A ROBUST POVERTY PROFILE FOR BRAZIL

DATA AND METHODOLOGY

The basic welfare indicator is given by

$$y_{ij} = \frac{Y_{ij}}{I_j n_i^{q}}$$

, where household i lives in spatial area j, n_i is the number of members of household i, $q \in (0,1)$ is the Buhmann et. al. (1988) equivalence scale parameter, and I_j is the price deflator for spatial area j. The recipient unit is the individual, which is to say that the distribution analyzed is a vector of y, where y_i is entered n_i times.

Imputed Rent - Y_{ij} incorporates one important addition to the total household income variable reported in the original PNAD data set, namely a measure of imputed rent. It is meant to evaluate the monthly flow of rental services that house-owners derive from their housing stock. It is imputed only to households that report owning their houses (whether or not they own the land). Imputed values were derived by means of a two-step procedure: first a hedonic rental price model was estimated by means of a set of regressions of rents actually paid, on characteristics of both the rented dwelling and the renting household. These regressions were run on the PNAD subsample of households which reported the rent they paid for the dwellings in which they lived. Secondly, the parameters of these estimated models were applied to the characteristics of each individual house-owning household in the PNAD 1996, and used to predict its imputed rent, which was added at the household level, and henceforth formed part of its total income. Imputed rent implied in an increase of average per capita income of 18.2% and a fall of FGT indexes P0, P1 and P2 of 16.1%, 21.9% and 26.3%, respectively (using the intermediary poverty line)

Spatial Deflation - like its temporal counterpart, seeks to approximate a true cost of living index, $\Gamma_j = \dfrac{E(p_j,\bar{u})}{E(p_R,\bar{u})}$ **, where E(.) is the expenditure function, p_j is the vector of prices ruling in area j, u is a given level of utility and R is some reference area.**

Any deflator used in practice is bound to be an imperfect approximation to Γ_j. Ravallion and Bidani (1994) argue for using a Laspeyres price index, constructed by fixing the vector of quantities for some reference area (in their case, a country average), and allowing the price vector to vary across all areas in the domain of the index. Others have pointed out that this method has a tendency to underestimate real incomes, by failing to account for the substitution effects of changes in relative prices over space.

The class of indices is given by : $I_{aj} = aI_+ + (1-a)I_-$, where

$I_+ = s_F \dfrac{q_+ p_j}{q_+ p_+} + s_H \dfrac{p_j}{p_+}$ and $I_- = s_F \dfrac{q_- p_j}{q_- p_-} + s_H \dfrac{p_j}{p_-}$ and a can take any arbitrary value in [0, 1]. σ_F is the food share in housing and food expenditure, and σ_H is the corresponding housing expenditure share. p and q are food price and quantity vectors in the regions they are indexed by. The quantities are averages of the consumption quantities for each commodity reported by deciles 2-5 in each region, and the prices are the implicit prices (or unit values) for those deciles. π is a housing cost analogue for the same deciles in each region. All of these are taken from the PPV data set. In order to make the parametric class of deflators I_α a suitable instrument to test for the robustness of the profile with respect to different reference consumption bundles, the reference regions indexed by - and + are chosen so as to maximize the differences in relative prices between them.

They are chosen so that (p_- , p_+) solve the following algorithm: $Min\, r(p_i, p_j)$ over S = {p_k}, $\forall$k. Rho is the Pearson correlation coefficient. This program simply entails choosing the two areas, within the ten areas surveyed by the PPV, which display the least correlated price vectors. In addition, we also examined the profile based on nominal incomes, i.e. the controlling case of no regional deflation: with $I_j = 1,\ \forall$j.

The correlation coefficients between price vectors for each pairwise combination of these ten regions are given in Table 1 below.

Table 1:
Correlation Coefficients across region-specific price vectors, from the PPV (1996) survey

	Fortaleza	Recife	Salvador	NE urb	NE rur	RM B.H.	RM Rio	S. Paulo	SE urb	SE ru
Fortaleza	1.000									
Recife	0.8581	1.000								
Salvador	0.9302	0.7321	1.000							
NE urban	0.9594	0.8805	0.9229	1.000						
NE rural	0.9593	0.8814	0.9143	0.9846	1.000					
RM B.H.	0.9050	0.6761	0.8559	0.8656	0.8513	1.000				
RM Rio	0.8468	0.8153	0.7772	0.8694	0.8268	0.8654	1.000			
S. Paulo	0.8969	**0.6239**	0.8580	0.8526	0.8453	0.9318	0.7985	1.000		
SE urban	0.9324	0.7992	0.8542	0.9240	0.8956	0.9591	0.9234	0.9205	1.000	
SE rural	0.9063	0.8360	0.8258	0.9163	0.8832	0.9326	0.9371	0.8582	0.9849	1.000

by varying α in the interval [0, 1], thereby constructing convex combinations of the two price indices based on the reference regions with the least correlated price vectors, we could test the robustness of the poverty profile – or indeed of any poverty or inequality measure – with respect to changes in the choice of price deflator. In the event, this procedure turns out to be unnecessary for the case of Brazil. I and I_+ themselves, given in Table 2 below, turn out to be very closely correlated. In particular, the ranking of the 10 PPV areas by poverty headcount with respect to the lower bound poverty line (see below) is identical for both of them. In this light, and in order to avoid the presentation of an unmanageable number of profile tables, the analysis presented below is based exclusively on the São Paulo-based regional price index (I_+). Clearly, given the information in Table 2, the matrix $I_{\alpha j}$ can be constructed for J = {j} and for any values of $\alpha \in [0, 1]$.

Table 2:
Regional Price Indices based on the Recife and São Paulo baskets.

PPV 'Region'	I: The Recife-based index	I_+: The São Paulo-based index
RM Fortaleza	1.004451	1.014087
RM Recife	1.000000	1.072469
RM Salvador	1.234505	1.179934
Northeast Urban	1.085385	1.032056
Northeast Rural	0.931643	0.953879
RM Belo Horizonte	1.043125	0.958839
RM Rio de Janeiro	1.094239	1.002163
RM São Paulo	1.120113	1.000000
Southeast Urban	0.995397	0.904720
Southeast Rural	0.985787	0.889700

Once one of these price indices (and a value for θ) is chosen, a vector of regionally deflated, equivalised household incomes is defined and ready for distributional analysis.

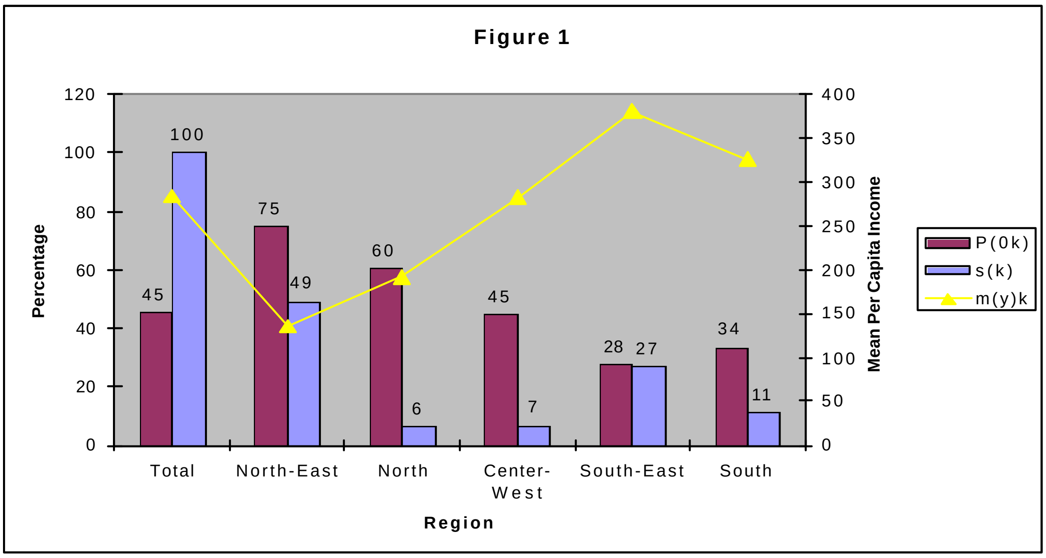
Lines

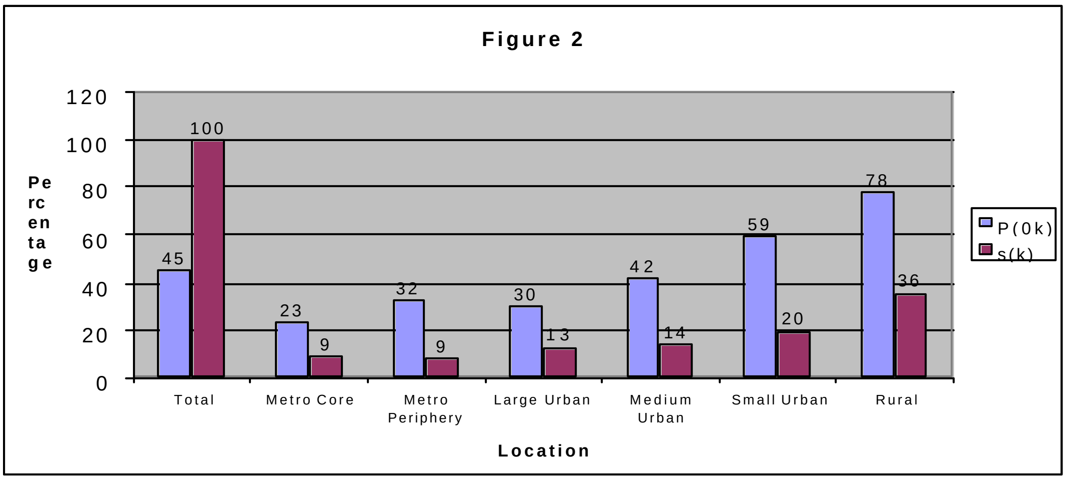
An indigence line, equal to the cost of the 'minimum food basket' in the reference region: $z = p_R q_R^*$, where q_R* is the same vector q_R of average consumption bundles for deciles 2-5 in reference region R, scaled up to yield a caloric intake equal to the FAO minimum intake of 2,288 calories per day. This line is equal to R$ 65.07.

- A lower-bound poverty line, which scales up the cost of the minimum food basket to take into account the non-food expenditures of those people whose total incomes would just allow them to purchase that minimum food basket. I.e. $z^- = \frac{z}{e_L}$, where ε_L is the

Engel coefficient for households whose total income is equal to the indigence line. This line is worth R$ 131.97 and we treat it as our main, 'headline' poverty threshold.

Profile





Characteristics of the Household Head.

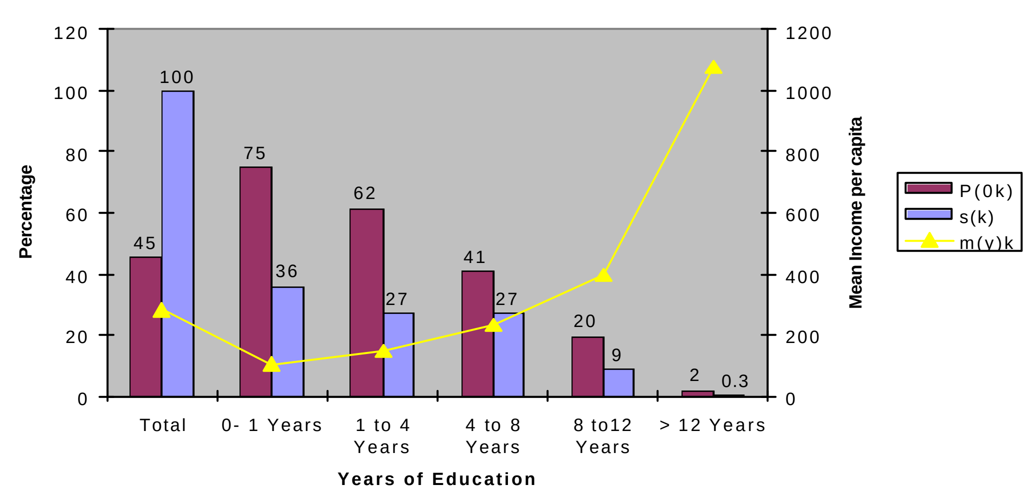


Figure 3

Table:Headcount indices (P0) for Brazil as a whole, under different assumptions.

	α = 0.5	α = 0.75	α = 1.0
I-	20.48	32.91	47.09
I+	19.41	31.22	45.29
I = 1	20.11	32.13	46.14

Table: Gini Coefficients for Brazil as a whole, under different assumptions.

	α = 0.5	α = 0.75	α = 1.0
I	0.5474	0.5574	0.5700
I_+	0.5525	0.5624	0.5747
I = 1	0.5529	0.5627	0.5750