Regional and demographic determinants of poverty in Brazil

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1. Introduction

Poor areas could be so because they concentrate household with the "wrong" characteristics, such as low level of education, higher family sizes, etc. If households were free to migrate, any social policy aiming at raising education levels in those specific areas, for example, would end-up estimulating out-migration. As a result, the inequality observed after the adjustment process would indicate a scenario in which there would be no geographical differences in levels of living (income, living conditions, etc.). It would be completely explained by the differentiated sets of personal characteristics across regions. In this case, there would be no place for targeting a specific region in the implementation of policy measures: there would be no need for "regional" policy. On the other hand, moving can be costly and risky for poor people, due to transportation costs and other personal (emotional, non-economic) factors. As Ravallion (1993) points out, it could be difficult to policy makers to target household characteristics, indicating that geographic targeting could be in case, even after allowing for migration. Park, Wang and Wu (2002) evaluated the effectiveness of regional targeting of a Chinese large-scale poverty alleviation program, and found out that political factors have affected targeting and leakage has increased as coverage increased. Bird and Shepherd (2003) tested social and political exclusion variables as well as typical geographical variables in the explanation of rural poverty in Zimbabwe, and showed that proximity to urban areas is an important factor.

This discussion points out to the importance of determining whether or not observed regional inequality is completely due to differences in mobile nongeographic characteristics, such as education, family size, etc., or if, even after controlling for those variables, a "regional" residual would still be present. Brazil is a country with huge and persistent regional inequalities, as described in Azzoni (2201), Baer (2001) and Haddad (1999) and is thus an interesting case to study the subject. Azzoni and Servo (2002) have shown that metropolitan differentials in wage income are important, even after controlling for personal and sectoral characteristics of households, as well as for cost-of-living differences, with similar results for the variables of interest across years. That study is limited in the sense that only households of the 11 official metropolitan are compared. In this paper we deal with all 27 states in the country, including households in urban (metropolitan and non-metropolitan) and rural areas. In this study we use information from the Population Census of 2000, while Azzoni and Servo had to rely on household surveys, since the census was not available at the time.

We apply different decomposition techniques to assess the role of demographic and geographical variables in explaining income inequality in Brazil, following Ravallion and Wodon (1999). Since we have a larger number of observations, we were able to estimate regressions for each state, improving on the results of both studies. The next section presents the database and provides some information on the regional distribution of poverty in Brazil. In section 3 we regress the log of real income values in the states against personal characteristics and regional dummies, allowing for a first statement of the importance of regional factors. A step forward in the decomposition of the factors influencing regional inequality is presented in section 4, in which both the influence of characteristics and of returns to characteristics is determined. In section 5 we develop geographic and concentration profiles, using national parameter estimates to predict the income of households in different states. Finally, section 6 presents the conclusion of the study.

2. Database

We use the log of the “welfare ratio” (**W**) to measure the standard of living in different states in Brazil. It is defined as the nominal per capita income deflated by a state-specific poverty line, incorporating cost-of-living differences. It is assumed that a vector of household characteristics **X**, with parameters that vary geographically, defines this welfare ratio. We use microdata from the 2000 population census, considering 3,918,674 urban, and 1,141,359 rural households across the 27 Brazilian states. For each household, we calculate the average per capita income from all sources. As for household characteristics, we use: number of children (age < 5), number of adolescents (age 5 to 18), number of adults (age 18 to 65), number of elderly people (age > 65), years of schooling, maximum number of years of education present in the household, gender, age, race, marital status, type of occupation (managers, directors; arts and sciences; middle-level occupations; administrative services; agricultural works; manufacturing; maintenance; military; others); age and years of schooling of the household-head partner.

Poverty lines values were taken from Rocha (1997), and translated into July 2000 money figures through an adequate price index. Since Rocha does not provide estimates for some rural areas, especially in the North region, we have made some adaptations based on her work. The figures for poverty lines consider different urban and rural cost-of-living in the states, therefore they are net of regional differences in those levels. The average values for income are R$ 402.71 and R$ 140.89[1], for urban and rural areas, respectively, giving a 2.86 ratio. After discounting for cost-of-living, the ratio drops to 1.26, since cost-of-living in rural areas is much lower than in urban areas. Table 1 presents the percentage of households below the poverty line in each state; it also shows the number of households under the indigence line (also taken from Rocha, 1997). For the country as a whole, 30.2% of households can be considered poor, and 10.2%, indigent, but the proportion of poor households varies significantly across states: it is almost 52% in the poor Northeastern states of Maranhão and Piauí, and only 12% in the Southern state of Santa Catarina.

(Table 1, Page 11)

3. Regression results

[1] In July 2000, US$ 1.00 ≡ R$ 1.80

Following Ravallion and Wodon (1999), our estimated regressions correlate the log of the welfare ratio (**W**) to characteristics of the households in general. We linearly regress *log* **W** to a vector of non-geographic variables (**X**) and a vector of state dummy variables **D**. We estimate equations of the form

$$(1) \qquad \log \boldsymbol{W}_i = \alpha + \beta \boldsymbol{X}_i + \delta \boldsymbol{D}_i + \varepsilon_i$$

With $i = 1, \ldots, 27$. The error terms ε are assumed independently distributed with zero mean. Separate equations are estimated for rural and urban households[2].

Results are presented in Table 2. As the basis for comparison for the dummy variables, we use unoccupied women, black, married, in the state of São Paulo. Thus, the regression coefficients must be interpreted as income gains/losses relative to this reference. The intercept indicates that such urban households had an average income of only 37%[3] of their poverty line, and similar rural households had only 71% of their poverty line. The coefficients for the non-geographic variables are statistically significant and presented the expected signs: per capita household income declines with number of children, adolescents and elderly people in the household (squared terms are also included); men make more money than women; age and age squared indicate the typical life cycle profile; white people earn more than people of other races; education is positively associated to income, etc[4].

Comparing urban and rural households, the coefficients are quite different in general. For example, number of adults is not as important a negative factor for rural households (the coefficient is almost half of the urban equation); the number of elderly turns out positive for rural households, probably indicating the importance of pension payments for people that age in the rural setting[5]. As for the state dummies, they are all significant, indicating that, controlling for all non-geographic characteristics included in the

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[2] Since our sample sizes are large enough, we have assumed that errors are i.i.d. We have ran a version correcting for heteroscedasticity and the results are practically the same.
[3] Exp (–1.0006) = .37
[4] The results for household characteristics are similar to the ones observed in Azzoni and Servo (2002) and to other studies in the same subject in the country, as Arbache (1998), Reis and Barros (1991).
[5] Pension payments to rural elderly is a very important source of income for rural communities, especially in poor regions

X vector, there are significant differences in the welfare ratio across states. This is a first indicator that geography matters.

(Table 2, Page 12)

4. Comparing areas

It is now important to explain the differences in welfare between urban and rural households. Writing separate equations for urban and rural households, and taking expectations of them, the urban-rural differential in mean welfare ratio is

$$(2) \qquad \boldsymbol{E}[\log \boldsymbol{W}_i / \mathrm{i} \in \mathrm{U}, \boldsymbol{X}_i = \boldsymbol{X}_U] - \boldsymbol{E}[\log \boldsymbol{W}_i / \mathrm{i} \in \mathrm{R}, \boldsymbol{X}_i = \boldsymbol{X}_R] = (\alpha_U - \alpha_R) + (\beta_U \boldsymbol{X}_{i,U} - \beta_R \boldsymbol{X}_{i,R}) + \sum_k (s_{U,k}\delta_{U,k} - s_{R,k}\delta_{R,k})$$

Where $\mathbf{X}_{U,R}$ are the sample means for urban and rural areas, and $s_{U,R,k}$ are the proportions of state *k*'s population in each sector. The first term in the right-hand side of Equation (2) is the difference in intercepts. In this case, it shows the difference between the predicted *log* W for an unemployed non-white married women in São Paulo state between urban and rural areas. The second term indicates the differential impacts of non-geographic variables in urban and rural areas. The third term gives the difference due to the geographical distribution of population between urban and rural areas.

The results of this decomposition are presented in Table 3. The difference in the intercept indicates that unemployed non-white married women living in the rural area of São Paulo state are better off, comparatively, than those living in the urban area. As for the nongeographic variables, the largest influence comes from the urban-rural differences in education variables, but differences in demographics also play a role. The difference in geographic dummy variables indicates that, on average, and controlling for other characteristics, the gap between the rural areas of São Paulo state and other similar areas in the country is higher than in the urban case. This effect is of the same order of magnitude as those of differences in occupation variables.

(Table 3, Page 13)

The above comparison between urban and rural areas does not tell the interesting part of the story, for the differences could either be due to differences in characteristics or to the varying returns to those characteristics across states. For example, the difference in education could result from different years of schooling across states and/or to the varying returns to each school year in different states. In other to advance further in the analysis, since the model parameters differ between the rural and urban models, we compute the expected gain in welfare from living in urban areas of a given state over rural areas, given that the household has the national means of all characteristics, $\mathbf{X}^*$. For the jth state, this is given by[6]

$$(3) \qquad \boldsymbol{E}\left[\log \boldsymbol{W_i}/\boldsymbol{i} \in \mathrm{U}, \boldsymbol{D}_{\mathrm{i}} = \boldsymbol{D}^{\boldsymbol{j}}, \boldsymbol{X_i} = \boldsymbol{X}^*\right] - \boldsymbol{E}\left[\log \boldsymbol{W_i}/\boldsymbol{i} \in \mathrm{R}, \boldsymbol{D}_{\mathrm{i}} = \boldsymbol{D}^{\boldsymbol{j}}, \boldsymbol{X_i} = \boldsymbol{X}^*\right] = (\alpha_U - \alpha_{\boldsymbol{R}}) + (\beta_U - \beta_{\boldsymbol{R}})\boldsymbol{X}^* + (\delta_{U,\boldsymbol{j}} - \delta_{\boldsymbol{R},\boldsymbol{j}})$$

Only the third term in the right-hand side of Equation (3) varies across states. The first term shows the effect of unexplained sectoral differences between rural and urban areas, as well as differences in the excluded dummies. The second term presents the effect of urban-rural differences in the returns to household characteristics, that is, for a household with the national set of average characteristics, what would be the difference in welfare if the location were urban or rural. The results of this decomposition are also presented in Table 3. Of the -0.10 difference in household characteristics, returns to characteristics account for –0.22, while the profile of characteristics in the rural area present a positive effect of 0.12. Thus, the comparative disadvantage of rural areas in terms of household characteristics is due mainly to the lower return to characteristics in the rural setting. As for demographics, the most important share belongs to the characteristics (58%), with returns at a lower level, although positive. That is, on average, rural households present a more adequate set of characteristics than urban households, although returns are also higher in the rural areas. A similar situation is observed for education, only that in this case the share of characteristics is higher, 72%. This indicates that, on average, households living in the rural areas present a more adequate set of characteristics. As for differences in the last term

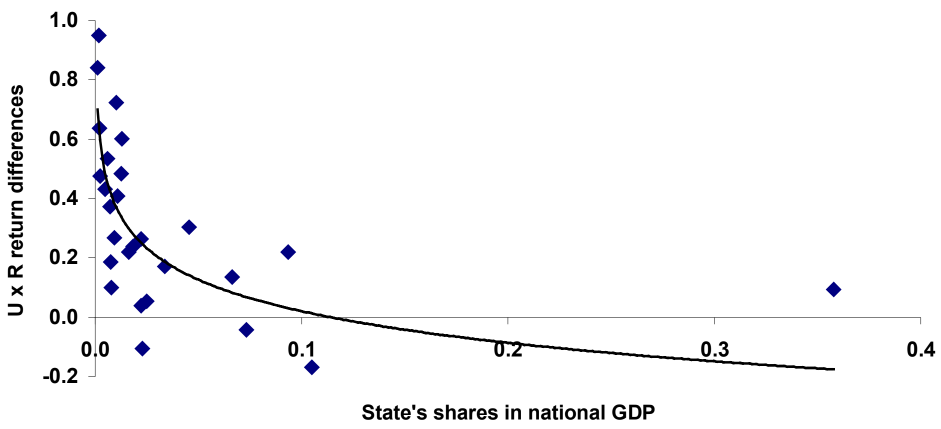
[6] This is obtained by adding and subtracting $\beta_U\mathbf{X}^*$ and $\beta_U\mathbf{X}^*$ to equation (1) for each type of area, and rearranging the terms.

of equation 3, the gap between urban areas of São Paulo state and other urban areas in the country favors this state, and is around one third of the same gap involving rural areas, indicating that both sectors do better in São Paulo, but the rural sector is in better shape, relatively, than its urban sector.

We have estimated regressions for households within each state, in which case the regional dummies were off course eliminated. From these equations, the same decomposition of equation (3) was estimated for households within each state, and the results are presented in Table 4. Column (B) indicates the urban-rural income differential for a household with the national average of characteristics, subject to the returns of those characteristics in each state. As Figure 1 indicates, the urban-rural return to household characteristics (column B) is inversely related to aggregate income levels. That is, the higher the share of a state in national production, the lower the premium for living in the urban areas. Another way to say it, is that the rural sector in big-economy states is more developed, comparatively, than in small states. For example, in the case of Sao Paulo state, with 35% of national GDP, the differences in returns between urban and rural households is only 0.9, from a total of 0.54. The highest share in the explanation comes from differences in characteristics of rural households (column E).

(Table 4, Page 14)

Figure 1 - Urban x rural return differeces across states



5. Geographic profiles

Another way of assessing the importance of geographic effects is by comparing the actual income with values conditioned to other characteristics. The first measure uses the estimated state parameters in each sector to predict the income of a household with the national characteristics. That is

$$(4) \qquad \log \hat{W}_U = \alpha_U^j + \beta_U^j X^* \quad \text{and} \qquad \log \hat{W}_R = \alpha_R^j + \beta_R^j X^*$$

Thus, if the estimated income value for state j coming from equations (4) is lower than the observed one (unconditional), there is an indication that households in that state experiment higher returns to characteristics, as compared to the national average return. This measure was named "geographic profile" by Ravallion and Wodon (1999), and isolates the purely geographical effects. The results are presented in Table 5. Figures 2 and 3 show the ratio of unconditional to the estimate incomes ("geographic") in relation to per capita income levels in states (national per capita income level = 1). The figures indicate that the richer the state, the higher the ratio, that is, rich states tend to experiment higher returns to characteristics than poor states, in both sectors.

Another measure is given by

$$(5) \qquad \log \tilde{\boldsymbol{W}}_U^j = \alpha^* + \beta^* \boldsymbol{X}_U^j \quad \text{and} \qquad \log \tilde{\boldsymbol{W}}_R^j = \alpha^* + \beta^* \boldsymbol{X}_R^j$$

With $\alpha^* \equiv \boldsymbol{s}_U(\alpha_U + \sum_k \boldsymbol{s}_{U,k}\delta_{U,k}) + \boldsymbol{s}_R(\alpha_R + \sum_k \boldsymbol{s}_{R,k}\delta_{R,k})$ and $\beta^* = \boldsymbol{s}_U\beta_U + \boldsymbol{s}_R\beta_U$ being weighted national averages. It uses overall national parameters to estimate income values to each state, highlighting the concentration of geographic characteristics, and is called by Ravallion and Wodon the "concentration profile". When the predicted value is larger than the observed (unconditional) value, there is an indication that there is a more favorable set of characteristic in that state, or that good characteristics are concentrated in that region. Results are also shown in Table 5. As Figures 3 and 4 indicate, the variation of the concentration profile across states does not provide such an evident relationship as in the case of the geographic profile. Nonetheless, the urban sector presents an increasing trend as per capita income grows for the poorer group of states, although the overall dispersion seems to be independent of the income level of a state. For the rural sector this conclusion is even stronger.

6. Conclusions

We have produced a study on whether or not observed real income regional inequality in Brazil is completely due to differences in mobile nongeographic characteristics, or a "regional" component would also be present. We have applied different decomposition techniques to assess the role of demographic and geographical variables in explaining income inequality in Brazil, following Ravallion and Wodon (1999). Since we have a larger number of observations, we were able to estimate regressions for each state, improving on the results of previous studies.

It is clear from the results that it is very important to differentiate urban and rural situations in studying regional inequality in Brazil. By applying adequate regional sector-specific deflators, the relative position of different states in relation to the national income average changes significantly, as compared to the relative position in terms of nominal (non regional-specifically deflated) income. The estimated income equations indicate that urban and rural coefficients are quite different, and that the state dummies are all significant, indicating the geography matters.

The decomposition of income differences between urban and regional areas indicates that education variables are the most important factor, followed by demographic characteristics, but geographical differences also play a role. The influence of all explanatory variables was disaggregated into returns to the variables and characteristics, and the relative importance of these components varies across characteristics. In the case of demographic variables, 58% of the importance is due to the set of characteristics, and the remaining 42% to returns to demographic characteristics. For education, a larger share of the influence comes from characteristics: 72%. The urban-rural differentiation in returns to characteristics in large-economy states tend to favor large-economy states, in which the highest share in the explanation comes from differences in characteristics of rural households. The comparison of observed (unconditional) real income levels with estimated levels, based on national sets of characteristics, indicate that rich states tend to experiment higher returns to characteristics than poor states, in both sectors.

These set of results indicate that, although personal characteristics do play an important role in explaining rural-urban regional differences in real income in Brazil, there still is room for regional differentiation. That is, even after controlling for all type of household characteristics, there still is room for geographical differentiation.

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Table 1 - Proportion of households under poverty and indigence lines

State	Proportion of Indigent			Proportion of Poor		
	Urban	Rural	Total	Urban	Rural	Total
Brazil	8.63	15.72	10.23	28.47	36.38	30.25
Rondônia	7.47	10.92	8.93	21.43	20.50	21.04
Acre	12.26	19.15	14.74	30.15	34.22	31.62
Amazonas	16.68	32.80	20.68	35.89	53.54	40.27
Roraima	9.19	28.69	14.88	23.67	40.10	28.47
Pará	14.31	17.42	15.38	37.00	35.96	36.65
Amapá	14.72	18.34	15.22	33.13	32.26	33.02
Tocantis	15.73	21.79	17.62	37.42	34.98	36.65
Maranhão	17.77	30.63	23.26	45.13	60.62	51.74
Piauí	17.33	28.78	22.10	48.62	56.48	51.89
Ceará	16.15	29.15	20.23	45.70	56.24	49.01
Rio Grande do Norte	11.75	23.83	15.45	31.70	48.17	36.75
Paraíba	15.28	23.34	18.00	44.88	50.53	46.78
Pernambuco	16.87	23.88	18.72	47.20	51.51	48.34
Alagoas	12.39	28.57	17.91	29.98	58.84	39.82
Sergipe	14.09	20.06	16.12	41.75	50.15	44.60
Bahia	16.37	21.64	18.26	46.53	48.91	47.39
Minas Gerais	5.56	9.41	6.48	25.73	27.18	26.08
Espírito Santo	5.80	4.62	5.51	26.78	20.59	25.26
Rio de Janeiro	8.65	5.23	8.47	27.68	26.69	27.63
São Paulo	5.85	5.66	5.83	21.20	17.95	20.89
Paraná	5.29	9.08	6.20	20.18	26.78	21.77
Santa Catarina	2.89	4.98	3.50	10.02	15.38	11.59
Rio Grande do Sul	4.62	5.80	4.91	14.40	17.91	15.26
Mato Grosso do Sul	5.49	6.60	5.72	32.99	26.95	31.71
Mato Grosso	5.40	10.87	6.75	30.88	30.30	30.74
Goiás	5.77	7.07	6.00	36.53	26.77	34.77
Distrito Federal	5.15	3.96	5.07	27.03	17.31	26.37

Table 2 - Regression of real income on characteristics and geographical variables

Dependent variable = Log W

	Urban		Rural		In relation to poverty line	
	Coefficient	St. Deviation	Coefficient	St. Deviation	Urban	Rural
Intercept	-1.0006	0.0051	-0.3363	0.0093	0.37	0.71
State Dummies						
Rondônia	0.3450	0.0046	0.4930	0.0060	1.41	1.64
Acre	0.2252	0.0071	0.2977	0.0100	1.25	1.35
Amazonas	0.1655	0.0034	0.1620	0.0065	1.18	1.18
Roraima	0.3858	0.0087	0.2534	0.0141	1.47	1.29
Pará	0.0614	0.0025	0.2188	0.0041	1.06	1.24
Amapá	0.2894	0.0072	0.2670	0.0188	1.34	1.31
Tocantis	0.0324	0.0042	0.1122	0.0068	1.03	1.12
Maranhão	-0.2760	0.0029	-0.4475	0.0039	0.76	0.64
Piauí	-0.2268	0.0032	-0.4891	0.0046	0.80	0.61
Ceará	-0.1881	0.0021	-0.4649	0.0039	0.83	0.63
Rio Grande do Norte	-0.2183	0.0036	-0.2979	0.0050	0.80	0.74
Paraíba	-0.1929	0.0027	-0.4101	0.0045	0.82	0.66
Pernambuco	-0.2972	0.0019	-0.3186	0.0039	0.74	0.73
Alagoas	-0.1596	0.0044	-0.3214	0.0052	0.85	0.73
Sergipe	-0.0829	0.0028	-0.3156	0.0046	0.92	0.73
Bahia	-0.2339	0.0017	-0.2631	0.0032	0.79	0.77
Minas Gerais	0.0542	0.0013	0.0350	0.0030	1.06	1.04
Espírito Santo	-0.0111	0.0027	0.1253	0.0053	0.99	1.13
Rio de Janeiro	-0.1997	0.0013	-0.2000	0.0054	0.82	0.82
Paraná	0.0777	0.0016	-0.0660	0.0035	1.08	0.94
Santa Catarina	0.2917	0.0022	0.1696	0.0039	1.34	1.18
Rio Grande do Sul	0.2108	0.0015	0.0102	0.0034	1.23	1.01
Mato Grosso do Sul	-0.1422	0.0032	-0.0749	0.0065	0.87	0.93
Mato Grosso	-0.0377	0.0040	-0.0192	0.0075	0.96	0.98
Goiás	-0.2213	0.0020	-0.1059	0.0047	0.80	0.90
Distrito Federal	-0.0893	0.0033	0.1637	0.0124	0.91	1.18
Household Characteristics						
Number of children under 5	-0.3862	0.0013	-0.3184	0.0021	0.68	0.73
Number of childern under 5 squared	0.0482	0.0005	0.0377	0.0007	1.05	1.04
Number of adolescents	-0.3499	0.0007	-0.3017	0.0011	0.70	0.74
Number of adolescents squared	0.0285	0.0002	0.0229	0.0002	1.03	1.02
Number of adults	-0.1799	0.0010	-0.0990	0.0018	0.84	0.91
Number of adults squared	0.0189	0.0001	0.0113	0.0002	1.02	1.01
Number of elderly	-0.0287	0.0023	0.1915	0.0041	0.97	1.21
Number of elderly squared	-0.0030	0.0011	-0.0504	0.0019	1.00	0.95
Maximum number of schooling years in the household	0.0529	0.0002	0.0232	0.0003	1.05	1.02
Household-Head Characteristics						
Dummy masculine	0.0856	0.0012	0.0647	0.0029	1.09	1.07
Age	0.0189	0.0002	0.0137	0.0003	1.02	1.01
Age squared	-0.0001	0.0000	-0.0001	0.0000	1.00	1.00
Dummy white	0.1495	0.0008	0.1029	0.0016	1.16	1.11
Years of schooling	0.0219	0.0003	0.0226	0.0007	1.02	1.02
Years of schooling squared	0.0018	0.0000	0.0027	0.0001	1.00	1.00
Dummy not-married	0.5568	0.0051	0.5467	0.0092	1.75	1.73
Spouse characteristics						
Age	0.0152	0.0002	0.0078	0.0004	1.02	1.01
Age squared	-0.0001	0.0000	0.0000	0.0000	1.00	1.00
Years of schooling	0.0109	0.0004	0.0148	0.0007	1.01	1.01
Years of schooling squared	0.0018	0.0000	0.0028	0.0001	1.00	1.00
Household-head Occupation						
Director, manager	0.9409	0.0020	0.7381	0.0052	2.56	2.09
Arts and sciences	0.6652	0.0022	0.5540	0.0099	1.94	1.74
Middle level technicians	0.5006	0.0018	0.4785	0.0068	1.65	1.61
Administrative services	0.3488	0.0020	0.5015	0.0093	1.42	1.65
Service sector	0.2595	0.0011	0.3581	0.0031	1.30	1.43
Agriculture	0.2167	0.0017	0.1697	0.0020	1.24	1.18
Manufacturing goods and services	0.3692	0.0012	0.4876	0.0029	1.45	1.63
Maintenance	0.3892	0.0025	0.5092	0.0087	1.48	1.66
Military	0.6205	0.0039	0.7898	0.0201	1.86	2.20
Unespecified	0.5377	0.0038	0.2256	0.0056	1.71	1.25
R2	0.5737		0.4792			
Number of observations	3.918.674		1.141.349			

Table 3 - Contributing factors to average urban-rural regional income disparities

	Urban	**Rural**	**Difference**
Mean log welfare ratio	0.66	0.42	**0.23**
Decomposition			
Constant term	-1.00	-0.34	**-0.66**
Geographic dummy variables	-0.04	-0.12	**0.08**
Household characteristics	-0.66	-0.56	**-0.10**
Returns			-0.22
Characteristics			0.12
Demographics	0.61	0.37	**0.24**
Returns			0.09
Characteristics			0.14
Education variables	0.82	0.32	**0.51**
Returns			0.14
Characteristics			0.37
Occupation variables	0.27	0.20	**0.07**
Returns			-0.02
Characteristics			0.10

Table 4 - Oaxaca Decomposition - Comparing urban and rural areas within states

State	$(\alpha_U - \alpha_R)$ (A)	$(\beta_U - \beta_R) X^*$ (B)	$(X_U - X^*) \beta_U$ (D)	$(X^* - X_R) \beta_R$ (E)	Difference (F)
Rondônia	-1.02	0.53	0.12	0.36	-0.01
Acre	-0.97	0.47	0.14	0.45	0.10
Amazonas	-0.87	0.48	0.14	0.47	0.23
Roraima	-1.22	0.84	0.14	0.50	0.27
Pará	-0.60	0.04	0.12	0.42	-0.02
Amapá	-1.37	0.95	0.14	0.46	0.18
Tocantis	-1.15	0.64	0.14	0.45	0.07
Maranhão	-0.74	0.41	0.15	0.52	0.34
Piauí	-0.69	0.43	0.16	0.55	0.45
Ceará	-0.43	0.24	0.17	0.49	0.47
Rio Grande do Norte	-0.66	0.27	0.13	0.47	0.21
Paraíba	-0.46	0.19	0.16	0.49	0.38
Pernambuco	-0.48	0.05	0.13	0.48	0.18
Alagoas	-0.49	0.10	0.13	0.52	0.27
Sergipe	-0.58	0.37	0.16	0.46	0.41
Bahia	-0.69	0.30	0.13	0.47	0.21
Minas Gerais	-0.66	0.22	0.13	0.49	0.18
Espírito Santo	-0.75	0.22	0.12	0.43	0.03
Rio de Janeiro	-0.28	-0.17	0.12	0.48	0.16
São Paulo	-0.54	0.09	0.13	0.49	0.17
Paraná	-0.43	0.14	0.14	0.49	0.33
Santa Catarina	-0.42	0.17	0.15	0.48	0.37
Rio Grande do Sul	-0.20	-0.04	0.15	0.56	0.46
Mato Grosso do Sul	-0.97	0.60	0.12	0.36	0.12
Mato Grosso	-1.12	0.72	0.11	0.42	0.14
Goiás	-0.76	0.26	0.12	0.43	0.06
Distrito Federal	-0.64	-0.11	0.14	0.57	-0.03

Table 5 - Geographical and concentration profiles by state

	Estimated income				Observed income	
State	State returns applied to national characteristics (Geografic Profile)		National returns applied to state characteristics (Concentration Profile)		(Unconditional)	
	Urban	Rural	Urban	Rural	Urban	Rural
Rondônia	0.88	1.37	0.55	0.08	0.85	0.97
Acre	0.78	1.28	0.44	-0.17	0.62	0.57
Amazonas	0.70	1.09	0.44	-0.39	0.56	0.23
Roraima	0.91	1.29	0.51	-0.04	0.85	0.64
Pará	0.61	1.17	0.43	-0.15	0.45	0.50
Amapá	0.81	1.23	0.39	-0.08	0.63	0.64
Tocantis	0.59	1.11	0.43	0.05	0.42	0.58
Maranhão	0.27	0.60	0.33	-0.18	-0.12	-0.19
Piauí	0.34	0.60	0.41	-0.10	0.13	-0.15
Ceará	0.35	0.54	0.48	-0.06	0.24	-0.10
Rio Grande do Norte	0.30	0.69	0.52	0.04	0.12	0.17
Paraíba	0.33	0.60	0.48	-0.01	0.24	0.01
Pernambuco	0.25	0.68	0.56	-0.07	0.22	0.05
Alagoas	0.32	0.70	0.37	-0.19	-0.04	-0.06
Sergipe	0.46	0.67	0.48	-0.07	0.35	0.06
Bahia	0.34	0.72	0.50	-0.07	0.22	0.11
Minas Gerais	0.62	1.06	0.69	0.19	0.72	0.62
Espírito Santo	0.57	1.09	0.74	0.24	0.69	0.75
Rio de Janeiro	0.39	0.83	0.92	0.36	0.69	0.58
São Paulo	0.57	1.02	0.89	0.45	0.86	0.86
Paraná	0.65	0.95	0.80	0.33	0.85	0.64
Santa Catarina	0.82	1.08	0.86	0.43	1.09	0.99
Rio Grande do Sul	0.73	0.98	0.93	0.54	1.11	0.92
Mato Grosso do Sul	0.43	0.80	0.70	0.25	0.52	0.57
Mato Grosso	0.52	0.92	0.67	0.23	0.59	0.60
Goiás	0.35	0.84	0.65	0.34	0.39	0.62
Distrito Federal	0.41	1.16	0.96	0.67	0.83	1.27

Figure 2 - Observed/geographic income - Urban

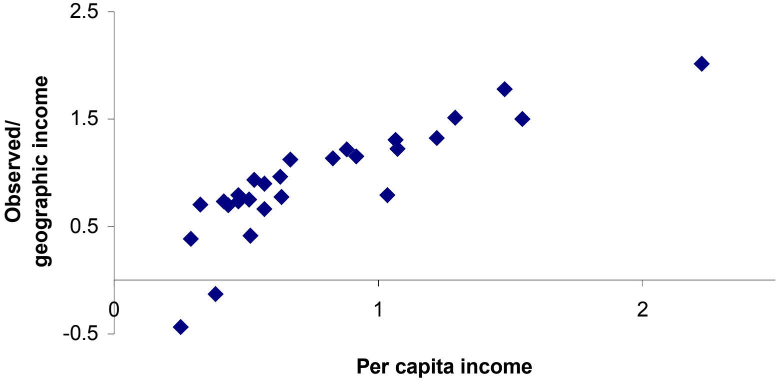

Figure 3 - Observed/geographic income - Rural

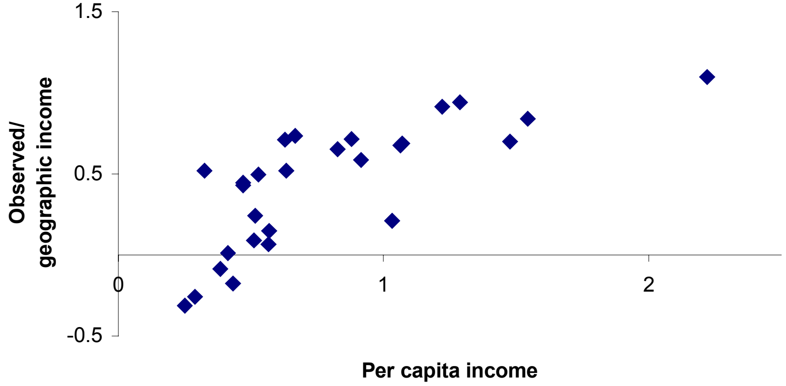

Figure 4 - Observed/concentration income - Urban

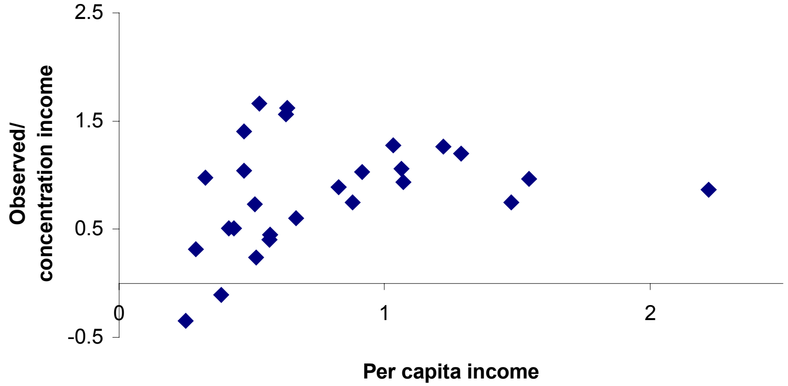

Figure 5 - Observed/concentration income - Rural