors' computation for individuals aged 15-65 using data from NSSO (2007-08).

Table 6: Mobility Measures

State	M_1	M_2
Andhra Pradesh	0.153	0.092
Assam	0.233	0.214
Bihar	0.300	0.177
Chhattisgarh	0.237	0.153
Gujarat	0.226	0.133
Haryana	0.129	0.079
Himachal Pradesh	0.322	0.177
Jammu & Kashmir	0.303	0.223
Jharkhand	0.349	0.185
Karnataka	0.335	0.189
Kerala	0.171	0.101
Madhya Pradesh	0.327	0.167
Maharashtra	0.244	0.119
Orissa	0.406	0.207
Punjab	0.056	0.025
Rajasthan	0.236	0.156
Tamil Nadu	0.218	0.139
Uttar Pradesh	0.338	0.199
Uttarakhand	0.490	0.316
West Bengal	0.259	0.147
Rural India	0.265	0.156

Note: M_1 and M_2 are measures of mobility. Please see section 6.2.

Table 7: Transition Matrix by Migration Stream: Rural India

1. Same District: Rural

Industry of work (usual status)	Industry of work when working as short term migrant			
	P	S	C	T
Primary (P)	81.07	10.60	5.64	2.69
Secondary (S)	28.26	69.89	1.30	0.55
Construction (C)	13.43	7.95	78.32	0.30
Services (T)	13.41	3.16	6.01	77.42

2. Same District: Urban

Industry of work (usual status)	Industry of work when working as short term migrant			
	P	S	C	T
Primary (P)	15.13	9.04	57.79	18.04
Secondary (S)	3.08	79.02	12.52	5.38
Construction (C)	1.46	3.55	94.09	0.90
Services (T)	2.22	3.44	4.49	89.85

3. Same State but another District: Rural

Industry of work (usual status)	Industry of work when working as short term migrant			
	P	S	C	T
Primary (P)	84.83	7.32	5.37	2.49
Secondary (S)	6.74	90.07	1.54	1.65
Construction (C)	24.04	8.20	67.75	0.02
Services (T)	24.37	0.27	5.30	70.06

4. Same State but another District: Urban

Industry of work (usual status)	Industry of work when working as short term migrant			
	P	S	C	T
Primary (P)	7.94	13.11	57.09	21.86
Secondary (S)	0.20	90.49	5.16	4.16
Construction (C)	0.40	1.58	96.79	1.22
Services (T)	0.83	5.16	12.31	81.70

5. Another State: Rural

Industry of work (usual status)	Industry of work when working as short term migrant			
	P	S	C	T
Primary (P)	72.52	13.26	10.27	3.95
Secondary (S)	6.71	91.87	0.64	0.77
Construction (C)	39.08	9.83	46.71	4.38
Services (T)	41.36	7.45	2.54	48.66

6. Another State: Urban

Industry of work (usual status)	Industry of work when working as short term migrant			
	P	S	C	T
Primary (P)	6.48	21.99	55.47	16.06
Secondary (S)	1.48	85.84	9.80	2.88
Construction (C)	0.51	2.97	93.59	2.93
Services (T)	1.19	8.31	11.90	78.61

Note: Each row in each panel adds up to 100.
Source: Authors' computation for individuals aged 15-65 using data from NSSO (2007-08).

Table 8: Mobility Measures for Migration Stream

Destination during Longest Spell	M_1	M_2
Same District: Rural	0.233	0.124
Same District: Urban	0.305	0.192
Same State but another District: Rural	0.218	0.144
Same State but another District: Urban	0.308	0.196
Another State: Rural	0.351	0.240
Another State: Urban	0.339	0.198

Note: M_1 and M_2 are measures of mobility. Please see section 6.2.