Racial Discrimination in the Brazilian Labour Market: Wage, Employment and Segregation Effects*

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Abstract

The social science literature has done much to document pervasive racial discrimination in Brazil and there is little doubt that a very dark color is a handicap to social advancement. Nevertheless, very few empirical economic studies have attempted to quantify the impact of ethnic discrimination in Brazil. Using data culled from the Pesquisa National por Amostra de Domicílios (PNAD), this paper fills this void by analysing ethnic wage and employment gaps, as well as sectoral segregation in Brazil, using the Oaxaca decomposition methodology. In addition, we use a quantile regression approach to see whether the inter-ethnic wage gap is heterogeneous over the conditional wage distribution

Keywords: Discrimination, Earnings, Unemployment, Segregation

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1 Introduction

Many people in Brazil associate racial discrimination with the hatred of specific ethnic groups. They also virulently reject any possibility of racial difference because of the widespread belief that Brazilian social relationships are both harmonious and based on

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principles of equality. In addition, the concept of "racial democracy", as initially developed by the anthropologist Freyre (1933), emphasizes the importance of miscegenation as a fundamental characteristic of Brazilian society, and is widely adhered too.[1] Moreover, the fluidity of the color line in Brazil, to whit the tendency of a person to declare themselves "Brown" one day and "White" later on if their relative position on the social ladder has improved, was seen as a serious impediment to the study of racial inequalities. It was not until the end of the military dictatorship in 1986 that the first statistical studies dealing with racial inequalities appeared, since, in the name of national unity, the dictatorship vigorously upheld the concept of racial democracy. To that end, the department of sociology of the University of São Paulo was closed and racial issues were dropped from the 1970 national census. This effectively prevented all empirical research on racial issues. Only in 1976 did survey data by racial group became available once more.

The studies that flowed in the wake of the 1976 PNAD, all carried out by demographers and sociologists, highlighted the hurdles faced by Afrobrazilians in terms of their attempts to improve their relative position in the labour market. Many Brazilians believe, consciously or otherwise, in a hierarchy of human groups.[2] This has led some observers to propose affirmative action programs geared towards breaking the discrimination inherited from the past.

The successful implementation of such policies is dependent upon identifying the relative importance of three types of discrimination that potentially plague the Brazilian labour market: (i) employment discrimination, (ii) wage discrimination, and (iii) occupational segregation. Economists have contributed little to this debate and to the best of our knowledge this paper constitutes the first study that applies the classic Oaxaca (1973, 1994) methodology to these three problems simultaneously. In contrast to the US literature, we will treat the black and brown ethnic groups separately, in order to allow for Degler's (1971) celebrated concept of the "mulatto escape hatch": Browns are widely held to occupy a more priviledged position than are Blacks.[3]

[1] Freyre developed this concept while the theory of "scientific" racism based on the biological superiority of whites was very present in all minds. He originally wished to respond to Vianna (1934) concerning the advantage of mixture among the Portuguese, Aboriginal and African ethnic groups (see Skidmore 1992). Before Freyre, several Brazilian scholars presented miscegnation as being the salvation of Brazil through its "whitening" of the population. The object of these theories was to reconcile the multi-racial aspect of Brazilian society with the concept of white superiority. In the period following Freyre's work, some authors, for example Azevedo (1953) or the group of scholars known as the "São Paulo School", led by Fernandes and Cardoso, concluded that class inequality is far more important than racial inequality.

[2] This study is limited to quantifying the importance of discrimination on the Brazilian labour market. The reasons that lie behind discrimination are not examined. Nogueira (1985), Skidmore (1992) and others have stated that, in Brazil, a person with a darker skin is perceived with a negative *a priori*. This form of discrimination would appear to square with the concept of statistical discrimination developed by Phelps (1972) and Aigner (1977) and which results from imperfect information on the labour market.

[3] Nevertheless, it is contrary to the results obtained by Silva (1985, 1992) who shows that Blacks and

The paper is organized as follows. In section 2 we outline the methodology used to decompose the ethnic wage and employment gaps. We also show how to identify the magnitude of sectoral segregation in determining inter-ethnic wages differences while solving the index number problem. Section 3 presents the empirical results, while in section 4 we examine robustness of our results. In order to do so, we apply a decomposition based on a quantile regression approach. Section 5 summarizes and concludes.

2 Decomposition methodology

The Oaxaca methodology (1973, 1994) was initially developed so as to decompose the earnings gap among groups into a first component that depends upon individual characteristics that affect productivity and another component associated with discrimination. This approach has been extended to allow one (i) to identify inter-occupational and intra-occupational wage differences among groups (Brown, Moon, and Zoloth 1980, Neuman and Silber 1996, Appleton, Hoddinott, and Krishnan 1999) and (ii) to explain differences in employment rates (Blackaby, Leslie, Murphy, and O'Leary 1998 or Altonji and Blank 1999). The employment rate gap on the labour market is decomposed as follows:

$$\begin{aligned} \overline{P}^w - \overline{P}^b &= \underbrace{\left[\overline{\varphi}(\widehat{\delta}^* X^w) - \overline{\varphi}(\widehat{\delta}^* X^b)\right]}_{\text{Productivity}} \\ &+ \underbrace{\underbrace{\left[\overline{\varphi}(\widehat{\delta}^w X^w) - \overline{\varphi}(\widehat{\delta}^* X^w)\right]}_{\text{White Advantage}} + \underbrace{\left[\overline{\varphi}(\widehat{\delta}^* X^b) - \overline{\varphi}(\widehat{\delta}^b X^b)\right]}_{\text{Black Disadvantage}}}_{\text{Discrimination}} \end{aligned} \tag{1}$$

where $\overline{P}^i$is the predicted employment probability for ethnic group i, $\overline{\varphi}(.)$ is the average predicted employment probability, X_i is a vector of endowments, $\widehat{\delta}^i$ is a vector of estimated coefficients from the employment probit equation and δ^* is the vector of competitive coefficients which would obtain in the absence of discrimination. In his early work (on wage decompositions), Oaxaca (1973) proposed using the coefficient vector $\widehat{\delta}^w$ or $\widehat{\delta}^b$ as the non-discriminatory norm. However, Neumark (1988) argued that the appropriate decomposition should depend on the type of discrimination: on the one hand, employers may engage in nepotism that favors ethnic group i; on the other hand, they may practice discrimination against ethnic group j. In the first case, the employment rate of ethnic group j would constitute the non-discriminatory norm while in the second case it would be the employment rate of group i. Eventually, Neumark (1988) and Oaxaca and Ransom

Browns do not behave differently. In addition, Lovell (1993) finds that Blacks suffer more discrimination than do Browns.

(1994) proposed using, as the non-discriminatory norm, the vector of coefficients δ^* that is obtained by estimating the employment probit equation on data which pools all ethnic groups.[4]

The first term in equation (1) represents the portion of the employment rate gap due to differences in individual characteristics while the second term is associated with differences in coefficients and is attributed to discrimination. The discrimination term is decomposed into two components: the advantage of ethnic group w and the disadvantage of ethnic group b relative to a non-discriminatory norm.[5]

In addition, as in Brown, Moon and Zoloth (1980), Neuman and Silber (1996) and more recently as in Appleton, Hoddinott and Krishnan (1999), we identify the earnings gap $\Delta\overline{Y}$ due to human capital differences, wage discrimination and sectoral segregation in the following way:[6]

$$\begin{aligned}\Delta\overline{Y} \;=\; & \underbrace{\sum_{c=1}^{c=C} p_c^*[\underbrace{\overline{Z}_c^w(\widehat{\beta}_c^w-\widehat{\beta}_c^*)-\overline{Z}_c^b(\widehat{\beta}_c^b-\widehat{\beta}_c^*)}_{\text{Discrimination}}+\underbrace{\widehat{\beta}_c^*(\overline{Z}_c^w-\overline{Z}_c^b)}_{\text{Endowments}}]}_{\Delta\overline{y}\text{ in the absence of segregation}} \\ & +\underbrace{\sum_{c=1}^{c=C}[(p_c^w-p_c^*)\overline{Z}_c^w\widehat{\beta}_c^w-(p_c^b-p_c^*)\overline{Z}_c^b\widehat{\beta}_c^b]}_{\Delta\overline{y}\text{ due to sectoral segregation}},\end{aligned} \tag{2}$$

where p_c^* is the probability of being in sector c in the absence of segregation, p_c^i is the proportion of ethnic group i that belongs to sectoral group c, $\overline{Z}_c^i$ is the vector of average endowments of the members of ethnic group i, $\widehat{\beta}_c^i$ is the vector of estimated coefficients from the traditional Mincerian wage equation, and $\widehat{\beta}_c^*$ is the vector of competitive coefficients.[7] Silber (1992) shows that, in the absence of segregation — which corresponds to a Duncan dissimilarity index of zero — the share of ethnic group i in sector c should be equal to this

[4] See Neumark (1988) for the assumptions that underlie the theoretical model. Initially, the discussion was about the competitive wage structure in the case of an earnings equation. See Reimers (1983) or Cotton (1988) for alternative weighting matrices.

[5] Note however that the discrimination component may in fact be partly the result of omitted variables, mispecification or measurement error. In particular, endogeneity bias may lead to a downwardly or upwardly biased estimate of the racial gap if the correlation of the explanatory variables with omitted variables is specific to each ethnic group. See Polachek and Kim (1994) for the impact of these biases on the decomposition of racial gaps.

[6] Note that this decomposition implies that the wage gap is the same along the whole of the wage scale.

[7] This vector of competitive coefficients is obtained by estimating a wage equation on data which pools all ethnic groups.

sectoral's share of the labour market.[8] As stated by Neuman and Silber (1996), this means that one assumes that the reallocation of workers between occupations does not affect the occupational wage structure. Technically, the implication is that p_c^* will be the same for both groups, with

$$p_c^* = \left[\frac{N_c^w + N_c^b}{N^w + N^b}\right],$$

where N_c^i is the number of individuals of ethnic group i working in sector c and N^i is the number of individuals of ethnic group i in the labour market. Another approach, proposed by Brown, Moon and Zoloth (1980) and Miller (1987), assumes that one of the two groups does not suffer from sectoral segregation, although this implies that their estimates suffer from an index number problem. These authors do, however, go further, in that they decompose the segregation effect into two components, the first stemming from differences in endowments and the second corresponding to a "pure" segregation effect. In order to do so and simultaneously solve the index number problem, one must estimate the coefficients associated with sectoral choice that one would obtain in the absence of segregation. Using equation (2), we are able to implement this approach using Silber's result on p_c^* and by noting that:

$$p_c^* = \hat{p}_c^* = \frac{1}{N}\sum_{J=1}^{N}\left[\frac{\exp(\hat{\theta}_c^* W_j)}{\exp\left(\sum_{c=1}^{c=C}\hat{\theta}_c^* W_j\right)}\right]. \tag{3}$$

$\hat{\theta}_c^*$ is the vector of coefficients specific to each sector obtained by estimating a multinominal logit model of sectoral choice on pooled data (N observations) and W_j is the vector of explanatory variables that affect sectoral choice.[9] We can then decompose the earnings gap due to sectoral segregation as follows:

$$\underbrace{\sum_{c=1}^{c=C}\left[(p_c^w - p_c^*)\overline{Y}_c^w - (p_c^b - p_c^*)\overline{Y}_c^b\right]}_{\Delta\overline{y} \text{ due to sectoral segregation}} = \underbrace{\sum_{c=1}^{c=C}\left[p_c^w - \hat{p}_c^{w*}\right]\overline{Y}_c^w + \left[\hat{p}_c^{b*} - p_c^b\right]\overline{Y}_c^b}_{\Delta\overline{y} \text{ due to "pure" sectoral segregation}}$$
$$+ \underbrace{\sum_{c=1}^{c=C}\underbrace{\left[\hat{p}_c^{w*} - \hat{p}_c^*\right]\overline{Y}_c^w}_{\text{White Advantage}} + \underbrace{\left[\hat{p}_c^* - \hat{p}_c^{b*}\right]\overline{Y}_c^b}_{\text{Black Disadvantage}}}_{\text{Endowments}}, \tag{4}$$

[8] The index of dissimilarity was developed by Duncan and Duncan (1955) and is given by $DDI = \sum_{c=1}^{c=C}\frac{1}{2}|p_c^w - p_c^b|$.

[9] See Appleton, Hoddinott and Krishnan (1999) who also solve the index number problem.

where $\widehat{p}_c^{*i}$ is is the proportion of ethnic group i that belongs to occupational group c if he faced the common structure $\widehat{\theta}_c^*$. The first term on the right-hand-side represents the "pure" effect of segregation**,** while the second term is that part of the wage gap due to differences in sectoral employment attributes. This decomposition allows one to take sectoral differences in earnings into account.

3 Empirical Analysis

3.1 Data

The dataset is derived from the 1998 national household survey (PNAD) collected by the Brazilian Institute of Geography and Statistics (IBGE).[10] The sample, composed of males of between 25 and 65 years of age, covers 69,956 individuals of whom 52.78% are Whites, 41.11% Browns, and 6.11% Blacks.[11]

Table 1 reports descriptive statistics for the three ethnic groups broken down into employed and unemployed individuals. The employment rate is defined as the percentage of individuals who were employed during the interview week.[12] The rate of predicted employment, which differs significantly by ethnic group, is equal to 88.92%, 84.98% and 82.51% respectively for Whites, Browns and Blacks.[13]

Figure 1 in the Appendix presents the cumulative density function of the logarithm of hourly wage-earnings, by ethnic group. As should be obvious from Figure 1, there is a clear shift to the right of the respective cumulative densities (as in first order stochastic dominance) as one moves from Afro-Brazilians to the white ethnic group. However, there is no clear difference between Browns and Blacks. This same tendency emerges in Table 1.

[10] The data are available on their web site at http://www.ibge.gov.br

[11] The definition of an ethnic group in Brazil is fraught with difficulties. In particular, there is a bewilderingly large number of terms that are used to refer to a person's ethnic origin or skin colour (135 according to 1976 PNAD). Lovell (1999), who provides a useful summary of the current state of the literature, notes that a study by Silva (1996) finds that only 57 percent of individuals faced with an open question in terms of their color classify themselves into one of the three groups refered to here. On the other hand, when faced with a closed question expressed in terms of the three above-mentioned groups, all individuals are able and (more or less) willing to classify themselves. Individuals of the asian ethnic group were excluded from our sample as they did not constitute a group of sufficient magnitude.

[12] We consider the unemployment rate as the percentage of individuals aged between 25 and 65 who were unemployed during the interview week. We are conscious of the fact that we should have only considered individuals who are both unemployed and actively looking for employment. However, many individuals in Brazil do not have the opportunity to actively search for a job because of the extremely difficult social conditions in their neighbourhoods.

[13] Note that the probit model implies that the predicted employment probability is slightly different from the actual employment rate.

Table 1: Summary Statistics: Adult Males, by Ethnic Group

	Unemployed			Employed		
Racial group	**Whites**	**Browns**	**Blacks**	**Whites**	**Browns**	**Blacks**
Number of obs.	4090	4319	747	32833	24442	3525
Age: mean	31.81	30.34	31.50	37.62	35.79	36.47
(std deviation)	(13.16)	(12.47)	(12.69)	(11.62)	(11.81)	(11.89)
Hourly earnings (in Reais)				4.94	2.38	2.34
Yrs of completed schooling	6.53	4.77	4.87	7.40	5.01	5.05
(std. deviation)	3.97	3.66	3.57	(4.39)	(4.00)	(3.91)
Region of residence (%)						
North	3.88	10.02	2.81	3.68	11.92	3.71
Northeast	23.44	52.07	41.36	15.70	43.67	31.97
Central Brazil	8.54	10.07	8.43	10.54	14.05	7.60
South	27.40	5.25	8.56	29.45	5.54	10.57
Southeast	36.74	22.59	38.84	40.63	24.82	46.15
Self-evaluation of health (%)						
Bad health	2.76	3.33	3.32	1.73	2.49	2.21
Occupational sector (%)						
Professional, Technical				9.64	4.59	4.91
Administration				19.79	10.47	8.57
Services				2.79	3.46	3.77
Trades				14.77	13.48	10.16
Transportation				9.39	8.27	8.11
Industry				29.06	34.91	44.14
Agriculture				14.56	24.82	20.34
Formal sector dummy				42.53	34.37	41.98

Source: Pesquisa National por Amostra de Domicílios, 1998.

The hourly wages of Blacks are on average half of those of Whites, whereas Browns appear to do as well as Blacks. Moreover, Afrobrazilians work mainly in the agricultural and industrial sectors where the average number of years of schooling is smaller. Differences in earnings and employment attributes may partly explain the ethnic-specific nature of the employment rates, earnings and sectoral distributions. Browns and Blacks are largely penalized in terms of human capital (educational attainment, labour market experience and health) with respect to Whites, and this is true whether they are employed or not. Moreover, the concentration of Blacks and Browns is higher in the poorer regions of Brazil (North and Northeast), a geographic concentration that stems from three centuries of slavery. Lastly, Afrobrazilians are more concentrated in rural areas, which should also penalize them in terms of employment opportunities.

3.2 Results

Table 2 displays the employment and earnings decomposition results. The first part of Table 2 displays the employment decomposition results. Employment probit equations were estimated both on pooled data and for each ethnic group in order to estimate $\widehat{\delta}^{*}$ and $\widehat{\delta}^{i}$. The attributes affecting employment that we considered include age, age squared, years of schooling, self-evaluation of health, family status, region of residence, location (urban or rural) and presence of a young child.[14]

The results presented in Table 2 highlight that the employment gap between Browns and Whites is to a great extent due to differences in endowments (82.98%). This means (in the absence of pre-entry discrimination on the labour market, which we deal with at greater length below) that the shortfall in the rate of employment faced by Browns is mainly the outcome of social inequalities inherited from the past, rather than discrimination.[15] In other words, it suggests that for Browns, racial inequality *could* be a purely transitory phenomenon. In contrast, for Blacks, the shortfall in the rate of employment is explained by the two effects (endowment and discrimination) which are of roughly equivalent magnitude.

The second part of Table 2 displays the earnings decomposition results. We decomposed the ethnic wage gap while adjusting for self-selection into employment (Heckman, 1979).[16] The attributes assumed to affect the logarithm of hourly wages considered were: experience on the labour market (age minus years of schooling minus 6), experience squared, years of schooling, self-evaluation of health, family status, region of residence, location (urban

[14] See Table 4 of the Appendix for the estimates that underlie these results.

[15] Using a linear probability model does not change these results.

[16] Following Reimers (1983), the wage gap is decomposed as:

$$\begin{aligned}\overline{Y}^{w} - \overline{Y}^{b} - (\hat{\gamma}_{c}^{w}\bar{\lambda}^{w} - \hat{\gamma}_{c}^{b}\bar{\lambda}^{b}) &= \sum_{c=1}^{c=C} p_{c}^{*}\left[\overline{Z}_{c}^{w}(\widehat{\beta}_{c}^{w} - \widehat{\beta}_{c}^{*}) - \overline{Z}_{c}^{b}(\widehat{\beta}_{c}^{b} - \widehat{\beta}_{c}^{*}) + \widehat{\beta}_{c}^{*}(\overline{Z}_{c}^{w} - \overline{Z}_{c}^{b})\right] \\ &\quad + \sum_{c=1}^{c=C}\left[(p_{c}^{w} - p_{c}^{*})\overline{Z}_{c}^{w}\widehat{\beta}_{c}^{w} - (p_{c}^{b} - p_{c}^{*})\overline{Z}_{c}^{b}\widehat{\beta}_{c}^{b}\right]\end{aligned}$$

where $\bar{\lambda}^{i}$ is the average inverse Mills ratio, which controls for selectivity into employment and $\hat{\gamma}_{c}^{i}$ represents the coefficients estimated from the earnings equations by sector (see Neuman and Oaxaca 2003 for alternatives and more detailed decompositions). We then analyse the adjusted wage differentials and *not* the observed wage differentials. The presence of a young child was used as the identifying variable in the employment probits. Note that one cannot use exclusion restrictions based on variables such as household income purged of the income of the individual who corresponds to the observation in question, because such variables would obviously not be orthogonal to unobserved characteristics linked to ethnically-determined wage differences. Note that the standard approach to correcting for selectivity bias assumes that the errors are normally distributed. See Schafgans (2000) for a semi-parametric approach that relaxes this assumption. Finally, there is potentially another source of selectivity bias due to the endogeneity of sectoral employment choice (see Appleton, Hoddinott, and Krishnan 1999).

Table 2: Decomposition of Ethnic Employment and Earnings Differences

Components	**Browns**	**Blacks**
Employment Decomposition		
Mean total predicted differencial	0.0394	0.0641
$\overline{P}^w - \overline{P}^b$	(100%)	(100%)
Differences in endowments	0.0327	0.0311
$\left[\overline{\varphi}(\widehat{\delta}^* \overline{X}^w) - \overline{\varphi}(\widehat{\delta}^* \overline{X}^b)\right]$	(82.98%	(48.52%)
Employment discrimination	0.0067	0.0329
$\left[\overline{\varphi}(\widehat{\delta}^w X^w) - \overline{\varphi}(\widehat{\delta}^* \overline{X}^w)\right] + \left[\overline{\varphi}(\widehat{\delta}^* X^b) - \overline{\varphi}(\widehat{\delta}^b X^b)\right]$	(17.02%)	(51.48%)
Earnings Decomposition		
Mean total differential adjusted for self-selection	0.7235	0.7491
$\left[\overline{Y}^w - \overline{Y}^b - (\hat{\gamma}_c^w \bar{\lambda}^w - \hat{\gamma}_c^b \bar{\lambda}^b)\right]$	(100%)	(100%)
Differences in endowments	0.5179	0.4218
$\sum_{c=1}^{c=C} \left[p_c^* \widehat{\beta}_c^* (\overline{Z}_c^w - \overline{Z}_c^b)\right] + \sum_{c=1}^{c=C} \left[(\hat{p}_c^{w*} - \hat{p}_c^*)\overline{Y}_c^w + (\hat{p}_c^* - \hat{p}_c^{b*})\overline{Y}_c^b\right]$	(71.58%)	(56.31%)
Wage discrimination	0.1676	0.2680
$\sum_{c=1}^{c=C} p_c^* \left[\overline{Z}_c^w (\widehat{\beta}_c^w - \widehat{\beta}_c^*) - \overline{Z}_c^b (\widehat{\beta}_c^b - \widehat{\beta}_c^*)\right]$	(23.16%)	(35.78%)
Sectoral segregation	0.0380	0.0593
$\sum_{c=1}^{c=C} \left[(p_c^w - \hat{p}_c^{w*})\overline{Y}_c^w - (p_c^b - \hat{p}_c^{b*})\overline{Y}_c^b\right]$	(5.26%)	(7.91%)

Source: Pesquisa National por Amostra de Domicílios, 1998.

or rural), and signature of a formal labour contract. Earnings functions were estimated for each ethnic group and each sector.[17] Doing so allowed us to apply the classical decomposition procedure to each sector. In addition, a multinominal logit specification was estimated on pooled data in order to determine $\widehat{\theta}_c^*$ and $\hat{p}_c^{i*}$. We considered the following seven agregated sectors : Professional and Technical, Services, Administration, Trades, Transportation, Industry and Agriculture.[18] In Table 5 of the Appendix, we present the actual distribution of each ethnic group, as well as the distribution that would prevail

[17] See Tables 6, 7, 8 of the Appendix. All the estimates display the usual pattern, that is to say, hourly earnings increase along with the human capital variables (years of completed schooling, health dummy). There are also important variations by region.

[18] If the sectors were ordered according to the type of qualification required we would have been able to estimate an ordered probit, as suggested by numerous authors. However, as stated by Meng and Miller (1995), the estimates provided by the ordered probit and those provided by the multinominal logit are quite similar.

if their specific attributes were rewarded as if there were "no discrimination" (common structure of coefficients, $\widehat{\theta}_c^*$). Finally, the last row displays the sectoral distribution in the absence of segregation.

The shortfall in wages suffered by the brown and black ethnic groups can be explained by three effects of different magnitude. First, lower levels of endowments explain more than half of inter-ethnic differences in wages. This effect should vanish with time if there is no discrimination in terms of access to educational and other opportunities, which may not be the case. Second, "pure" discrimination, respectively for Browns and Blacks, accounts for 23 and 35 percent of the shortfall. It is interesting to note that the wage gap is slightly larger for Browns, but that the discrimination component (in percentage terms) is greater for Blacks. This corresponds to the same pattern as with the employment decomposition. While affirmative action programs may reduce labour market discrimination, available evidence for Brazil suggests that prejudice lies at its heart: as such, affirmative action programs may exacerbate this form of prejudice by suggesting that success is not wholly based on merit.[19] Moreover, prejudice-based discrimination can be eliminated by permanent programs, which run counter to the principles upon which such initiatives are formulated in Brazil. Programs aimed at heightening awareness concerning the value of ethnic diversity might constitute a complementary and promising approach.

Finally, the most striking result is that the impact of sectoral segregation is negligible. Therefore, programs aimed at facilitating the access of Afro-Brazilians to sectors where they are underrepresented do not appear as a legitimate course of action in the Brazilian case. This is either because existing programs have done their job or because there was (and remains) no sectoral segregation to speak of.

4 Robustness

4.1 Potential problems

Despite the relatively clear picture that emerges from our results, they should be interpreted with caution.

First, as we have already mentioned, we have restricted our attention so far to *average* inter-ethnic differences. In other words, if one takes the case of the wage decompositions, a given level of average discrimination against blacks can hide important differences according to that portion of the wage distribution over which the discrimination obtains. For example, a relatively low average level of discrimination could stem from a high level of discrimination that only affects a given segment of the distribution. An example of how to deal with this

[19] See in particular Beghin and Jaccoud (2002) for a discussion of this topic.

issue is provided by Arias *et al* (2004), Garcia *et al* (2001) or Mwabu et Schultz (1996), who carry out Oaxaca decompositions where the associated coefficients are specific to each quantile of the wage distribution.[20]

Second, we are unable to isolate those factors stemming from inequality of opportunity *before* entry into the labour market. In particular, the Brazilian educational system is characterized by the coexistence at all levels of private and public institutions that differ greatly in quality. Only wealthier students (i.e., whites) can afford private schools which yield higher returns to schooling.[21] A portion of what we attribute to discrimination on the labour market may thus be due to the impact of differences in educational quality on the returns to schooling, stemming from whether students attended private or public schools. Another way of putting this is that we are unable to isolate that portion of discrimination due to inequality of opportunity that flows from differences in family background.[22] In addition, differences in the level of services offered at the municipal level could also lead to a bias in the estimated endowment effect through their impact on individual educational attainment. Unfortunately, we do not have information concerning family background and municipality of birth. Moreover, while the federally-funded SUS (Unified and decentralized healthcare system), set up in 1988, theoretically guarantees universal access regardless of income, Brazil is in fact characterized by municipal heterogeneity in healthcare quality (see Lobato 2001).[23] The inequality of opportunity that flows from an individual's place of residence (Afrobrazilians are mainly concentrated in poorer areas of the North and Northeast) also leads us to be cautious concerning the interpretation of our results.[24]

Note that our results do not identify discrimination effects stemming from potential inter-ethnic differences in access to formal sector jobs. This is because it was impossible to simultaneously estimate segregation effects in the seven agregate sectors of the economy,

[20] Jenkins (1994) suggests comparing the Lorenz curve associated with the conditional distribution of wages with the concentration curve (the Lorenz curve constructed on the basis of identical regression coefficients for all ethnic groups). He then suggests computing a series of agregate discrimination indices which allow one to account for the degree of discrimination as it varies along the conditional distribution. Note however, that this approach forces the determinants of the structure of wages to be constant across the entire distribution. For alternative procedures that relax this assumption, see DiNardo *et al (*1996), Bonjour and Gerfin (2001), Bourguignon *et al* (2002).

[21] See Herrán and Rodríguez (2001) for a complete discussion concerning heterogeneity in the quality of education in Brazil.

[22] See Bourguignon, Ferreira and Menéndez (2003).

[23] Including 807 municipality of residence dummies (there are more than 5500 municipalities in Brazil, 807 are included in PNAD data) would have in part controled for this problem but it is obviously impossible for degrees of freedom reasons.

[24] In addition, as stressed by Karlsen and Nazroo (2002) there is also a potential effect of discrimination in health outcomes through the violence to which individuals are subjected and the psychological stress to which they are exposed through living in a racially segregated society. However it is difficult to quantitatively control for these effects.

Table 3: Decomposition of Ethnic Earnings Differences, by Wage Quantile

θ	0.05	0.10	0.25	0.50	0.75	0.90
Browns						
Wage differential adjusted	0.591	0.595	0.593	0.663	0.726	0.779
Endowments	0.476	0.481	0.484	0.521	0.554	0.576
	(80.5%)	(80.8%)	(81.6%)	(78.6%)	(76.3%)	(73.91%)
Discrimination	0.115	0.114	0.109	0.142	0.172	0.203
	(19.5%)	(19.2%)	(18.4%)	(21.4%)	(23.7%)	(26.1%)
Blacks						
Wage differential adjusted	0.507	0.414	0.630	0.698	0.879	0.953
Endowments	0.305	0.319	0.353	0.405	0.457	0.495
	(60.1%)	(77%)	(56%)	(58%)	(52%)	(51.9%)
Discrimination	0.232	0.095	0.277	0.293	0.422	0.458
	(39.9%)	(23%)	(44%)	(42%)	(48%)	(48.1%)

Source: Pesquisa National por Amostra de Domicílios, 1998

while dividing each into formal and informal sectors, for statistical reasons.[25]

In what follows, to take these potential problems into account, we consider a decomposition based on quantile regressions. Note that we are unable to apply this method by sector because of the relatively small sample sizes that would result from doing so. The results that follow are therefore based on the assumption that there is no sectoral segregation, an assumption that would appear to be reasonable given that no sectoral segregation was identified at the average level. In order to partially account for the second problem (inequality of opportunity) we include state dummies.[26]

4.2 Quantile regression

Results by wage quantile (each one being denoted by θ, where $\theta = 0.05, 0.10, 0.25, 0.5, 0.75, 0.90$) are presented in Tables 9 to 11.[27] The procedure is equivalent to minimizing the weighted sum of the absolute values of the residuals, the weights being given by the corresponding

[25] This is because the resulting subsamples become too small for one to be able to have confidence in the resulting statistical inference. Note, however that we carried out an Oaxaca decomposition on the basis of the formal-informal dichotomy which we do not present here for the sake of brevity. No significant discrimination effect obtains, all differences being explained by the "endowment effect".

[26] We also include occupational dummies.

[27] See Koenker and Hallock (2001) for a review of quantile regression methods.

θ. In the last column of the tables, we report the corresponding OLS coefficient in order to facilitate comparisons.
Formally speaking, the quantile wage decompositions take the form:

$$Q_\theta(Y^w/\overline{Z}^w) - Q_\theta(Y^b/\overline{Z}^b) = [\underbrace{\overline{Z}^w(\widehat{\beta}_\theta^w - \widehat{\beta}_\theta^*) - \overline{Z}^b(\widehat{\beta}_\theta^b - \widehat{\beta}_\theta^*)}_{\text{Discrimination}} + \underbrace{\widehat{\beta}_\theta^*(\overline{Z}^w - \overline{Z}^b)}_{\text{Dotation}},$$

where $Q_\theta(.)$ is the θ^{th} quantile of the conditional distribution of Y^i evaluated at the mean of the vector of charactéristics $\overline{Z}^i$ and $\widehat{\beta}_\theta^i$ is specific to each wage quantile. We therefore have the wage gap for quantile θ, evaluated at the *mean* sample characteristics (*not* the mean quantile characteristics). This follows from the fact that $\widehat{\beta}_\theta^i E(Z^i/Y^i = Y_\theta^i) \neq E(Y^i/Y^i = Y_\theta^i)$, as opposed to the OLS results, in which $\overline{Y}^i = \widehat{\beta}^i\overline{Z}$.[28]

The wage decompositions are presented in Table 3.[29] The results corroborate those presented earlier, in that the extent of discrimination remains much higher for Blacks than for Browns. There is however, a tendency for discrimination to increase as one moves up the wage distribution. For example, for $\theta = 0.10$, 19.2% and 23% of the wage gap is attributed to discrimination for Blacks and Browns, respectively, whereas the corresponding figures are 26.1% and 48.1% for $\theta = 0.90$.Note that we also conducted wage décompositions without correcting for the selection bias. The results thus obtained corroborate the ones set out in this study.

5 Concluding Remarks

This paper has investigated ethnic wage and employment gaps in Brazil. We have found that discrimination in the Brazilian labour market is present, particularly with respect to wages. Nevertheless, this does not mean that discrimination is absent in employment insofar as unemployment duration may vary by ethnic group. We have also highlighted that there are no great differences in the employment and wage gaps suffered by blacks *versus* those affecting browns. In contrast, the portion of the gaps due to discrimination is far more

[28] For an alternative decomposition, see Machado et Mata (2004). Note that we account for sample selection bias and that we are therefore decomposing an adjusted wage gap rather than an observed wage gap. As with Dolado and Llorens (2003), we consider the wage gap given by $Q_\theta(Y^w/Z^w = \overline{Z}^w) - Q_\theta(Y^b/Z^b = \overline{Z}^b) - (\hat{\gamma}_\theta^w\bar{\lambda}^w - \hat{\gamma}_\theta^b\bar{\lambda}^b)$, where $\bar{\lambda}^i$ is the average inverse Mills ratio, which controls for selectivity into employment and $\hat{\gamma}_\theta^i$ is specific to each wage quintile. See Buchinky (1998) for an approach that also accounts for the bias stemming from quantile regression.

[29] The introduction of state dummies significantly reduces the return to education. Therefore, without state dummies, the OLS estimate leads to a return to education of 16.4% for Whites. It reaches 12.9% and 11.9% for half-casts and Blacks. This verifies the existence of high disparities between States in the quality of education and job opportunities.

important in the case of Blacks.[30] This result is robust to a decomposition based on wage quantiles. Not only does racial prejudice appear to affect Blacks more than Browns, its extent also increases as one moves up the conditional distribution of wages.

This result is in line with the idea that racial prejudice affects Blacks more than it does Browns. However, a portion of the discrimination and of endowment effects estimated here are potentially due to unequal opportunities in an individual's capacity to finance a private education.

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[30] Insofar as the coefficients estimated in the employment and wages equations are stochastic, it would be very interesting to test the statistical significance of the discrimination and endowment components. This would allow us to see whether differences between Browns and Blacks in the discrimination component are statistically significant.

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Table 4: Employment Equations, by Ethnic Group

	Full sample	Whites	Browns	Blacks
Education	0.026 14.64	0.030 11.69	0.018 6.52	0.016 2.27
Age	0.078 23.18	0.080 16.60	0.076 14.93	0.073 5.83
$(\text{Age})^2$	−0.001 21.41	−0.001 15.61	−0.001 13.54	−0.001 5.40
Young child dummy	0.176 10.38	0.203 8.15	0.169 6.70	0.041 0.66
Bad health dummy	−0.278 6.94	−0.246 3.98	−0.304 5.40	−0.286 1.99
Household head dummy	0.611 35.59	0.626 25.11	0.593 22.91	0.556 8.92
Region of residence				
Northeast	−0.169 9.83	−0.180 6.90	−0.134 4.83	−0.236 1.99
Southeast	0.002 0.10	0.029 1.29	−0.022 0.69	−0.036 0.47
Central Brazil	0.080 3.34	0.091 2.66	0.119 3.21	−0.189 1.81
Urban area	0.093 5.83	0.125 5.26	0.092 4.00	0.002 0.03
Constant	−0.900 15.18	−0.972 11.38	−0.845 9.44	−0.680 2.98
Observations	69956	36923	28761	4272

Note: Probit Specification.

White heteroskedasticity-consistent absolute value of t-statistics below coefficients.

Table 5: Predicted and Actual Occupational Distribution

Sector		1	2	3	4	5	6	7
p_c^i	White	0.096	0.197	0.027	0.295	0.147	0.093	0.145
	Brown	0.045	0.104	0.034	0.353	0.134	0.082	0.248
	Black	0.049	0.085	0.037	0.444	0.101	0.081	0.203
$\widehat{p}_c^{*i}$	White	0.095	0.175	0.033	0.293	0.154	0.093	0.157
	Brown	0.043	0.113	0.041	0.317	0.147	0.087	0.252
	Black	0.042	0.115	0.043	0.346	0.144	0.098	0.212
p_c^*		0.073	0.153	0.031	0.323	0.140	0.089	0.191

(1) Professional and Technical, (2) Administration, (3) Service, (4) Industry,
(5) Trade, (6) Transportation, (7) Agriculture.
p_c^i is the actual proportion of ethnic group i in the relevant sector.
$\widehat{p}_c^{*i}$ is the predicted proportion of ethnic group i in the relevant sector if it faced "non-discriminatory" coefficients (common structure $\widehat{\theta}_c^*$) from the occupational choice model estimated using a multinomial logit on pooled data.
p_c^* is the proportion of each ethnic group in the absence of segregation.

Table 6: Wage Equations*, by Sector, for Whites

White group							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Experience	0.063	0.068	0.045	0.061	0.068	0.056	0.060
	[13.64]	[19.15]	[12.14]	[28.54]	[18.88]	[13.04]	[7.89]
$(\text{Experience})^2$	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	[9.05]	[11.42]	[9.97]	[21.55]	[14.31]	[9.71]	[6.57]
Yrs of schooling	0.187	0.154	0.117	0.118	0.142	0.101	0.103
	[33.39]	[48.81]	[23.40]	[48.12]	[40.46]	[21.46]	[10.85]
Formal sector	−0.059	−0.126	0.206	0.172	0.018	−0.133	0.066
	[2.04]	[6.01]	[9.70]	[13.87]	[0.75]	[5.50]	[1.46]
Bad health	−0.067	−0.171	−0.243	−0.254	−0.287	−0.257	−0.333
	[0.35]	[1.39]	[4.22]	[4.56]	[2.53]	[2.88]	[1.50]
Household head	0.570	0.648	0.608	0.609	0.595	0.527	0.553
	[15.48]	[22.52]	[21.58]	[38.10]	[20.22]	[16.71]	[10.13]
Region of residence							
Northeast	−0.206	−0.154	−0.296	−0.359	−0.345	−0.306	−0.540
	[4.89]	[4.65]	[9.34]	[16.57]	[9.90]	[8.39]	[6.91]
Southeast	0.018	0.037	0.090	0.128	0.011	0.125	0.015
	[0.55]	[1.60]	[3.45]	[9.46]	[0.43]	[4.82]	[0.28]
Central Brazil	0.102	0.137	0.170	−0.019	−0.005	−0.003	−0.081
	[2.14]	[3.95]	[5.34]	[0.76]	[0.13]	[0.05]	[1.02]
Urban area	0.223	0.255	0.180	0.163	0.173	0.138	0.378
	[2.81]	[6.06]	[7.95]	[7.97]	[3.20]	[3.14]	[6.02]
Constant	−1.934	−1.841	−2.139	−1.859	−1.971	−1.298	−1.991
	[18.62]	[31.27]	[34.27]	[51.81]	[27.05]	[16.59]	[16.20]
Observations	3164	6497	4784	9541	4848	3084	915
R-squared	0.51	0.45	0.32	0.47	0.43	0.33	0.37

White heteroskedasticity-consistent absolute value of t-statistics in brackets.

* Wage equation adjusted for the self-selection bias into employment.

(1) Professional and Technical, (2) Administration, (3) Service, (4) Industry, (5) Trade, (6) Transportation, (7) Agriculture.

Source: Pesquisa National por Amostra de Domicílios, 1998.

Table 7: Wage Equations*, by Sector, for Browns

Brown group							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Experience	0.056	0.077	0.055	0.072	0.065	0.062	0.075
	[7.04]	[15.27]	[16.42]	[30.43]	[14.43]	[12.00]	[11.39]
$(\text{Experience})^2$	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001	−0.001
	[4.24]	[9.24]	[14.31]	[23.08]	[11.48]	[8.89]	[10.51]
Yrs of schooling	0.152	0.150	0.096	0.106	0.121	0.085	0.093
	[21.99]	[30.28]	[20.49]	[41.73]	[26.47]	[15.79]	[11.94]
Formal sector	0.016	−0.138	0.298	0.191	0.026	0.083	0.190
	[0.33]	[4.16]	[16.98]	[14.71]	[0.90]	[2.73]	[4.27]
Bad health	−0.371	−0.436	−0.356	−0.447	−0.641	−0.317	−0.177
	[1.35]	[2.72]	[8.03]	[9.79]	[7.60]	[3.11]	[1.16]
Household head	0.668	0.682	0.577	0.615	0.744	0.581	0.556
	[11.30]	[16.40]	[26.60]	[37.55]	[20.75]	[15.44]	[11.53]
Region of residence							
Northeast	−0.171	−0.255	−0.296	−0.265	−0.139	−0.261	−0.290
	[2.75]	[5.90]	[10.71]	[14.26]	[3.58]	[6.31]	[4.27]
Southeast	−0.011	0.013	−0.069	0.117	0.099	0.106	0.114
	[0.16]	[0.27]	[2.36]	[6.18]	[2.34]	[2.51]	[1.56]
Central Brazil	0.247	0.086	0.169	0.077	0.239	0.143	0.088
	[3.38]	[1.65]	[5.57]	[3.35]	[4.98]	[2.57]	[1.07]
Urban area	0.237	0.426	0.151	0.172	0.195	0.216	0.280
	[2.31]	[7.98]	[8.01]	[8.26]	[3.45]	[4.37]	[4.62]
Constant	−1.920	−2.353	−2.271	−2.151	−2.300	−1.744	−2.290
	[15.00]	[28.25]	[41.62]	[53.19]	[27.39]	[19.25]	[19.34]
Observations	1121	2560	6065	8533	3296	2021	846
R-squared	0.54	0.49	0.34	0.50	0.40	0.37	0.45

White heteroskedasticity-consistent absolute value of t-statistics in brackets.

* Wage equation adjusted for the self-selection bias into employment.

(1) Professional and Technical, (2) Administration, (3) Service, (4) Industry, (5) Trade, (6) Transportation, (7) Agriculture.

Source: Pesquisa National por Amostra de Domicílios, 1998.

Table 8: Wage Equations*, by Sector, for Blacks

Black group							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Experience	0.064	0.061	0.033	0.061	0.053	0.075	0.054
	[3.08]	[5.35]	[3.98]	[10.69]	[4.17]	[6.72]	[2.68]
$(\text{Experience})^2$	−0.001	−0.000	−0.000	−0.001	−0.001	−0.001	−0.001
	[2.27]	[3.17]	[3.27]	[7.31]	[4.38]	[5.08]	[2.90]
Yrs of schooling	0.172	0.139	0.074	0.105	0.110	0.109	0.024
	[8.79]	[12.37]	[6.10]	[18.35]	[8.22]	[6.44]	[0.99]
Formal sector	0.028	0.038	0.239	0.156	−0.023	0.210	0.146
	[0.19]	[0.46]	[4.94]	[5.20]	[0.29]	[2.48]	[1.10]
Bad health	−0.209	−0.158	−0.579	−0.462	−0.660	−0.183	−0.623
	[0.89]	[0; 49]	[4.85]	[3.07]	[1.62]	[1.13]	[2.17]
Household head	0.656	0.661	0.530	0.579	0.745	0.434	0.674
	[4.94]	[7.27]	[9.63]	[16.05]	[7.73]	[4.58]	[4.27]
Region of residence							
Northeast	−0.663	−0.493	−0.241	−0.361	−0.594	−0.406	−0.238
	[3.98]	[4.09]	[3.07]	[7.63]	[4.70]	[3.15]	[1.11]
Southeast	−0.300	−0.231	0.038	0.023	−0.107	−0.049	0.026
	[1.74]	[2.29]	[0.52]	[0.57]	[0.86]	[0.39]	[0.13]
Central Brazil	−0.426	−0.167	0.107	−0.131	−0.308	−0.095	−0.090
	[1.59]	[1.17]	[1.00]	[1.79]	[1.61]	[0.53]	[0.38]
Urban area	−0.126	0.422	0.210	0.224	0.213	0.200	0.329
	[0.38]	[2.29]	[4.54]	[4.03]	[1.76]	[2.18]	[2.02]
Constant	−1.663	−2.105	−1.946	−2.020	−1.716	−1.991	−1.759
	[3.72]	[8.68]	[14.75]	[22.27]	[7.38]	[8.55]	[4.45]
Observations	173	302	717	1556	358	286	133
R-squared	0.57	0.55	0.35	0.48	0.49	0.39	0.31

White heteroskedasticity-consistent absolute value of t-statistics in brackets.

* Wage equation adjusted for the self-selection bias into employment.

(1) Professional and Technical, (2) Administration, (3) Service, (4) Industry, (5) Trade, (6) Transportation, (7) Agriculture.

Source: Pesquisa National por Amostra de Domicílios, 1998

Table 9: Wage Equations*, by Wage Quantile, for Whites

WHITE GROUP								
θ	0.05	0.10	0.25	0.50	0.75	0.90	0.95	OLS
Experience	0.032	0.035	0.041	0.047	0.050	0.050	0.047	0.0044
	[14.04]	[18.48]	[32.26]	[34.88]	[34.90]	[24.04]	[16.63]	[37.46]
$(\text{Experience})^2$	−0.0004	−0.0004	−0.0005	−0.0005	−0.0005	−0.0005	−0.0005	−0.0005
	[14.31]	[15.78]	[26.16]	[26.48]	[−24.51]	[15.52]	[9.49]	[27.54]
Yrs of schooling	0.077	0.084	0.097	0.111	0.124	0.130	0.135	0.111
	[30.19]	[40.37]	[69.65]	[74.41]	[74.89]	[50.05]	[38.65]	[84.98]
Formal sector	0.267	0.219	0.130	0.027	−0.088	−0.198	−0.279	0.001
	[16.73]	[16.79]	[14.37	[2.84]	[−8.43]	[12.70]	[13.28]	[0.22]
Bad health	−0.329	−0.232	−0.196	−0.117	−0.083	−0.131	−0.012	−0.150
	[5.80]	[5.03]	[6.22]	[3.51]	[2.34]	[2.47]	[0.34]	[5.13]
Household head	0.226	0.237	0.235	0.225	0.211	0.212	0.209	0.233
	[11.21]	[14.35]	[20.62]	[18.44]	[16.07]	[10.77]	[7.88]	[21.74]
Urban area	0.191	0.184	0.143	0.141	0.133	0.130	0.141	0.151
	[7.51]	[8.76]	[9.79]	[9.05]	[8.05]	[5.21]	[4.26]	[11.01]
Constant	−1.585	−1.363	−1.00	−0.721	−0.158	0.354	0.645	−0.557
	[14.00]	[14.94]	[31.08]	[10.96]	[2.26]	[3.41]	[4.59]	[9.65]
R^2	0.269	0.2776	0.3068	0.335	0.362	0.3542	0.3348	0.5270

Absolute value of t-statistics in brackets.

State and occupational dummies included in all specifications.

* Wage equation adjusted for the self-selection bias into employment.

Source: Pesquisa National por Amostra de Domicílios, 1998.

Table 10: Wage Equations*, by Wage Quantile, for Browns

Brown group								
θ	0.05	0.10	0.25	0.50	0.75	0.90	0.95	OLS
Experience	0.018	0.032	0.036	0.042	0.047	0.049	0.053	0.0041
	[9.97]	[16.07]	[24.47]	[32.60]	[29.55]	[21.37]	[14.52]	[30.65]
(Experience)^2	−0.0004	−0.0004	−0.004	−0.0005	−0.0005	−0.0005	−0.0005	−0.0005
	[10.05]	[15.31]	[21.51]	[26.73]	[22.63]	[15.42]	[10.02]	[24.76]
Yrs of schooling	0.052	0.059	0.070	0.085	0.100	0.111	0.117	0.088
	[16.62]	[26.80]	[43.01]	[58.68]	[53.43]	[40.20]	[26.37]	[58.31]
Formal sector	0.372	0.283	0.199	0.110	0.016	−0.071	−0.120	0.098
	[19.34]	[20.29]	[18.82]	[11.63]	[1.38]	[4.17]	[4.36]	[10.00]
Bad health	−0.179	−0.262	−0.218	−0.211	[0.206	−0.268	−0.275	−0.243
	[3.25]	[6.70	[7.46]	[8.10]	[6.44]	[5.94]	[3.89]	[8.97]
Household head	0.163	0.162	0.157	0.161	0.177	0.223	0.195	0.194
	[7.01]	[9.82]	[12.86]	[14.79]	[13.13]	[11.48]	[6.32]	[17.12]
Urban area	0.136	0.134	0.126	0.110	0.089	0.094	0.111	0.122
	[5.13]	[7.17]	[8.94]	[8.95]	[5.99]	[4.42]	[3.27]	[9.57]
Constant	−1.418	−1.280	−0.949	−0.571	−0.166	0.265	0.320	−0.596
	[12.36]	[15.87]	[15.68]	[10.67]	[2.54]	[2.92]	[2.21]	[10.50]
R^2	0.2668	0.2527	0.262	0.288	0.301	0.3165	0.3134	0.4657

Absolute value of t-statistics in brackets.

State and occupational dummies included in all specifications.

Source: Pesquisa National por Amostra de Domicílios, 1998.

Table 11: Wage Equations*, by Wage Quantile, for Blacks

Black group								
θ	0.05	0.10	0.25	0.50	0.75	0.90	0.95	OLS
Experience	0.030	0.026	0.033	0.035	0.033	0.048	0.048	0.034
	[4.55]	[4.36]	[7.23]	[10.48]	[8.71]	[8.16]	[6.05]	[10.45]
(Experience)^2	−0.0004	−0.0003	−0.004	−0.0004	−0.0003	−0.0005	−0.0005	−0.0004
	[4.52	[4.08]	[6.30]	[8.53]	[6.38]	[5.88]	[4.45]	[8.43]
Yrs of schooling	0.053	0.051	0.072	0.081	0.097	0.113	0.118	0.086
	[6.85	[7.49]	[14.10]	[21.18]	[21.47]	[15.35]	[10.41]	[22.93]
Formal sector	0.331	0.238	0.189	0.151	0.070	−0.003	−0.014	0.135
	[7.10]	[5.78]	[6.06]	[6.43]	[2.61]	[0.07]	[0.23]	[5.88]
Bad health	−0.785	−0.522	−0.331	−0.267	−0.247	−0.099	−0.005	−0.321
	[5.37]	[4.06]	[3.49]	[3.72]	[3.14]	[0.77]	[0.04]	[4.57]
Household head	0.133	0.135	0.147	0.194	0.256	0.169	0.190	0.207
	[2.57]	[2.82]	[4.02]	[7.02]	[7.98]	[3.38]	[2.62]	[7.64]
Urban area	0.109	0.126	0.096	0.159	0.203	0.161	0.165	0.157
	[1.48]	[2.05]	[2.09]	[4.67]	[5.37]	[2.62]	[1.70]	[4.70]
Constant	−1.771	−1.089	−1.184	−1.168	−1.179	−0.733	−0.637	−1.086
	[9.28]	[3.21]	[4.41]	[5.96]	[5.68]	[2.17]	[2.54]	[5.50]
R^2	0.288	0.2696	0.2858	0.297	0.296	0.3233	0.3431	0.4711

Absolute value of t-statistics in brackets.

State and occupational dummies included in all specifications.

Source: Pesquisa National por Amostra de Domicílios, 1998.

Figure 1: Cumulative densities of log hourly Wage, by ethnic group