The Impact of NREGS on Urbanization in India*

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Abstract

This paper tests the impact of the National Rural Employment Guarantee Scheme (NREGS) on (1) rural-urban migration; (2) urban unemployment and (3) Inequality in India. We use the simple Harris-Todaro framework to analyze the labor market outcomes of this policy intervention. We use district level data from two rounds of National Sample Survey (NSSO) and exploit a quasi experiment setting where the NREGS was launched in phases across different districts over time. Our main results show that the NREGS has significantly reduced rural to urban migration in India by 27.9 percent and has reduced urban unemployment by 38.7 percent. Our results on inequality are ambiguous. We have further disaggregated the data to study heterogeneity of results. Analyzing causes of migration shows that employment related migration reduced by 58.5 percent; marriage related migration fell by 33.6 percent and as expected, study related migration was unaffected by the job scheme. Disaggregating by education level reveals that NREGS reduced rural-urban migration of illiterate households by 32 percent. Literate households were unaffected by this labor market scheme which guarantees unskilled employment at a minimum rural wage. Further decomposition across different sectors of the economy reaveals that NREGS reduced rural to urban migration into services sector by 26 percent while migration into manufacturing sector was unaffected.

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1 Introduction

Internal migration or what is commonly called rural-urban migration, plays a central role in the urbanization process of most developing economies. 30 percent of all urban growth in India during 1990s was due to rural-urban migration (Census, Government of India, 2005). Internal migration accounted for 52 percent of all urban growth in Africa in 1960s and 1970s and approximately 25 percent in the 1980s and 1990s (Brockerhoff 1995). Over the last 2 decades, a rich literature has evolved focusing on very specific aspects of rural-urban migration, yet some basic questions remain unanswered. To what extent can government policies influence rural-urban migration and whether this can affect urban unemployment and inequality. Our paper provides answers to these questions.

We provide economic analysis of a labor market policy using the Harris-Todaro model. The Harris-Todaro (1970) model has been the workhorse for analyzing labor market policies in dualistic labor market economies. Many aspects of the model have been studied including unemployment, development policies, tax and transfer policies.[1] One aspect that has not yet been explored, however, is the implication of labor market intervention within this model. We are able to do so and test the predictions of the model within the Indian labor market context. The contribution of this paper to the literature is that we test the predictions of the Harris-Todaro model using a rural labor market intervention. More specifically, we test the impact of the National Rural Employment Guarantee Scheme (NREGS) on (1) rural-urban migration; (2) urban unemployment and (3) Inequality as measured by changes in Gini coefficient and changes in relative urban-rural wages. We analyze the labor market outcomes of this policy intervention. We do not, however, look at the broader welfare implications.

In 2006, the Government of India launched the massive NREGS whereby every rural household is guaranteed 100 days of unskilled wage employment at guaranteed minimum wages. We study the impact of this scheme on rural-urban migration, urban unemployment and inequality. We analyze district level data from two rounds of National Sample Survey (NSSO) and exploit a quasi experiment setting where the NREGS was implemented in multiple phases across different districts over

[1] Todaro and Smith, 2003, provides a good overview of the literature.

time. Our main results show that the NREGS has significantly reduced rural to urban migration in India by 27.9 percent and has reduced urban unemployment by 38.7 percent. Our results on inequality are ambiguous. We have further disaggregated the data to study heterogeneity of effects. Analyzing data on the cause of migration shows that employment related migration has reduced by 58.5 percent as against marriage related migration which has fallen by 33.6 percent. Disaggregating by education level reveals that NREGS has significantly reduced rural-urban migration of illiterate households by 32 percent. Literate households are unaffected by this labor market scheme which guarantees unskilled employment.

The NREGS was launched in multiple phases beginning in 2006. In the first phase, NREGS was implemented in 200 districts in 2006. It was subsequently expanded to all 618 rural districts in 2008-09. For our analysis, we use NSSO data from round 55 (July 1999 to June 2000) and round 64 (July 2007 to June 2008). These two rounds cover the time periods before and after the implementation of the NREGS. This allows us to use the data from the two rounds for a difference-in-difference analysis to evaluate the impact of the program on relevant outcomes.

Existing literature focuses on very specific aspects of rural-urban migration. There are studies to show that potential migrants invest in education before migrating, anticipating better rewards for human capital in the urban sector (Kochar, 2004); they also gather information about jobs from migrant networks (Roberts, 2001). Katz and Stark (1986) show that labor migrates to generate remittances to overcome credit constraints to finance rural investments. There are some studies that have explored the exact process of migration and show that migration is facilitated by the concentration on the migrant pool of same origin in the areas of destination(Mora and Taylor, 2005) while others have shown that finding a job is facilitated when same origin network is larger but this could also lead to congestion if they compete for jobs (Yamauchi and Tanabe, 2003). In a dynamic context, education enhances migrant's learning in the job market and accelerates the convergence of migrants earnings to native earnings (Yamauchi, 2004). There is also significant literature which focuses on remittances generated from rural-urban migration. They are used to invest in one's parents to secure potential bequests (De la Briere et. al., 2002); to insure family against volatile income (Gubert, 2002); to repay loans (Ilahi and Jafarey, 1999); for consumption (Banerjee, 1984);

housing when anticipating return migration (Osili, 2004) as well as capital expenditure (Lucas and Stark 1985).

This paper answers some basic questions about rural-urban migration. Can government interventions in the rural labor market influence rural-urban migration flows? To what extend can such an intervention affect urban unemployment and inequality in the economy? In answering these basic questions, we contribute to the literature and understanding of the process of urbanization in developing economies. We use the simple Harris-Todaro framework to structure our analysis and test the policy implications.

The paper is structured in the following manner: section 2 outlines the simple Harris-Todaro model and derives the policy recommendations from this model; section 3 describes the empirical strategy used for the analysis; section 4 describes the data and section 5 has the results. Section 6 is the conclusion.

2 The Model

We use the seminal Harris-Todaro (1970) model in this paper as it establishes the link of internal migration to urbananization. In particular, we explore the relationship between rural development, internal migration and urban unemployment. In the simple HT model there are two sectors in the economy, the agricultural or rural sector (R) and the modern sector (M). The modern sector wage (W_M) is set above the real wage in the rural sector (W_R). There are a total of L workers who allocate themselves between the two job search strategies to maximize expected earnings. Urban search strategy produces a modern sector job paying W_M with probability p; and with probability $(1-p)$, he remains unemployed with a wage 0. So the expected urban sector wage is such that

$$E(W_U) = W_M p$$

Employment in the modern sector, E_M,depends negatively on modern sector wage through a regular downward sloping labor demand curve

$$E_M = e(W_M p); e' < 0$$

Jobs in the modern sector are filled randomly. Each member of urban labor force L_M have the same chance of employment. That is, $p = \frac{E_M}{L_M}$ and $L_M$is determined endogenously from equilibrium condition. Rather than pursuing an urban job search, a worker has the alternative to instead adopt a rural job search, such that

$$E(W_R) = W_R$$

In this model, workers continue to migrate from rural to urban sector, despite the existence of urban unemployment as long as $E(W_U) > E(W_R)$

From the above simple model, we get the powerful prediction of the HT model. Urban unemployment will exist even in equilibrium when the expected wages across the two sectors equalize, that is $E(W_U) = E(W_R)$. Since $W_M > W_R$, it implies that the probability of getting a job in the urban sector $p < 1$. In equilibrium,

$$E(W_U) = E(W_R)$$

$$W_M p = W_R$$

$$\frac{E_M}{L_M} W_M = W_R$$

And urban unemployment can be calculated as

$$L_M - E_M = \frac{W_M}{W_R} E_M - E_M = E_M(\frac{W_M}{W_R} - 1)$$

The two policy recommendations from this are the following:

1. As long as the wages in the two sectors remain constant, any attempt to eliminate urban

unemployment through urban job creation (raising E_M) would raise unemployment. This is termed as the Todaro Paradox.

2. Solution to urban unemployment is rural development or raising W_R.

Further work extended the Harris-Todaro policy analysis from unemployment to labor market inequality. It was shown that inequality goes down with an increase in W_R (Bhagwati and Srinivasan, 1974; Bourguignon, 1990; Temple, 1999 and Fields, 2005). In this paper, we test the two predictions of the HT model which are based on the recommendation of rural development. The NREGS in India raised the $W_R$and guaranteed rural employment.

3 Empirical Strategy

The empirical strategy that we employ to measure the effect of the NREGS on test the two predictions of the HT model based on changes in W_R, is a difference-in-difference approach. Our empirical specification is

$$Y_{it} = \alpha + \beta_1 dT + \beta_2 dY + \delta dT * dY + X_{it}\gamma + \epsilon_{it}$$

where, $Y_{it}$is the outcome of interest in district i at time t. It will be the log of total rural-urban migrants, the log of total urban unemployment and it will also be different measures of inequality. $dT$is the treatment group dummy variable which equals 1 if district i has NREGS implemented. dY is the year dummy which equals 0 for the baseline year 1999-2000 and it equals 1 for endline year 2007-08. $X_{it}$is a vector of district characteristics. The coefficient of interest is δ and its OLS estimate measures the causal effect of NREGS on the outcomes of interest.

$$\hat{\delta} = (Y^T_{2007-08} - Y^C_{2007-08}) - (Y^T_{1999-00} - Y^C_{1999-00})$$

4 Data

We use two rounds of the National Sample Survey Organization data in our analysis. The NSSO conducts annual household surveys of consumer expenditure and employment/unemployment status with relatively small 'thin' sample sizes. It typically conducts large sample, 'thick' all-India household surveys on employment and unemployment once every five years. The 55th (July 1999 – June 2000) and 64th (July 2007- June 2008) were thick rounds of the NSS that also collected migration particulars from the households that were interviewed. These particulars included information on whether members of the household had changed their usual place of residence, the location of their last place of residence, their reason for migrating etc. The 55th and 64th NSS rounds cover the time periods before and after the implementation of NREGA. This allows us to use the data collected during the two rounds for a difference-in-difference analysis of the impact of the program on migration.

The NSS uses a recall based interview method for data collection from a sample of randomly selected households. In the 64th round, 125,578 households were surveyed – 79,091 in rural areas and 46, 487 in urban areas. In the 55th round, 165,244 households were surveyed – with 97,986 rural households and 67,258 urban ones. The large sample size enables us to construct district level estimates of migration. To ensure representative samples, we restrict our analysis to those districts where the NSS data allows us to create estimates with p-values less than 0.01. The districts included in our main results cover over 75% of the total rural population .

We also use district level socio-economic data from various government agencies, including the Central Statistical Office (CSO) and the Reserve Bank of India. The district level GDP is derived using two measures - a 'district index' for each of the sectors of the economy and the state level GDP reported by the CSO. The district index is computed separately for each sector based on production data released by the concerned department – Ministry of agriculture, Indian bureau of mines, etc. The index is then used in conjunction with the state level GDP computed by the CSO to arrive at district level GDP data. Other variables like literacy rate are compiled from various government sources. This district level data is available for 2001-02 for the pre-treatment period,

and for 2007-08 for the post-treatment. It allows us to control for factors like the proportion of primary and secondary sectors in the district, the district's GDP per capita, and its growth rate.

5 National Rural Employment Guarantee Scheme of India

Agriculture absorbs 52 percent of India's labor force but contributes less then one fifth to the country's GDP. Although recent growth rates of the sector compared favorably to its performance in the past, the average GDP growth per worker of 2.2 percent between 1994 and 2005 clearly lagged behind the economy-wide 4.4 percent in the same period (Planning Commission 2008b). Against this background, the Indian Parliament passed the National Rural Employment Guaranteed Act (NREGA) in 2005 and the scheme was launched in February 2006 in 200 districts across the country. As per the NREGA, each rural household is entitled to 100 days of unskilled employment per year at a guaranteed minimum wage. Within the Indian rural labor market context, the NREGS is also viewed as an effective minimum wage legislation.

The scheme was subsequently expanded and by 2007-08, when the 64th round of the NSSO survey was conducted, the NREGS had been rolled out in 271 districts of the country. By 2008-09, it included all of India's 618 rural districts. Common assignments include small scale road construction, water supply works, flood protection, irrigation infrastructure, land development and reforestation projects. By April 2007-08, our endline year, 33.7 million households or every fourth rural Indian household worked under the NREGS.

Insert Table 1

6 Rural-Urban Migration in India

This section will present an overview of the evolution of internal migration in India between 1999 and 2008, a period characterized by rapid economic growth and urbanization. The total number of migrants increased by 18 percent from 245 million to 288 million. In the same time period,

the population of the country is estimated to have gone up by 10 percent, increasing the migrant population from 27 percent to 29 percent. Disaggregating data further in Table 2 shows that the dominant form of migration in both rounds of NSSO survey is within the same state, accounting for approximately 88 percent of total migrants. And if we disaggregate even further, we note that 62 percent of the total within state migration involves migration within the same districts. A district in India is the basic administrative unit with an average size of 4300 sq. kilometers. Our unit of analysis is a district and therefore the exact rural-urban migration that we will study are those which are within the same district and which account for a significant 54.5 percent of total rural-urban migration in India.

Insert Table 2

Next, we would like to understand the relationship between urbanization and rural-urban migration at the district level. As figure 1 shows there has been a steady increase in the urban population relative to rural population from 1970s onwards indicating a growing trend of urbanization. As of 2011, 45 percent of Indian population resides in urban areas. This period has also witnessed a rapid growth in the rural-urban migration flows.

Insert Figure 1

In order to understand the context of migration, it is important to highlight the reasons why people migrate. Table 3 shows the dominant reasons that households report for migration, across the major states in India. The numbers in the table correspond to percentages. The main three reasons reported are employment, marriage and for education purposes. While half the population of male migrants report employment as a leading cause, 89 percent of females report marriage as the leading cause of migration.

Insert Table 3

Skill is an important driver of migration. Existing literature reports that both high and low

skilled individual are more likely to migrate but for different reasons. While "surplus" low skilled labor migrate in search of manual jobs which they may not find in rural areas; the "scarce" high skilled labor migrate for better rewards on their human capital (Lanzona, 1998 and Agesa, 2001). Our data shows, in Table 4, that while 50 percent of all rural-urban migrants in India are illiterate, nearly 13 percent have attained more than high school education and 25 percent have some basic primary school education.

Insert Table 4

Studying the age of migrants reveals a trend which is seen in most developing countries. Rural-urban migrants are predominantly in the working age group of 16 years to 60 years.

Insert Table 5

7 Results

First, we compare the treatment and control districts in our sample, before and after the NREGS was implemented. The summary statistics of the variables that we use in the analysis are presented in Table 6. NREGS was implemented in the poorest 200 districts of India. It is, therefore, not surprising that treatment districts are predominantly rural with lower literacy rates, lower GDP per capita and lower road coverage. We control for these differences between treatment and control samples, by including these variables as separate explanatory variables in our specification. Over time, these variables show similar trends in treatment and control districts. In terms of the sample size, 271 districts had implemented the NREGS at the time of our endline, NSSO 64th round survey. Control group sample comprises of 235 neighboring districts.

Insert Table 6

7.1 Effect of NREGS on rural-urban migration

The first set of major results are reported in Table 7. The first row shows the coefficient $\hat{\delta}$ from the difference-in-difference analysis based on the outline specification. The district characteristics that we control for are the district GDP, proportion of agriculture sector in the district GDP, the proportion of secondary sector in the district GDP, district population, the literacy rate and road coverage. The standard errors are clustered at the district level. Column 1 reports the effects of NREGS on log of total migrant population. The results show that NREGS reduced total rural to urban migration by 27.9 percent and it is statistically significant. The next three columns disaggregated this average result for different types of migration based on the stated purpose for migration. The second column reports the results for employment related migration. This results shows that NREGS has lead to a massive reduction of 58.5 percent in the total employment related rural to urban migration in India. This is a big effect but not along unexpected lines. With guaranteed employment at an improved minimum rural wage, migration to cities for employment is expected to come down. The third column reports effect of the NREGS on rural to urban migration for marriage. This has also significantly reduced by 33.6 percent. This result too is along expected lines as marriage related migration follows employment related migration. If potential male migrants are staying back in rural areas because they are assured employment at improved minimum wages, the wives are also staying back in the rural areas. The last column reports effects of NREGS on rural to urban migration related to education. As expected, this is not impacted by the rural employment scheme.

Insert Table 7

7.2 Effect of NREGS on wages

The next set of results that we wanted to explore was the impact of the NREGS on rural and urban wages. NSSO data reveals that from 2006 to 2012, rural wages in India have increased by approximately 27 percent. The wages for NREGS are set by state governments and there have been

constant upward adjustments over the years. But what we would like to explore in our data is the extent to which rural and urban wages were affected by NREGS, a year after it was implemented. Based on the same empirical specification that we have followed so far, Table 8 reports the results on log of mean rural wages and log of mean urban wages. As is expected, while NREGS significantly raised the rural wages by 7 percent , urban wages were not affected by this scheme. Since our endline data is just a year after the scheme was implemented, the magnitude of the effect is modest and not surprising.

Insert Table 8

7.3 Effect of NREGS on urban unemployment

The second major results of our paper is based on the effect of the NREGS on urban unemployment. Table 9 reports these results which are estimates from the same empirical specification. The first column of Table 10 shows effects on log of total urban unemployment and the second column shows results for log of total urban underemployment. NREGS significantly reduces urban unemployment by 38.7 percent and urban underemployment by 1.6 percent. These results are consistent with the HT model predict

Insert Table 9

7.4 Heterogeneity of results

Though the average rural to urban migration comes down by 27.9 percent due to the NREGS, we want to further explore the heterogeneity in the results. The heterogeneity that we explore is based on education level which is a proxy for skill. As Table 11 reports, NREGS only affects rural to urban migration of unskilled or illiterate migrant population. This is expected as NREGS guarantees unskilled employment at a minimum wage. The decision to migrate for the population with some degree of skill or education, is not affected by this job scheme.

Insert Table 10

We have also disaggregated the effect of NREGS across different sectors of the economy. Table 9 shows the result for services sector and the manufacturing sector for each district. As would be expected NREGS reduced migration into the services sector by 26 percent. Migration into manufacturing sector is unaffected by the job scheme. This is perhaps because manufacturing sector attracts skilled labor force form the rural areas which are unaffected by the NREGS.

Insert Table 11

7.5 Effect of NREGS on inequality

We study the effect of the NREGS on different measures of inequality, using the same specification as the earlier analysis. The two inequality measures that we use for this are changes in the Gini coefficient and changes in the relative rural and urban wages or $\frac{W_M}{W_R}$. Our results are ambiguous and still UNDER PROGRESS. More generally, however, we see in Figure 2 which has the Lorenz curves for the baseline and endline years that inequality has reduced over time.

Insert Figure 2

8 Conclusion

This paper tests the impact of the National Rural Employment Guarantee Scheme (NREGS) on (1) rural-urban migration; (2) urban unemployment and (3) Inequality in India. We use the simple Harris-Todaro framework to analyze the labor market outcomes of this policy intervention. We use district level data from two rounds of National Sample Survey (NSSO) to compare districts where the NREGS was launched with nearby districts, over time. Our main results show that the NREGS

has significantly reduced rural to urban migration in India by 27.9 percent and has reduced urban unemployment by 38.7 percent. Our results on inequality are ambiguous. We have further disaggregated the data to study heterogeneity of results. Analyzing data on causes of migration shows that employment related migration reduced by 58.5 percent as against marriage related migration which fell by 33.6 percent. Disaggregating by education level reveals that NREGS significantly reduced rural-urban migration of illiterate households by 32 percent. Literate households were unaffected by this labor market scheme which guarantees unskilled employment and minimum rural wage.

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Table 1: Expansion of NREGS, 2006/07 to 2007/08

	2006-07	2007-08	2008-09*
Total expenditures (million USD)	2146	3946	4000
Districts under the program	200	330	604
Employed households (million)	20.5	33.7	43.7
Working days (million)	884	1431	1609
Average salary per day (USD)	1.6	1.9	1.7
Completed work projects since the start of NREGA (million)	0.38	0.82	2.62
- Water catchment and conservation	72.1%	50.8%	28.5%
- Rural connectivity	16.6%	26.4%	18.4%
- Drought control, flood control, irrigation	4.9%	11.2%	22.4%
- Land development	1.8%	6.9%	22.6%
- Others	4.5%	4.7%	8.0%

Notes: The figures for the year 2008/09 are estimates based on the information available by the end of December 2008. 1 USD = 40 Rs. Data source: Employment and financial status reports, \cite{MRD2008b}.

Table 2: Overall changes in migration in India

Variable	1999-00	2007-08
Total migrants	245,081,037	287,838,899
Within states	216,351,956	252,530,184
Across states	25,809,883	33,282,329
Within district	151,420,388	169,036,864

Figure 1: Rural Urban migration and Urban/Rural Population in India

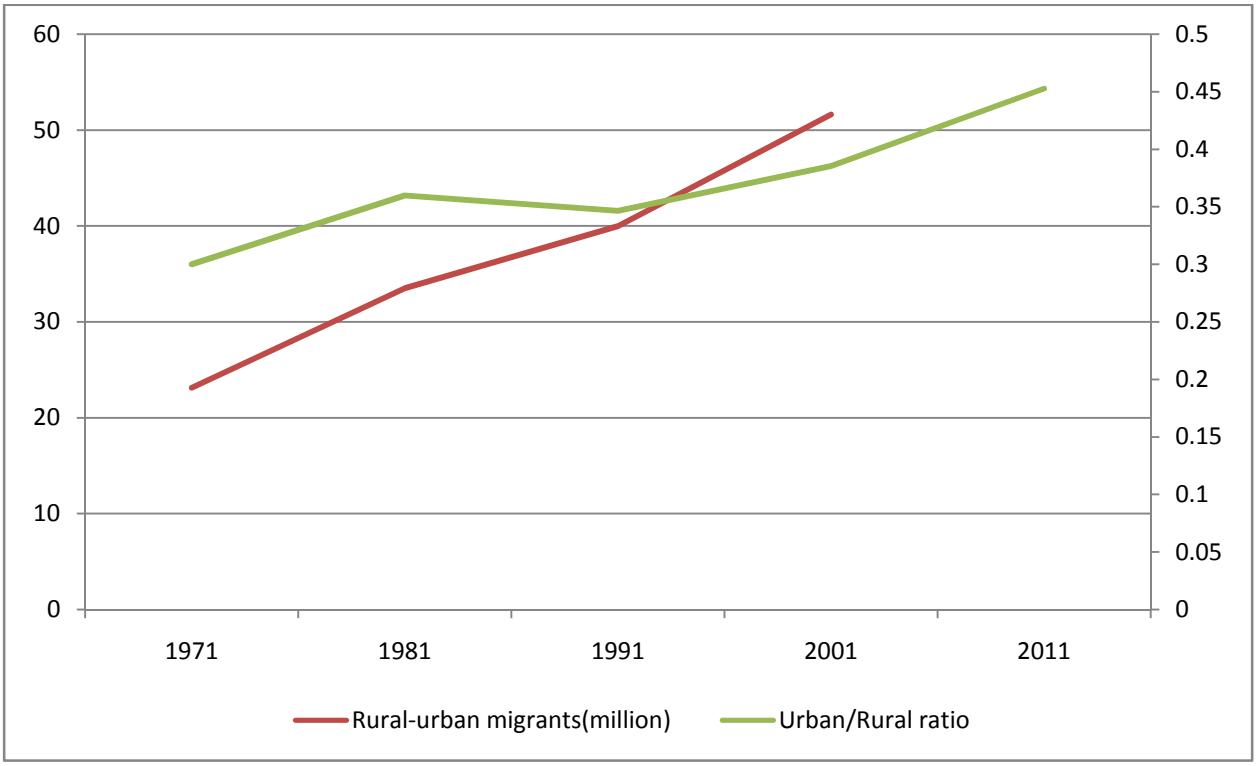

Table 3: Reasons for Rural Urban Migration

	Employment related reason		Studies		Marriage	
	Male	Female	Male	Female	Male	Female
UP	0.56	0.003	0.055	0.007	0.05	0.89
Bihar	0.60	0.006	0.064	0.006	0.06	0.87
Rajasthan	0.48	0.008	0.10	0.003	0.04	0.88
MP	0.42	0.009	0.12	0.004	0.05	0.90
Maharashtra	0.47	0.018	0.093	0.015	0.02	0.77
Haryana	0.46	0.004	0.040	0.002	0.07	0.89
Tamil Nadu	0.43	0.020	0.06	0.013	0.03	0.75
Overall	0.46	0.011	0.082	0.009	0.04	0.84
Rural migrants	0.48	0.009	0.09	0.008	0.06	0.87
Urban migrants	.43	.02	.07	.017	0.01	0.64

Table 4: Proportion of migrants by the level of education from the states 2007-08

		Not Literate	Literate but below primary	Primary and Middle	Secondary and higher secondary	Graduate and above
UP	Migrant	0.59	0.05	0.19	0.11	0.05
	All	0.45	0.16	0.24	0.10	0.04
Bihar	Migrant	0.59	0.09	0.18	0.09	0.04
	All	0.51	0.18	0.19	0.08	0.02
Rajasthan	Migrant	0.64	0.06	0.17	0.08	0.04
	All	0.46	0.17	0.24	0.08	0.04
MP	Migrant	0.51	0.12	0.23	0.08	0.05
	All	0.38	0.22	0.28	0.08	0.03
Maharashtra	Migrant	0.30	0.08	0.31	0.20	0.08
	All	0.26	0.13	0.34	0.19	0.06
Haryana	Migrant	0.46	0.05	0.22	0.18	0.07
	All	0.34	0.14	0.30	0.18	0.04
Tamil Nadu	Migrant	0.28	0.14	0.32	0.17	0.07
	All	0.27	0.17	0.33	0.16	0.05
Overall	Migrant	0.45	0.09	0.25	0.13	0.06
	All	0.37	0.16	0.29	0.12	0.04
	Rural migrants	0.50	0.09	0.25	0.10	0.03
	Urban Migrants	0.19	0.08	0.25	0.25	0.18

Table 5: Proportion of different ages among migrants 2007-08

	<15	16-30	31-45	46-60	>60
Within state migrants	0.054	0.33	0.33	0.2	0.09
Outside state migrants	.09	0.37	0.32	0.16	.07
All migrants	0.057	0.34	0.33	0.19	.09
Within district migrants	0.05	0.37	0.32	0.16	0.07

Table 6: Summary statistics across treatment and control districts before and after NREGS

	Pre-intervention (1999-2000)		Post intervention (2007-08)	
	Control	Treatment	Control	Treatment
Number of districts	235	271	235	271
Average migrants	52186	47893	54540	43316
Average migrants – employment related	8729	9858	9344	7458
Primary sector share of GDP	0.29	0.40	0.26	0.34
Population	2045193	2012213	2273966	2197893
Literacy rate	69.18	58.79	75.55	66.07
GDP per capita (constant prices)	19833	12559	27601	16511
Road coverage	72.01	54.95	79.30	63.58

Table 7: Effect of NREGS on rural urban migration in India

VARIABLES	Log of total migrants	Log of migration for employment related reasons	Log of migration for marriage related reasons	Log of migration for studies related reasons
Interaction term between NREGA and 2008	-0.279**	-0.585**	-0.336**	0.684
	(0.136)	(0.264)	(0.139)	(0.600)
Proportion of primary sector in the GDP	-1.888***	-1.889***	-1.794***	-0.772
	(0.315)	(0.589)	(0.332)	(1.017)
Proportion of secondary sector in the GDP	-1.723***	-2.248***	-1.555***	-0.639
	(0.424)	(0.816)	(0.457)	(1.443)
Log of per capita GDP(Constant Prices)	0.225**	0.736***	0.139	0.0942
	(0.0975)	(0.187)	(0.107)	(0.310)
Compound Annual Growth Rate(Constant Prices)	0.0184	0.0585**	0.0175	0.0177
	(0.0121)	(0.0236)	(0.0124)	(0.0409)
Dummy Variable for 2008	0.0845	0.198	-0.0165	0.188
	(0.109)	(0.171)	(0.106)	(0.290)
Dummy Variable for NREGA implementation	0.0385	0.188	0.351***	0.301
	(0.0999)	(0.191)	(0.104)	(0.481)
Constant	8.469***	1.548	8.394***	5.658*
	(0.996)	(1.919)	(1.086)	(3.211)
Observations	736	371	644	207
Adjusted R-squared	0.473	0.450	0.484	0.198

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1; standard errors are clustered at the district level

Table 8: Effect of NREGS on wages in India

VARIABLES	(1) Log of mean rural wages	(2) Log of mean urban wages	(3) Log of mean wages for rural-urban migrants
Interaction term between NREGA and 2008	0.0770**	0.0568	-0.143
	(0.0318)	(0.0519)	(0.118)
Proportion of primary sector in the GDP	-0.320***	-0.528***	-0.366
	(0.0766)	(0.121)	(0.305)
Proportion of secondary sector in the GDP	0.00102	-0.198	0.0167
	(0.101)	(0.154)	(0.352)
Log of per capita GDP(Constant Prices)	0.0700***	0.0951***	0.0301
	(0.0237)	(0.0363)	(0.0914)
Compound Annual Growth Rate(Constant Prices)	2.69e-05	-0.00799*	-0.0150
	(0.00259)	(0.00446)	(0.0110)
Dummy Variable for NREGA implementation	-0.144***	0.0115	0.0293
	(0.0253)	(0.0418)	(0.0863)
Dummy Variable for 2008	0.346***	0.362***	0.377***
	(0.0244)	(0.0389)	(0.0872)
Constant	4.337***	4.504***	5.100***
	(0.231)	(0.362)	(0.941)
Observations	958	890	361
Adjusted R-squared	0.768	0.392	0.285

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1; standard errors clustered at district level

Table 9: Effect of NREGS on urban unemployment

VARIABLES	Log Urban unemployed	Log Urban underemployed
Interaction term between NREGA and 2008	**-0.387****	**-0.0166***
	(0.181)	**(0.0100)**
Proportion of primary sector in the GDP	-2.408***	0.0632**
	(0.436)	(0.0245)
Proportion of secondary sector in the GDP	-0.946	0.00558
	(0.583)	(0.0316)
Log of per capita GDP(Constant Prices)	0.753***	-0.00509
	(0.132)	(0.00714)
Compound Real Annual Growth Rate	0.0145	0.00126
	(0.0166)	(0.000940)
Dummy for NREGA implementation	0.201	0.00601
	(0.138)	(0.00772)
Dummy Variable for 2008	0.0230	0.0189***
	(0.136)	(0.00725)
Constant	1.576	0.108
	(1.382)	(0.0739)
Observations	403	408
Adjusted R-squared	0.518	0.252

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1; standard errors clustered at district level

Table 10: Heterogeneous effect of the NREGS on rural urban migration by skill levels

VARIABLES	(1) Log of not literate migrants	(2) Log of primary-middle school level migrants	(3) Log of secondary and above migrants
Interaction term between NREGA and 2008	-0.321**	-0.0187	-0.230
	(0.159)	(0.143)	(0.174)
Proportion of primary sector in the GDP	-1.123***	-1.627***	-1.637***
	(0.381)	(0.340)	(0.422)
Proportion of secondary sector in the GDP	-1.254**	-1.954***	-1.437***
	(0.536)	(0.452)	(0.537)
Log of per capita GDP(Constant Prices)	0.283**	0.341***	0.102
	(0.123)	(0.104)	(0.126)
Compound Annual Growth Rate(Constant Prices)	0.0340**	0.00287	0.0282*
	(0.0138)	(0.0128)	(0.0162)
Dummy Variable for NREGA implementation	0.136	-0.113	0.0720
	(0.118)	(0.108)	(0.130)
Dummy Variable for 2008	0.0486	0.0457	0.379***
	(0.120)	(0.106)	(0.128)
Constant	6.242***	6.885***	8.610***
	(1.254)	(1.074)	(1.300)
Observations	504	560	440
Adjusted R-squared	0.393	0.533	0.334

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1; standard errors clustered at district level

Table 11: Heterogeneous effect of NREGS on migration into different sectors

VARIABLES	(1) Log of migrants working in services	(2) Log of migrants working in manufacturing
Interaction term between NREGA and 2008	-0.263**	-0.461
	(0.132)	(0.375)
Proportion of primary sector in the GDP	-1.823***	0.655
	(0.307)	(0.846)
Proportion of secondary sector in the GDP	-1.780***	-0.793
	(0.412)	(1.100)
Log of per capita GDP(Constant Prices)	0.244***	0.422
	(0.0940)	(0.255)
Compound Annual Growth Rate(Constant Prices)	0.0173	-0.0271
	(0.0116)	(0.0375)
Dummy Variable for NREGA implementation	0.0815	-0.0860
	(0.106)	(0.212)
Dummy Variable for 2008	0.0469	0.539**
	(0.0969)	(0.260)
Constant	8.221***	3.397
	(0.966)	(2.690)
Observations	735	147
Adjusted R-squared	0.455	0.346

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1; standard errors clustered at district level

Figure 2: Lorenz Curve for baseline and endline years