MEASURING SEGREGATION OF THE POOR *

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ABSTRACT

In this paper I propose a poverty segregation curve to measure inequality in the distribution of the poor. Axioms of relative income inequality are reformulated for the poverty segregation curve and a generalized segregation curve is proposed. The segregation analysis is applied to study regional concentration of the poor in India in the last two decades. Various measures of segregation indicate that although poverty has declined over a period of time in almost all regions, there is a significant increase in the segregation of the poor in some regions in India.

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Introduction

Inequality in the distribution of population subgroups has been studied in a variety of contexts by sociologists as well as economists. Traditionally sociologists have analyzed residential segregation and its impact on poverty among the black population in the US (classic paper by Massey 1990). Similarly the impact of school segregation on educational outcomes has been studied in both the disciplines (Frankel and Volij, 2005 for a review). Although there is a large literature in economics on occupational segregation among female workers (Moir and Smith 1979, Lewis 1982, 1996, Hutchens, 1991, 2001, 2004) economists have largely ignored measuring spatial inequality in the distribution of the poor.[1]

The purpose of this paper is to fill this important gap in the literature by focusing on the segregation of the poor. We measure regional segregation of the poor compared to the distribution of the general population. Specifically we compare whether a region consisting of 20 percent of a country's population also contains 20 percent of its poor population. Official poverty statistics in any country measures the headcount ratio of poverty i.e. the number of poor as a percent of the region's population. For instance, in India, Assam had 40% of its population living in poverty whereas Maharashtra had 30% of its population living in poverty. Based on this statistics Assam will be on a higher priority than Maharashtra while targeting poverty reducing policies. However if we pool together all the poor in India and then find out of nearly 300 million poor, only 4% of poor lived in Assam and whereas10% of poor lived in Maharashtra then we may want to reconsider the ranking of the states at least for some policy purposes.

[1] An exception is Ravallion et. al (2007) who find evidence suggesting increasing urbanization of the global poor.

We measure changes in the distribution of the poor by proposing a poverty segregation curve. The segregation curve graphically compares the extent to which actual distribution of the poor deviates from the ideal situation when the poor are distributed proportionally among different regions. Hutchens (1991, 2001, 2004) has derived axioms for occupational segregation curve based on the properties satisfied by the Lorenz curve of income inequality. We cannot apply properties of the occupational segregation curve directly to the poverty segregation curve. The main reason is that the exercise of measuring segregation of the poor is distinct from the exercise of measuring segregation of population groups based on race (white and non-white residents) and gender (male and female workers). Unlike a division of the people along their intrinsic features, a division between the poor and non-poor is not rigid. A person cannot change his racial status but she can switch from being poor to being not poor and vice versa. In particular, this ability to change group membership is important in the formulation of the transfer principle. We reformulate these axioms and interpret them in the context of the poverty segregation curve. Additionally we adopt the locational gini index to measure regional inequality in the distribution of the poor.

A generalized Lorenz curve first proposed by Shorrocks (1980) is routinely used in measuring income inequality adjusted to average income levels. However we are not aware of any study which has proposed a generalized segregation curve. In this paper, for the first time we propose a generalized segregation curve. A generalized segregation curve helps rank a distribution with substantially lower poverty rates above a distribution with higher poverty levels, when ranking is not possible by ordinary segregation curves

The poverty segregation analysis is applied to study changes in the distribution of the poor among regions in India. Since the economic reforms of the early 1990s, per capita GDP in India has grown at about 4-5 percent per year. However growth has been largely uneven among different regions and rising regional disparity is one of the main reasons why India has not been able to reduce poverty significantly. There are more than 400 million poor in India living on less than a dollar per day poverty line (World Bank PovcalNet). Figure 1 shows percent of poor in regions in 1993 and 2004. Although poverty has declined in all regions it is not evident from the figure (and the official poverty statistics) how the regional distribution of poor has changed over the period of time. Has poverty declined uniformly across regions or is there a growing concentration of the poor in some regions of the country? Ongoing debate on poverty levels in India has largely focused on measurement differences, discrepancies in survey data and choice of poverty lines.[2] However we are aware of no study so far, which systematically quantifies the segregation of the poor in India.

We measure changes in the distribution of the poor in the decade following economic reforms (1993-2004). We find that the poverty segregation curve for 1993 dominated the curve for 2004, meaning thereby that the distribution of the poor became more unequal between 1993 and 2004. The rise in segregation of the poor is confirmed by estimating different segregation indices such as the dissimilarity index, the Gini index and the square root index. Regional segregation is disaggregated further into segregation in the urban and rural sectors. Our results indicate that compared to the rural sector, the poor were more segregated within the urban sector.

[2] Deaton and Kozel (2005) review the Indian poverty debate in detail.

The remainder of the paper is organized as follows: in Section 2 we formalize the notion of a poverty segregation curve, and in Section 3 we specify properties satisfied by the class of segregation measures which rank distributions in accordance to the segregation curve. Section 4 introduces the generalized segregation curve and the application to poverty in India is provided in Section 5. Section 6 concludes.

2. A Poverty Segregation Curve

The segregation curve has been used to measure inequality in the distribution of two population subgroups. It was first applied by Duncan and Duncan (1955) to measure residential segregation between the white and the non-white population in the US. Hutchens (1991) used it to measure inequality in the distribution of men and women; Dygalo (2007) used it to measure distribution of old and not-so-old workers across occupations. The curve can also been used to measure segregation of a particular group compared to the general population. Moir and Selby Smith (1979) used the segregation curve to compare distribution of female employees with total workforce. More recently, Alonso-Villar (2010) used the curve to measure concentration of specific industries compared to all industries in different locations. Below we define a poverty segregation curve to measure segregation of the poor from the general population.

Let a population of size N be divided into two groups $t = 1,2$, namely, the poor and the non-poor.[3] The population is distributed among R regions $i = 1,2...R$, $R \geq 2$. The set of all possible distributions of the poor for a fixed value of R is given by D_R, and the

[3] The poor can be defined in a conventional way, as those with income less than benchmark income defined by the poverty line. However in recent times the poor are increasingly identified using non-income factors such as those who lack housing, health services, education or a combination of a multiple of dimensions. For our purpose any acceptable definition of the poverty line will suffice.

union set for different *R* values is given by $D = U_{R \in I} D_R$ where $I \geq 1$ is a set of positive integers. Distribution $X \in D_R$ is denoted by a $2xR$ matrix $\begin{bmatrix} x_{11} & x_{12} \cdots x_{1R} \\ x_1 & x_2 \quad x_R \end{bmatrix}$, where x_{ti} is the number of type *t* people in region *i*, $N_t(X) = \sum_{i=1}^{R} x_{1i}$ is the population of type *t* people in all regions combined; $x_i = \sum_{t=1}^{2} x_{ti}$ is the population in region *i* combined across all types and $N(X) = \sum_{t=1}^{2} \sum_{i=1}^{R} x_{ti}$ is the total population for all types in all regions combined. [4]

2.1 Definition:

A poverty segregation curve for distribution $X \in D$, relates the cumulative proportion of the poor population $\sum_{i=1}^{m} \frac{x_{1i}}{N_1}$ as a function of the cumulative proportion of the total population $\sum_{i=1}^{m} \frac{x_i}{N}$ in m regions combined, when regions are ordered in increasing value of the headcount poverty ratio $\frac{x_{1i}}{x_i}$.

Figure 2 shows the poverty segregation curves for India. As seen in the figure the curve is bounded in a unit square between (0, 0) and (1, 1) with positive slope and is convex in shape.[5]There is no segregation when every region's share of the poor is equal to its share of the total population $\frac{x_{1i}}{N_1} = \frac{x_i}{N}$; i.e. all regions have the same headcount ratio

[4] To make the problem meaningful, there are non-zero numbers of poor in any distribution $N_1(X) > 0$. Additionally whenever the context of distribution X is implied, $N(X)$ is simply written as N.

[5] Given the discrete number of regions, the segregation curve is piece-wise linear. Segregation curves are plotted by smoothly joining discrete data points and are compared only at those points for which data is available.

of poverty, equal to the headcount ratio in the country , $\frac{x_{1i}}{x_i} = \frac{x_{1j}}{x_j} = \frac{N_1}{N}$ for all $i, j = 1,2,...R$. In this case the segregation curve lies along the diagonal of the unit square. Conversely, if the poor and the non-poor are completely segregated then all the poor reside in one region, say j, $x_{1j} = x_j = N_1; x_{2j} = 0$ and all the non-poor in other regions $x_{1k} = 0; x_{2k} = x_2$ for all $k \neq j$ so that the segregation curve is L-shaped. In general, the more the regional distribution of the poor matches that of overall population, the closer the segregation curve will be to the diagonal line. Formally, the dominance relation between the segregation curves can be stated as follows.

2.2 Dominance Relation:

For any two distributions $X, Y \in D$, ($X \geq_P Y$) i.e. X's poverty segregation curve '*dominates*' that of Y if and only if Y 's curve lies at some point below and at no point above X 's curve. The $\geq_P$relation is a strict partial ordering, similar to the Lorenz-dominance relation. For $X, Y, Z \in D$, $\geq_P$ is irreflexive ($not\ X \geq_P X$), asymmetric ($X \geq_P Y\ implies\ not\ Y \geq_P X$), transitive ($X \geq_P Y\ and\ Y \geq_P Z, implies\ X \geq_P Z$) but not complete (there exist $X, Y \in D$, such that neither $X \geq_P Y$ nor $Y \geq_P X$) i.e. when two segregation curves intersect, $\geq_P$cannot rank order distributions. Thus non-intersecting segregation curves provide a ranking of distributions based on increasing level of segregation of the poor.

3. Axiomatic Properties

The Lorenz curve of income inequality is a relative inequality measure and satisfies basic axioms of symmetry, scale invariance (homogeneity and population principle) and the

Pigou-Dalton transfer principle.[6] These properties were reformulated by Hutchens (1991, 2004) for the occupational segregation curve and by Alonso-Villar (2010) in the context of employment concentration. Below we formulate these axioms for the poverty segregation curve. In particular, we find that the principle of Pigou-Dalton transfer lends itself to different interpretation in the context of poverty segregation.

3.1 Symmetry in Regions

The property of symmetry treats individuals anonymously; income inequality remains unchanged when individuals trade places with each other. Similarly if one region trades places with another region, there is no change in poverty segregation. For any two distributions $X, Y \in D$, if Y is derived by permuting columns of X then $Y =_P X$.

3.2 Population Invariance

Relative inequality remains unaffected by a change in the size of income (homogeneity principle) or a change in the size of population (population principle) as long as the proportion of population receiving each income is fixed. In the context of poverty segregation, a proportional change in the number of poor and the number of non-poor in every region does not change the extent of segregation. For $X, Y \in D$, if Y is derived from X such that $y_{ti} = w_t x_{ti}; w_t$ for $t = 1,2$ is a positive scalar such that $w_{1i} x_{1i} \leq (w_1 x_{1i} + w_2 x_{2i})$ for all $i = 1,2,...R$, then $Y =_P X$.

3.3 Pigou-Dalton Transfer Principle

The principle of transfer by Pigou (1912) and Dalton (1920) states that a regressive transfer of income from a poor person to anyone who is less poor will increase inequality. In the context of poverty segregation, this property can be formulated as follows. Arrange

[6] See Lemma 2 in Foster (1985).

all R regions in distribution $X \in D_R$ in an increasing order of their poverty ratio (x_{1i} / x_i). Y is derived from X by a regressive transfer of the poor, if $y_{ti} = x_{ti}$ for $t = 1,2$ in all $i \neq h, j$, $\alpha > 0$ and in regions $h, j (h \leq j - 1)$:

i) $y_{1h} = x_{1h} - \alpha$ and $y_{2h} = x_{2h} + \alpha$

ii) $y_{1j} = x_{1j} + \alpha$ and $y_{2j} = x_{2j} - \alpha$

If Y is derived from X by a regressive transfer of the poor then $Y >_P X$. In all regions except *h* and *j*, distribution *Y* has identical population shares as in distribution *X*. A regressive transfer of poor results in an increase in the number of poor in a poorer region (j) and a decrease in the number of poor in a less poor region (h). Conversely a regressive transfer of poor results in an increase in the number of non-poor in a less poor region and a decrease in the number of non-poor in a poorer region. There are two ways which can bring about such a transfer.

A transfer of income is termed regressive when income is transferred from a poor to a less poor individual. Following convention, a regressive transfer of poor can happen *between* regions i.e. by transferring (α) poor from a less poor region $[y_{1h} = x_{1h} - \alpha]$ to a poorer region $[y_{1j} = x_{1j} + \alpha]$ and transferring equal number of non-poor in a reverse direction, from a poorer region $[y_{2j} = x_{2j} - \alpha]$ to a less poor region$[y_{2h} = x_{2h} + \alpha]$. Note that we require the transfer of the poor and the non-poor to happen simultaneously in order to ensure that population in both regions remains unchanged since we measure number of poor as a fraction of the regions' population. On the other hand, Hutchens (1991) who measures number of women as a fraction of men employees in an occupation

defines the transfer when women leave a male dominated occupation to join a female dominated occupation without requiring male employees to move in a reverse direction.[7]

Another way to interpret the above regressive transfer property is by affecting the transfer *within* regions i.e. (α) poor in a less poor region move out of poverty $[y_{1h} = x_{1h} - \alpha$ and $y_{2h} = x_{2h} + \alpha]$ and (α) non-poor in a poorer region move into poverty $[y_{1j} = x_{1j} + \alpha$ and $y_{2j} = x_{2j} - \alpha]$. This alternative way to characterize a regressive transfer is possible because unlike being a "female" or an "African American", being "poor" is not an intrinsic feature of an individual. It is possible that a person is poor in one distribution and not poor in another distribution. Though interchangeability of type is not unique to segregation of the poor (a person can be unemployed or employed, single or married; obese or healthy), its implications for interpreting the regressive transfer property have not been discussed in the literature so far.

3.4 Insensitivity to proportional division of a region

In addition to the properties of the Lorenz curve of income inequality, a segregation curve also satisfies another property of insensitivity to proportional divisions (Hutchens 2004). For $X, Y \in D$, if Y is derived from X such that $y_{ti} = x_{ti}$ for $t = 1,2$ and for $i = 1,2,...R-1$, and $y_{ti} = (x_{tR} / M)$ for $t = 1,2$ and for $i = R,...R+M-1$, where M is a positive integer, then $Y =_P X$. The property states that everything else remaining same, if distribution *Y* is derived from distribution *X* by sub-dividing a region (*R*) into additional *(M)* regions such that the population shares in these additional regions are exactly identical to those of the former region, then both distributions will have equal levels of segregation.

[7] Hutchens (1991) refers to the transfer property as the principle of movement between groups.

5. Generalized Poverty Segregation Curve

Shorrocks (1983) first proposed a generalized Lorenz curve based on the notion that greater inequality can be compensated by higher average living standards. Despite its similarity to the Lorenz curve, the segregation curve has never been generalized and this is the first attempt to define it.[8]

The generalized Lorenz curve is derived by assuming a social preference for a more equitable distribution and higher incomes, *ceteris paribus.* In our context, these preferences will imply equitable distribution of the poor and lower poverty rates. A generalized Lorenz curve is constructed by scaling up the ordinary Lorenz curve by the mean income of the distribution. We define a generalized poverty segregation curve by scaling the poverty segregation curve by the mean of the non-poor population.

5. 1 Definition:

A generalized poverty segregation curve for distribution $X \in D$, relates the cumulative proportion of the poor population $\sum_{i=1}^{m} \frac{x_{1i}}{N_1}$ scaled by the *average non-poor ratio* $\frac{N_2}{N}$ as a function of the cumulative proportion of the total population $\sum_{i=1}^{m} \frac{x_i}{N}$ in m regions combined, when regions are ordered in increasing value of the headcount poverty ratio $\frac{x_{1i}}{x_i}$.

The curve is bounded by $(0, N_2 / N)$. If the segregation curve of distribution X is below that of Y and if the average poverty rate of X is higher than that of Y, then

[8] Shorrocks (1983) for formulation of generalized Lorenz curve.

obviously the generalized segregation curve of X will be below that of Y. However if distribution X's segregation curve intersects that of Y, hence there is ambiguity between the ranking of the two distributions based on segregation levels, but distribution X has substantially low average poverty rate than that of Y, then the generalized segregation curve of X can be higher than that of Y. Thus, the generalized segregation curve helps rank a distribution with substantially lower poverty rates above a distribution with higher poverty levels, when ranking is not possible by ordinary segregation curves.

6. Application

6. 1 Background

Until the 1980's India's economic growth was extremely slow with the growth rate of GDP per capita barely exceeding 2 percent per year. In the 1980s the growth rate increased to more than 3 percent but as was evident later, the faster growth was unsustainable since it was fuelled by an increase in government spending and borrowing from abroad (Srinivasan and Tendulkar, 2003). By the end of the decade, the country faced a severe fiscal and balance of payments crisis which led to its adoption of broad ranging economic reforms in early 1990s (Joshi and Little, 1996). Overall the reforms systematically shifted the economy to a more open economy with greater reliance on market forces. The reforms were successful in accelerating economic growth. Per-capita GDP grew on an average at 4 percent per year during the 1990s and by more than 5 percent per year since 2001.

There is growing evidence that economic disparity in India has increased since the economic reforms. There is considerable regional variation in terms of income levels and

growth rates and most of the studies find no convergence among the different states in the country.[9] In 2004-2005, per capita income in Bihar was as low as 6,000 Rupees whereas that in Chandigarh was as high as 60,000 Rupees. States that were initially poorer grew more slowly and were unable to keep pace with the rapid growth witnessed by the richer states (Deaton and Dreze, 2002). In terms of economic performance, Bihar, Madhya Pradesh, Orissa, Rajasthan, and Uttar Pradesh are the lagging states; Andhra Pradesh, Assam, Karnataka, Kerala, Tamil Nadu, and West Bengal are intermediate; and finally Gujarat, Haryana, Punjab, and Maharashtra are the faster growing states.

There is a large literature measuring changes in poverty in India both before and after reforms. Most of the studies debate the accuracy of poverty estimates based on differences in methodological assumptions, poverty lines and recall periods used in household surveys. The consensus opinion is that despite significant growth, the rate of poverty reduction did not accelerate particularly, since the introduction of economic reforms (Datt and Ravallion, 2011). Our poverty estimates indicate that on an average, poverty at the national level declined by about 10 percent points every ten years; it declined from 45 percent in1983 to 36 percent in 1993 and further to 27 percent by 2004. Despite a large body of literature on regional disparity in income and poverty levels, we are not aware of any study so far, which systematically quantifies the segregation of the poor in India.

[9] See Purfield 2006, for literature review on convergence in Indian states

6. 2. Data:

Segregation of the poor is measured for all the regions in India, namely, 28 states and 7 union territories. [10] Poverty estimates for all states are calculated using household survey data from the National Sample Survey (NSS) Organization of the Ministry of Statistics and Program Implementation, Government of India. The NSS conducts large consumer expenditure surveys every five years, the latest survey being conducted in 2004-05. We choose 50^{th} (1993-94) and 61^{st} (2004-2005) survey rounds so that we are able to observe changes in the distribution of the poor approximately at an interval of ten years.[11] Data on population levels in each state is obtained from the Census Bureau of India. [12] Poverty in each state is estimated using state-specific poverty lines specified by the Planning Commission of India's Expert Group on Estimation of Proportion and Number of Poor (1993).The poverty lines are based on monthly per capita expenditure and are adjusted for state-wide price differences.

7. Segregation of Poverty in India

7.1 Poverty Segregation Curve

The segregation curve is a straight line along the unit diagonal when each region's share in the poor population is equal to its share in the total population. The further away

[10] States are typically larger in area than union territories. Unlike state legislatures, the union territories are governed directly by the appointees of the central government. Pondicherry is the only union territory with its own elected legislature. We include the national capital of New Delhi in the union territories list.
[11] The 51^{st} round (1999-2000) was another large survey round conducted by the NSS. However we do not use data from the 51^{st} round because poverty estimates from this round are not comparable with estimates from other rounds. The main reason for the non-comparability of the data was that the NSS changed the recall periods in the 51^{st} round. (See Dhongde, 2007 for further details)
[12] The Census Bureau conducts population surveys every 10 years 2001, 1991, 1981 and so on; we use projections of populations for 1993 and 2004.

is the segregation curve from the diagonal, the greater is the extent of segregation. Figure 2 shows the poverty segregation curves for1994 and 2004 respectively. The X-axis shows the cumulative proportion of population in each state, and the Y-axis shows the cumulative proportion of poor population in each state, when states are ranked in an increasing order of the poverty index. The curves in figure 2 imply that regional segregation of the poor in India had increased in 2004 compared to 1994.

Table 1 shows the regional share in the poor population in both the years. As seen in the table, the two states of Bihar and Uttar Pradesh combined had more than 30 percent of the total poor population and about 25 percent of the total population in the country. Between 1994 and 2004, although the poor as a share of the state population declined in every state, share of the poor as a proportion of the total poor population increased in five states, Delhi, Maharashtra, Orissa, Rajasthan and Uttar Pradesh.

Further analysis of the data reveals interesting patterns in distributional changes of the poor. In 2004, the poor were increasingly segregated in the relatively densely populated states of Bihar, Orissa, Madhya Pradesh, Maharashtra and Uttar Pradesh. [13]Poverty levels in these states were higher than the national average. Together these states make up nearly 50 percent of the total population; but their share in total poor population increased from 58 percent in 1993 to 65 percent in 2004. Thus between 1993 and 2004, the proportion of the poor increased disproportionately in high poverty regions and decreased significantly in low poverty regions.

[13] The states of Chattisgarh, Jharkhand, and Uttaranchal were created in 2000 from parts of Bihar, Madhya Pradesh and Uttar Pradesh and are included in the calculation.

7.2 Indices of Poverty Segregation

The rise in segregation in 2004 is also evident from different segregation measures given in Table 2. The dissimilarity index, the Gini index as well as the square root index show that the segregation of the poor increased between 1993 and 2004. The dissimilarity index suggests that in order to attain perfect integration of the two income classes, we would have to redistribute a much larger percent of population between states in 2004 (16 percent) compared to 1993 (11 percent).

Interestingly regional population shares have not changed to a significant extent in India. Throughout the two decades, Uttar Pradesh was the most populous state with a steady share of about 16 percent of the total population and about 19 percent of the poor population. Typically one would expect out migration from state which are perpetually poor. For instance in the United States a declining proportion of the total population, including the poor, reside in high poverty counties (Lichter and Johnson, 2006). However in India not only has the overall interstate mobility of population declined systematically over the years but the rates of net out-migration from perpetually poor states have declined as well (Kundu 2007).

7.3 Segregation of the Poor in Rural-Urban Sectors

The square root index is aggregative and additively decomposable (Hutchens 2004). Since NSS data is available separately for rural and urban sectors within each state, in this section we compute the sectoral composition of segregation using the square root index. Table 3 shows the value of the total square root index is equal to the sum of values of the square root index for the rural and the urban sector. The urban sector accounted for more than 50 percent of the total segregation, though in India, the urban sector is

relatively small and consists of about 30 percent of the total population. The rural-urban composition was about 40-60 percent in both 1983 and 2004. In 1993 though, the rural component was only 20 percent and the urban component accounted for the remaining 80 percent of the total segregation.

The square root index is also additively decomposable. Thus the total value of the square root index can be written as the sum of the weighted average values of the square root index within the rural and the urban sector and the value of the index between sectors. The between sector inequality shows the value of the square root index if the poor and the non-poor within each sector were redistributed across regions such that the within-sector measure was zero. As seen from table 4, segregation values between the rural and the urban sector are strikingly low, and nearly close to zero. Low values of between sector segregation are observed in all three years. In fact proportional share of population between sectors was remarkably similar over the period of time. The rural sector had about 70% of the total population, and roughly about 70% of the poor and the non-poor population in 2004. In 1993, the rural sector had about 73% and in 1983 about 76% of poor and non-poor populations. Thus unlike the trend observed globally (Ravallion et. al. 2007), in India, the poor have not urbanized at a faster pace than the population as a whole.

Total segregation was largely accounted for by segregation within each sector. In the rural sector, the value of the square root index remained close to 0.04 for the three years. However segregation of the poor increased significantly within the urban sector. The square root index for the urban sector rose from 0.016 in 1983 to 0.04 in 2005. As seen in figure 3, the 1983 segregation curve dominated the 2005 curve in the urban

sector. Thus all the measures indicate that there was a rise in segregation in the urban sector between 1983 and 2005.

8. Conclusions

The paper highlighted the importance of measuring spatial inequality in the distribution of the poor by introducing a poverty segregation curve. Axiomatic properties of segregation measures were discussed in detail. Additionally a generalized segregation curve was introduced.

Segregation analysis was applied to the Indian economy where despite rapid rise in average incomes, poverty has not reduced significantly due to persisting regional disparities. Our results indicated that since the economic reforms in early 1990s the poor are increasingly concentrated in a few states. In particular, the poor are highly segregated in the urban sector. If this trend continues, significant percent of the poor population will be spatially isolated from the non-poor population. Such regional imbalances may pose a serious threat to the political stability in India.

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Table 1 Regional Share of the Poor

States and Union Territories	1993-1994	2004-2005
A & N Island	0.0	0.0
Andhra Pradesh	4.8	4.2
Arunachal Pradesh	0.1	0.1
Assam	3.0	1.8
Bihar	15.7	12.3
Chandigarh	0.0	0.0
Chattisgarh	N/A	3.0
Dadra & Nagar Haveli	0.0	0.0
Daman & Diu	0.0	0.0
Delhi	0.5	0.8
Goa	0.1	0.1
Gujarat	3.3	3.0
Haryana	1.4	1.1
Himachal Pradesh	0.5	0.2
Jammu & Kashmir	0.6	0.2
Jharkhand	N/A	3.9
Karnataka	4.9	4.6
Kerala	2.4	1.6
Lakshadweep	0.0	0.0
Madhya Pradesh	9.3	8.3
Maharashtra	9.6	10.5
Manipur	0.2	0.1
Meghalaya	0.2	0.1
Mizoram	0.1	0.0
Nagaland	0.2	0.1
Orissa	5.0	5.9
Pondicherry	0.1	0.1
Punjab	0.8	0.7
Rajasthan	4.0	4.5
Sikkim	0.1	0.0
Tamil Nadu	6.3	4.8
Tripura	0.4	0.2
Uttar Pradesh	18.6	19.5
Uttaranchal	N/A	1.2
West Bengal	7.9	6.9
Total	**100**	**100**

* The states of Chattisgarh, Jharkhand, and Uttaranchal were created in 2000 from parts of Bihar, Madhya Pradesh and Uttar Pradesh.
Source: Author's calculations

Table 2 Poverty Segregation Indices for Indian States

Measures of Segregation	1993-1994	2004-2005
Gini Index	0.16	0.21
Dissimilarity Index	0.11	0.16
Square Root Index	0.011	0.018

Source: Author's calculations

Table 3 Extent of Rural-Urban Segregation as measured by Square Root Index

Year	Rural	Urban	Total
2004	0.017	0.024	0.041
1993	0.007	0.029	0.036
1983	0.014	0.023	0.037

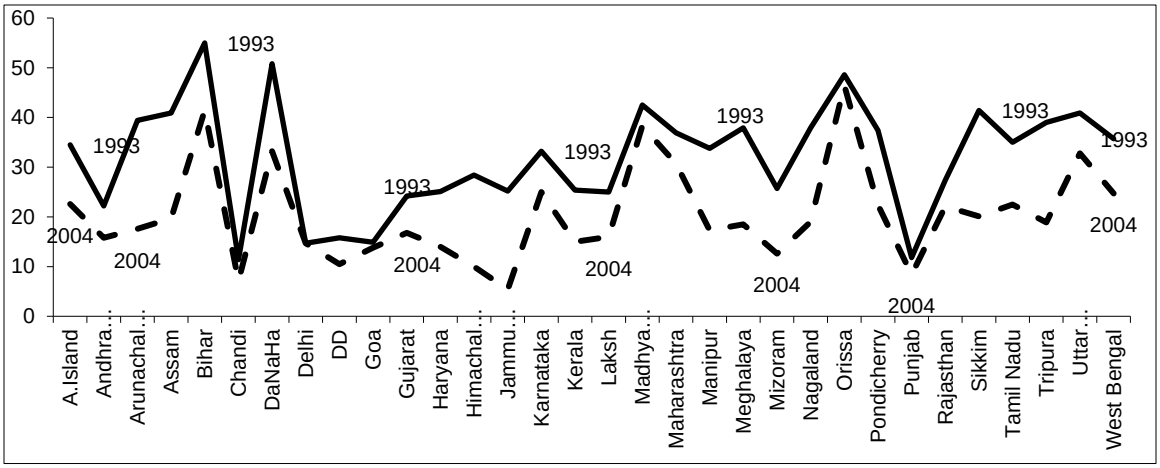
Source: Author's calculations

Table 4 Decomposition of Segregation as measured by Square Root Index

Year	Within Sectors		Weighted Average	Between	Total
	Rural	Urban	Within Sector	Sectors	
2004	0.040	0.040	0.040	0.001	0.041
1993	0.037	0.028	0.034	0.002	0.036
1983	0.042	0.016	0.036	0.001	0.037

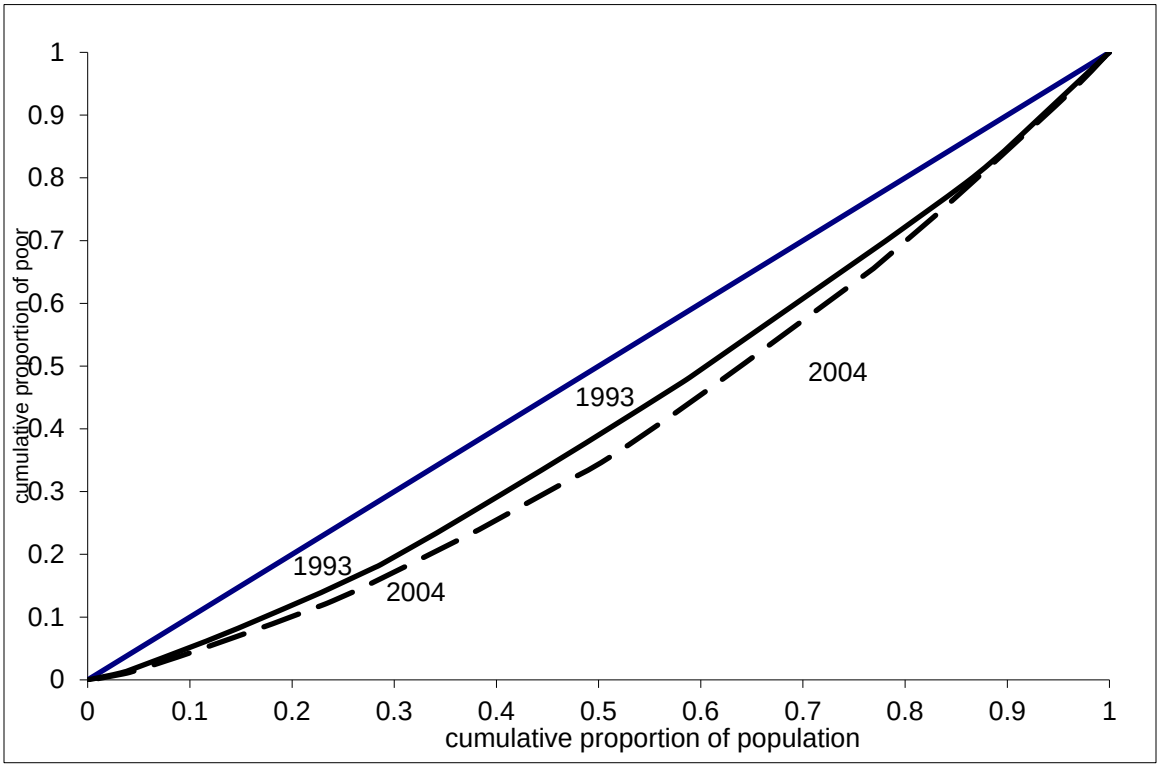
Source: Author's calculations

Figure 1 Change in Headcount Percent in Indian States during 1993-2004



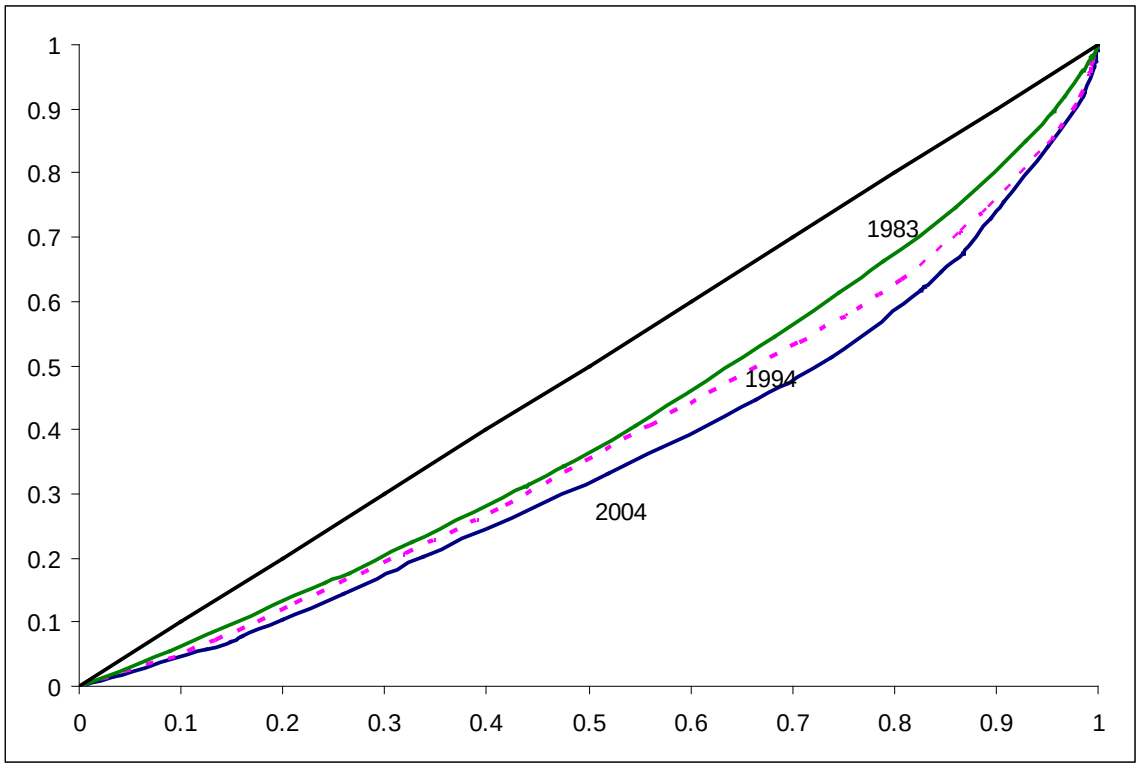
Source: Author's calculations

Figure 2 Poverty Segregation Curve in India for 1993-2004



Source: Author's calculations based on the technique explained in Section 2

Figure 3 Poverty Segregation Curves for Urban Sector of Indian States



Source: Author's calculations based on the technique explained in Section 2