

# Multidimensions of Urban Poverty: Evidence from India

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## Abstract

*Content of abstract* This paper provides a robust multidimensional evaluation of intra -urban differences. The hypothesis that joint consumption of public goods of individuals in non slum urban India dominates those of individuals living in slums is accepted while the hypothesis that consumption of private goods of individuals in non slum urban India dominates those of individuals living in slums is rejected.

Key words: Urban, Poverty, Slums, India, Intra Urban Differences, Multidimensional, Dominance

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# Multidimensions of Urban Poverty: Evidence from India<sup>2</sup>

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## 1. Introduction

This paper contributes to the empirical literature on robust measurement of multidimensions of urban poverty by taking the discussion beyond unidimensional measures like head count ratio. In particular, using a unique nationwide data set from India, our emphasis is on differences in well being across individuals living in slum and non slum urban areas.

Understanding intra urban differences in well being is important in light of urbanization of poverty in developing countries (Ravallion et. al. 2007) and the growth of slum population fuelled by migration. It is projected that by 2025 nearly 40 percent of India would be urban. In India, between 1983 and 2004-05, while poverty (head count ratio) declined, the total number of rural poor declined by 12.31 percent while the total number of urban poor increased by 13.89 percent.

Slums are visual manifestations of urban poverty, viz. poor households deprived along multiple dimensions. The UN-Habitat defines a slum household as a group of individuals living under the same roof in an urban area lacking one or more of the following: durable housing, sufficient living space, easy access to safe water in sufficient amounts at an affordable price, access to adequate sanitation, and security of tenure that prevents forced evictions.

In this paper we compare outcomes in slum and non slum households by using the equivalence established between welfare analysis and stochastic dominance (Atkinson and Bourguignon 1982).

We first establish that if utility is defined over access to public goods like water and sanitation, then residents in non slum urban areas are unambiguously better off than slum dwellers. Moreover, a household's utility depends not only on access to these public goods but also on its private consumption. We reject the hypothesis that the distribution of monthly per capita expenditure (MPCE) in non slum urban areas stochastically dominates that in slums. We find a similar result if we consider per capita area of the dwelling, a measure for sufficient living space.

Our key finding is that we reject the dominance of outcomes in non slums over slums in the case of private goods (MPCE, area of dwelling) while finding dominance in the case of public goods (water and sanitation). This implies that when we examine the joint distribution of a household's consumption of private goods and access to public goods we do not find that non slum dwellers are unequivocally better off than slum dwellers.

## 2. Data

We use a data set collected by National Sample Survey Organisation (NSSO) in 2002 covering a total of 41,916 households from urban areas: 6,138 slum households and squatters, 35,703 households from non slum urban areas and 75 households without a house (National Sample Survey Organisation

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2005). This data is unique in that, unlike standard data sets that have information on rural and urban households, it identifies whether a household lives in the slum or in the non slum urban area. This allows us to analyze intra urban differences. In addition, the data has an identifier to distinguish two types of slums: notified and non-notified slums. Unlike non-notified slums, in the case of notified slums a notification has been issued by the respective municipalities, corporations, local bodies or development authorities. In Indian cities, the act of notification leads to improved provision of public goods including water and sanitation.

The definition of a slum used by NSSO is similar in spirit to that of UN-Habitat. In this study, we focus on individuals from non slum urban areas, notified slums and non-notified slums. We ignore the squatter settlements and the homeless. Our analysis is at the all India level because the number of observations on slum households will be greatly reduced if we undertake the analysis at the level of city. For purpose of this analysis, we focus on the twenty six states of India (we exclude the north east states and the union territories).

In line with the literature on poverty measurement, our unit of analysis is the individual. We ascribe to each individual the MPCE of the household to which the individual belongs. We smooth the MPCE variable in the following way. We have 122 MPCE classes starting with Rs 0 – 50 and in increments of Rs 50. Each individual is assigned the midpoint consumption of his or her class. As a measure of sufficient living space, we use the per capita floor area (the sum of area of living room, area of other rooms, covered veranda and uncovered veranda divided by the household size). With regard to availability of public goods, we examine the drainage facilities available to the household and hence to the individual (no drainage, open katcha, open pucca, covered pucca and underground – ranked from the worst to the best), the drinking water facility (community use, common use of households in the building, and household’s exclusive use - ranked from the worst to the best). For purposes of distribution analysis we need to be able to rank these facilities. As is evident, our choice of variables is driven by the definition of slum proposed by UN-Habitat<sup>3</sup>.

### 3. Methods

In order to compare the joint distribution of a set of  $K$  goods across individuals living in slum and non slum urban areas<sup>4</sup>, we test whether the distribution in the non slum areas ( $F^A(\cdot)$ ) dominates the distribution in the slums ( $F^B(\cdot)$ ). In the theoretical literature, the equivalence between welfare analysis and stochastic dominance has been well established. The robust criteria used for welfare analysis are generalizations, to more than two attributes, of the first and second order stochastic dominance criteria of Atkinson and Bourguignon (1982). These are known to correspond to the unanimity of results of utilitarian welfare evaluations taken over a specific class of individual utility functions.

We use the Union-Intersection method<sup>5</sup> to test for stochastic dominance of  $F^A$  over  $F^B$  (Bishop and Formby 1999).

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<sup>3</sup> In the absence of data on housing quality or security of tenure we do not focus on these in our analysis.

<sup>4</sup> This is the approach to undertake pair wise comparisons of non slum urban, notified slums and non-notified slums.

<sup>5</sup> We do not use the Intersection Union method as these tests have low power.

Let  $\hat{F}^A, \hat{F}^B$  be the empirical distributions. We calculate  $T_i = \frac{\hat{F}^A(t_i) - \hat{F}^B(t_i)}{\sqrt{V(\hat{F}^A(t_i) - \hat{F}^B(t_i))}}$ , for all  $t_i$  in

the K dimensional grid (over all values of the K goods observed in the data) and the variance  $\hat{V}$  is the variance estimator derived by Davidson and Duclos (2000). Then  $\hat{F}^A$  dominates  $\hat{F}^B$  iff  $\min(T_1, \dots, T_K) < -C_\alpha$  and  $\max(T_1, \dots, T_K) < C_\alpha$ , where  $C_\alpha$  is the critical value (at significance level  $\alpha$ ) given by the Studentized Modulos Distribution.

A necessary condition for  $\hat{F}^A(\cdot)$  to dominate  $\hat{F}^B(\cdot)$  when we consider K attributes is that no region in the marginal distribution of A must be dominated by the marginal distribution of B for each of the K attributes.

#### 4. Results

The results of the pair wise comparisons are reported in Table 1. When we compare the univariate distributions of MPCE or per capita area for non slum urban with each type of slum, the minimum value of  $T_i$  is lower than  $-C_\alpha$  but the maximum value of  $T_i$  is greater than  $C_\alpha$  (Table 1). This implies that neither distribution in non slums dominates the corresponding distribution in either type of slum. In fact, at very low values of these variables, the univariate distribution of MPCE and per capita area in the notified slums and non-notified slums dominates the corresponding distribution in non slum urban areas. The domination at the lower end of the distribution implies that the joint distribution of MPCE, per capita area, drainage and rights to water source for individuals living in non slum urban areas cannot dominate those for individuals living in either type of slum.

The significance of these findings can be gauged by the fact that if one used a fixed poverty line for the year 2002, the only conclusion one can arrive at is that the head count ratio is lower at 20.66 percent in the non slums compared to 34.23 (40.62) percent in the notified (non-notified) slums<sup>6</sup>. The presence of individuals living way below the poverty line in the non slum urban areas, a fact that gets shrouded by looking at just the head count ratio, leads to the non dominance result. In similar vein, despite the fact that the average per capita area of dwellings is higher (131.61 sq meters) in the non slums than in either the notified slums (70.15 sq meters) or the notified slums (67.44 sq meters) we do not find that distribution of per capita area in non slum urban dominates either notified or non-notified slums.

The joint distribution of drainage facilities and rights to water source in the non slum urban areas does dominate the corresponding distributions in notified slums and non-notified slums. This corroborates the observation that the provision of water and sanitation services lags in the slums. Our findings imply the need for a concerted focus in improving such amenities as part of slum development and upgradation programmes.

We accept the hypothesis that the univariate distribution of MPCE and per capita area of dwelling in notified slums dominates the distribution in non-notified slums. Further, the joint distribution of

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<sup>6</sup> Using an all India poverty line of Rs 496.36 for the year 2002, we estimate that 22.40 percent of people are poor in urban India. The poverty line was calculated by taking the simple average of the official poverty line for urban India for 1999-00 and 2004-05. Since this data is not the quinquennial consumption schedule, our estimate of urban poverty is different from the official estimates; it is lower by around 3 percent.

drainage facilities and rights to water source in the notified slums dominates the corresponding distributions in non-notified slums. This result can be explained by the fact that the act of notification leads to a greater share of funds under the development programs going to the notified slums thereby leading to improved living conditions.

Further, we find that the joint distribution over consumption of public and private goods, viz. MPCE, per capita area, drainage and rights to water source of individuals living in notified slums dominates the corresponding distribution in non-notified slums. This result implies that individuals living in notified slums are unequivocally better off than dwellers in non-notified slums.

## 5. Conclusion

An understanding of intra urban differences is important given that the urban poor are not necessarily spatially concentrated. An examination of the joint distribution of a household's consumption of private goods and access to public goods reveals that non slum dwellers are not unequivocally better off than slum dwellers.

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**Table 1: Results of First Order Stochastic Dominance Tests**

<b>Null Hypothesis</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Critical Value (<math>C_\alpha</math>)</b>	<b>Result</b>
<b>Monthly Per Capita Expenditure</b>				
Non Slum Urban Dominates Notified Slum	-90.11	15.64	3.93	Reject
Non Slum Urban Dominates Non-notified Slum	-105.18	10.10	3.93	Reject
Notified Slum Dominates Non-notified Slum	-16.31	-0.52	3.87	Accept
<b>Per Capita Area of Dwelling</b>				
Non Slum Urban Dominates Notified Slum	-98.28	5.49	4.35	Reject
Non Slum Urban Dominates Non-notified Slum	-106.12	6.24	4.35	Reject
Notified Slum Dominates Non-notified Slum	-21.03	4.05	4.34	Accept
<b>Drainage and Access to Water Source</b>				
Non Slum Urban Dominates Notified Slum	-84.90	-2.54	3.52	Accept
Non Slum Urban Dominates Non-notified Slum	-107.81	-2.54	3.52	Accept
Notified Slum Dominates Non-notified Slum	-38.46	-16.67	3.52	Accept
<b>MPCE, Per Capita Area of Dwelling, Drainage and Access to Water Source</b>				
Notified Slum Dominates Non-notified Slum	-38.8	5.15	5.49	Accept