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Short communication

On the urbanization of poverty

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Abstract

In the context of a simple model of the urbanization of poverty in a developing country, conditions are identified under which the poor urbanize faster than the nonpoor. This is found to be consistent with cross-sectional data for 39 countries and time series data for India. However, the estimated empirical model suggests that the urban poverty rate rises slowly relative to the rural rate. It is predicted that 60% of the poor will still live in rural areas by the time half the population of the developing world lives in urban areas. © 2002 Elsevier Science B.V. All rights reserved.

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1. Introduction

As is well known, the incidence of poverty is higher in the rural areas of almost all developing countries.[1] And (in the aggregate) most people still live in rural areas. Thus, urban areas account for less than half—about 30% on average—of the poor.[2] However, as is also well known, the population of the developing world is urbanizing quite rapidly. In 1995, 38% of people lived in urban areas, and this is projected to rise to 52% by 2020 (UN, 1996). Is the urban share of poverty also likely to grow? There is evidence that it has

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[1] Lipton and Ravallion (1995) survey the evidence on this point, and related work on rural–urban migration in developing countries.

[2] Taking an unweighted mean across the data set used in this paper, one finds that 68% of the poor live in rural areas. If one weights by the total number of poor, the figure rises to 75%.

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been doing so.[3] Will the poor urbanize faster than the nonpoor? How long will it be before a majority of the poor live in urban areas?

The answers to such questions have bearing on poverty reduction efforts. There are differences in the policy instruments for urban vs. rural poverty. Judgements about whether current knowledge and action have the right sectoral composition for fighting poverty will then be influenced by how the urban–rural composition of poverty is expected to evolve. There may also be implications for understanding the political economy of antipoverty policy. More spatially concentrated and visible forms of urban poverty are likely to generate new pressures on governments to respond and in ways that may or may not be coincident with good policies for overall poverty reduction.

To help throw light on these issues, this paper provides a simple theoretical representation of the urbanization of poverty in a developing country, and shows that this is consistent with poverty data for countries over a wide range of urban population shares. Implications are drawn for the future urbanization of poverty.

2. A theoretical representation of the urbanization of poverty

Define the poverty urbanization curve as the function, $P_u(S_u)$ mapping from [0, 1] to [0, 1], that gives the urban sector's share of the poor when its share of the population is S_u. This can be written as:

$$P_u(S_u) = h(S_u)S_u \tag{1}$$

where

$$h(S_u) \equiv \frac{H_u(S_u)}{H(S_u)} \tag{2}$$

is the incidence of poverty in urban areas (H_u) relative to its national incidence:

$$H(S_u) = S_u H_u(S_u) + (1 - S_u)H_r(S_u) \tag{3}$$

where H_r is the rural incidence of poverty. Since we are interested in the association between urbanization (a rise in S_u) and poverty, the urban and rural poverty measures are written as functions of S_u; these functions are assumed to be differentiable.[4] In turn, we can think of S_u as a function of time, t. From Eq. (1), it then evident that the speed at which the poor urbanize over time is greater or less than the speed at which the population as a whole urbanizes according to the sign of $h'(S_u)$; in particular:

$$\frac{\partial \ln P_u}{\partial t} = \left(1 + \frac{\partial \ln h}{\partial \ln S_u}\right)\frac{\partial \ln S_u}{\partial t} \tag{4}$$

The poor urbanize faster than the population as a whole if (and only if) $h'(S_u) > 0$.

[3] Haddad et al. (1999) compile urban and rural poverty measures for eight countries; for seven of them, they find that the urban share of the total number of poor rose over time.

[4] Writing the poverty measures as functions of S_u does not, of course, mean that S_u is exogenous; here, the interest is in how these variables co-move, rather than causality.

To identify economic conditions under which the poor urbanize faster, consider the following simple model. Escaping poverty in urban areas means getting a skilled "formal sector" job at a real wage rate set well above the rural wage. An urban household is poor if it does not get such a job, and everyone is poor in the rural economy. Hence, $P_u(S_u) < S_u$ throughout. The number of formal sector jobs per capita of the population is $L_u = (1 - H_u)S_u$ and $1 - L_u$ is the national poverty rate (since getting an urban formal sector job is the only way to escape poverty in this model).

The process of urbanization is assumed to generate external economies such that productivity in the urban economy rises as its share of the population rises.[5] In particular, the output of the urban formal sector is $\phi(S_u)F(L_u)$ where $\phi(S_u)$ is productivity-enhancing effect of urbanization, with $\phi'(S_u)>0$, and $F'(.)>0$ is the marginal product of skilled labor with $F''(.)<0$. Firms maximize profits such that:

$$\phi(S_u)F'[(1 - H_u(S_u))S_u] = W_u(S_u) \tag{5}$$

where W_u is the urban wage rate which is assumed to be a nondecreasing function of S_u. (In a competitive labor market, $W_u(S_u)$ is the inverse supply function of skilled labor.) On differentiating with respect to S_u and solving, one obtains:

$$H_u'(S_u) = [1 + \varepsilon(\eta - \omega)](1 - H_u)/S_u \tag{6.1}$$

$$H'(S_u) = \varepsilon(\eta - \omega)(1 - H_u) \tag{6.2}$$

where

$$\varepsilon = \frac{\partial \ln L_u}{\partial \ln W_u} < 0, \quad \eta = \frac{\partial \ln \phi}{\partial \ln S_u} > 0 \quad \text{and} \quad \omega = \frac{\partial \ln W_u}{\partial \ln S_u} \geq 0$$

Consider first the case in which $\eta > \omega$ (so that urbanization reduces national poverty) and assume for the moment that:

$$1 + \frac{1}{\varepsilon(\eta - \omega)} < P_u(S_u) \text{ for all } S_u \text{ in } [0, 1] \tag{7}$$

This implies that the urban poverty rate rises relative to the national rate as urbanization proceeds, i.e., $h'(S_u)>0$ for all S_u in [0, 1]; thus, the poor urbanize faster than the population as a whole. Under the same conditions, it is readily verified that the poor urbanize faster than the nonpoor.[6]

[5] Alternatively, one might allow external diseconomies of urbanization to set in after some point. Further urbanization will then be poverty increasing nationally in this model. This possibility is noted, but not analyzed further.

[6] With $h'(S_u)>0$ and S_u rising over time, it must be the case that the rate of decline in the urban poverty rate is less than for the national rate, i.e., $\partial \ln H_u/\partial t > \partial \ln H/\partial t$, noting that both are negative. Thus, $\partial \ln(1 - H_u)/\partial t < \partial \ln(1 - H)/\partial t$ (given that $H_u < H$ and H is falling over time). It follows that the growth rate of the urban share of the nonpoor, $(1 - H_u)S_u/(1 - H)$, is less than the growth rate of S_u.

The urbanization of poverty curve must then be a strictly increasing and convex throughout as illustrated in Fig. 1. It is plain that $P_u(S_u)$ is strictly increasing given that $h(S_u)=P_u(S_u)/S_u$ is increasing in S_u. It is also clear that $P_u(S_u)$ cannot be linear in any interval since this would mean that $h'(S_u)=0$. The only other possibility is that the function is strictly concave in some interval. But then, there will be a point S_u^* such that $h(S_u)$ reaches a maximum within that interval, i.e., $P_u'(S_u^*)=h(S_u^*)$. If $S_u^*<1$, then $h(.)$ must be a decreasing function for some $S_u>S_u^*$—again a contradiction. When $S_u^*=1$, $P_u'(S_u^*)=1$. Since $P_u'(1)=h'(1)+h(1)$ and $h(1)=1$, this requires that the left derivative of h vanishes, $h'(1)=0$—also a contradiction. Thus, the function must be strictly convex throughout, as in Fig. 1.

If $\eta \leq \omega$, then the national poverty rate will be nondecreasing in S_u and the urban poverty rate will be strictly increasing in S_u. However, it will still be true that $h'(S_u)>0$ and that the function $P_u(S_u)$ is strictly increasing and convex.

There are a number of ways in which the assumptions of the above model can be changed such that the poverty urbanization curve no longer looks like Fig. 1. To illustrate one possibility, let us suppose that the restriction in Eq. (7) does not hold so that $h'(S_u)<0$ for some S_u. Also, suppose that (i) $\phi(S_u)=S_u$; (ii) the real wage rate is fixed ($\omega=0$), and (iii) the labor demand function has constant elasticity so that Eq. (4) can be written:

$$(1-H_u(S_u))S_u=(W_u/S_u)^{\varepsilon} \tag{8}$$

where ε is a constant. When $\varepsilon<-1$, the restriction in Eq. (7) fails for some S_u. Fig. 2 gives the implied $P_u(S_u)$ functions for $\varepsilon=-1,-2,-3,-4$ (labeled (1), (2),...). (The wage rate

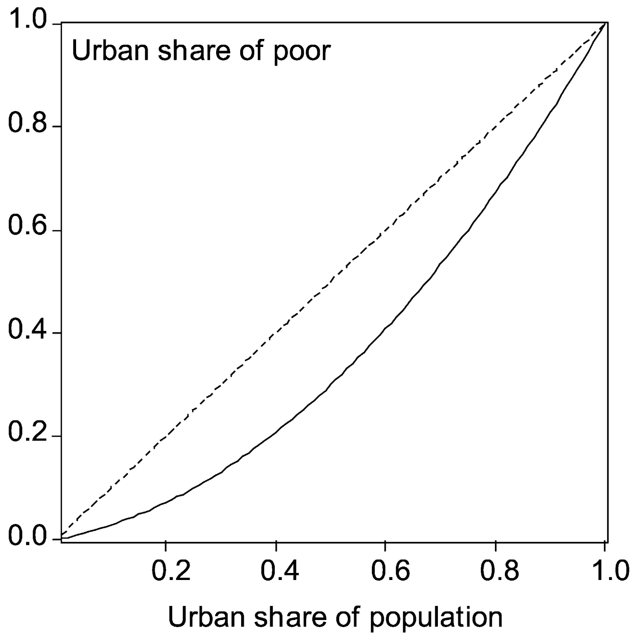

Fig. 1. Theoretical poverty urbanization curve.

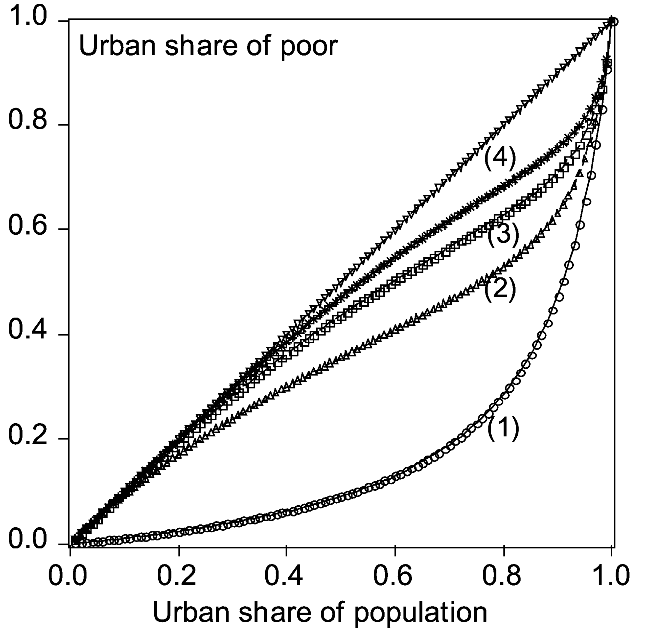

Fig. 2. Urbanization of poverty for various labor demand elasticities.

has been arbitrarily set such that the poverty rate when all the population is in urban areas is 10%.) The curve becomes concave at higher elasticities of labor demand, and over a wider interval as the absolute elasticity rises. By introducing a rural nonpoor sector, one can also generate poverty urbanization curves that cross the 45° line. For example, if the rural poverty rate is less than one but fixed, then S-shaped curves emerge in which the urban share of the poor exceeds the urban population share for an interval of low levels of urbanization.

The model in the section has only served to illustrate one possible set of conditions under which the poor urbanize faster than the population as a whole such that poverty urbanization curve looks like Fig. 1. There can be no general presumption that this will be the case. And there are no doubt other models that can generate Fig. 1. The rest of this paper turns to empirical evidence.

3. Calibrating the poverty urbanization curve to cross-country data

A specification for $P_u(S_u)$ with sufficient flexibility for the present purpose is a cubic polynomial, whereby $h(S_u)$ has the quadratic form:

$$h(S_u) = 1 - \beta(1 - S_u) + \gamma(1 - S_u)^2 + \upsilon \tag{9}$$

where β and γ are parameters to be estimated and v is a zero mean error term. $P_u(S_u)$ passes through (0, 0) and (1, 1) when the curve is evaluated at the expected value of h.

World Bank (1999, Table 2.7) gives a compilation of estimates of urban and rural poverty incidence for 39 countries. The estimates are drawn from country-level poverty studies by the World Bank and developing country governments. All the estimates are based on household survey data and (naturally) these data are of varying quality. Methods of setting poverty lines also vary between countries and the differences can matter to comparisons of urban and rural poverty.[7] These would appear, nonetheless, to be the best available data source for the present purpose. I will use the urban population share implicit in the urban, rural and national poverty rates, though I test sensitivity to using the Census-based urban population shares given in World Bank (1999).

Using these data, I initially regressed $h-1$ on a constant term, $1-S_u$ and $(1-S_u)^2$; the constant and the coefficient on $(1-S_u)^2$ were jointly insignificant ($F=0.53$, which rejects the null with probability 0.59). (White standard errors are used throughout.) If one sets the constant to zero, then the coefficient on the squared term is not significantly different from zero ($t=-0.66$), and the estimate of β is 0.451 with a standard error of 0.072. (Similarly, the constant term is insignificant if one suppresses the squared term.) Dropping both the constant and the squared term, I obtained an estimate of 0.468 for β with a (robust) standard error of 0.060 ($n=39$). (If instead one uses the Census-based urban population shares, the estimate is 0.473 with a standard error of 0.083.) The estimate is significantly positive, and significantly less than one. Fig. 3 plots the data and fitted values.

Thus, one is drawn toward the following empirical model:

$$P_u(S_u) = [1-\beta(1-S_u)]S_u \tag{10}$$

in which the value of β is around 0.5. The speed at which poverty urbanizes is then related to the overall speed of urbanization as:

$$\frac{\partial \ln P_u}{\partial t} = \left(1+\frac{\beta S_u^2}{P_u}\right)\frac{\partial \ln S_u}{\partial t} \tag{11}$$

At sample means ($S_u=0.423$; $P_u=0.321$, with $\beta=0.468$), the poor urbanize at a speed 26% higher than the population as a whole.

How much does rise with urbanization? It is readily verified that:[8]

$$\frac{H_u}{H_r} = \frac{1-\beta(1-S_u)}{1+\beta S_u} \tag{12}$$

It can be seen that H_u/H_r increases monotonically in S_u (with slope $[\beta/(1+\beta S_u)]^2$). At the lower bound of S_u, one finds that $H_u(0)/H_r(0)=P_u'(0)=1-\beta$, which is estimated to be 0.53. At the upper bound, $H_u(1)/H_r(1)=1/(1+\beta)$, which is 0.68. Thus, with urbanization, the urban poverty rate rises relative to the rural rate, but it does so rather slowly; indeed,

[7] See, for example, Ravallion and Bidani (1994) who compare alternative methods of setting urban and rural poverty lines in Indonesia. Also, see the discussion in Haddad et al. (1999).

[8] The following equation is derived by first noting that Eq. (3) can be rewritten in the form $H_u/H_r=h(1-S_u)/(1-hS_u)$ and then substituting $h=1-\beta(1-S_u)$ from Eq. (10).

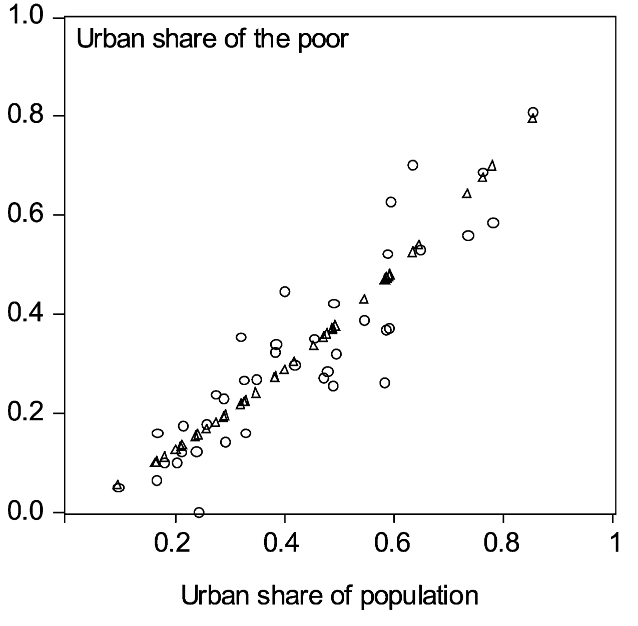

Fig. 3. Data for 39 developing countries.

even between the extremes in which nobody lives in urban areas and everyone does, the urban poverty rate rises from about one-half to two-thirds of the rural rate.

4. Time series evidence for India

There are very few countries with sufficient time series data to convincingly estimate Eq. (9). An exception is India, for which a reasonably long time series of reasonably comparable, nationally representative, household surveys allow us to study how the urban–rural poverty profile, has evolved with urbanization. I repeated the above analysis using 14 survey rounds spanning 1974–1997/1998.[9] Again, I found that a linear h function performed well, giving an estimate of 0.151 for β with a robust standard error of 0.019. Again, this is significantly positive (and less than one), implying that the poor urbanize faster. However, the estimate of β is much lower than for the cross-country data. The "India curve" implies a lower urban–rural disparity in poverty rates, and this varies little with urbanization.

It may, however, be hazardous to try to infer what is likely to happen with future urbanization from these data for India. Over this 25-year period, the urban share of the population in India spans a relatively narrow range, from 21% to 27%. By contrast, the

[9] The data are from Datt (1999) and are a slightly updated version of the data set described in Özler et al. (1996) and http://www.worldbank.org/poverty/data/indiapaper.htm.

cross-country comparisons above span a range from 10% to 85%. The India curve may be close to the 45° line at low levels, but fan out later.

5. Conclusions

Conditions have been identified under which the poor urbanize faster than the nonpoor, implying that the urban share of the poor is an increasing convex function of the urban share of the population, as in Fig. 1. Supportive evidence for this theoretical relationship is found in data for a cross-section of developing countries and in time series data for India.

If poverty urbanizes in the future consistently with the cross-country relationship modeled above, then the urban share of poverty will reach 40% in 2020 when the urban share of the population is projected to reach 52% (UN, 1996). At the projected growth rate in the urban population share between 2015 and 2020 in UN (1996), the urban share of the total number of poor will reach 50% by 2035, when the urban population share reaches 61%.

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