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Jajati Keshari Parida
S Madheswaran

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SPATIAL HETEROGENEITY AND POPULATION MOBILITY IN INDIA

Jajati Keshari Parida[*] and S Madheswaran[**]

Abstract

Mobility is one of the important aspects of human nature, which is often guided by socio-economic, political as well as environmental factors. The nature, pattern and direction of population mobility may vary across the space. The dynamics of internal migration in India plays an important role in the process of economic development and social transformation and shows an increasing trend of rural to urban flow over the years. At the same time, it shows falling trends in all other streams of migration and are registering negative growth rates as well. The determinants of rural to urban migration include a set of socio-economic, demographic, geographical and environmental variables. The empirical results establish the "Gravity Model" of migration in India; where as the "Harris-Todaro Model" of rural urban migration has limited applicability in both inter-state and intra-state migration in India.

1. Introduction

The concept of internal migration now connotes much wider dimension that varies from daily commuting to nearby places on one hand, to permanent shift of residence to distant places on the other. The nature and pattern of migration varies from one social group of migrants to another because of the fact that the rural migrants are not a homogenous group (Mitra and Murayama, 2008). Rural to urban migration has attracted the attention of academicians as well as the policymakers throughout the world in recent years, because of its wide range of socio-economic, political, demographic, ecological and environmental implications. It plays an important role in the process of economic development and social transformation because the shifting of the work force from primary to secondary and tertiary sectors that result in structural change. The improvement in infrastructure and communication accompanying economic development could result in increased population mobility. But from the earlier studies (Kundu and Gupta, 1996; Singh, 1998; and Srivastava, 1998), it is evident that migration as a percentage of total population has been declining up to 1991 census, where as the rural to urban migration is showing an increasing trend over the period 1971 to 2001(Lusome & Bhagat, 2006) The recent report of United Nations Development Programme (UNDP, 2009) entitled 'Mobility and Human Development' stated that population shift from villages to cities is natural and should be encouraged and that it results in concentration of production, mobility of people and economic integration to lift rural people out of poverty in India. Hence, any long-term plan aiming at an increase in labour productivity and rural employment opportunities should consider the possibility of migration of a relatively large proportion of population away from areas with relatively low agronomic potential (Dhar, 1980; and Kundu & Sarangi, 2007). The availability of good agricultural land continues to be one of the most powerful economic factors determining the magnitude and direction of population migration. The

agricultural unemployment and underemployment, lower agricultural wage and poverty are the major factors pushing labourers towards job opportunities in urban areas, while the availability of employment opportunities, relatively higher wages, better educational opportunities, better availability of transportation and infrastructure etc. are the major factors in the rural-urban migration (Harris and Todaro, 1970; Barro & Sala-i-Martin, 1991; Gupta, 1993; Bhattacharya, 1998; Pekkala and Tervo, 2002; Bhattacharya, 2002; and Joshi & Lobo, 2003; Andrienko and Sergei, 2003). Therefore, in this context, an attempt has been made to examine the broad trends and patterns of internal migration and to study the determinants of rural to urban migration in India.

The paper is organised as follows. Section 2 provides a brief review of literature. Section 3 gives the data sources used in the present study both for the estimation of trends and patterns, and determinants of migration. Section 4 analyses the broad trends and patterns of internal migration and the intercensal growth of migrants for three intercensal periods as well as provides the reasons for migration. The empirical model for the estimation of migration function is given in section 5. Section 6 provides the empirical results and section 7 presents the conclusion.

2. A Brief Review of Literature

Internal migration is defined as 'population movement across a political or administrative boundary, which entails a change of usual residence' (Bilsborrow, 1998). The migration literature provides a diverse range of related definitions based on three dimensions, which are explained by Kothari (2002). The first dimension entails the motives for migrations. The reasons to migrate are in many cases not just economic, social, political and cultural aspects also play its part. A migrant from an impoverished backward region may be attracted to more prosperous regions because of better public services, higher wages, more business opportunities, more employment opportunities etc. The second dimension is the geographical aspect of population movement. Migration flows form a certain spatial pattern, which depends on the distance the migrant's travel and the direction of their movements. The last dimension is time, which is for how long does the migrant stay in the destination area and how often does he or she travel between different destinations. The Indian Population Census classifies a person as a migrant if either (a) 'his/her place of birth was different from the place of enumeration' or (b) 'his/her place of last continuous residence was different from the place of enumeration'. Hence, the census provided data on both lifetime (birthplace) migration and last-move migration. The former definition is less practical because of the fact that it defines a person as a migrant even if he or she stays in the new destination area permanently. The Population Census of India collected information regarding internal migration flows at three levels of spatial aggregation, i.e., migration flows between Indian states (inter-state migration), migration flows between districts (inter-district migration) and migration flows within a district (Intra-district).

The concept of internal migration (from rural to urban) attracted the attention of both academicians and policymakers only after the seminal work of Lewis (1954). The inter-sectoral allocation of labour is the centerpiece in the dual economy analysis of Lewis (1954) and subsequent works by Ranis and Fei (1961). The main message of these studies is that in the process of development, labour moves to the modern sector which facilitates development. However, in developing

this idea, it is assumed that the modern sector faces perfectly elastic labour supply originating in the traditional or rural sector (i.e., there is unlimited supply of labour from rural to urban sectors). This view is inconsistent with the idea that migration is determined by varying income differentials and that labour is productive in all sectors of the economy. But labour migration from rural to urban sector increases labour productivity and hence it is always desirable and should be encouraged. Ranis and Fei (1961) are of the opinion that technological progress in agriculture sector will make migration process slow by increasing agricultural labour productivity. The Todaro (1969) and Harris and Todaro (1970) models explain the migration flows in the presence of rising unemployment rates in the destination (urban) region which in turn results in the development of informal sector. The internal migration is driven by the higher expected wage in urban sector. The expected wage is nothing but the product of higher urban (institutionally fixed) wage and probability of finding a job (calculated by dividing total availability of urban jobs and total urban labour force) in the urban sector. Further developments on micro modeling approach are 'the new economics of migration' which focus on family as the agent that maximize the family utility function by minimising the risks associated with the agricultural sector (Stark & Bloom 1985; Stark & Katz 1986; Banerjee, 1998; Taylor & Martin 2001; Stark 1991; Mincer, 1978). Similarly, the networks created by migrants in the destination region reduce the migration costs and hence encourages new migration flows to the destination places (Bhattacharya, 1998; Mitra, 2003).

Internal migration at macro level studies the relationship between aggregate migration flows and the presence of spatial heterogeneity among the different locations. The geographical differentials in terms of economic growth and development, is the main determinant of internal migration. The Gravity Model is the most common theoretical framework used in empirical analysis to study the spatial determinants of migrations. It argues that migration is directly correlated with population size and inversely correlated with the distance between the origin and the destination regions. Distance is a key variable, the proxy for all the migration costs, both psychological and monetary, that is spatially related to the sending and destination region. The population size is the sign of the rate of urbanisation or the growth of urban sector (Greenwood, 1985; Greenwood and Hunt, 2003; Larson and Mundlack, 1995). However, not all people react in the same way to differences between places. The selectivity influence of migration characterises the different propensity to migrate for different categories of people. Young people in the working age have a higher propensity to migrate than people in other age groups. Moreover, education is also an important selective factor. High skilled people tend to migrate more than low skilled people (Greenwood, 1997).

The majority of empirical works tries to investigate the impact of some economic variables on internal migration. A high economic prosperity also means more activities, services and opportunities for people living in that area. Moreover, dynamic centres attract mostly young people, who are widely recognised to be highly mobile. The most representative economic variable is the per capita gross domestic product (GDP) as explained by Greenwood (1997). Internal migration has greater potential for poverty reduction, meeting the Millennium Development Goals (MDGs) and contributing to economic growth in developing countries than international migration (Deshingkar, 2004, 2006; Deshingkar and Start, 2003; Srivastava and Sasikumar, 2004; Deshingkar et al, 2006). The relatively poor and backward states show large population mobility, which is primarily in search of livelihood. The mobility of male

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population is also found to be prominent in the relatively advanced states like Maharashtra and Gujarat as explained by Mitra and Murayama (2008). The labour market variables, which are often included as explanatory variables in migration analysis, are the unemployment rate and wage rate. The increasing level of education for rural residents unaccompanied by increased opportunities for higher earnings implies an increase in the gap between rural earnings and hence a cause of migration (Diehl, 1966; Barkley, 1990; Perloff et al, 1998 and Agesa, 2001; Waddington and Sabates-Wheeler, 2004). The flow of migration to the major cities is the result of rural – urban dichotomies in income, employment opportunity and absorptive capacity as stated by Ullah (2004). Hossain (2001) found that while poverty, job searching and family influence were the main push factors for out-migration, better opportunity, prior migrants and availability of jobs were the main factors behind migration. The reason why people decide to move from one region to another is not just related to economic factors. A host of other factors play a role as well. The group of variables that can affect internal migration flows is quite broad and is related with the quality of life. All these factors concern public safety, social services, environmental quality, as well as political factors (Adrienko and Guriev, 2003). According to Adrienko and Guriev (2003), people move from poorer and job scarce regions with worse public good provision to areas that are richer and more prospering both in terms of employment prospects and public goods.

In this context, an attempt has been made to study (at the macro level) the trends, patterns and determinants of internal migration in India using the grouped data from Indian Census. To study the determinants of internal migration, a "Gravity Model" is used as the theoretical background for the empirical estimation. In the "Gravity Model", a set of other explanatory variables (besides population size and distance) are included to test the applicability of "Harris-Todaro Model" in both inter-state and intra-state migration in India.

3. Data Sources

The paper seeks to address two main questions, the first being the current patterns and trends of internal (both inter-state and intra-state) migration in India and the second one: 'What are the determinants of rural to urban migration in India?' The first question is analysed using the Census data. The migration tables (Census of India) are used to analyse the trends and broad patterns of internal migration at inter-state, inter-district and intra-district levels and for different sex categories. The intercensal growth of migrants is also estimated using the same migration tables. The data analysis for the study of determinants of migration is limited to males (Census of India, migration tables), since a large proportion of female migration in India is for non-economic reasons such as marriage. The data for the explanatory variables are taken from other sources like Ministry of Agriculture, Government of India (GoI); Lok Sabha Unstarred Question No. 193, 15th July, 2002; Department of Secondary and Higher Education, Ministry of Human Resource Development, GOI; Wage Rate in Rural India, Labour Bureau and Annual Survey of Industries, 2000-2001, Statistics on Employment and Labour, Ministry of labour, GOI; Central Statistical Organisation (CSO). Most of the data are collected from the website (http://www.indiastat.com). The distance data between the capital cities is collected from (http://www.mapsofindia.com).

4. Trends, Patterns and Intercensal Growth of Migration in India

4.1. Trends of Internal Migration:

The total (in millions) and percentage of lifetime migrants based on the place of last residence criterion, by sex and type of residence in India from 1971 to 2001 is given in Table 1 and 2, respectively. In 1971 census, 159.6 million people, comprising of 49.6 million males and 110 million females, were termed as migrants on the basis of place of last residence criterion. This constitutes 30.6 per cent of the total population of the country. In terms of total volume of migration, the figure increased to 201.6 million in 1981, 225.9 million in 1991 and 309.4 million in 2001.

Table 1: Internal Migrants by Sex, India (1971-2001)

Year	Lifetime Migrants (in million)		
	Total	Males	Females
1971	159.6	49.6	110.0
1981	201.6	59.2	142.4
1991	225.9	61.1	164.8
2001	309.4	90.7	218.7

Source: Calculated from Census of India, Migration Tables.

The percentages of migrants to total population however declined to 30.3 in 1981 and further to 27.4 in 1991. It could be suspected that Census of India underestimates the total number of migrants. It is partially recurring seasonal migration and commuting (in the less than one year duration of last residence), which is the most significant emerging pattern of internal migration in India. The percentage of migrants is however increased to 30.07 per cent in 2001 and this increase may be due to the rapid expansion of the urban areas in India. The percentages of male migrants declined from 18.9 in 1971 to 17.8 in 1981 and further to 14.6 in 1991. It has however increased to 17.03 per cent in 2001. The phenomenal increase in the urban informal sector, particularly after the economic reforms (1991), could be responsible for this. The percentages of female migration increased to 48.3 in 1981 as compared to 42.3 in 1971 and in 1991, it was 41.2 per cent which again increased to 44.05 per cent in 2001. It is obviously due to the social-cultural setup in India where females normally migrate after marriage. In comparison to the rural and urban categories, the percentage of migrants in rural areas increased from 28.2 per cent in 1971 to 30.07 per cent in 2001, while the percentages of urban migrants declined from 28.2 per cent in 1971 to 17.3 per cent in 2001. In both rural and urban areas, the share of female migrants is again found to be dominant.

Table 2: Percentage of Lifetime Migrants in the Total Population by Sex and Type of Residence in India, (1971-2001).

Type of Residence	Year	Total	Male	Female
Total	1971	30.6	18.9	42.8
	1981	30.3	17.8	44.3
	1991	27.4	14.6	41.2
	2001	30.07	17.03	44.05
Rural	1971	28.2	14.1	43.1
	1981	28.2	16.1	46.5
	1991	26.8	13.4	41.8
	2001	30.09	13.2	47.9
Urban	1971	28.2	14.1	43.1
	1981	28.2	16.1	46.5
	1991	26.8	13.4	41.8
	2001	17.3	13.9	21.03

Source: Calculated from Census of India, Migration Tables.

4.2. Reasons for Migration:

Table 3: Reasons for Internal Migration according to Sex and different Streams of Migration in 2001 Census (figures in %)

Reasons for Migration	Male				Female			
	Rural-Rural	Rural-Urban	Urban-Rural	Urban-Urban	Rural-Rural	Rural-Urban	Urban-Rural	Urban-Urban
Work or Employment	28.87	26.51	50.64	38.53	2.17	3.5	5.0	4.1
Business	2.15	2.44	3.63	3.55	0.2	0.4	0.35	0.45
Education	6.27	5.16	7.08	6.16	0.71	1.56	2.85	2.61
Marriage	4.26	1.58	0.83	0.84	78.17	47.58	43.03	39.87
Moved after birth	14.46	24.19	5.11	9.01	3.66	14.92	4.66	6.92
Moved with Household	25.17	24.93	22.68	30.12	9.71	24.45	36.62	38.66
Other reasons	18.82	15.19	10.03	11.79	5.38	7.59	7.49	7.39
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Calculated from Census of India, Migration Tables.

The reasons for migration have been classified into seven broad groups (viz., work/employment, business, education, marriage, moved at birth, moved with family and others) in 2001 Census. The data on reasons for migration are useful to understand the motivational factors behind the movement of people. It is observed from Table 3 that employment among males and marriage among females are the main reasons for migration. About 29 per cent of the male migrants moved form rural to rural areas due to work or employment reasons. Similarly, employment or work caused around 26.5 per cent from rural to urban, 50.64 per cent from urban to rural and 38.53 per cent from urban to urban migration in India. While in the case of females, 78.17 per cent migrated from

rural to rural areas due to marriage. Again 47.58 per cent from rural to urban, 43.03 per cent from urban to rural and 39.87 per cent from urban to urban females migrated due to marriage. Associational reasons like movement on account of accompanying parents or any other members of the family is regarded as the second most important reason among both male and female intercensal migrants.

4.3. Patterns of Internal Migration:

The total migration flow can broadly be divided into four different streams viz., rural to rural, rural to urban, urban to urban and urban to rural. Similarly from the point of view of distance, it can be classified as inter-state and intra-state (inter-district & intra-district) migration. Table 4 depicts the percentage distribution of lifetime migrants in different streams for males and females from 1971 to 2001 at intra-district, inter-district, inter-state distance categories, respectively. The results show a considerable decline in the proportion of intra-district migrants for both the sex categories, where as both inter-district and inter-state migrations are increasing over the same period of time. As explained by Bhagat (2005), droughts and floods which occurs in some parts of the country every year renders many people homeless. This has been recognised as one of the reasons for migration in the censuses of 1981 and 1991." And at the same time, the phenomenal expansion of urban informal sector during the 1990s could be the reason for migration in 2001 Census. At the national level, rural to rural migration constitutes the most dominant category. But its share has been declining over time for both males and females in all the three streams. The decline was greater in case of males as compared to females. There is a large share of female intra-district rural-to-rural migration, which is normally explained in terms of marriage migration (Census of India). Rural-to-rural intra-district migration of males seems to be due to their migration from areas of low agricultural productivity to sparsely populated areas with new developmental activities. In addition, Lusome & Bhagat, (2006) stated that apart from employment among males and marriage among females, moved with household emerged as another important factor for migration among males as well as females. The rural to urban streams show increased percentage share of migrants over the period, 1971 to 2001, which is mainly on account of employment or work.

Combining all the above three distance categories of migration (i.e., intra-district, inter-district and inter-state migration), it is suggested that rural-to-urban male migration has increased substantially over the period, 1971 to 2001. The creation of modern sector in major metropolises and big cities and the subsequent development of the urban informal sector as is the major reason for rural to urban migration. A similar trend is found for urban-to-urban migration. However, the proportion of rural-to-urban lifetime migration of females has decreased with increasing distance between origin and destination places. The share of urban-to-urban migration of both males and females was comparatively low in the intra-district stream, but it increased substantially in the inter-district and inter-state streams. The reason could be that the institutions of higher learning, particularly professional and technical institutions, are not available in all districts and the motives for higher education drives both the urban dwellers as well as the rural folks to migrate over long distances.

Table 4: Internal Migration flows by Sex and different distance categories in India, 1971-2001 (figures in %).

Migration Categories	Males				Females			
	1971	1981	1991	2001	1971	1981	1991	2001
Intra-district Level								
Rural to Rural	36.8	32.3	30.9	29.9	61.3	56.6	54.7	54.6
Rural to Urban	9.8	10.7	11.5	10.3	5.3	6.0	6.3	5.9
Urban to Urban	3.6	3.6	3.6	4.6	3.0	3.0	2.9	2.7
Urban to Rural	3.8	4.6	4.3	5.8	1.8	2.5	2.3	3.7
Sub Total	54	51.2	50.3	50.6	71.4	68.1	66.2	66.9
Inter-district Level								
Rural to Rural	9.5	9.3	8.9	8.2	12.2	13.4	14.0	12.8
Rural to Urban	8.0	9.6	10.5	8.9	3.2	3.9	4.5	4.4
Urban to Urban	2.4	2.6	2.5	3.5	1.5	1.8	1.9	1.9
Urban to Rural	7.2	8.4	8.0	7.2	3.4	4.2	4.2	3.9
Sub Total	27.1	29.9	29.9	27.8	20.3	23.3	24.6	23.0
Inter-state Level								
Rural to Rural	4.5	3.8	3.5	3.4	3.6	3.3	3.3	3.8
Rural to Urban	6.7	7.5	8.2	9.8	1.7	2.2	2.5	2.9
Urban to Urban	1.5	1.4	1.8	2.7	0.7	0.6	0.7	0.4
Urban to Rural	6.2	6.2	6.5	5.7	2.3	2.5	2.7	2.5
Sub Total	18.9	18.9	19.8	21.6	8.3	8.6	9.2	10.1
Grand Total	100	100	100	100	100	100	100	100
All distance categories								
Rural to Rural	50.8	45.2	43.3	28.8	76.8	73.3	72.0	66.6
Rural to Urban	24.0	27.7	29.8	27.0	10.2	12.0	13.2	12.4
Urban to Urban	7.5	7.6	7.4	5.0	5.1	5.5	5.4	3.9
Urban to Rural	16.6	19.2	18.9	18.2	7.5	9.1	9.0	9.2

Source: Calculated from Census of India, Migration Tables.

4.4. Intercensal Growth of Migrants in India:

The percentage growth of intercensal (1971-81, 1981-91 and 1991-2001 periods) migrants for all categories are presented in intra-district, inter-district, inter-state streams and the combination of all streams in Table 5. During 1971-81, there was a positive growth of total and female migrants for all migration categories while a negative growth of male migration from rural-rural areas in both intra-district and inter-state cases. Similarly, the growth rate of urban-urban male migration in inter-state cases is negative in the same period. Again during the decade 1981-91, both male and female migration decreased as registered by the negative growth rates. The growth rate of male migrants in all streams is negative except rural-urban inter-district and inter-state cases, while the growth rate of female migration from urban to rural areas is negative except in inter-state case. The resulting growth of total migration is positive in rural-urban areas and is negative in all other cases. The growth rate of intercensal migrants during 1991-01, for both male and female migrants is positive except urban-urban category in inter-district stream and rural-rural and rural to urban categories in intra-district male cases.

Male inter-state rural to urban migration stream shows an increase of nearly 90 per cent while females increased by about 61 per cent. On the other hand, inter-state urban to urban migration stream for males shows an increase of 28 per cent while females have increased by 22 per cent. These increases in rural - urban and urban – urban cases are greater than the increases in other streams of migration for both male and female categories. The main reasons for the above migration streams could be explained in terms of employment and marriage. Associational reasons including movement on account of accompanying parents or any other members of the family and for learning and higher education are considered t to be the second most important reason for both male and female migration. The reasons for the negative growth rates are mostly because of the inability of Indian Census to collect information regarding both seasonal migrants and commuters, which are the two emerging migration patterns in India during the last two decades. The Census of India collects the information at a particular point of time and there are no such questions in the Census questionnaire which can collect information regarding the seasonal migration and commuting. The reasons for the positive growth rate could be due to the creation of new districts or states during the intercensal period. The number of internal migrants could be either overstated or under estimated depending upon the creation of new districts or states during the intercensal period. Recently, three new states viz., Uttaranchal, Jharkhand and Chhattisgarh were created in 2000- a few months before the latest census held in February 2001.

Table 5: Intercensal growth rates of migrants by sex and distance categories, India 1971-2001

Migration Categories	Intercensal Growth Rates								
	1971-81			1981-91			1991-01		
	Total	Males	Females	Total	Males	Females	Total	Males	Females
Intra-district Level									
Rural to Rural	6.2	-1.5	9.4	-0.73	-19.6	6.2	12.5	-0.99	16.3
Rural to Urban	41.8	36.3	47.3	4.9	-2.9	12.2	1.2	-1.8	3.7
Urban to Urban	18.5	14.7	21.4	-4.1	-13.2	2.3	8.2	12.6	5.5
Urban to Rural	66.9	57.3	76.4	-17.0	-24.	-10.5	33.4	37.4	30.4
Inter-district Level									
Rural to Rural	20.8	8.7	27.6	3.5	-17.2	13.3	13.4	8.54	15.1
Rural to Urban	50.4	42.3	60.2	9.1	1.1	17.8	16.3	17.1	15.5
Urban to Urban	30.7	22.5	38.1	-5.8	-17.0	3.21	-8.6	-7.8	-9.1
Urban to Rural	38.6	29.3	48.3	-7.9	-14.6	-1.8	19.0	20.4	17.9
Inter-state Level									
Rural to Rural	5.8	-3.7	13.8	-3.4	-15.8	5.4	54.5	67.6	47.1
Rural to Urban	19.7	2.3	49.2	20.1	23.8	15.8	77.5	90.9	60.8
Urban to Urban	10.4	-0.4	24.7	-9.6	-16.4	-2.5	12.0	17.2	7.3
Urban to Rural	15.9	5.9	28.2	6.06	0.87	11.2	24.9	28.3	21.7
Total Internal Migration									
Rural to Rural	8.8	0.3	12.8	-0.03	-18.7	7.61	15.3	7.7	17.7
Rural to Urban	43.2	36.0	51.8	6.58	-1.03	14.2	22.8	27.6	18.3
Urban to Urban	21.0	14.0	27.2	-5.63	-15.2	1.9	3.0	6.4	0.7
Urban to Rural	38.6	29.2	48.7	-7.3	-14.2	-0.78	24.2	26.8	22.2

Source: Calculated from Census of India, Migration Tables.

5. Econometric Framework

In the present context, to study the factors affecting the internal migration process in India, the single equation regression model is used. The theoretical background for the empirical model has been borrowed from the "Gravity Model" of migration (which includes the demographic variables viz., population size in both destinations and places of origin, and the distance between the places). At the same time, a vector of socio-economic variables is included in the same model to test the applicability of another important theory of internal migration (i.e., the Harris-Todaro model).

The origin of most empirical research of this type of "Gravity Model" of migration, in which the gross flow of migrants are assumed to be directly proportional to origin and destination population and inversely proportional to the distance between origin and destination, in addition to being dependent on a number of other origin and destination variables is:

$$M_{ij} = P_i^{\,a} P_j^{\,b} D_{ij}^{\,g} f(X_i, X_j) \tag{1}$$

$$\{i, j = 1, 2, \ldots\ldots\ldots\ldots n\}$$

Where M_{ij} is the gross flow of migrants from region i to region j, P_i is the population of region i, and P_j is the population of region j. D_{ij} is the physical distance between region i and region j. And X_i, X_j are the vectors of origin and destination variables, respectively. Estimation of equation (1) is generally done in the double logarithmic form to get the coefficients as elasticities. In this model, the explanatory variables in the migration function typically include the urban expected wage rates (outcome of the product of urban fixed wage rate and probability of getting an urban job), the rural (agricultural) wage rate, income (Per Capita Net State Domestic Product) levels of both origin and destination places, unemployment or employment rates, education or literacy rates, and urbanisation and population levels, as well as the physical distance between regions of origin and destination.

Although there is a consensus that the types of economic variables affect migration, there is no uniformity concerning the manner in which demographic variables are entered into the migration function. A variety of dependent variables are used even in the ordinary least square (OLS) estimation; for example, M_{ij}/P_i, $M_{ij}/(P_i.P_j)$, M_{ij}. The normalisation most frequently adopted in the actual estimation is to divide migration flows by the origin population. Strict adherence to the gravity model would require the inclusion of both origin and destination population on the right-hand side of the equation. The model suggested by Levy and Wadycky (1972) is:

$$\left(\frac{M_{ij}}{P_i}\right) = P_i^{\,a-1} P_j^{\,b} D_{ij}^{\,g} f(X_i, X_j) \tag{2}$$

However, population variables included on the right-hand side often tend to be highly correlated with other explanatory variables, and the methods of their inclusion vary with the problems encountered while using different data sets. Other authors have omitted both population variables from the right-hand side or imposed a "constant return to scale" property with respect to origin and destination populations (Mundlak, 1979)- the rationale being that doubling the origin and destination

population should double the flow of migration, with factors remaining constant. Imposing homogeneity (a = 1-ß) in equation (1) produces

$$\left(\frac{M_{ij}}{P_i}\right) = \left(\frac{P_j}{P_i}\right)^{b} D_{ij}^{g} f(X_i, X_j) \tag{3}$$

Similarly, the normalisation ($M_{ij}/P_i.P_j$) was used by Greenwood (1971) which imposes the restriction of ß=1 (in addition to a=1) if P_i, P_j are left out of the right -hand side.

$$\left(\frac{M_{ij}}{P_i P_j}\right) = D_{ij}^{g} f(X_i, X_j) \tag{4}$$

In the present study, the dependent variable for all the migration equations (inter-state and intra-state) is the gross male migration flow divided by the relevant (rural) origin population. It is because of the fact that most of the females migrate because of non-economic reasons (i.e. marriage). The explanatory variables included in the models are not the same, because of the unavailability of data at the intra-state level. The equation 5 and 6 represent the ordinary least square (OLS) estimation model for inter-state and intra-state migrations, respectively. A detailed description of the all the explanatory variables are given in appendix-A.

$$\ln\left(\frac{M_{ij}}{P_i}\right) = b_0 + b_1 \ln\left(\frac{p_j}{p_i}\right) + b_2 \ln D_{ij} + b_3 \ln U_i + b_4 \ln W_e + b_5 \ln W_i + b_6 \ln Y_i + \\ b_7 \ln Y_j + b_8 \ln L_i + b_9 \ln Lit_i + b_{10} \ln GFCF_i + b_{11} \ln Wat_j + b_{12} LD + e_1 \tag{5}$$

$$\ln\left(\frac{M_{ij}}{P_i}\right) = b_0 + b_1 \ln\left(\frac{p_j}{p_i}\right) + b_2 \ln D_{ij} + b_3 \ln U_i + b_4 \ln W_e + b_5 \ln W_i + b_6 \ln Y_i + \\ b_7 \ln Y_j + b_8 \ln L_i + b_9 \ln Lit_i + b_{10} \ln GFCF_i + b_{11} \ln Wat_j + b_{12} LD + e_2 \tag{6}$$

Estimation of determinants of migration using single equation methods has been the practice in almost all previous works and hence is given prime importance in the present study. In the present study, an attempt has also been made to study the simultaneous relationship between migration rate and rural wage, using a two-stage least square (2SLS) method. The existence of simultaneous relationship between the rural wage and internal migration was established by Harris-Todaro (1970), where they have assumed that in the urban sector, there exists an institutional fixed wage, which is above the minimum subsistence level. The internal migration is driven by the higher expected wages in urban sector, and the equilibrium rural wage and migration flows are determined simultaneously in the economy. The Harris-Todaro condition for long run equilibrium is:

$$W_e - W_i = 0 \tag{7}$$

The equation 8 and 9 are the structural equations for both migration and rural wage functions estimated by the Two-Stage Least Square (TSLS) method at inter-state and intra-state levels. A detailed description of the all the explanatory variables are given in appendix-A.

$$\ln\left(\frac{M_{ij}}{P_i}\right) = b_0 + b_1 \ln\left(\frac{p_j}{p_i}\right) + b_2 \ln D_{ij} + b_3 \ln U_i + b_4 \ln W_e + b_5 \ln W_i + b_6 \ln Y_i +$$
$$b_7 \ln Y_j + b_8 \ln L_i + b_9 \ln Lit_i + b_{10} \ln GFCF_i + b_{11} \ln Wat_j + b_{12} LD + e_1 \tag{8A}$$

$$\ln W_i = b_0 + b_1 \ln U_i + b_2 \ln Y_i + b_3 \ln L_i + b_4 \ln\left(\frac{M_{ij}}{P_i}\right) + b_5 \ln Lit_i +$$
$$b_6 \ln GFCF_i + b_7 \ln Emp_i + e_2 \tag{8B}$$

$$\ln\left(\frac{M_{ij}}{P_i}\right) = b_0 + b_1 \ln\left(\frac{p_j}{p_i}\right) + b_2 D + b_3 \ln U_i + b_4 \ln W_e + b_5 \ln W_i + b_6 \ln Emp_i +$$
$$b_7 \ln L_i + b_8 \ln Lit_i + e_1 \tag{9A}$$

$$\ln W_i = b_0 + b_1 \ln U_i + b_2 \ln L_i + b_3 \ln\left(\frac{M_{ij}}{P_i}\right) + b_4 \ln Lit_i + b_5 \ln GFCF_i +$$
$$b_6 \ln Emp_i + e_2 \tag{9A}$$

6. Rural to Urban Migration: Empirical Results:

The migration function estimated on the basis of aggregated data may not be preferable to base our expectations about the results on a single hypothesised response. Because of the fact that people who belongs to different economic sections will respond differently to changes in economic variables. Again individuals in the same migration stream may have widely different reasons for moving. Accordingly, an attempt is made here to offer, wherever necessary, competing explanations of a particular result. Since all the variables are in the form of logarithms, the parameter estimates represent elasticities. The T-statistics are presented in parentheses along with the coefficient values. A single, double and triple star implies the statistical level of significance at 10%, 5% and 1%, respectively.

6.1. Inter-state Rural to Urban Migration

Both Ordinary Least Square (OLS) and Two-Stage Least Square (TSLS) results of the less than one year and one to four years durations of inter-state rural-urban migration are presented in Table 6 & 7 to facilitate comparisons. The OLS results are presented in Column 2 in both the tables, where as the TSLS results are given in Column 3 & 4 respectively.

The OLS results presented here are the robust result which was corrected for both heteroscedasticity and possible serial correlation problems. The mean of variance inflation factors figures are given in the tables and they indicate that the degree of multicollinearity is very low, though

it does not affect the estimated coefficients. The R^2 (the measure of goodness of fit) for both the equations are quite reasonable along with high significance levels of F-statistics.

The estimated results suggest that in both durations of migration, the gravity variables (population size and distance) are statistically (at 1% level) as well as economically significant, with positive and negative signs (as expected), and absolute values of the coefficients are 0.58 & 0.608 (population elasticities of migration) and -1.3 & -1.48 (distance elasticities of migration) respectively. The origin population size acts as a pushing factor where as the size of urban population is an indication for the rate of urbanisation (as a pulling factor). Both origin and destination population have positive roles to play in the migration process, which is evident from the empirical results. The distance is the proxy for all migration costs (including the psychic cost) and has played a deteriorating role in the internal migration process in India.

Table 6: Interstate Rural-Urban Migration (Duration of less than 1 year)

Variables	OLS	2SLS	
	M_{ij}/P_i	M_{ij}/P_i	W_i
Constant	-12.23(-5.01)***	-18.78(-5.0)***	0.33(0.72)
P_j/P_i	0.58(16.29)***	0.65(15.14)***	---
D_{ij}	-1.3(-14.44)***	-1.41(-12.07)***	---
U_i	0.49(4.83)***	0.38(3.08)***	0.032(1.80)*
W_e	0.009(0.15)	-0.027(-0.37)	---
W_i	0.13(0.63)	4.14(3.46)***	---
Y_i	-0.55(-2.44)***	-1.69(-3.87)***	0.27(6.91)***
Y_j	1.35(10.05)***	1.42(7.92)***	---
L_i	-0.07(-0.78)	0.55(2.51)**	-0.16(-9.90)***
Lit_i	-0.7(-1.13)	-0.63(-0.72)	0.18(1.36)
$GFCF_i$	0.24(5.47)***	0.36(5.99)***	-0.055 (-5.35)***
Wat_j	0.32(1.73)*	0.21(0.87)	---
LD	0.71(4.34)***	0.84(3.94)***	---
M_{ij}/P_i	---	---	-0.01(-1.59)
Emp_i	---	---	-0.03(-3.4)***
P_i	---	---	0.062(5.38)***
R^2	0.637	0.41	0.34
F-Statistics	76.37***	48.97***	34,49***
Root MSE	1.27	1.61	0.23
Mean VIF	1.64	---	---
N	543	543	543

Note: The T-statistics are presented in parentheses and *, **, and *** implies the statistical level of significance at 10%, 5% and 1%, respectively.

The origin (rural) unemployment has the positive coefficients (0.49 and 0.43) as expected and are highly significant (at 1% level), suggesting that the origin unemployment is one of the major pushing factors responsible for rural-urban migration. But the most crucial finding of the study is the insignificant expected wage, the most important economic variable as explained in the famous 'Harris-

Todaro' model. The rapid expansion of the urban informal sector in India could be responsible for this, which in itself attracts the workers. There hardly exists any labour mobility from urban informal to the urban formal sectors which is shown by the fact that about 93% of the total work force is engaged in informal sector in India (Sengupta, 2007). The coefficient of rural agricultural real wage has a limited role to play in the inter-state migration, since it is statistically insignificant in all the equations. It may be due to the fact that the migration is not just by the very poor during times of crisis for survival and coping but has increasingly become an accumulative option for both poor and non-poor (Deshingkar and Start, 2003).The coefficients of both origin and destination states' per capita net state domestic product are highly statistically (at 1% level) as well as economically significant (having expected negative and positive signs, respectively). This finding is similar to Greenwood study (1997) which stated that the per capita gross domestic product (GDP) is the most representative macro-economic variable responsible for migration of people as high economic prosperity means more activities, services and opportunities for people living in that area. The results suggest that origin income elasticities of migration are less than one (-0.55 and -0.56) where as the destination income elasticities of migration are greater than one (1.35 in both the equations). This suggests that the rural to urban migration in India is basically to the relatively developed states.

Table 7: Interstate Rural-Urban Migration (Duration of 1 to 4 years)

Variables	OLS	2SLS	
	M_{ij}/P_i	M_{ij}/P_i	W_i
Constant	-8.89(-3.43)***	-22.93(-4.43)***	0.94(2.26)**
P_j/P_i	0.608(18.29)***	0.7(14.45)***	---
D_{ij}	-1.48(-16.54)***	-1.64(-11.46)***	---
U_i	0.43(4.02)***	0.079(0.48)	0.06(3.81)***
W_e	-0.029(-0.57)	-0.068(-0.76)	---
W_i	0.34(1.52)	6.82(4.39)***	---
Y_i	-0.56(-2.44)***	-2.56(4.40)***	0.29(8.03)***
Y_j	1.35(9.53)***	1.45(6.53)***	---
L_i	-0.18(-1.74)*	0.82(2.96)***	-0.16(-10.65)***
Lit_i	-1.06(-1.62)	0.24(0.23)	0.002(0.02)
$GFCF_i$	0.23(5.41)***	0.36(5.57)***	-0.044(-4.99)***
Wat_j	0.49(2.42)***	0.45(1.57)	---
LD	0.64(3.54)***	0.74(2.80)***	---
M_{ij}/P_i	---	---	-0.007(-1.49)
Emp_i	---	---	-0.038(-3.62)***
P_i	---	---	0.054(5.49)***
R^2	0.639	0.179	0.34
F-Statistics	91.3***	41.18***	40.17***
Root MSE	1.40	2.11	0.23
Mean VIF	1.59	---	---
N	624	624	624

Note: The T-statistics are presented in parentheses and *, **, and *** implies the statistical level of significance at 10%, 5% and 1% respectively.

The coefficient of the average size of operational holdings is significant only in 1 to 4-year duration case with a negative sign (-0.18), implying the fact the people with small operational holdings prefer to migrate to the urban sector and either settles down there permanently or send remittance regularly back home. The coefficients of Gross Fixed Capital Formation (GFCF) in agriculture are highly significant, with positive signs (0.24 and 0.23), implying that the people from agriculturally advanced regions migrate to urban sectors. The reasons could be either that they can bear the migration costs and have a greater propensity to migrate for better opportunities or to carry out their businesses.

The coefficients of rural literacy rate are not significant in all the regression equations. This prompts us to think again about the urban informal sector in which a large proportion of workers are unskilled and illiterate. The coefficient of the water facilities at the destination is positive and significant in both the cases (0.32 and 0.49), indicating urban sanitation facility is one the factors responsible for rural-urban migration in India. The coefficients language dummies are positive and highly significant (0.71 and 0.64) in both equations suggesting that language plays an important role in inter-state migration in India. Out of the total migrants, 71% of migrants in the less than 1 duration and 64% of migrants in the 1 to 4 years of duration scenarios prefer to migrate to states with similar language.

Two-Stage Least Square estimates are presented above to facilitate the comparison with the OLS results. After satisfying both the necessary and sufficient identification conditions (i.e., the rank and order conditions for identification) for all equations, it is clear form both Table 6 and 7 that the simultaneous relationship between migration rate and the average rural wage is not established even though the 'Hausman Test' suggests the possibility of the existence of simultaneity between migration rate and rural wage. The coefficients of migration rates are insignificant in both the rural wage equations even if rural wage rates are highly significant in both the cases. This 2SLS results again put a question mark on the applicabilit y of 'Harris-Todaro' model in the case of a developing country like India

6.2. Intrastate Rural to Urban Migration:

The estimated results in intra-state rural-urban migration of both ordinary least square (OLS) and two-stage least square (2SLS) for less than one year and one to four years durations are presented in Table 8 & 9 respectively. Again, the OLS results presented here are robust result with very low degree of multicollinearity, considerable R^2 and highly significant F-statistics.

In the intra-state case too, the "Gravity Model" is well established in India. The coefficients of the destination and origin population ratio are positive and highly significant, which supports the theoretical argument that the internal migration is directly proportional to the population size of both origin and destination places. And the coefficients of distance dummies are negative (-0.35 & -0.408) in both the less than 1 year and 1 to 4 years of duration cases, as expected and highly significant. This indicates the fact that distance factor has a deteriorating impact on population mobility.
The coefficient of Harris-Todarian expected wage rate is highly significant in less than 1 year duration of migration where as insignificant in 1 to 4 year duration of migration cases. This result, in fact, is very interesting since most of the short distance and duration migrants are seasonal migrants and commuters, often guided by the higher expected wages in the destination places. But as the duration of migration increases, there are a host of factors responsible for rural-urban migration where the role of

expected wage is almost restricted. The coefficient of origin unemployment is statistically significant having the expected negative signs (-0.22 and -0.31) in both less than one year and one to four years of duration cases, which suggests the fact that the origin unemployment is one of the major factors for intra-state (short distance) rural-urban migration. But the most interesting result that appears in within state migration is that the coefficient of the destination employment is statistically significant with the negative signs (-5.08 and -1.34). This implies the fact that the short distance migration in India is discouraged by the destination employment because the urban informal sector attracts both unskilled and semiskilled workers from the rural areas. Both the self employed and wage workers face competition in the informal job market and it is very difficult for them to get a livelihood if the destination places are already crowded.

Table 8: Rural-Urban Migration (Duration of less than 1 Year)

Variables	OLS	2SLS	
	M_{ij}/P_i	M_{ij}/P_i	W_i
Constant	10.11(1.61)	9.23 (1.28)	4.48(6.10)***
P_j/P_i	0.16(1.93)*	0.14(1.71)*	---
D	-0.35(-4.17)***	-0.35(-4.17)***	---
U_i	-0.22(-1.80)*	-0.21(-1.72)*	0.044(0.74)
W_e	0.98(4.25)***	1.02(3.82)***	---
W_i	-0.01(-0.10)	-0.095(-0.39)	---
Emp_j	-5.08(-3.25)***	-4.82(-2.66)***	---
L_i	0.08(1.23)	0.081(0.95)	0.081(0.95)
Lit_i	0.84(7.58)***	0.86(6.14)***	0.18(2.01)**
M_{ij}/P_i	---	---	-0.037(-0.53)
R^2	0.301	0.30	0.05
F-Statistics	46.75***	21.58***	4.87***
Root MSE	0.86	0.86	0.39
Mean VIF	1.88	---	---
N	410	410	410

Note: The T-statistics are presented in parentheses and *, **, and *** implies the statistical level of significance at 10%, 5% and 1% respectively.

The coefficients of the average size of operational holdings are insignificant in both equations suggesting that land holding does not have any impact on the intra-state migration flows. The coefficients of rural literacy are highly significant, with positive signs (0.84 and 0.86) in all the regression equations, indicating that literacy plays a crucial role in intra-state migration. This could be due to the reason that among the class of migrants, the educated people have a greater chance of migrating, for purpose of either higher education or in search of better job opportunities.

Similarly, the Two-Stage Least Square estimates presented above in Table 8 and 9 fail to establish simultaneous relationship between migration rate and the average rural wage as the coefficient of rural wage is insignificant in both the migration equations. The coefficient of migration rate is not significant in the rural wage equation in both durations even though 'Hausman Test'

suggested the possibility of the existence of simultaneity between migration and rural wage. The OLS results itself provide consistent estimator for the parameters estimated in the intra-state migration.

Table 9: Rural-Urban Migration (Duration of 1 to 4 Years)

Variables	OLS	2SLS	
	M_{ij}/P_i	M_{ij}/P_i	W_i
Constant	-1.9(-0.32)	-3.22(-0.45)	4.48(6.2)***
P_j/P_i	0.11(1.27)	0.08(1.0)	---
D	-0.408(-4.86)***	-0.408(-4.85)***	---
U_i	-0.31(-2.56)***	-.299(-2.42)***	0.04(0.48)
W_e	0.28(1.28)	0.34(1.3)	---
W_i	0.05(0.53)	-0.06(-0.28)	---
Emp_j	-1.34(-0.9)	-0.95(-0.54)	---
L_i	0.064(0.95)	0.061(0.73)	-0.03(-0.80)
Lit_i	0.86(7.77)***	0.899(6.48)***	0.19(1.85)*
M_{ij}/P_i	---	---	-0.04(-0.55)
P_i	---	---	-0.03(-0.8)
R^2	0.277	0.275	0.042
F-Statistics	46.16***	19.15***	4.84***
Root MSE	0.85	0.85	0.39
Mean VIF	1.88	---	---
N	410	410	410

Note: The T-statistics are presented in parentheses and *, **, and *** implies the statistical level of significance at 10%, 5% and 1% respectively.

7. Summary and Conclusion

The rural to rural migration has been the most important migration flow that indicates a steadily declining proportion, while the proportions of other categories have increased over the period. In the same way, the proportion of short distance migrants has decreased while the proportions of medium and long distance migrants have increased, suggesting that the long distance movements are more urban-oriented than short distance movements. The short distance migration is main migration pattern among Indian females while long distance migration is often undertaken by the males. Marriage is the reason for a large proportion female migration where as in the case of males, the most important reasons are employment, business etc. Again, it is evident from the Indian Census that there has been a significant increase in migration to urban areas both among males and females during 1991-2001. The rural to urban migration may be due to the rapid growth of urban informal sectors in the recent years, which comprises about 93 per cent of the total employment in the economy. The movements from urban to urban areas are also increasing considerably. This may be due to globalisation and the quick expansion of the service sector. From the current trends and patterns of internal migration in India, it can be anticipated that long distance rural to urban and urban to urban streams will be the dominant migration streams in the future.

In this context, the study analysed the determinants of migration to provide a sound understanding of the factors responsible for rural to urban migration. The estimated results from OLS method suggests that in both inter-state and intra-state levels and durations (less than 1 year and one to four years) of migration, the gravity variables (population size and distance between the places) are highly significant, with the expected signs while the Harris-Todarian variable dealing with the urban expected wages, has a limited role to play in the internal migration process in India. At the same time, the possibility of the existence of simultaneous relationship between the migration rates and rural (agricultural) wage rate is rejected in both the categories of migration in India. But there exists other push and pull factors (like unemployment, level of income, average size of operational holdings, urban water and sanitation facilities, similar language etc.) which operating mutually both at origin and destination places, are the main determinants for internal migration. The role of the third sector (urban informal sector) in the internal migration process is not explicitly analysed here, which is one of the limitations of the present macro-level study. The main reason for this is the use of the group-level data of Indian Census, which fails to provide information about a particular migrant, whether he/she is migrating to urban informal sector or formal sector. However, these limitations of Census data can be tackled if they include a few more questions in addition to the question of the place of last residence. It would be better if they ask whether they are staying at the same place or have ever changed their place of residence; if yes since how long? With regard to the employment question, it is worthwhile to include an additional question which can explicitly define the informal sector employment since it constitutes the major share in employment in Indian labour market. In order to get information regarding seasonal migration, a question can be asked whether the particular respondent moves elsewhere in a particular year for the purpose of employment during the agricultural off seasons. Information about commuting can easily be collected by asking whether his place of work is same as the place of residence. Nevertheless, a detailed and in-depth study of migration behaviour (at the micro-level) and the labour market dynamics in India is urgently required. The forthcoming National Sample Survey (NSS 64th Round) data pertaining to migration details and in-depth micro survey related to new directions and issues may be useful to examine the complexity arising out of the context of migration patterns in India.

Notes

The urban expected wage $W_e = W_j$ (Emp$_j$/Total urban labour force) is equated to the rural wage W_i (here in the origin wage rates) at the long run equilibrium where the migration flow from rural to urban sector comes to a halt. Therefore, the rural wage rates and migration rates in short-run are determined simultaneously (Harris J. & M. Todaro, 1970).

Hausman test is performed to find out whether a particular variable is exogenous or endogenous in the model. A variable *x* is exogenous if the conditional distribution of *y* given *x* does not change with modifications of the process generating *x*. And a *strictly exogenous* variable is one that is independent of all contemporaneous, future and past errors (Wooldridge, 2006; and Brooks, 2008)

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Appendix

1. Variables used in the analysis of inter-state migration in India

M_{ij} Number of males whose previous place of residence was state i (rural) and whose present place of residence (2001) was state j (urban) by the duration of residence in the destination urban place.

P_i Total rural population of state i

P_j Total urban population of state j

U_i Estimated of Rural Unemployment Rate for Youth (15 to 29 Years) in state i as per usual status approach.

U_j Estimated of Urban Unemployment Rate for Youth (15 to 29 Years) in state j as per usual status approach.

Y_i Per Capita Net State Domestic Product (NSDP) at Constant 1999-2000 Prices for state i

Y_j Per Capita Net State Domestic Product (NSDP) at Constant 1999-2000 Prices for state j

W_i Average Daily Wage Rates for Agricultural Occupation (Ploughing) in state i

W_j Labour Cost on Wages/Salaries of Workers per Man-day Worked at the industrial sector in state j

W_e The urban expected wage is calculated by multiplying W_j and Emp_j and dividing the product by 100.

Lit_i The Rural Literacy rate of state i.

Lit_j The urban Literacy rate of state j.

$GFCF_i$ Gross fixed capital formation in agriculture (irrigation) in state i

L_i Average size of operational landholdings in state i

Emp_i Rural employment rates in state i

Emp_j Urban employment rates in state j

Wat_j Percentage of urban population getting water facility in state j

D_{ij} The physical distance between the capital cities of state i and j

LD The language dummy takes value 1 for same language in origin and destination states and zero otherwise.

2. Variables used in the analysis of intrastate migration in India

M_{ij} Number of males whose previous place of residence was places i (rural) within or outside the district of enumeration in a particular state and whose present place of residence (2001) was place j (urban) by the duration of residence in the destination urban place.

P_i Total rural population of district i

P_j Total urban population of the state

U_i Estimated of Rural Unemployment Rate (15 to 59 Years) in district i

U_j Estimated of Urban Unemployment Rate for Youth (15 to 29 Years) in State

W_i Average Daily Wage Rates for Agricultural Occupation (Ploughing) in district i

W_j Labour Cost on Wages/Salaries of Workers per Man-day Worked at the industrial sector in state

W_e The urban expected wage is calculated by multiplying W_j and Emp_j and dividing the product by 100.

Lit_i The Rural Literacy rate of district i.

L_i Average size of operational landholdings in district i

Emp_j Urban employment rates in state

Wat_j Percentage of urban population with water facility in state

D_{ij} Distance dummy assumes value 1 for the migrants whose previous place of residence was outside the district of enumeration and zero for within the districts of enumeration

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