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A Decomposition Analysis of the Racial Poverty Gap**

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ABSTRACT

Why Is Poverty So High Among Afro-Brazilians? A Decomposition Analysis of the Racial Poverty Gap*

This study aimed to identify the major factors underlying the large discrepancy in poverty levels between two Brazilian racial groups: whites and Afro-Brazilians. We performed an Oaxaca-Blinder-type decomposition for nonlinear regressions in order to quantify the extent to which differences in observed geographic, sociodemographic, and labor characteristics (*characteristics effect*) account for this difference. The remaining unexplained part (*coefficients effect*) provides evidence on how these characteristics differentially impact on the risk of poverty in each group. A detailed decomposition of both effects allows the individual contribution of each characteristic to be determined. Our results show that the characteristics effect explains a large part of the discrepancy in poverty levels, with education and labor variables of household members explaining at least one half of the effect, and geographic and demographic variables accounting for the remainder. However, the unexplained part that remains significant has increased in importance in recent last years, and probably results from unequal access to high-quality education and the persistence of discrimination against colored workers in the labor market.

JEL Classification: D31, D63, J15, J82, O15

Keywords: poverty, gap, race, skin color, decomposition, Oaxaca-Blinder, Brazil, PNAD, labor market, participation, education, household characteristics

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Introduction

Brazil is well known for its high inequality and poverty levels, even by Latin American standards. For instance, according to Londoño and Székely (2000), Brazil has the highest Gini index in Latin America and also the third-highest proportion of people below the US\$ 2-a-day poverty line after Honduras and Panama. One of the most striking features of income inequality in Brazil is the large socioeconomic discrepancy between population groups based on skin color.

Three and a half centuries of a slavery-based economy has endowed Brazil with the second largest population of people of African descent after Nigeria, who account for almost one half of all Brazilians: there were 79.6 million browns and 11.6 million blacks in a total population of 184.4 million in 2005. Despite the lack of legally sanctioned racism since slavery was abolished in 1888, this system has left a legacy of social discrimination against Afro-Brazilians, who are more likely to be members of socially disadvantaged groups. Indeed, the 2005 UNDP report specified the indicator for human development for Brazil in 2000 separately for each race. Whites alone (0.814) were placed among those countries with the highest human development level, ranking 44th (between Costa Rica and Kuwait), while blacks (0.703) fell in an intermediate group, ranking 105th (between El Salvador and Moldavia). According to the main Brazilian household survey, the *Pesquisa Nacional por Amostra de Domicílios*, the mean per-capita income of Afro-Brazilians was only half that of whites. Further, in 2005 about 33 percent of Afro-Brazilians lived in poor households whose incomes were below 50 percent of the median income of the country, in contrast to 14 percent of whites falling into this group. This paper addresses this race-based discrepancy in poverty risk faced by Brazilians.

There are several possible explanations for poverty rates differing between racial groups. Colored people are clearly overrepresented in those groups at a higher risk of being below the poverty line. Indeed, compared to whites, a higher proportion of colored people live in the poor north of the country, in the most-rural areas, and in families with a large number of children. While participation rates in the labor market do not differ substantially between these groups, blacks and browns drop out of the education system earlier and more often work in low-paid occupations. However, the extent to which each of these factors contributes to the overall discrepancy in poverty

levels is unclear. Further, there is evidence that the impacts of individual characteristics on the poverty risk differ between racial groups. For instance, the existence of discrimination in the labor market against Afro-Brazilians has been widely debated, and there is also evidence that the quality of the education varies between racial groups. Both of these factors result in Afro-Brazilians receiving lower returns from their schooling and from their experiences in the labor market, which reduces their ability to obtain the income necessary to escape from poverty.

The aim of this study was to identify the major factors responsible for the discrepancy in poverty levels between Brazilian racial groups. We used an Oaxaca-Blinder-type decomposition for nonlinear regressions to measure to the extent to which differences in observed geographic, sociodemographic, and labor characteristics, such as the number of children or years of schooling, account for this discrepancy (*characteristics effect*). The remaining unexplained part (*coefficients effect*) provides evidence on how the same characteristics differentially impact on the poverty risk of each group. A detailed decomposition of both effects allows the individual contribution of each characteristic to be determined. The results of this analysis will help in determining which social policies are more likely to be effective at reducing this race-based poverty gap.

The structure of the paper is as follows. In the following section we describe the data and review the main socioeconomic patterns between racial groups in Brazil. We then introduce the decomposition technique and present the empirical results. The final section summarizes the main conclusions.

Poverty by race in Brazil

Data and definitions

Our data come from the 1992 and 2005 releases of the Brazilian National Household Survey (*Pesquisa Nacional por Amostra de Domicílios*, PNAD). This survey has been produced annually by the *Instituto Brasileiro de Geografia e Estatística* during the last quarter of each intercensus year since 1971, while between 1967 and 1970 it was produced quarterly. This database gathers information on the main demographic, socioeconomic, and labor characteristics at the household and individual levels for a

nationally representative sample of the Brazilian population.¹ Since 1987 the survey has asked respondents to self-categorize their skin color or race into one of five groups: indigenous, whites, blacks, Asians, and browns.²

Incomes are defined in this paper as monthly household cash incomes measured in per-capita terms and quantified in 2005 Brazilians reais (R\$). There were 389,388 individual observations in 2005 reporting this income: 180,480 whites, 180,456 browns, 26,129 blacks, and 2,323 observations either belonging to other minorities (Asians and indigenous) or not classified. Sample weights must be applied to the observations in order to obtain unbiased estimates of the population parameters. In our analyses we pooled browns and blacks into the same group (Afro-Brazilians or colored people), since African descent could choose either of these categories under the influence of social stigma attached to *blackness*,³ and given that despite apparent differences in their socioeconomic performance, we show below that the probability of being at risk of poverty is the same in both groups after controlling for the relevant characteristics.

No official poverty line is applied to Brazil, and so we defined the poverty line as 50 percent of the median per-capita income. In 2005 this poverty threshold corresponded to R\$ 120 (about US\$ 54), which also corresponds to the current maximum administrative limit to be eligible for the means-tested *Bolsa Familia* assistance program. This will help our results to be used in the context of traditional administrative poverty lines in Brazil.⁴ For the sake of robustness we also repeated the analysis based on an alternative threshold (60 percent of the median) and a standard equivalent scale (square root of the household size)⁵.

We analyzed time trends in the racial poverty gap by comparing results from the 2005 and 1992 surveys. We chose 1992 rather than 1987 (the first year when race was

¹ Only observations from the rural population of six states in the Amazonian area in the north of Brazil (Rondônia, Acre, Amazonas, Roraima, Pará, and Amapá) need to be excluded from the 2004 and 2005 surveys in order to facilitate comparability with previous years.

² The corresponding words in Portuguese are *indígena*, *branca*, *preta*, *amarela*, and *parda*.

³ Telles (2002), among others, supports this view arguing that the white-nonwhite distinction is less ambiguous. After comparing the consistency in a specific survey between interviewer and respondent categorizations, he showed that racial classification between black and brown is more influenced by characteristics such as education, gender, age or local racial composition.

⁴ In a similar way, Ferreira *et al.* (2006) used a 2004 threshold of R\$ 100 in their study, which was the initial limit of the program. Several other studies have set the threshold at half the minimum wage (or a quarter of this to define extreme poverty).

⁵ According to the parameterization of Buhman *et al.* (1988).

reported) for two reasons: (i) for comparability, given that in 1992 some new definitions for labor variables were introduced by the PNAD, making the comparison with previous surveys difficult,⁶ and (ii) the 1980s in Brazil were characterized by high macroeconomic instability, with a high volatility also evident in the poverty indices. After stabilization was achieved at the beginning of the 1990s, poverty levels began a steady downward trend to the present day (Ferreira *et al.*, 2006). In order to measure the changes in *absolute* poverty levels between 1992 and 2005, our poverty threshold for the first year was set to the same 2005 R\$ 120 level, while for capturing changes in *relative* poverty it was set at half the contemporary median income (2005 R\$ 85.24).⁷

Poverty and households characteristics in Brazil

In 2005 the average per-capita income in Brazil was R\$ 440, and about 23 percent of the population is considered to be poor according to the poverty line described above. The magnitudes of racial differences in Brazil are striking. Table 1 indicates that the 2005 poverty rate is 14 percent among whites but 33 percent among Afro-Brazilians (26 percent for blacks and 34 percent for browns). Further, the average monthly per-capita income for whites in 2005 (R\$ 591) is twice that for those of Afro-Brazilians (R\$ 310 for blacks and R\$ 275 for browns). Note that the Asian minority (mainly of Japanese descent) exhibit an average per-capita income that is 87 percent higher than that of whites and a poverty rate of only 7 percent, while the indigenous minority shows similar patterns to those of blacks and browns. However, these minorities were excluded from the subsequent analyses since they account for less than 1 percent of the population.

Table 1

Figure 1 presents the skin-color distributions across income deciles. Clearly, the share of Afro-Brazilians decreases with per-capita income: colored people account for 71 and 19 percent of the population in the bottom and top deciles, respectively, in contrast to the corresponding values for whites of 28 and 79 percent.

Figure 1

⁶ Comparing data between 1992 and 2005 is not straightforward, due to the need to restrict the 2005 sample geographically, as already mentioned, and construct employment variables based on different classifications for occupations.

⁷ We adjusted the 1992 income using the INPC time deflator reported in Ferreira *et al.* (2006).

The poverty rates differ between Afro-Brazilians and whites for all household types considered in Table 2, but not to the same extent. The ratio of poverty rates for colored people compared to those for whites is higher for households living in urban areas in the rich south and southeast of the country. This ratio increases with the number of years of schooling completed by the household head, and is larger when he or she is economically inactive or works in the formal sector in industries other than agriculture and domestic service.

Table 2

This large race-based discrepancy in poverty rates might primarily result from Afro-Brazilians being overrepresented in those socioeconomic groups at a higher risk of poverty. This can be inferred from most groups reported in Table 2 exhibiting a ratio of poverty levels lower than that for the whole population, which is evidence of a composition effect. Indeed, as Table 3 indicates, colored people account for at least 70 percent of the population in states located in the two poorest geographic regions in Brazil (the north and northeast). In contrast, whites represent 81 and 58.5 percent of those in two of the richest regions in the south and southeast of the country, with the latter including the main metropolises of São Paulo and Rio de Janeiro. Afro-Brazilians represent the majority (55.5 percent) in only one relatively rich region, the center-west, where the capital (Brasilia) is located. Differences in population shares are even more pronounced when rural and urban areas are distinguished, given that 20 percent of browns live in the former against only 13 percent of whites (and 12 percent of blacks). As a consequence, whites are underrepresented in the rural areas of all regions (where poverty is twice as high as in urban areas) except for the southern states.

Table 3

Colored people tend to live in larger households: they have 4.6 members on average compared to 4.0 for whites (Table 4). Afro-Brazilian households have more dependents: especially children, on average 1.6 are aged 15 years or less compared to 1.2 for whites; but also young adults, 0.7 are between 16 and 45 years, compared to 0.6 for whites. However, the number of older dependents (older than 45 years) in the household is slightly lower for Afro-Brazilians (0.13) than for whites (0.15). This of course reflects Afro-Brazilians being, on average, younger than whites. This is

compensated by the number of people receiving incomes in the household also being larger for Afro-Brazilians, although the difference relative to whites is less, reflecting a higher degree of dependency in colored households: on average 48 percent of their household members do not receive incomes, in contrast to 42 percent in white households.

Table 4

One of the main characteristics that could explain the racial poverty gap is education. It is well documented that Brazil exhibits one of the most unequal distributions of years of education in the world (Ferranti *et al.*, 2003). Although great progress has been made in this indicator during recent decades, the Gini index for years of schooling among those aged between 25 and 65 years was still 41 percent in 2001, which is the highest level in Latin America after Bolivia (43.4) and a few Central American countries, and greatly different from the other main economies in the region (36.6 in Mexico and 22.2 in Argentina). This fact is reflected in the racial distribution, given that colored people drop out of the education system at a younger age. Table 4 indicates that the adult illiteracy rate is 15 percent among Afro-Brazilians, in contrast to 7 percent for the white population. Additionally, the proportion of colored people aged at least 25 years who had no education is about 21 percent and the proportion with 15 or more years of studies is lower than 4 percent, while the corresponding percentages are 10 and 12 percent for whites. Differences in the quality of education have often been stressed as important reasons for opportunities inequalities in Brazil (v.gr. Leite, 2005), because students from the poorest families are overrepresented in public schools, which typically provide education of lower quality. Indeed, according to our own estimates, the proportion of students aged 16 years or less attending a private school is 22 percent for whites but only 11 percent for Afro-Brazilians. This difference in proportions increases for those aged over 18 years: 48 and 21 percent of whites and Afro-Brazilians attend a private institution, respectively. There is also evidence that Afro-Brazilians attending university are underrepresented in those degrees that lead to higher earnings (UNDP, 2005).

Finally, Table 5 reports how different racial groups perform in the labor market. The proportion of people aged at least 16 years in employment is similar in both groups, at about 64 percent, and they also work a similar number of hours per week (43 hours). There is only a smaller participation (of 1 percent) in the case of colored females, who

also work 1 hour less than whites. Afro-Brazilian males and females show higher activity rates, but these are offset by a greater risk of unemployment. However, there is strong evidence of racial segregation by occupation and industry, with whites being overrepresented among employers, managers, and professional employees in both the public sector and the formal private sector, and being underrepresented among employees and the self-employed in agriculture and domestic services, as well as among informal and unpaid workers. Nevertheless, the main racial difference is evident in average hourly earnings, which is R\$ 6.50 for white men but only R\$ 3.60 for colored workers (note that the difference is only slightly smaller for females). As a consequence, average monthly earnings are R\$ 1,034 for whites but only R\$ 550 for Afro-Brazilians. The extent to which these differences in earnings between white and colored workers in Brazil reflect pay discrimination and segregation has been widely explored in recent years. For instance, Arcand and D’Hombres (2004) concluded that wage discrimination accounted for 36 and 23 percent of the racial wage discrepancy for blacks and browns, respectively, while occupational segregation explained an additional 8 and 5 percent. Campante *et al.* (2004) reported a contribution of 26 percent for wage discrimination among Afro-Brazilians, while Leite (2005) found a reduced value of 11 percent after controlling for differences in the mother’s education, emphasizing the role played by intergenerational transmission of education in the observed race-based pay gap.

Table 5

Methodology: multivariate decomposition analysis with nonlinear regression

We examined the contribution of household characteristics to the discrepancy in poverty rates among racial groups in Brazil by applying an extension of the well-known regression-based Oaxaca-Blinder decomposition approach to the probability of being poor.⁸ In our framework, the i -th person in group g is considered poor when his or her household income y_i^g falls below the poverty line, z . Then, under a logit probabilistic model, the likelihood of this person being poor (P_i^g) is given by

$$P_i^g = \Pr(y_i^g < z) = F(X_i^g \hat{\beta}^g) = \frac{\exp(X_i^g \hat{\beta}^g)}{1 + \exp(X_i^g \hat{\beta}^g)}, \quad (1)$$

⁸ Oaxaca (1973) and Blinder (1973).

where F represents the logistic probabilistic cumulative distribution, X_i^g is a vector of characteristics describing household i , and $\hat{\beta}^g$ is the associated vector of coefficient estimates. In this logit framework, the head-count ratio of poverty in group g , H^g , is equal to the average predicted probability for this group (with population N^g):

$$H^g = \overline{P^g} = \overline{F(X_i^g \hat{\beta}^g)} = \frac{1}{N^g} \sum_{i=1}^{N^g} F(X_i^g \hat{\beta}^g). \quad (2)$$

In this type of nonlinear relationship it is widely accepted that the difference in incidence rates between two given groups 0 and 1,

$$H^1 - H^0 = \overline{P^1} - \overline{P^0} = \overline{F(X^1 \beta^1)} - \overline{F(X^0 \beta^0)}, \quad (3)$$

can be decomposed into two terms,⁹

$$H^1 - H^0 = \left[\overline{F(X^1 \beta^1)} - \overline{F(X^0 \beta^1)} \right] + \left[\overline{F(X^0 \beta^1)} - \overline{F(X^0 \beta^0)} \right], \quad (4)$$

which represent, respectively, the *aggregate characteristics effect* and the *aggregate coefficients effect* when 0 is taken as the reference group. In our empirical analysis we compared poverty rates between Afro-Brazilians and whites. The latter group shows the lowest poverty incidence and hence is used as the reference ($g=0$).¹⁰

To evaluate the individual contribution of each variable (or set of variables) to the total difference, which is usually referred to as the *detailed decomposition*, we follow the method proposed by Yun (2004), which is valid for any nonlinear function F and is a generalization of the decomposition of Even and Macpherson (1990, 1993) of

⁹ See, for instance, Gang *et al.* (2006) and Bhaumik *et al.* (2006) for the analysis of intergroup poverty rates in India and Kosovo, or Biewen and Jenkins (2004) and Quintano and D'Agostino (2006) who examined intercountry differences in poverty levels. A similar decomposition is found in other (nonlinear) contexts: Gomulka and Stern (1989) analyzed the changes in the employment of married women; Ham *et al.* (1998) analyzed intercountry differences in the duration of unemployment; Farlie (1999, 2005) analyzed the racial discrepancies in the transition rate into self-employment and in computer ownership; Nielsen (1998, 2000) analyzed the gender discrepancy in the formal sector employment and child labor incidence; Bevelander and Nielsen (2000) analyzed the employment success of immigrants; and Gang *et al.* (2002) analyzed attitudes toward foreigners in the European Union. Alternative decomposition strategies of the aggregate effects can be found in Borooah and Iyer (2005a,b) and Even and Macpherson (1990, 1993).

¹⁰ Note that for the sake of robustness the analysis was repeated with the alternative assumption.

only the characteristics effect.¹¹ The detailed decomposition of Yun (2004) is given by

$$H^1 - H^0 = \sum_{k=1}^K W_{\Delta X}^k \left[\overline{F(X^1 \beta^1)} - \overline{F(X^0 \beta^1)} \right] + \sum_{k=1}^K W_{\Delta \beta}^k \left[\overline{F(X^0 \beta^1)} - \overline{F(X^0 \beta^0)} \right], \quad (5)$$

where $W_{\Delta X}^k$ and $W_{\Delta \beta}^k$ are, respectively, the individual relative contributions of characteristic k ($k=1, \dots, K$) to the overall characteristics and coefficients effects such that

$$W_{\Delta X}^k = \frac{(\bar{X}_k^1 - \bar{X}_k^0) \beta_k^1}{(\bar{X}^1 - \bar{X}^0) \beta^1}, \quad \sum_{k=1}^K W_{\Delta X}^k = 1; \quad W_{\Delta \beta}^k = \frac{\bar{X}_k^0 (\beta_k^1 - \beta_k^0)}{\bar{X}^0 (\beta^1 - \beta^0)}, \quad \sum_{k=1}^K W_{\Delta \beta}^k = 1. \quad (6)$$

These weights were obtained in Yun (2004) in two stages: (i) the value of the average of F , $\overline{F(X^s \beta^s)}$, was approximated with that of the function evaluated at the sample average of the exogenous variables, $\overline{F(\bar{X}^s \beta^s)}$, and (ii) then a first-order Taylor-series expansion was used to linearize the characteristics and the effects of coefficients around the sample mean.¹²

This technique has a few advantages over other proposed methods that appear in the literature. First, the weights are quite transparent and simple to compute because this only requires estimates of the coefficients and sample means of the characteristics. Second, this procedure overrides the problem of path dependency that is common to all sequential approaches to nonlinear models, where values of characteristics and/or coefficients of one group need to be switched with those of the other group.¹³ Third, unlike these sequential approaches, the detailed characteristics effect can be obtained without making any assumptions to match individuals of one group with the characteristics of another.¹⁴ Finally, the original Oaxaca-Blinder approach is shown to be a particular case of this decomposition when F is a linear function.

¹¹ This approach was used by, among others, Gang *et al.* (2006), Bhaumik *et al.* (2006), and Gang *et al.* (2002).

¹² An alternative linearization strategy can be found in Doiron and Riddell (1994).

¹³ Sequential approaches have been applied to, for instance, detailed decompositions of both effects (Gomulka and Stern, 1999) and of only the characteristics effect (Fairlie, 1999, 2005; Ham *et al.*, 1998). The latter involves computing an average of all possible permutations of characteristics in order to override path dependency.

¹⁴ Sequential approaches require a matching assumption to be imposed. For instance, Fairlie (1999, 2005) drew a random subsample from the largest group that was equal in size to the smallest group. Both groups of observations were ranked according to their predicted probabilities and matched by

However, an additional and well-known problem that needs to be addressed is that detailed decompositions of the coefficients effects suffer from severe identification difficulties.¹⁵ This is because the contribution of a dummy variable to this effect will vary with the choice of the reference group, and this applies to any set of dummy variables.¹⁶ For this reason, several researchers have undertaken detailed decompositions of only the characteristics effect, which is not affected by this problem.¹⁷ To tackle this difficulty we use *normalized regressions* in computing weights in (5), as proposed by Gardeazabal and Ugidos (2005) and Yun (2005a, b). This method has the advantage of being invariant to the “left-out” reference category in computing the contribution of dummy variables to the detailed coefficients effect. Further, it alters neither the detailed characteristics effect nor the contribution of continuous variables to the coefficients effect.

After suppressing group superscripts for simplicity, we can rewrite our model in (1) as

$$P_i = F \left(\alpha + \sum_{l=1}^L X_l \delta_l + \sum_{m=1}^M \sum_{k_m=2}^{K_m} D_{mk_m} \hat{\beta}_{mk_m} \right), \quad (7)$$

where there are L continuous variables X and M sets of categorical variables D , where the m -th set has K_m categories and K_m-1 dummy variables in the equation, with the reference group being the first category of each set of dummy variables. Then, the normalized equation is given by

$$P_i^* = F \left(\alpha^* + \sum_{l=1}^L X_l \delta_l^* + \sum_{m=1}^M \sum_{k_m=1}^{K_m} D_{mk_m} \hat{\beta}_{mk_m}^* \right), \quad (8)$$

where the parameters for the intercept, continuous variables, and dummy variables are, respectively,

their respective rankings when computing the change in the characteristics effect. The final estimate was produced by computing the mean effect after repeating this exercise a large number of times.

¹⁵ Jones (1983) pointed out the problem of identifying the contribution of the intercept using the approach of Blinder (1973) in the presence of a set of dummy variables. Oaxaca and Ransom (1999) showed, more generally, that conventional decompositions cannot identify the separate contribution of dummy variables because it is only possible to estimate the *relative* effect of a dummy variable. However, Gelbach (2002) argued that the problem is not of identification, but of population heterogeneity in parameter estimates.

¹⁶ However, as Oaxaca and Ransom (1999) stressed, the combined estimated contributions of all sets of dummy variables – including the constant term – to the overall coefficients effect are invariant to the reference group.

¹⁷ Fairlie (1999, 2005) and Ham *et al.* (1998) are good examples of this in the nonlinear case.

$$\begin{aligned}
\hat{\alpha}^* &= \hat{\alpha} + \sum_{m=1}^M \overline{\hat{\beta}}_m; \\
\hat{\delta}_i^* &= \hat{\delta}_i, i = 1, \dots, L; \\
\hat{\beta}_{mk_m}^* &= \hat{\beta}_{mk_m} - \overline{\hat{\beta}}_m, k_m = 1, \dots, K_m, m = 1, \dots, M.
\end{aligned} \tag{9}$$

For the omitted categories in the original regression it holds that $\hat{\beta}_{m1} = 0, \forall m = 1, \dots, M$. In this way we can compute the decomposition to identify characteristics and coefficients effects for each category, including the reference group in the original equation.¹⁸

Results

Poverty regressions

Our analysis started with multivariate logit regressions explaining the likelihood of a person being poor. Our explanatory variables included certain characteristics of the head of the household: sex, age, years of schooling, illiteracy, geographic mobility (indicating the area of origin), and a set of variables describing the labor participation by the head and the characteristics of the job. Other variables included the state and whether the household resided in an urban or rural area, as well as the number of other household members, distinguishing the number of dependents (by age intervals) from the number of income receivers. We considered the number of workers in different job categories (controlling for the average number of weekly hours worked) and of unemployed adults receiving nonlabor income in the household. In each case a distinction was made according to age, sex, and years of studies. Given that we estimated the probability of a person being poor with explanatory variables collected at the household level, our estimated robust standard errors take into account individuals being “clustered” across households. The benchmark person is a lone male aged between 16 and 24 years, illiterate with no schooling, employed in the informal agrarian sector in a rural area in Minas Gerais (southeastern region), and born in the same municipality as where he currently lives. Summary statistics for the explanatory variables and the estimated coefficients of all regressions are given in the Appendix.

¹⁸ A similar problem affects affine transformations of continuous regressors that involve a location parameter. As Yun (2005a) pointed out, unlike categorical variables, the problem related to a continuous variable cannot be resolved because there are infinitely many transformations. Therefore, one has to rely on specifications that make sense and are widely accepted in the literature.

First, a regression for the pooled sample of Brazilians run with dummy variables for all nonwhite groups showed that being black, brown, or indigenous was strongly positively correlated with the likelihood of being poor (with coefficients of around 0.30 and higher), while being Asian showed no significant effect.¹⁹ However, there was no significant difference between blacks and browns after controlling for other characteristics.

We then estimated regressions separately for whites and Afro-Brazilians; the results are also presented in the Appendix.²⁰ In general, our results suggest that the coefficients are similar in sign for both racial groups, although they differ in magnitude and statistical significance. Compared to the reference case, living in an urban area and in the center-west and south of the country, as well as in states such as Rio de Janeiro, São Paulo, or Santa Catarina has a significant and negative effect on poverty risk, which is generally larger for Afro-Brazilians, while living in northeastern and some northern states has a significant and strongly positive effect (more clearly in the case of whites). Single-mother-headed households are more likely to be poor in both groups, as are other Afro-Brazilians female-headed households, but not white ones. Single-family households and those comprising a couple with many dependents face a higher risk of being poor. Indeed, the number of dependents has a significant and large impact on poverty, especially in terms of the numbers of young children and of adults older than 45 years. The older and more educated the household head, the lower the probability of being poor. The risk of falling into poverty decreases when the head is originally from a different municipality, especially when this is in the center-western region or abroad.

The risk of poverty increases when the head of the household is unemployed and decreases when he or she is economically inactive or, especially, when he or she works as an employer or as a skilled formal employee in industries other than agriculture or domestic service. Working more hours has a greater effect on reducing the poverty risk for whites. The poverty risk increases with the number of employed

¹⁹ Ferreira *et al.* (2003) obtained nonsignificant coefficients for race dummies, but this was probably due to them introducing several wealth-related variables in the right-hand side of the regression, such as the availability of electricity and piped water, and the housing status.

²⁰ Alternatively, applying the regression separately to each colored group (blacks and browns) and using our methodology to explain the discrepancy between their poverty rates (6.6 percent) revealed that if browns had the same characteristics as blacks, the poverty rate after conditioning by characteristics would be almost zero; that is, all the difference can be explained by the characteristics effect.

children (aged between 10 and 15 years) in colored households, which reflects that their contribution to household income is too small to compensate the increase in household needs. However, the presence of more employed adults is generally associated with lower poverty. This latter effect increases with an increased number of years of education, increased weekly hours of working, and decreased number of female workers. The impact is also substantially larger in formal and skilled occupations. The number of unemployed adults in the household receiving nonlabor income, especially if they are male and with either low or high education, is also significantly negatively correlated with the likelihood of the household members being poor. These effects appear to be stronger for whites and have a U-shaped relationship with education. This might be due to those with low education being more likely to be eligible for social assistance programs, while those with higher education have better access to other sources of income (e.g., pension benefits or properties).

Decomposition analysis: aggregate and detailed effects

Based on the above estimates, the poverty gap between Brazilian racial groups, shown in Table 6, was decomposed into aggregate characteristics and coefficients effects as indicated in Table 7. The aggregate decomposition shows that combining the observed characteristics explained a large proportion of the raw difference in poverty levels between Afro-Brazilians and whites (85.6 percent according to the estimated model). This means that if colored people had the same characteristics as whites in Brazil, the observed discrepancy in poverty rates (18.4 percent) would be narrowed to 2.6 percent – this is the *conditional racial poverty gap*. This value corresponds to the remaining unexplained part (i.e., the coefficients effect) accounting for 14.4 percent of the raw difference.

Tables 6 and 7

A detailed decomposition of the characteristics effect, also displayed in Table 7, shows that three main factors account for the entire explained discrepancy: (i) education and labor activity of household members account for 44.1 percent of the raw gap, (ii) demographic factors account for 20.7 percent, and (iii) geographic

factors account for 19 percent.²¹ The first major contribution mainly results from the lower education of colored household heads (17.9 percent) and their overrepresentation in low-paid occupations (10.2 percent), although the education of other working household members and their performance in the labor market are also important (15.1 percent). The other two major factors are colored people having more dependent children and young adults (both summing to 21.8 percent), and residing in the poorest states of the country (18.5 percent). The number and education of nonlabor income receivers, the area of residence (urban or rural), and other demographic characteristics (i.e., sex, age, type of family, and mobility status) appear to play only marginal roles after controlling for the other factors. It should be noted that only one characteristic exerts a significant, even if small, negative impact on the discrepancy (of -1.1 percent) – the lower number of dependent adults older than 45 years in Afro-Brazilian households. This appears to be the only *advantage* of being Afro-Brazilian when facing the risk of poverty.²²

We have revealed that differences in characteristics explain the largest part of poverty discrepancies. However, there is also evidence that the same factors can have quite different impacts on the race-based variation in the probability of being poor. The overall impact of the coefficients effect is 14.4 percent of the raw discrepancy, as mentioned above. Table 7 also provides the detailed decomposition of the coefficients effect using the normalized regressions reported in the Appendix. The most salient point is that after controlling for education and occupation, the number of hours worked by Afro-Brazilians has a lower impact on their poverty risk compared to

²¹ Here we discuss the effect of sets of characteristics while the complete list of individual detailed effects is reported in the Appendix. We also performed a similar analysis with Afro-Brazilians as the reference group, which indicated that the results were quite robust: the explained part was only slightly larger (at 87.9 percent), and accordingly the conditional poverty gap was smaller (2.2 percent, that is, 12.1 percent of the raw gap). The main factors explaining the discrepancy would be roughly the same, with a slightly larger contribution of labor and demographic variables (46.6 and 24 percent of the discrepancy, respectively), and smaller contribution from geographic variables (17.4 percent).

²² The role played by the education and labor market performance of household members in explaining the racial poverty gap is increased (to 48.9 percent of the raw discrepancy) when the square root of household size is used to adjust incomes. This increase is at the expense of the contribution made by the number of dependent children/young, which appears to be quite sensitive to the change in the equivalence scale. Its contribution would be reduced to 14 percent, but it is noteworthy that combining this with an increase in the role played by the state of residence (to 20.7 percent) would leave the overall characteristics effect unaffected. In contrast, if the poverty line is increased to 60 percent of the median, the overall characteristics effect would be slightly larger (87.4 percent), mainly due to a small increase in the contribution of the number of dependents (up to 22.2 percent), with only a small variation in the other effects. If both methodological changes are implemented simultaneously, the effects of the first shift would predominate. In this case the conditional poverty gap would be 2.9 percent, not far from 2.6 percent shown in our main specification.

whites, explaining almost 10 percent of the raw poverty gap (8.1 percent in the case of household heads and an additional 1.4 percent in the case of other household members). The underlying reasons are unclear given that this is essentially the *unexplained* part of the model, but the existing empirical evidence suggests that they could result from differences in the quality of education combined with the persistence of labor discrimination against Afro-Brazilians, all of which reduce their opportunities in the labor market. This could also explain why there are nonneglectable coefficient effects for geographic-related variables such the state, the area of residence, and even the mobility, indicating that Afro-Brazilians obtain less advantage from living in urban areas and in rich states.

Finally, we address the issue of whether the major factors explaining the race-based poverty discrepancy have changed with time. This was achieved by comparing results for 2005 with those for 1992, which are also given in Table 7. The absolute poverty rate in Brazil (using the fixed 2005 R\$ 120 poverty line) has declined sharply, from 36 percent of the overall population in 1992 to 23 percent in 2005. This reduction has benefited both racial groups, and the raw racial poverty gap also decreased during this period from 25.9 to 18.4 percent.²³ However, the reduction in the *conditional* gap or coefficients effect was small, from 2.9 percent in 1992 to 2.6 percent in 2005. Thus, most of the decrease in the difference in poverty rates by race was due to the characteristics effect: in 1992 (a 23 percent gap) and 2005 (15.8 percent gap) this explained 88.8 and 85.6 percent, respectively, of the raw gap. This decrease in the characteristics effect was entirely due to lower contributions from the number of dependent children, head education, and area of residence, all of which were similar: their relative contributions decreased from 20.5, 20.9, and 20.3 percent to 17.0, 17.9, and 19.0 percent, respectively. At the same time, the education and labor characteristics of nonhead members became a much more important factor for explaining the race-based poverty gap during the same period (from 10.6 to 15.1 percent), because in this case the explained gap was also reduced but only by a small amount.

The progress in reducing poverty in Brazil has been rather modest based on a *relative* poverty concept (50 percent of the contemporary median): from 26.4 percent of the

²³ However, the reduction was proportionally higher for whites (from 24.8 to 14.5 percent; 42 percent of the reduction) than for Afro-Brazilians (from 50.1 to 32.8 percent; 35 percent of the reduction).

population being considered poor in 1992 to 23.5 percent in 2005.²⁴ The raw racial difference consequently reduced only from 21.0 to 18.4 percent. In fact, the *conditional* poverty gap rose from 1.9 to 2.6 percent in that period, while the gap explained by characteristics fell from 19.1 to 15.8 percent due to all three factors combined (geographic, sociodemographic, and labor characteristics). Regardless of whether we use absolute or relative notions of poverty to compare the data from 1992 and 2005, it is clear that even if the characteristics effect still explains a large part of the raw racial poverty gap, this share is now smaller, indicating the increasing role played by persistent unobservable factors (coefficients effect).

Conclusions

In this study we investigated why poverty in Brazil is so much higher for Afro-Brazilians than for whites. We have shown that this discrepancy affects most types of household, but especially those with more-educated members who live in urban areas in the rich southern and southeast states of the country. Our use of an Oaxaca-Blinder extension for nonlinear regressions revealed that differences in observed characteristics account for almost 86 percent of the difference in poverty levels between whites and Afro-Brazilians. Labor-related characteristics fueled by differences in years of schooling of household members contribute the most, at least one half of what can be explained. Geographic and demographic factors (the number of dependents) also explain another significant part of the raw gap.

We have additionally shown that despite this large characteristics effect, there remains a significant unexplained part reflected by the lower impact of hourly earnings on poverty risk (especially those worked by the head). This is the consequence of the lower opportunities for Afro-Brazilians in the labor market, which probably results from unequal access to high-quality education and persisting segregation and discrimination in the labor market.

The sharp reduction in the skin-color-related differences in the incidence of absolute poverty from 1992 to 2005 was driven by geographic and demographic variables, with the factors of education and performance in the labor market showing smaller changes and hence becoming more important explanatory factors. The decrease in the

²⁴ This is because the decrease in poverty was mainly due to (modest) economic growth, combined with a small decrease in inequalities (Ferreira *et al.*, 2006).

racial gap was due to a lower characteristics effect, but the *conditional* gap was only slightly reduced between *absolute* poverty levels and even increased between *relative* poverty rates.

The main policy implication of this decomposition analysis is that the most effective measures for removing race-based differences in poverty risk are bridging the huge educational gap between Brazilians, and compensating poor households with dependent children, as well as reducing regional disequilibria, even if some of these changes would only be effective over a long time period. The *Bolsa Familia* program, in which cash payments to poor families with children are conditional on their schooling, may represent a step in the right direction for reducing both the overall poverty and the race-based poverty gap.

References

- Arcand, J. L. and B. D'Hombres (2004), "Racial discrimination in the Brazilian labour market: Wage, employment and segregation effects", **Journal of International Development**, 16, 1053-1066.
- Bevelander, P. and H. S. Nielsen (2000), "Declining success of immigrant males in Sweden: Observed or unobserved characteristics", **Journal of Population Economics**, 14, pp. 455-471.
- Bhaumik, S. K., I. N. Gang and M-S. Yun (2006), "A note on decomposing differences in poverty incidence using regression estimates: Algorithm and example", IZA Discussion Paper, No. 2262, IZA, Bonn.
- Biewen, M. and S. P. Jenkins (2005), "A framework for the decomposition of poverty differences with an application to poverty differences between countries", **Empirical Economics**, 30, pp. 331-358.
- Blinder, A. S. (1973), "Wage Discrimination: Reduced Form and Structural Estimates" **Journal of Human Resources**, 8(4), 436-55.
- Borooh, V. K. (2005), "Caste, Inequality, and Poverty in India", **Review of Development Economics**, 9 (3), pp. 399-414.
- Borooh, V. K. and S. Iyer (2005a), "The decomposition of inter-group differences in a logit model: Extending the Oaxaca-Blinder approach with an application to school enrolment in India", **Journal of Economic and Social Measurement**, 30, pp. 279-293.
- Borooh, V. K. and S. Iyer (2005b) "Vidya, Veda, and Varna: The influence of religion and caste on education in rural India", **Journal of Development Studies**, 41 (8), pp. 1369 - 1404.
- Buhman B., Rainwater G., Schmaus G. and Smeeding T.M. (1988), "Equivalence scales, well-being, inequality and poverty: Sensitivity estimates across ten countries using the Luxembourg Income Study (LIS) database", **Review of Income and Wealth**, 34, pp. 115-142.
- Campante, F. R., A. R. V. Crespo and P. G. Leite (2004), "Desigualdade salarial entre raças no mercado de trabalho urbano brasileiro: aspectos regionais", **Revista Brasileira de Economia**, 2, p.185-210. ISSN 0034-7140
- De Ferranti, D., G. E. Perry, F. H. G. Ferreira and M. Walton (2003), "Inequality in Latin America and the Caribbean: Breaking with History?", The World Bank, Mexico City.
- Doiron, D. J. and W. C. Riddell (1994), "The Impact of Unionization on Male-Differences in Canada," **Journal of Human Resources**, 29:2, pp. 504-534.
- Even, W. E. and D. A. Macpherson (1993), "The Decline of Private-Sector Unionism and the Gender Wage Gap", **The Journal of Human Resources**, Vol. 28, No. 2, pp. 279-296.
- Fairlie, R. W. (1999), "The absence of the African-American owned business: An analysis of the dynamics of self-employment", **Journal of Labor Economics**, Vol. 17, No. 1, pp. 80-108.
- Fairlie, R. W. (2005), "An extension of the Oaxaca-blinder decomposition technique to logit and probit models", **Journal of Economic and Social Measurement**, Vol. 30, No. 4, pp. 305-316.

- Ferreira, F. H. G., P. Lanjouw and M. Neri (2003), "A robust poverty profile for Brazil using multiple data sources", **Revista Brasileira de Economia**, 57(1), pp. 59-92.
- Ferreira, F. H. G., P. G. Leite, and J. A. Litchfield (2006), "The rise and fall of Brazilian inequality: 1981-2004", **World Bank Policy Research Working Paper**, 3867, March.
- Gang, I. N., K. Sen and M-S. Yun (2006), "Caste, ethnicity and poverty in rural India", **Economic Development and Cultural Change**, 54(2), pp. 369-404.
- Gang, I. N., F. L. Rivera-Batiz and M-S. Yun (2002), "Economic strain, ethnic concentration and attitudes towards foreigners in the European Union", IZA Discussion Paper, No. 578, IZA, Bonn.
- Gardeazabal, J., and A. Ugidos (2005), "More on Identification in Detailed Wage Decompositions" **Review of Economics and Statistics**, 86(4), 1034-36.
- Gelbach, J. B. (2002), "Identified Heterogeneity in Detailed Wage Decompositions", mimeo, Department of Economics, University of Maryland at College Park.
- Gomulka, J. and N. Stern (1989), "The employment of married women in the United Kingdom 1970-83", **Economica**, 57, pp. 171-99.
- Ham, J. C., J. Svejnar, and K. Terrell (1998), "Unemployment and the Social Safety Net during transitions to a Market Economy: Evidence from the Czech and Slovak Republics", **The American Economic Review**, 88(5), 1117-42.
- Jones, F. L. (1983), "On decomposing the wage gap: A critical comment on Blinder's method", **The Journal of Human Resources**, Vol. 18, No. 1, pp. 126-130.
- Leite, P. G. (2005), "Race discrimination or inequality of opportunities: The Brazilian case", Ibero-America Institute for Economic Research Discussion Paper, No. 118, Georg-August-Universität Göttingen.
- Londoño, J. L. and M. Székely (2000), "Persistent poverty and excess inequality: Latin America, 1970-1995", **Journal of Applied Economics**, Vol. III, No 1, 93-134
- Nielsen, H. S. (1998), "Discrimination and detailed decomposition in a logit model", **Economics Letters**, 7(6), 405-8.
- Nielsen, H. S. (2000), "Wage Discrimination in Zambia: An Extension of the Oaxaca-Blinder Decomposition", **Applied Economics Letters**, 7 (6), 405-8.
- Oaxaca, R. L. (1973), "Male-female Wage Differentials in Urban Labor Markets", **International Economic Review**, 14(3), 693-709.
- Oaxaca, R. L. and M. A. Ransom (1999), "Identification in Detailed Wage Decompositions", **The Review of Economics and Statistics**, Vol. 81, No 1, 154-157.
- Quintano, C. and A. D'Agostino (2006), "Studying inequality in income distribution of single-person households in four developed countries", *Review of Income and Wealth*, 52 (4), pp. 525-546.
- Suits, D. B. (1984), "Dummy Variables: Mechanics v. Interpretation", **Review of Economics and Statistics**, 66(1), 177-80.
- Telles, E. E. (2002), "Racial ambiguity among the Brazilian population", **Ethnic and Racial Studies**, 25(3), pp. 415-441.
- UNDP (2005), "Relatorio de desenvolvimento humano - Brasil 2005: Racismo, pobreza e violência", UNDP-Brazil, Brasilia.
- Yun, M-S. (2004), "Decomposing Differences in the First moment", **Economics Letters**, 82(2), pp. 275-280.
- Yun, M-S. (2005a), "A Simple Solution to the Identification Problem in Detailed Wage Decompositions", **Economic Inquiry**, 43(4), pp. 766-772.
- Yun, M-S. (2005b), "Normalized Equation and Decomposition Analysis: Computation and Inference", IZA Working Papers Series, No. 1822.

Table 1. Poverty and skin color/race in Brazil in 2005

Skin color/race	Population (%)	Mean income (R\$)	Poverty rate (%)
White	50.5	591	14.5
Afro-Brazilian	48.8	279	32.8
Black	6.3	310	27.1
Brown	42.5	275	33.7
Asian	0.5	1,108	7.5
Indigenous	0.2	340	34.8
All	100	440	23.5

Note: Excluding rural areas of Rondônia, Acre, Amazonas, Roraima, Pará, and Amapá

Source: Author's calculations using PNAD (2005) data.

Table 2. Poverty rates by characteristics and skin color in Brazil in 2005
(percentage of the corresponding group below the poverty line)

	Whites (1)	Afro-Brazilians (2)	Ratio (2)/(1)
All households	14.5	32.8	2.3
Residence			
North	21.3	30.5	1.4
Northeast	36.5	48.2	1.3
Southeast	8.8	20.4	2.3
South	10.4	21.9	2.1
Center-west	12.8	21.5	1.7
Urban	33.5	55.8	1.7
Rural	11.7	27.5	2.4
Household-head years of schooling			
0	32.0	47.5	1.5
1–3	24.9	43.9	1.8
4–7	17.2	32.0	1.9
8–10	12.0	22.9	1.9
11+	3.3	9.5	2.9
Household-head employment status			
Inactive	11.4	25.8	2.3
Unemployed	50.1	66.4	1.3
Informal employee in agriculture	49.8	67.9	1.4
Informal employee in domestic service	31.8	43.7	1.4
Informal employee in other industries	16.6	35.3	2.1
Formal employee in agriculture	24.0	37.9	1.6
Formal employee in domestic service	15.0	25.5	1.7
Formal employee in other industries (manager or professional)	0.4	2.3	5.4
Formal employee in other industries (other occupations in private sector)	8.2	17.6	2.2
Formal employee in other industries (other occupations in public sector)	5.3	13.0	2.5
Self-employed in agriculture	37.2	62.3	1.7
Self-employed in other industries	13.1	29.7	2.3
Employer	2.0	10.0	5.0
Unpaid and others	27.4	47.2	1.7

Note: Excluding rural areas of Rondônia, Acre, Amazonas, Roraima, Pará, and Amapá

Source: Author's calculations using PNAD (2005) data.

Table 3. Household characteristics in Brazil in 2005: distribution of population by region of residence and skin color

Residence	Average income (R\$)	Poverty rate (%)	Population distribution (%)		
			Whites	Afro-Brazilians	Others
North	323	25.6	25.7	73.7	0.6
Northeast	248	42.6	29.5	70.2	0.4
Southeast	543	12.5	58.5	40.6	0.9
South	530	11.1	80.8	18.6	0.6
Center-west	498	15.0	43.5	55.5	1.0
Urban	485	18.7	52.2	47.0	0.8
Rural	199	45.9	41.0	58.7	0.3
All	440	23.0	50.5	48.8	0.7

Note: Excluding rural areas of Rondônia, Acre, Amazonas, Roraima, Pará, and Amapá

Source: Author's calculations using PNAD (2005) data.

Table 4. Household characteristics and skin color in Brazil in 2005

	Whites	Afro- Brazilians
Household members and income		
No. of household members	4.00	4.64
No. of dependents*	1.89	2.46
Aged <10 years	0.72	1.00
Aged 10–15 years	0.44	0.59
Aged 16–45 years	0.58	0.74
Aged 46+ years	0.15	0.13
No. of workers receiving earnings	1.72	1.77
No. of nonworkers receiving nonlabor income	0.40	0.41
Household dependency ratio (%)	42.1	48.2
Age (% in each interval)		
<16 years	26.2	30.2
16–24 years	16.2	18.2
25–55 years	42.8	40.5
56+ years	14.8	11.0
Education		
Illiteracy rate (% aged 15+ years)	7.0	15.3
Years of education (% aged 25+ years)		
0	9.9	20.6
1–3	11.5	16.2
4–7	27.1	28.2
8–10	13.5	12.6
11–14	26.1	19.0
15+	11.9	3.4

* Dependents: all children younger than 10 years and all individuals above that age not receiving any income.

Excluding rural areas of Rondônia, Acre, Amazonas, Roraima, Pará, and Amapá

Source: Author's calculations using PNAD (2005) data.

Table 5. Labor market performance in Brazil by skin color (people aged 16+ years) in 2005

Labor status (% population)	All		Males		Females	
	Whites	Afro-Brazilians	Whites	Afro-Brazilians	Whites	Afro-Brazilians
Inactive	30.6	28.8	18.2	16.8	41.5	40.4
Unemployed	5.6	7.5	5.0	6.6	6.1	8.3
Employed	63.8	63.7	76.8	76.6	52.4	51.3
Informal employee in agriculture	1.4	3.5	2.6	6.5	0.3	0.7
Informal employee in domestic service	2.7	4.6	0.3	0.5	4.9	8.5
Informal employee in other industries	8.4	9.4	10.7	12.8	6.4	6.2
Formal employee in agriculture	0.9	1.5	1.8	2.7	0.2	0.3
Formal employee in domestic service	1.2	1.6	0.3	0.3	1.9	2.8
Formal employee in other industries (manager or professional in private sector)	2.8	0.9	3.2	1.0	2.5	0.7
Formal employee in other industries (manager or professional in public sector)	17.7	14.4	23.6	20.4	12.6	8.7
Formal employee in other industries (other occupations in private sector)	2.1	0.9	1.4	0.6	2.8	1.3
Formal employee in other industries (other occupations in public sector)	4.2	4.0	4.4	4.1	4.0	3.9
Self-employed in agriculture	2.7	3.8	5.1	6.6	0.5	1.0
Self-employed in other industries	10.7	10.8	14.0	14.0	7.8	7.8
Employers	3.8	1.6	5.9	2.4	2.0	0.7
Unpaid and others	5.1	6.8	3.5	4.9	6.5	8.7
Weekly hours*	42.9	42.4	45.8	45.3	38.8	37.9
Hourly earnings (R\$)	6.5	3.6	7.1	3.7	5.7	3.3
Monthly earnings (R\$)	1,034	550	1,191	617	814	443

* Average computed for workers receiving labor income

Note: Excluding rural areas of Rondônia, Acre, Amazonas, Roraima, Pará, and Amapá.

Source: Author's calculations using PNAD (2005) data.

Table 6. Poverty rates and the poverty discrepancy in Brazil: 1992 and 2005

	2005 poverty line (50% median income =2005 R\$120)	1992 fixed/absolute poverty line (2005 R\$120)	1992 relative poverty line (50% median income)
Poverty rates			
All	23.5	36.5	26.4
Whites	14.5	24.8	16.8
Afro-Brazilians	32.8	50.6	37.9
Raw racial poverty gap	18.4	25.9	21.0

Note: Excluding rural areas of Rondônia, Acre, Amazonas, Roraima, Pará, and Amapá.

Source: Author's calculations using PNAD (1992 and 2005) data.

Table 7. Decomposition analysis of the racial poverty gap in Brazil from 1992 to 2005
(Afro-Brazilians and whites)

Variables	Characteristics effect						Coefficients effect					
	2005		1992		1992		2005		1992		1992	
	gap	%	gap	%	gap	%	gap	%	gap	%	gap	%
Total	15.8	85.6	23.0	88.8	19.1	91.1	2.6	14.4	2.9	11.2	1.9	8.9
Geographic	3.5	19.0	5.2	20.3	4.6	21.7	0.6	3.5	0.2	0.6	0.5	2.2
State	3.4	18.5	4.8	18.7	4.2	20.0	0.4	1.9	-0.2	-0.6	0.3	1.4
Urban vs rural	0.1	0.5	0.4	1.6	0.4	1.7	0.3	1.6	0.3	1.2	0.2	0.7
Sociodemographic	4.1	22.5	6.5	25.3	5.3	25.1	0.6	3.2	-2.1	-7.1	-3.3	-15.9
Household type	0.0	0.0	0.1	0.3	0.1	0.4	0.6	3.0	0.5	1.9	0.2	1.1
Mobility	0.1	0.4	0.0	0.1	0.0	0.1	0.2	1.2	-1.3	-4.1	-1.1	-5.5
Sex of head	0.0	0.1	0.1	0.3	0.0	0.1	-0.2	-1.3	0.0	-0.1	-0.5	-2.5
Age of head	0.2	1.3	0.0	-0.1	0.0	-0.2	0.1	0.6	-0.1	-0.2	0.2	1.1
<i>Dependents</i>	<i>3.8</i>	<i>20.7</i>	<i>6.4</i>	<i>24.6</i>	<i>5.2</i>	<i>24.7</i>	<i>-0.1</i>	<i>-0.3</i>	<i>-1.3</i>	<i>-4.6</i>	<i>-2.1</i>	<i>-10.2</i>
Aged 0–15 years	3.1	17.0	5.3	20.5	4.4	20.8	-0.2	-1.3	-0.4	-1.3	-1.3	-6.4
Aged 16–45 years	0.9	4.8	1.0	4.0	0.8	3.8	0.2	1.3	-0.8	-3.1	-0.8	-3.7
Aged 46+ years	-0.2	-1.1	0.0	0.1	0.0	0.1	0.0	-0.2	-0.1	-0.2	0.0	-0.1
Education and labor activity	8.1	44.1	11.1	43.0	9.2	43.8	2.4	13.2	2.1	7.7	1.8	8.6
Education of head	3.3	17.9	5.4	20.9	4.3	20.3	0.5	3.0	0.3	1.0	0.2	1.0
<i>Labor activity of head</i>	<i>2.1</i>	<i>11.2</i>	<i>3.0</i>	<i>11.5</i>	<i>2.8</i>	<i>13.1</i>	<i>1.3</i>	<i>7.3</i>	<i>2.3</i>	<i>8.4</i>	<i>1.8</i>	<i>8.8</i>
Inactive	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	-0.1	0.1	0.4	0.1	0.6
Unemployed	0.1	0.7	0.1	0.2	0.1	0.3	0.0	-0.2	-0.1	-0.2	-0.1	-0.5
Employed	1.9	10.2	2.7	10.4	2.5	11.8	-0.1	-0.4	0.3	1.2	0.4	2.1
Hours worked	0.1	0.4	0.2	0.9	0.2	1.0	1.5	8.1	1.9	7.0	1.4	6.5
<i>Other working household members</i>	<i>2.8</i>	<i>15.1</i>	<i>2.8</i>	<i>10.6</i>	<i>2.2</i>	<i>10.4</i>	<i>0.5</i>	<i>3.0</i>	<i>-0.5</i>	<i>-1.8</i>	<i>-0.2</i>	<i>-1.2</i>
Employed	2.7	14.6	2.8	10.6	2.2	10.4	0.3	1.6	1.2	4.3	1.4	6.7
Hours worked	0.1	0.5	0.0	0.0	0.0	0.0	0.3	1.4	-1.7	-6.0	-1.6	-7.8
Nonlabor incomes												
Other nonworking household members	0.0	-0.1	0.1	0.3	0.1	0.5	0.2	1.0	0.0	-0.1	-0.1	-0.5
Constant							-1.2	-6.6	2.8	10.2	3.1	14.6

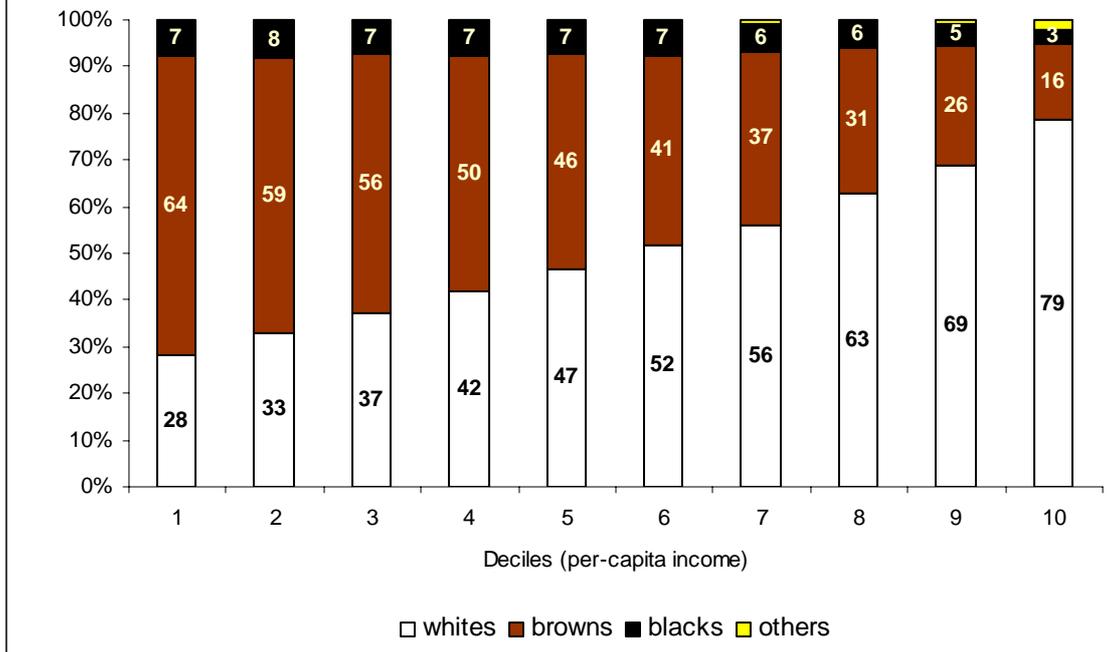
Notes:

(i) Excluding rural areas of Rondônia, Acre, Amazonas, Roraima, Pará, and Amapá

(ii) “gap” and “%” columns indicate, respectively, the *raw* gap and the *share* of the overall *raw* gap explained by each set of characteristics (through the characteristics and coefficients effect)

Source: Author’s calculations using PNAD (1992 and 2005) data.

Figure 1. Population by income deciles and skin color/race in Brazil in 2005



Note: Excluding rural areas of Rondônia, Acre, Amazonas, Roraima, Pará, and Amapá

Source: Author's calculations using PNAD (2005) data.

APPENDIX

Characteristic*	Mean characteristics				Normalized regression coefficients					
	2005		1992		2005		1992		1992	
	Whites	Afro-B	Whites	Afro-B	Whites	Afro-B	Whites	Afro-B	Whites	Afro-B
Residence in north: Rondônia	0.42	0.75	0.40	0.59	0.185	-0.201	0.254	0.042	0.006	0.035
Residence in north: Acre	0.13	0.37	0.09	0.31	0.092	0.013	-0.238	-0.007	-0.399	-0.056
Residence in north: Amazonas	0.66	2.20	0.66	1.60	-0.307	-0.662	0.192	0.159	0.336	0.165
Residence in north: Roraima	0.08	0.25	0.06	0.15	0.444	0.058	-0.971	-1.465	-1.439	-1.179
Residence in north: Pará	1.42	4.32	0.90	3.09	0.009	-0.066	0.041	0.060	0.002	-0.090
Residence in north: Amapá	0.14	0.49	0.10	0.26	-0.581	-0.668	-0.386	-1.132	-0.398	-1.002
Residence in north: Tocantins	0.37	1.10	0.28	1.14	0.455	0.418	0.097	0.395	0.201	0.386
Residence in northeast: Maranhão	1.69	5.20	1.00	4.13	0.815	0.961	0.404	0.586	0.548	0.571
Residence in northeast: Piauí	0.83	2.59	0.62	3.32	0.604	0.891	0.640	0.973	0.937	0.951
Residence in northeast: Ceará	3.06	5.92	2.60	6.79	1.147	1.006	0.815	0.756	0.688	0.646
Residence in northeast: Rio Grande do N.	1.24	2.17	1.11	2.51	0.706	0.513	0.788	0.885	0.853	0.990
Residence in northeast: Paraíba	1.43	2.60	1.39	3.23	0.683	0.646	0.978	0.969	1.101	0.821
Residence in northeast: Pernambuco	3.41	5.97	3.27	7.21	0.886	0.782	0.640	0.486	0.674	0.534
Residence in northeast: Alagoas	1.11	2.31	1.22	2.52	0.621	0.696	0.441	0.261	0.281	0.289
Residence in northeast: Sergipe	0.62	1.60	0.53	1.68	0.690	0.588	0.328	0.601	0.353	0.532
Residence in northeast: Bahia	3.20	12.35	3.13	14.20	0.544	0.464	0.290	0.251	0.208	0.171
Residence in southeast: Minas Gerais	9.73	11.72	11.20	11.27	-0.275	-0.059	-0.156	0.057	-0.124	-0.017
Residence in southeast: Espírito Santo	1.49	2.36	1.50	2.29	-0.391	-0.250	0.065	-0.023	0.161	0.137
Residence in southeast: Rio de Janeiro	8.83	7.75	9.95	7.92	-0.757	-0.610	-0.670	-0.558	-0.660	-0.590
Residence in southeast: São Paulo	29.86	14.00	30.00	12.64	-1.003	-0.849	-1.010	-1.063	-0.957	-0.999
Residence in south: Paraná	8.31	3.01	8.42	2.93	-0.431	-0.294	-0.126	-0.094	-0.131	-0.055
Residence in south: Santa Catarina	5.63	0.76	5.43	0.55	-1.266	-0.824	-0.729	-0.313	-0.710	-0.350
Residence in south: Rio Grande do S.	10.08	1.92	10.32	1.81	-0.603	-0.570	-0.513	-0.499	-0.547	-0.493
Residence in center-west: Mato Grosso do S.	1.27	1.24	1.29	1.21	-0.333	-0.313	0.005	-0.288	-0.016	-0.252
Residence in center-west: Mato Grosso	1.15	2.01	1.04	2.00	-0.984	-0.771	-0.315	-0.359	-0.330	-0.349
Residence in center-west: Goiás	2.76	3.59	2.53	3.31	-0.400	-0.420	-0.224	-0.255	-0.153	-0.294
Residence in center-west: Distrito Federal	1.11	1.43	0.97	1.34	-0.548	-0.479	-0.641	-0.425	-0.485	-0.501
Residence in rural area	12.78	18.81	17.36	26.03	0.102	0.043	0.189	0.157	0.192	0.136
Residence in urban area	87.22	81.19	82.64	73.97	-0.102	-0.043	-0.189	-0.157	-0.192	-0.136
One-person household	3.69	2.82	2.07	1.70	-0.222	-0.391	-0.473	-0.682	-0.533	-0.621
Couple	76.16	73.70	82.49	78.68	0.097	0.162	0.010	0.240	0.079	0.184
Single mother	15.46	18.10	11.53	14.94	0.207	0.234	0.308	0.396	0.309	0.395
Other type of family	4.70	5.37	3.92	4.68	-0.082	-0.005	0.155	0.046	0.144	0.042
Single-family household	94.62	93.17	95.45	94.60	0.158	0.178	0.248	0.065	0.144	0.091
Multifamily household	5.38	6.83	4.55	5.40	-0.158	-0.178	-0.248	-0.065	-0.144	-0.091
Head: nonimmigrant	41.54	42.53	37.77	40.68	0.178	0.239	0.171	0.079	0.201	0.130
Head moved from the same state	34.61	32.65	35.82	34.53	0.016	0.071	0.045	-0.034	0.080	-0.024
Head moved from north	0.55	1.24	0.48	0.88	0.198	0.047	-0.278	-0.043	-0.396	-0.032
Head moved from northeast	9.43	14.02	10.27	13.86	0.132	0.001	0.088	-0.143	0.101	-0.130
Head moved from southeast	7.18	6.57	8.84	7.48	-0.004	0.022	0.083	-0.075	0.091	-0.022
Head moved from south	4.98	1.68	4.77	1.40	-0.078	-0.017	0.059	-0.258	0.084	-0.016
Head moved from center-west	0.90	1.16	0.74	0.99	-0.387	-0.292	-0.301	-0.136	-0.097	-0.065
Head moved from abroad	0.81	0.15	1.31	0.18	-0.055	-0.072	0.132	0.609	-0.064	0.159
Male household head	76.81	74.50	85.79	82.82	-0.065	-0.127	-0.038	-0.113	-0.114	-0.117
Female household head	23.19	25.50	14.21	17.18	0.065	0.127	0.038	0.113	0.114	0.117
Head aged 16–24 years	3.45	4.50	3.98	4.80	1.016	0.893	0.567	0.496	0.594	0.533
Head aged 25–55 years	70.67	71.19	74.41	72.74	0.253	0.233	0.146	0.163	0.053	0.022
Head aged 56+ years	25.88	24.30	21.61	22.45	-1.269	-1.127	-0.714	-0.659	-0.647	-0.555
Head with no education	10.73	23.38	16.44	36.68	0.960	0.929	1.042	0.960	1.109	1.034
Head with 1–3 years of education	12.62	18.13	18.61	22.56	1.044	1.104	0.979	1.010	1.045	1.066
Head with 4–7 years of education	29.47	29.32	32.84	25.78	0.615	0.716	0.540	0.645	0.616	0.697
Head with 8–10 years of education	14.21	12.20	11.24	7.24	0.133	0.268	0.020	0.126	0.040	0.166
Head with 11–14 years of education	23.14	14.54	13.60	6.20	-0.715	-0.406	-0.839	-0.659	-0.785	-0.739
Head with 15+ years of education	9.83	2.42	7.28	1.54	-2.036	-2.611	-1.743	-2.082	-2.025	-2.224

Head illiterate	9.56	22.89	13.30	32.92	0.174	0.196	0.178	0.172	0.230	0.184
Head literate	90.44	77.11	86.70	67.08	-0.174	-0.196	-0.178	-0.172	-0.230	-0.184
Head inactive	20.37	19.17	15.23	14.96	0.139	0.129	-0.003	0.078	-0.137	-0.077
Head unemployed	2.90	3.77	2.49	2.78	1.856	1.713	1.901	1.565	1.582	1.405
Head: informal employee in agriculture	2.34	5.52	3.85	8.71	1.178	1.253	1.173	1.028	1.211	1.023
Head: informal employee in domestic service	1.75	2.97	0.97	1.96	1.359	0.943	0.679	0.774	0.755	0.816
Head: informal employee in other industries	7.64	8.99	5.94	7.78	0.448	0.526	0.197	0.316	0.273	0.316
Head: formal employee in agriculture	1.85	2.67	2.39	2.90	0.286	0.081	0.192	0.093	0.445	0.431
Head: formal employee in domestic service	0.89	1.25	0.45	0.55	0.480	0.383	0.845	0.309	0.473	0.023
Head: formal employee in other industries (manager or professional in private sector)	3.05	0.90	4.70	1.47	-1.868	-1.337	-1.945	-1.430	-1.526	-1.295
Head: formal employee in other industries (others in private sector)	20.46	17.90	19.88	17.13	-0.335	-0.390	-0.824	-0.797	-0.515	-0.546
Head: formal employee in other industries (manager or professional in public sector)	2.08	0.91	2.92	1.52	-3.874	-3.590	-0.985	-0.672	-0.984	-0.674
Head: formal employee in other industries (others in public sector)	5.46	5.18	6.65	6.44	-0.606	-0.625	-0.733	-0.628	-0.534	-0.583
Head: self-employed in agriculture	6.04	8.95	8.88	12.47	0.997	1.032	0.505	0.596	0.438	0.585
Head: self-employed in other industries	16.23	15.87	16.55	15.82	0.212	0.214	-0.420	-0.271	-0.335	-0.184
Head: employer	6.73	3.00	7.18	3.14	-1.378	-1.156	-1.546	-1.572	-1.693	-1.689
Head: unpaid/others	2.22	2.95	1.92	2.37	1.105	0.825	0.966	0.610	0.546	0.450
Hours worked by head	34.74	34.08	39.18	38.42	-0.022	-0.017	-0.018	-0.015	-0.016	-0.012
No. of dependents aged 0–9 years	0.72	1.00	1.03	1.45	1.005	0.986	0.190	0.203	0.194	0.211
No. of dependents aged 10–15 years	0.44	0.59	1.64	2.30	0.820	0.800	0.569	0.505	0.601	0.578
No. of dependents aged 16–45 years	0.58	0.74	0.79	0.93	0.726	0.765	0.574	0.496	0.633	0.562
No. of dependents aged 46–64 years	0.13	0.12	0.15	0.16	1.276	1.244	0.950	0.931	0.910	0.879
No. of dependents aged 65+ years	0.02	0.01	0.03	0.02	1.108	0.938	0.531	0.575	0.434	0.473
No. of employed aged 10–15 years (0–3)	0.01	0.04	0.08	0.20	0.151	0.426	0.279	0.161	0.180	0.233
No. of employed aged 10–15 years (4–7)	0.03	0.06	0.08	0.07	-0.073	0.267	-0.264	-0.232	-0.201	-0.070
No. of employed aged 10–15 years (8+)	0.01	0.01	0.01	0.00	-0.099	0.175	0.397	-0.516	0.133	-0.571
No. of employed aged 16–45 years (0–3)	0.08	0.18	0.20	0.44	0.056	-0.043	-0.256	-0.275	-0.229	-0.253
No. of employed aged 16–45 years (4–7)	0.18	0.28	0.35	0.38	-0.316	-0.268	-0.373	-0.509	-0.411	-0.397
No. of employed aged 16–45 years (8–10)	0.18	0.20	0.17	0.13	-0.279	-0.345	-0.500	-0.740	-0.704	-0.589
No. of employed aged 16–45 years (11+)	0.44	0.30	0.24	0.13	-0.821	-0.795	-0.993	-1.216	-1.141	-1.038
No. of employed aged 46+ years (0–3)	0.04	0.07	0.06	0.09	-0.384	-0.317	-0.281	-0.331	-0.276	-0.206
No. of employed aged 46+ years (4–7)	0.05	0.04	0.03	0.02	-0.706	-0.278	-0.531	-0.708	-0.322	-0.425
No. of employed aged 46+ years (8–10)	0.02	0.01	0.01	0.00	-0.206	-0.746	-2.391	-1.005	-1.707	-0.701
No. of employed aged 46+ years (11+)	0.05	0.02	0.02	0.01	-1.151	-1.632	-1.046	-2.213	-1.533	-2.006
No. of informal employees in agriculture	0.03	0.07	0.05	0.12	-0.139	-0.165	-0.166	-0.023	-0.049	0.109
No. of informal employees in domestic service	0.06	0.12	0.09	0.15	0.066	0.101	-0.035	0.054	0.198	0.233
No. of informal employees in other industries	0.18	0.21	0.16	0.21	-0.487	-0.444	-0.311	-0.124	0.017	0.079
No. of formal employees in agriculture	0.01	0.02	0.02	0.02	-1.413	-1.585	-1.306	-0.888	-1.132	-0.781
No. of formal employees in domestic service	0.02	0.03	0.02	0.02	-1.170	-1.159	-0.848	-1.332	-0.460	-0.674
No. of formal employees in other industries (manager or professional in private sector)	0.04	0.01	0.04	0.02	-3.159	-2.522	-1.918	-1.615	-1.498	-1.467
No. of formal employees in other industries (others in private sector)	0.29	0.23	0.25	0.20	-1.475	-1.437	-1.370	-1.152	-0.863	-0.694
No. of formal employees in other industries (manager or professional in public sector)	0.03	0.01	0.06	0.04	-3.124	-2.480	-0.521	-0.607	-0.291	-0.332
No. of formal employees other industries (others in public sector)	0.06	0.06	0.06	0.06	-1.761	-1.606	-0.938	-0.614	-0.685	-0.444
No. of self-employed in agriculture	0.02	0.03	0.02	0.04	-0.082	-0.108	-0.414	-0.466	-0.264	-0.330
No. of self-employed in other industries	0.14	0.15	0.13	0.16	-0.257	-0.203	-0.315	-0.175	-0.166	-0.124
No. of employers	0.03	0.01	0.02	0.01	-2.059	-1.813	-3.360	-2.277	-2.636	-2.352
No. of females employed	0.66	0.67	0.72	0.78	0.285	0.221	0.171	0.335	0.285	0.219
Average weekly hours worked	25.75	24.70	25.66	25.95	-0.014	-0.013	-0.005	-0.012	-0.005	-0.010
No. of other income receivers (0–3)	0.08	0.12	0.06	0.07	-0.991	-0.702	-0.733	-0.949	-0.508	-0.492
No. of other income receivers (4–7)	0.07	0.07	0.04	0.02	-0.343	0.098	-0.425	-0.520	-0.311	-0.255
No. of other income receivers (7–10)	0.02	0.02	0.01	0.01	-0.707	-0.298	0.030	-0.514	-0.085	-0.519
No. of other income receivers (11+)	0.04	0.02	0.02	0.01	-1.243	-0.865	-0.251	-1.285	-0.247	-1.037
No. of other female income receivers	0.17	0.19	0.10	0.09	0.735	0.419	-0.390	-0.189	-0.188	-0.157
Constant	1.00	1.00	1.00	1.00	-2.772	-2.926	-2.478	-2.188	-1.935	-1.716

* Numbers in parenthesis indicate years of schooling

Logit regressions of the probability of being poor in 1992 and 2005: estimated coefficients and statistical significance

	2005			1992			
	Pooled sample	Whites	Afro-Brazilians	Relative poverty line		Fixed poverty line	
				Whites	Afro-Brazilians	Whites	Afro-Brazilians
Indigenous	0.419**	-	-	-	-	-	-
Black ⁺	0.343**	-	-	-	-	-	-
Asian	-0.055	-	-	-	-	-	-
Brown ⁺	0.295**	-	-	-	-	-	-
Not classified	-0.933	-	-	-	-	-	-
Residence in north: Rondônia	0.06	0.460**	-0.142	0.410*	-0.015	0.13	0.052
Residence in north: Acre	0.162	0.368	0.072	-0.082	-0.064	-0.274	-0.039
Residence in north: Amazonas	-0.450**	-0.032	-0.603**	0.348*	0.102	0.460**	0.182
Residence in north: Roraima	0.258	0.719**	0.116	-0.815	-1.522**	-1.315**	-1.162**
Residence in north: Pará	0.095	0.285**	-0.008	0.197	0.003	0.127	-0.073
Residence in north: Amapá	-0.505**	-0.306	-0.609**	-0.23	-1.189**	-0.274	-0.984**
Residence in north: Tocantins	0.564**	0.731**	0.477**	0.253	0.338**	0.325	0.404**
Residence in northeast: Maranhão	1.078**	1.091**	1.020**	0.560**	0.529**	0.672**	0.588**
Residence in northeast: Piauí	0.971**	0.879**	0.950**	0.796**	0.916**	1.061**	0.968**
Residence in northeast: Ceará	1.196**	1.422**	1.065**	0.971**	0.699**	0.812**	0.663**
Residence in northeast: Rio Grande do N.	0.722**	0.981**	0.572**	0.944**	0.828**	0.977**	1.008**
Residence in northeast: Paraíba	0.799**	0.958**	0.705**	1.134**	0.912**	1.225**	0.838**
Residence in northeast: Pernambuco	0.959**	1.161**	0.841**	0.796**	0.429**	0.798**	0.551**
Residence in northeast: Alagoas	0.805**	0.896**	0.754**	0.597**	0.204	0.405**	0.306**
Residence in northeast: Sergipe	0.754**	0.965**	0.647**	0.483**	0.544**	0.478**	0.549**
Residence in northeast: Bahia	0.612**	0.819**	0.523**	0.446**	0.194**	0.333**	0.188**
Residence in southeast: Espírito Santo	-0.162	-0.116	-0.191	0.221	-0.08	0.285**	0.154
Residence in southeast: Rio de Janeiro	-0.527**	-0.482**	-0.551**	-0.514**	-0.615**	-0.536**	-0.573**
Residence in southeast: São Paulo	-0.791**	-0.728**	-0.790**	-0.854**	-1.120**	-0.832**	-0.982**
Residence in south: Paraná	-0.245**	-0.155*	-0.235**	0.03	-0.151	-0.007	-0.038
Residence in south: Santa Catarina	-1.020**	-0.991**	-0.765**	-0.573**	-0.37	-0.585**	-0.333
Residence in south: Rio Grande do S.	-0.451**	-0.328**	-0.511**	-0.357**	-0.556**	-0.423**	-0.476**
Residence in center-west: Mato Grosso do S.	-0.186**	-0.058	-0.254**	0.161	-0.345**	0.108	-0.235*
Residence in center-west: Mato Grosso	-0.677**	-0.708**	-0.712**	-0.159	-0.416**	-0.206	-0.331**
Residence in center-west: Goiás	-0.271**	-0.124	-0.361**	-0.068	-0.312**	-0.028	-0.277**
Residence in center-west: Distrito Federal	-0.368**	-0.273*	-0.421**	-0.485**	-0.482**	-0.360**	-0.484**
Residence in urban area	-0.130**	-0.203**	-0.087*	-0.378**	-0.313**	-0.384**	-0.273**
Couple	0.476**	0.319**	0.554**	0.483**	0.922**	0.612**	0.804**
Single mother	0.562**	0.429**	0.625**	0.781**	1.077**	0.842**	1.016**
Other type of family	0.306**	0.14	0.386**	0.628**	0.728**	0.677**	0.662**
Multifamily household	-0.342**	-0.316**	-0.357**	-0.496**	-0.130*	-0.287**	-0.182**
Head moved from the same state	-0.165**	-0.162**	-0.168**	-0.126**	-0.113**	-0.121**	-0.154**
Head moved from north	-0.136	0.02	-0.193	-0.450*	-0.122	-0.597**	-0.162
Head moved from northeast	-0.163**	-0.046	-0.239**	-0.083	-0.222**	-0.1	-0.260**
Head moved from southeast	-0.191**	-0.182**	-0.217**	-0.088	-0.154*	-0.11	-0.152**
Head moved from south	-0.259**	-0.256**	-0.256*	-0.113	-0.337**	-0.117	-0.147
Head moved from center-west	-0.540**	-0.564**	-0.532**	-0.472**	-0.215	-0.297	-0.195
Head moved from abroad	-0.327	-0.233	-0.311	-0.04	0.53	-0.265	0.029
Female household head	0.211**	0.129	0.255**	0.076	0.226**	0.229**	0.234**
Head aged 25–55 years	-0.696**	-0.763**	-0.660**	-0.421**	-0.332**	-0.541**	-0.511**
Head aged 56+ years	-2.106**	-2.284**	-2.020**	-1.281**	-1.154**	-1.241**	-1.087**
Head with 1–3 years of education	0.146**	0.084	0.175**	-0.063	0.05	-0.063	0.032
Head with 4–7 years of education	-0.261**	-0.344**	-0.212**	-0.502**	-0.315**	-0.492**	-0.338**
Head with 8–10 years of education	-0.726**	-0.826**	-0.661**	-1.022**	-0.835**	-1.068**	-0.869**
Head with 11–14 years of education	-1.476**	-1.675**	-1.335**	-1.881**	-1.620**	-1.894**	-1.773**
Head with 15+ years of education	-3.114**	-2.996**	-3.540**	-2.785**	-3.043**	-3.134**	-3.258**
Head literate	-0.368**	-0.349**	-0.392**	-0.357**	-0.343**	-0.459**	-0.368**
Head inactive	-1.112**	-1.038**	-1.124**	-1.176**	-0.950**	-1.348**	-1.100**
Head unemployed	0.534**	0.678**	0.461**	0.728**	0.537**	0.371**	0.382**
Head: informal employee in domestic service	-0.143	0.182	-0.310**	-0.494**	-0.254*	-0.456**	-0.207

Head: informal employee in other industries	-0.734**	-0.730**	-0.726**	-0.977**	-0.712**	-0.938**	-0.706**
Head: formal employee in agriculture	-1.069**	-0.891**	-1.171**	-0.981**	-0.935**	-0.766**	-0.592**
Head: formal employee in domestic service	-0.814**	-0.698**	-0.870**	-0.328	-0.719**	-0.738**	-1.000**
Head: formal employee in other industries (manager or professional in private sector)	-2.780**	-3.046**	-2.590**	-3.119**	-2.458**	-2.737**	-2.318**
Head: formal employee in other industries (others in private sector)	-1.598**	-1.512**	-1.643**	-1.997**	-1.825**	-1.726**	-1.568**
Head: formal employee in other industries (manager or professional in public sector)	-4.981**	-5.052**	-4.843**	-2.158**	-1.700**	-2.195**	-1.697**
Head: formal employee in other industries (others in public sector)	-1.840**	-1.784**	-1.878**	-1.906**	-1.656**	-1.745**	-1.605**
Head: self-employed in agriculture	-0.219**	-0.181	-0.221**	-0.668**	-0.431**	-0.773**	-0.437**
Head: self-employed in other industries	-1.018**	-0.966**	-1.039**	-1.594**	-1.298**	-1.546**	-1.207**
Head: employer	-2.488**	-2.556**	-2.409**	-2.720**	-2.600**	-2.904**	-2.711**
Head: unpaid/others	-0.298**	-0.073	-0.427**	-0.207	-0.418**	-0.665**	-0.573**
Hours worked by head	-0.019**	-0.022**	-0.017**	-0.018**	-0.015**	-0.016**	-0.012**
No. of dependents aged 0–9 years	0.993**	1.005**	0.986**	0.190**	0.203**	0.194**	0.211**
No. of dependents aged 10–15 years	0.805**	0.820**	0.800**	0.569**	0.505**	0.601**	0.578**
No. of dependents aged 16–45 years	0.750**	0.726**	0.765**	0.574**	0.496**	0.633**	0.562**
No. of dependents aged 46–64 years	1.251**	1.276**	1.244**	0.950**	0.931**	0.910**	0.879**
No. of dependents aged 65+ years	0.997**	1.108**	0.938**	0.531**	0.575**	0.434**	0.473**
No. of employed aged 10–15 years (0–3)	0.334**	0.151	0.426**	0.279**	0.161**	0.180**	0.233**
No. of employed aged 10–15 years (4–7)	0.140**	-0.073	0.267**	-0.264**	-0.232**	-0.201**	-0.07
No. of employed aged 10–15 years (8+)	0.04	-0.099	0.175	0.397	-0.516	0.133	-0.571
No. of employed aged 16–45 years (0–3)	-0.018	0.056	-0.043	-0.256**	-0.275**	-0.229**	-0.253**
No. of employed aged 16–45 years (4–7)	-0.287**	-0.316**	-0.268**	-0.373**	-0.509**	-0.411**	-0.397**
No. of employed aged 16–45 years (8–10)	-0.324**	-0.279**	-0.345**	-0.500**	-0.740**	-0.704**	-0.589**
No. of employed aged 16–45 years (11+)	-0.809**	-0.821**	-0.795**	-0.993**	-1.216**	-1.141**	-1.038**
No. of employed aged 46+ years (0–3)	-0.334**	-0.384**	-0.317**	-0.281**	-0.331**	-0.276**	-0.206**
No. of employed aged 46+ years (4–7)	-0.467**	-0.706**	-0.278**	-0.531**	-0.708**	-0.322**	-0.425**
No. of employed aged 46+ years (8–10)	-0.547**	-0.206	-0.746**	-2.391**	-1.005*	-1.707**	-0.701*
No. of employed aged 46+ years (11+)	-1.430**	-1.151**	-1.632**	-1.046**	-2.213**	-1.533**	-2.006**
No. of informal employees in agriculture	-0.155**	-0.139	-0.165**	-0.166**	-0.023	-0.049	0.109*
No. of informal employees in domestic service	0.101*	0.066	0.101	-0.035	0.054	0.198**	0.233**
No. of informal employees in other industries	-0.446**	-0.487**	-0.444**	-0.311**	-0.124**	0.017	0.079
No. of formal employees in agriculture	-1.551**	-1.413**	-1.585**	-1.306**	-0.888**	-1.132**	-0.781**
No. of formal employees in domestic service	-1.143**	-1.170**	-1.159**	-0.848**	-1.332**	-0.460**	-0.674**
No. of formal employees in other industries (manager or professional in private sector)	-2.874**	-3.159**	-2.522**	-1.918**	-1.615**	-1.498**	-1.467**
No. of formal employees in other industries (others in private sector)	-1.431**	-1.475**	-1.437**	-1.370**	-1.152**	-0.863**	-0.694**
No. of formal employees in other industries (manager or professional in public sector)	-2.680**	-3.124**	-2.480**	-0.521**	-0.607**	-0.291*	-0.332**
No. of formal employees in other industries (others in public sector)	-1.640**	-1.761**	-1.606**	-0.938**	-0.614**	-0.685**	-0.444**
No. of self-employed in agriculture	-0.099	-0.082	-0.108	-0.414**	-0.466**	-0.264**	-0.330**
No. of self-employed in other industries	-0.207**	-0.257**	-0.203**	-0.315**	-0.175**	-0.166**	-0.124*
No. of employers	-1.923**	-2.059**	-1.813**	-3.360**	-2.277**	-2.636**	-2.352**
No. of females employed	0.241**	0.285**	0.221**	0.171**	0.335**	0.285**	0.219**
Average weekly hours worked	-0.013**	-0.014**	-0.013**	-0.005**	-0.012**	-0.005**	-0.010**
No. of other income receivers (0–3)	-0.803**	-0.991**	-0.702**	-0.733**	-0.949**	-0.508**	-0.492**
No. of other income receivers (4–7)	-0.057	-0.343**	0.098	-0.425*	-0.520**	-0.311*	-0.255
No. of other income receivers (7–10)	-0.441**	-0.707**	-0.298**	0.03	-0.514	-0.085	-0.519
No. of other income receivers (11+)	-1.007**	-1.243**	-0.865**	-0.251	-1.285**	-0.247	-1.037**
No. of other female income receivers	0.527**	0.735**	0.419**	-0.390*	-0.189	-0.188	-0.157
Constant	0.113	0.431**	0.228*	0.425**	0.031	0.973**	0.661**
No. of unweighted observations	388,653	180,078	206,259	159,314	147,706	159,314	147,706
Log-likelihood	13,262	-36,033	-66,215	-38,838	-53,724	-49,316	-57,408
Pseudo R^2	52.3	51.5	49.3	46.3	45.2	44.7	43.9

Notes:

Numbers in parenthesis (first column) indicate years of schooling

* Color coefficients between blacks and browns do not differ significantly at 10%.

* Significant at 10%, ** significant at 5% (with robust standard errors, individuals clustering across households).

Reference: Lone male aged 16–24 years with no formal education, illiterate, living in rural Minas Gerais, employed in agriculture, and a nonmigrant.

Source: Author's calculations using PNAD (1992 and 2005) data.

Characteristic*	Detailed characteristics effects			Detailed coefficients effects		
	$w_{\Delta X}^k, \sum_k w_{\Delta X}^k = 1$			$w_{\Delta \beta}^k, \sum_k w_{\Delta \beta}^k = 1$		
	2005	1992 relative pov. line	1992 fixed pov. line	2005	1992 relative pov. line	1992 fixed pov. line
Residence in north: Rondônia	0.03	0.02	0.00	-0.12	-0.06	0.01
Residence in north: Acre	0.01	-0.02	-0.04	-0.01	0.04	0.05
Residence in north: Amazonas	-0.19	0.08	0.13	-0.33	-0.03	-0.13
Residence in north: Roraima	0.03	-0.04	-0.06	-0.04	-0.04	0.02
Residence in north: Pará	0.01	0.04	0.00	-0.14	0.03	-0.14
Residence in north: Amapá	-0.08	-0.02	-0.02	-0.02	-0.09	-0.07
Residence in north: Tocantins	0.14	0.04	0.07	-0.02	0.17	0.10
Residence in northeast: Maranhão	1.16	0.85	1.09	0.32	0.55	0.07
Residence in northeast: Piauí	0.43	0.77	1.05	0.32	0.54	0.02
Residence in northeast: Ceará	1.35	1.53	1.21	-0.36	-0.20	-0.14
Residence in northeast: Rio Grande do N.	0.27	0.48	0.49	-0.18	0.12	0.16
Residence in northeast: Paraíba	0.33	0.80	0.84	-0.04	-0.02	-0.44
Residence in northeast: Pernambuco	0.93	1.11	1.10	-0.27	-0.54	-0.48
Residence in northeast: Alagoas	0.30	0.25	0.15	0.07	-0.22	0.01
Residence in northeast: Sergipe	0.28	0.17	0.18	-0.07	0.23	0.15
Residence in northeast: Bahia	2.05	1.47	0.99	-0.42	-0.28	-0.27
Residence in southeast: Minas Gerais	-0.23	0.01	0.01	1.09	1.17	0.58
Residence in southeast: Espírito Santo	-0.14	0.02	0.05	0.14	-0.10	-0.03
Residence in southeast: Rio de Janeiro	0.37	0.67	0.62	0.50	0.44	0.27
Residence in southeast: São Paulo	6.53	8.14	7.24	0.94	-0.33	-0.26
Residence in south: Paraná	0.92	0.32	0.31	0.18	0.04	0.11
Residence in south: Santa Catarina	2.54	1.63	1.49	0.15	0.11	0.09
Residence in south: Rio Grande do S.	2.01	2.00	2.00	0.03	0.01	0.05
Residence in center-west: Mato Grosso do S.	0.00	0.00	0.00	0.01	-0.17	-0.14
Residence in center-west: Mato Grosso	-0.34	-0.13	-0.13	0.18	-0.04	-0.02
Residence in center-west: Goiás	-0.14	-0.07	-0.05	-0.03	-0.05	-0.22
Residence in center-west: Distrito Federal	-0.07	-0.10	-0.07	0.04	0.14	-0.01
Residence in rural area	0.25	0.84	0.80	-0.47	-0.45	-0.75
Residence in urban area	0.25	0.84	0.80	2.04	1.19	1.99
One-person household	0.08	0.08	0.09	-0.20	-0.17	-0.07
Couple	-0.10	-0.02	-0.13	2.07	9.10	4.04
Single mother	0.23	0.47	0.44	0.21	0.65	0.62
Other type of family	-0.02	0.05	0.05	0.18	-0.26	-0.24
Single-family household	-0.09	-0.10	-0.05	0.81	-8.70	-2.44
Multifamily household	-0.09	-0.10	-0.05	-0.06	0.50	0.14
Head: nonimmigrant	0.07	0.23	0.25	1.13	-1.88	-1.41
Head moved from the same state	-0.01	-0.03	-0.04	0.78	-1.37	-1.75
Head moved from north	0.06	-0.05	-0.07	-0.08	0.10	0.16
Head moved from northeast	0.25	0.15	0.16	-0.79	-1.61	-1.57
Head moved from southeast	0.00	-0.05	-0.05	0.08	-0.60	-0.42
Head moved from south	0.11	-0.09	-0.12	0.04	-0.22	-0.07
Head moved from center-west	-0.04	-0.03	-0.01	0.05	0.08	0.02
Head moved from abroad	0.01	-0.07	0.03	0.00	0.04	0.02
Male household head	0.06	0.05	0.15	-2.01	-3.11	-0.11
Female household head	0.06	0.05	0.15	0.69	0.65	0.02
Head aged 16–24 years	0.44	0.21	0.21	-0.24	-0.17	-0.14
Head aged 25–55 years	0.05	-0.11	-0.04	-0.60	0.61	-1.11
Head aged 56+ years	0.82	-0.28	-0.24	1.48	0.62	1.02
Head with no education	4.99	9.67	9.65	-0.31	-1.51	-1.34
Head with 1–3 years of education	2.37	1.78	1.78	0.47	0.35	0.23
Head with 4–7 years of education	-0.04	-1.74	-1.87	1.28	1.36	1.02
Head with 8–10 years of education	-0.11	-0.04	-0.07	0.71	0.38	0.45
Head with 11–14 years of education	2.53	2.85	2.50	1.94	0.56	0.14
Head with 15+ years of education	6.21	4.58	5.00	-0.60	-0.26	-0.15

Head illiterate	0.95	1.60	1.93	0.21	-0.11	-0.73
Head literate	0.95	1.60	1.93	-0.72	0.23	1.49
Head inactive	-0.07	0.00	0.02	-0.09	0.61	0.43
Head unemployed	0.66	0.26	0.20	-0.23	-0.47	-0.24
Head: informal employee in agriculture	1.54	2.61	2.53	0.18	-0.63	-0.80
Head: informal employee in domestic service	0.69	0.31	0.32	-0.54	0.09	0.06
Head: informal employee in other industries	0.25	0.17	0.22	0.30	0.47	0.17
Head: formal employee in agriculture	0.10	0.05	0.10	-0.24	-0.14	-0.02
Head: formal employee in domestic service	0.07	0.04	0.02	-0.05	-0.15	-0.12
Head: formal employee in other industries (manager or professional in private sector)	1.65	2.88	2.12	0.20	0.38	0.17
Head: formal employee in other industries (others in private sector)	0.35	1.05	0.62	-0.43	0.24	-0.25
Head: formal employee in other industries (manager or professional in public sector)	1.85	0.63	0.59	0.11	0.24	0.23
Head: formal employee in other industries (others in public sector)	0.07	0.08	0.05	-0.04	0.34	-0.15
Head: self-employed in agriculture	1.19	0.83	0.68	0.14	0.58	0.90
Head: self-employed in other industries	-0.03	0.14	0.10	0.01	1.19	1.17
Head: employer	2.12	2.85	2.93	0.29	-0.04	0.01
Head: unpaid/others	0.33	0.20	0.11	-0.36	-0.42	-0.11
Hours worked by head	0.43	1.02	0.87	8.05	6.52	7.42
No. of dependents aged 0–9 years	11.83	3.64	3.50	-0.81	0.96	1.21
No. of dependents aged 10–15 years	5.12	17.19	17.04	-0.52	-7.36	-2.60
No. of dependents aged 16–45 years	4.77	3.84	3.97	1.27	-3.65	-3.25
No. of dependents aged 46–64 years	-0.76	0.18	0.16	-0.16	-0.15	-0.24
No. of dependents aged 65+ years	-0.30	-0.13	-0.10	-0.08	0.05	0.04
No. of employed aged 10–15 years (0–3)	0.16	1.51	0.92	0.46	-1.16	0.51
No. of employed aged 10–15 years (4–7)	-0.06	0.13	0.09	0.80	0.10	0.42
No. of employed aged 10–15 years (8+)	0.00	-0.05	-0.02	0.07	-0.13	-0.10
No. of employed aged 16–45 years (0–3)	0.23	-2.82	-2.37	-0.77	-0.43	-0.52
No. of employed aged 16–45 years (4–7)	-1.27	-0.48	-0.50	0.56	-2.59	0.28
No. of employed aged 16–45 years (8–10)	-0.22	0.95	1.26	-0.58	-1.61	0.75
No. of employed aged 16–45 years (11+)	4.67	4.88	5.26	0.33	-1.50	0.68
No. of employed aged 46+ years (0–3)	-0.50	-0.42	-0.39	0.21	-0.24	0.32
No. of employed aged 46+ years (4–7)	0.26	0.33	0.19	0.67	-0.19	-0.11
No. of employed aged 46+ years (8–10)	0.03	0.20	0.13	-0.29	0.27	0.19
No. of employed aged 46+ (11+)	1.28	0.46	0.63	-0.47	-0.35	-0.14
No. of informal employees in agriculture	-0.23	-0.49	-0.13	-0.07	0.84	0.91
No. of informal employees in domestic service	0.13	-0.10	0.52	0.17	0.68	0.27
No. of informal employees in other industries	-0.57	-0.76	0.04	0.39	1.99	0.64
No. of formal employees in agriculture	-0.36	-0.24	-0.20	-0.13	0.43	0.35
No. of formal employees in domestic service	-0.30	0.06	0.03	0.01	-0.46	-0.20
No. of formal employees in other industries (manager or professional in private sector)	3.23	1.93	1.42	0.34	0.31	0.03
No. of formal employees in other industries (others in private sector)	4.00	3.22	1.90	0.37	2.21	1.67
No. of formal employees in other industries (manager or professional in public sector)	2.19	0.54	0.28	0.41	-0.16	-0.08
No. of formal employees in other industries (others in public sector)	0.13	-0.02	-0.01	0.39	1.05	0.76
No. of self-employed in agriculture	-0.03	-0.34	-0.21	-0.03	-0.10	-0.12
No. of self-employed in other industries	-0.14	-0.36	-0.18	0.35	1.10	0.32
No. of employers	1.77	1.92	1.41	0.13	0.44	0.11
No. of females employed	0.15	0.35	0.55	-1.79	6.15	-2.42
Average weekly hours worked	0.50	0.01	0.01	1.40	-7.84	-6.39
No. of other income receivers (0–3)	-1.64	-0.29	-0.19	1.52	-0.74	0.05
No. of other income receivers (4–7)	-0.09	0.31	0.21	1.40	-0.11	0.07
No. of other income receivers (7–10)	0.03	-0.01	0.02	0.42	-0.17	-0.13
No. of other income receivers (11+)	0.87	0.14	0.13	0.32	-0.35	-0.26
No. of other female income receivers	0.77	0.31	0.14	-2.61	0.87	0.13
Constant				-6.63	14.56	10.76

* Numbers in parenthesis (first column) indicate years of schooling

