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Patterns and determinants of wage inequality in the Brazilian territory[1]

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Abstract

This paper is part of a wider project to analyze the impacts of socioeconomic development on regional inequality in Brazil. In this analysis, it aims to highlight the important role of regional disparities on wage inequality in Brazil. Results are based on inequality indicators, spatial data analysis and on an econometric model to identify elasticity coefficients and the discriminatory power of labor market and economic characteristics on wage differences between municipalities. Overall, results stress the high level of wage inequality between and within municipalities and the relevant contribution of regional factors to the extreme wage inequality in Brazil. Results also suggest that, if spatial autocorrelation is not considered, inequality analyses can be subject to significant source of biases.

Key words: wage inequality; regional disparities; spatial data analysis;

JEL: J31; J24; R12

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1. Introduction

All studies on income distribution in Brazil stress the high levels of poverty and inequality (BARROS *et al*., 2000; HOFFMANN, 2002a). Wages in the labor market play an important role in these inequalities because, besides representing the major share of total income in Brazil, they also determine future income for most members of society.

Among the determinants of the high wage inequality level in Brazil, emphasis is given on those related to regional labor market disparities, such as characteristics related to labor force participation, employment conditions and economic structure. For instance, labor force qualification and experience influence wage distribution, as well as current level of occupational segregation and discrimination observed in the labor market. Similarly, cost of living tends to influence the employee's expected remuneration, while unemployment tends to debilitate their bargaining power and compels them to accept lower wages.

Regional disparities witnessed in Brazil are also responsible for huge socioeconomic differences in the territory and, thus, determine different patterns of spatial distribution of employment and wages. As well as historical, cultural and environmental events influence on socioeconomic development level, different levels of regional development determine distinct socioeconomic structures, playing an important role in the geographic distribution of people and income.

To help understanding the patterns and determinants of wage inequality in the Brazilian territory, this paper aims to analyze the wage distribution between and within Brazilian municipalities. It is an initial step of a wider project to analyze the impacts of socioeconomic development on regional inequality in Brazil. To reach such purposes, results are based on inequality measures, regression models and spatial data analyses. Municipalities are the lower autonomous territorial units inside the politic-administrative division in Brazil. Understanding their relation in the territory is essential to plan and make decisions concerning implementation of economic activities, public and private consumption, as well as providing ways to understand emerging social relations and spatial patterns of inequality.

This paper's results are presented in two major parts, besides this introduction and final conclusions: i) patterns of spatial inequality; ii) determinants of spatial inequality. In the first part, patterns of wage inequality between and within municipalities are analyzed based on distribution of municipalities according to average wage deciles, inequality indicators, choropleth maps and coefficients of spatial autocorrelation. Second part combines spatial data analysis an econometric modeling to analyze determinants of wage inequalities between municipalities. Overall, results allow inferring the high level of inequality between and within municipalities and the important role of regional disparities on the extreme wage inequality in Brazil.

2. Methodology of analysis

2.1. Data source

Analyses were based on microdata sample of Demographic Census 2000. Demographic Census is the major household survey sponsored by the IBGE (*Instituto Brasileiro de Geografia e Estatística*) and it is conducted decennially over most Brazilian territory, except for those rare and inaccessible indigenous tribes. In 2000, Census microdata sample contained 20.3 million of observations, which represented a universe of 169.9 million of persons and 5,507 municipalities.

In such universe, it was considered as employed those persons 10 years old or more who, during the reference week, performed any work for wage, salary or profit in cash, or those persons who, having already worked in their present job or with an enterprise, were temporally not at work during the reference week for any specific reason. Although unpaid workers could play an important role in labor force composition, especially on developing countries (HUSSMANNS, 2009), they have not been considered in order to avoid overestimation of wage inequality due to methodological concerns.

To simplify denominations, wages, salaries and profits were referred, in this paper, basically as wages, representing monthly payments for labor or rendered services. These wages were deflated to July 2004 using INPC (National Consumer Price Index) from IBGE and converted to dollars considering the Purchasing Parity Power (PPP)[2].

2.2. Measuring inequality

The municipal distribution of wage and people among income deciles allowed to understand more precisely what happened in the extremes of distribution, namely the share of wage and population in the poorest and the richest Brazilian municipalities. Such analysis was enhanced by Theil's T index and its decomposition property, which allowed to verify the share of total inequality due to differences between municipalities. Because municipalities can be arranged in states and administrative regions, it also enabled evaluating the contribution of each of these areas to total inequality in the labor market.

Suppose a population with n members and the total wage equal Y, where Y_i is the wage shared by the i-th individual. Theil's T, which varies between 0 and natural logarithm of n, can be written by (HOFFMANN, 1998):

$$Theil's\ T = \sum_{i=1}^{n} \frac{Y_i}{Y} \log n \frac{Y_i}{Y} \tag{1}$$

Theil's T index also allows total inequality measuring as a weighted average of inequality within and between subgroups. Thus, the total wage inequality could be decomposed into differences within and between municipalities. Supposing k subgroups, each one with n_g members and total wage equal Y_g, Theil's T decomposition will be given by (HOFFMANN, 1998):

$$Theil's\ T = T_{between} + T_{within} \tag{2}$$

$$T_{between} = \sum_{g=1}^{k} \frac{Y_g}{Y} \log \frac{Y_g / Y}{n_g / n} \tag{3}$$

$$T_{within} = \sum_{g=1}^{k} \frac{Y_g}{Y} T_g \tag{4}$$

[2] 1.2 *reais* (R$) for each dollar (US$) in July 2004.

2.3. Spatial patterns

Choropleth maps are the most usual and intuitive way to analyze spatial areas. They permit an initial visualization of wage distribution between municipalities and to identify apparent patterns of inequality in the Brazilian territory. In order to support this graphical analysis, Moran's autocorrelation index was used to measure the spatial dependency level for average wages between municipalities.

Moran's *I* is a measure of spatial autocorrelation which allows verifying if adjacent values of the same phenomenon are correlated. Suppose *X* the value of such phenomenon in a population with *k* spatial elements, Moran's *I* will be given by (BAILEY & GATRELL, 1995):

$$I = \frac{k\sum_{i=1}^{k}\sum_{j=1}^{k} w_{ij}(X_i - \overline{X})(X_j - \overline{X})}{\left(\sum_{i=1}^{k}(X_i - \overline{X})^2\right)\left(\sum\sum_{i\neq j} w_{ij}\right)} \tag{5}$$

Where $\overline{X}$ is the average of *X* and w_{ij} the *ij*-th element of the proximity matrix $W_{k\times k}$ indicating if two areas A_i and A_j are adjacent. There are various approaches to compute w_{ij}, being most usual the following:

$$w_{ij} = \begin{cases} 1 \ \textit{if Ai and Aj are adjacent} \\ 0 \ \textit{otherwise} \end{cases}$$

Moran's *I* can also be generalized to estimate spatial autocorrelation at different spatial lags. Since $W^{(l)}$, the proximity matrix for lag *l*, is known, Moran's $I^{(k)}$ will be given by (BAILEY & GATRELL, 1995):

$$I^{(l)} = \frac{k\sum_{i=1}^{k}\sum_{j=1}^{k} w_{ij}^{(l)}(X_i - \overline{X})(X_j - \overline{X})}{\left(\sum_{i=1}^{k}(X_i - \overline{X})^2\right)\left(\sum\sum_{i\neq j} w_{ij}^{(l)}\right)} \tag{6}$$

2.4. Econometric model

In order to analyze the determinants of spatial inequalities, an econometric model was adjusted for the natural logarithm of average wage using covariates related to the main labor market conditions (such as participation, unemployment and informality ratio), labor force composition (such as qualification, experience, gender and race) and other municipal economic characteristics (such as sectoral structure). Such model can be expressed by:

$$\ln(Y_i) = \beta_0 + \sum_{j=1}^{k}\beta_j X_{ij} + e_i \tag{7}$$

Where $ln(Y)$ represents the natural logarithm for municipal average wage, X_j is the j-th covariate and e is the unpredicted random error. Thus, β_j represents the impacts on the natural logarithm related to a unitary variation on X_j. In other words, given a unitary variation on X_j, percentage variation on Y will be given by $100\beta_j$% (GUJARATI, 1995).

It was considered 15 covariates to represent 3 major groups of analysis:

Labor market conditions

i) Participation rate (0..1): the ratio of labor force (employed and unemployed population) to working age population (10 years old or more);
ii) Unemployment rate (0..1): the ratio of unemployed population to labor force;
iii) Informality rate (0..1): the share of employed population covered by social security;
iv) Underemployment rate (0..1): the share of employed population working less than 35 hours a week;

Labor force composition

v) Participation of young people (0..1): the share of young persons (less than 25 years old) in the employed population
vi) Elder participation (0..1): the share of elderly persons (60 years old or more) in the employed population;
vii) Secondary participation (0..1): the share of those with secondary degree attainment in the employed population;
viii) Women participation (0..1): the share of women in the employed participation;
ix) White participation (0..1): the share of white or yellow color persons in the employed population;

Sectoral structure

According to main economic activities suggested by United Nation Statistics (UNSD, 2009), it was considered the share of employed population (0..1) in the following economic sectors (agriculture sector was used as reference of analysis):

x) mining, manufacturing and utilities (electricity, gas and water supply);
xi) Construction;
xii) wholesale, retail trade, restaurants and hotels;
xiii) transport, storage and communication;
xiv) other activities (financial intermediation, real state, renting, business activities, public administration, defense, education, health, social work, social services, personal activities, private households and others services).

An approach to the municipal cost of living was also used in the econometric model but it had neither significant nor consistent relation with municipal average wage. Because accurate information for municipal price indexes was not available, differences between regional poverty lines was used as an approximation to municipal cost of living (IBGE, 2003). Another problem is that differences between poverty lines were just available for 20 major areas in Brazil, raising extra skepticism over its significance in relation to the municipal average wages.

Given that all covariates are ratios varying between 0 and 1, regression coefficients will represent marginal elasticity on average income given a percentage variation on the desirable explanatory index. Reinforcing the analysis of relationship between dependent and independent

variables, discriminatory power for each covariate was estimated using the coefficient of partial determination (r^2 semi-partial). Such coefficient measures the marginal contribution of each independent variable X_j to total variability of the dependent variable, the natural logarithm for the municipal average wage. The r^2_j for the j-th independent variable was estimated by:

$$r_j^2 = R^2_{y.12...k} - R^2_{y.12...(j)...k} \quad (8)$$

Where $R^2_{y.12...k}$ is de coefficient of determination considering all independent variables in the model and $R^2_{y.12...(j)...k}$ is the coefficient of determination excluding independent variable X_j.

3. Patterns of spatial inequality

The extreme socioeconomic inequality in Brazil can be uncovered by any income or wage distribution and household surveys allows a reliable way to analyze such dynamics and differences on the territory. Although p*er capita* income used to be a more accurate measure of individual purchase power, wages play an important role in the Brazilian inequality because it either represents the most expressive portion of total income (78% in 2000) as it determines future income for most individuals.

Individual differences between wage and *per capita* income were measured by Theil's *T* and both measures exhibit extreme values in Brazil (Table 1). *Per capita* income inequality is slightly superior than wage inequality, probably due to the facts that: i) socio-demographic tends to increase inequality provided that low-wage workers usually live in families with more dependents; ii) asymmetric distribution of income from pensions (richest persons attaining highest shares of pensions) tends to increase *per capita* income inequality in Brazil, particularly in metropolitan regions (HOFFMANN, 2003).

Theil's *T* decomposition also allows estimating the contribution of regional differences to overall inequality in Brazil. Differences among municipalities represented 12.5% of total wage inequality and 19% of income inequality in 2000. Although these values seem inexpressive contributions, they represent average wage differences among the 5,507 municipalities over almost 170 million Brazilian and thus could be considered as a relevant contribution of regional differences to overall inequality in Brazil. Differences between Federal Units and Regions also represent significant share of total inequality, although in lower level due to reduced number of groups.

It must also be highlighted that differences between geographical areas is significantly lower for wages compared to *per capita* income, probably because socio-demographic differences between regions (such as number of children and other dependents) tend to increase their discriminatory power over income inequality but not for wage inequality.

Table 1 –Theil's T decomposition according to geographical areas – Brazil 2000

Region	Wage		Income	
	T	%	T	%
Municipalities (5,507)	0.1053	12.5	0.1654	19.0
Federal Units (27)	0.0442	5.3	0.0761	8.7
Regions (5)	0.0303	3.6	0.0600	6.9
Total	**0.8403**	**100.0**	**0.8693**	**100.0**

Data source: Demographic Census, microdata,IBGE

Taking to account the relevance of wage distribution for socioeconomic inequality in Brazil and the importance of municipalities to understand its relations in the territory, next analyses will explore how this extreme inequality expands over the spatial distribution of workers and wages (Table 2). To reach such purpose, it is explored differences between and within municipalities, the lower autonomous territorial unit in Brazil.

First of all, it must be stressed that the level of wage and employment inequality between municipalities in Brazil is extremely high, which means that just few municipalities accumulate most significant share of employed population and total wage in the labor market. For instance, the 10% richest Brazilian municipalities, arranged according to *per capita* income, shared 49% of employed population and 67% of total wage in 2000. On the other hand, the share of the poorest municipalities was almost inexpressive: the 40% poorest municipalities shared 14% of employed population and just 5% of total wage.

Spatial inequality in the Brazilian labor market is higher than that witnessed for the whole income and population distributions. For instance, the 10% richest municipalities shared 49% of employment and 43% of total population, a difference of 6 percentage points. Analogous behavior, although not in the same extent, is observed for the share of wage and income, which can be more clearly analyzed comparing the ratio between the percentages accumulated by the richest and the poorest municipalities. For instance, the share of total wage in the 10% richest municipalities was 13 times higher than the share of the 40% poorest, whereas this ratio was 12 times higher for share of total income.

Table 2 – Population, wage and income distribution according to tenth of municipalities' per capita income – Brazil 2000

Tenth	Employed				Total			
	% Pop	% Wage	% Total Income	Avg Wage (US$)	% Pop	% Income	% Total Income	Per Cap Inc (US$)
1°	2.1	0.6	65.1	373.9	3.8	0.7	100.0	113.7
2°	2.9	0.9	68.1	433.6	4.5	1.1	100.0	148.2
3°	3.8	1.4	71.8	500.7	5.3	1.6	100.0	178.9
4°	4.7	2.1	74.3	595.1	6.0	2.2	100.0	224.3
5°	4.8	2.6	78.4	723.9	5.5	2.6	100.0	284.0
6°	4.7	2.9	79.4	828.4	5.0	2.9	100.0	350.8
7°	7.0	4.8	81.1	927.0	6.8	4.6	100.0	415.4
8°	8.7	6.8	79.2	1,041.0	8.4	6.7	100.0	485.0
9°	12.7	11.3	79.4	1,186.4	12.0	11.1	100.0	562.2
10°	48.6	66.6	77.8	1,830.0	42.6	66.7	100.0	957.5
Total	**100.0**	**100.0**	**77.9**	**1,336.6**	**100.0**	**100.0**	**100.0**	**612.1**

Data source: Demographic Census, microdata, IBGE
Values of July 2004

These results show contradictory trends between individual and municipal inequalities. Between individuals, *per capita* income inequality is higher than wage inequality but few developed regions tend to accumulate most significant group of employed persons and thus wage inequality between municipalities is higher than *per capita* income inequality. These areas offer

more attractive occupational opportunities and therefore contribute to increase wage inequality between municipalities. On the other hand, government benefits, such as pensions and financial aids, tend to reduce income inequality between municipalities (MAIA & TERRY, 2009).

Employment inequality between municipalities is lower than wage inequality, although both distribution exhibit evident patterns of spatial accumulation (Figure 1). Those few municipalities accumulating the most significant share of wage and employment are located in state of São Paulo, South and east side of Shoutheast region, in addition to narrow areas on the coast border of Northeast region. Only São Paulo city, the biggest in Brazil, holds 7% of employed population and 6% of total wage. On the other hand, large areas in central-north regions are expressive on territory but practically inexpressive in reference to total employment and wage participation.

Besides lower productivity, labor market in underdeveloped regions is usually disorganized and of limited scope, giving rise to lower wages and employment opportunities. Low-wage and unpaid jobs, such as persons working for family gain or self-subsistence, especially in the rural areas of Northeast region (MAIA, 2009), prevail in less developed areas. On the other hand, migratory movements, especially of young and adult workers, tend to reduce labor force supply in less developed and to raise it in more developed areas. In Brazil, such movement was observed in the last decades from rural to urban areas; from less developed areas on Northeast region to more developed areas on Southeast; and, recently, from South and Northeast regions to Central-West and North regions, following the new agricultural borders of development (THÉRY & MELLO, 2006).

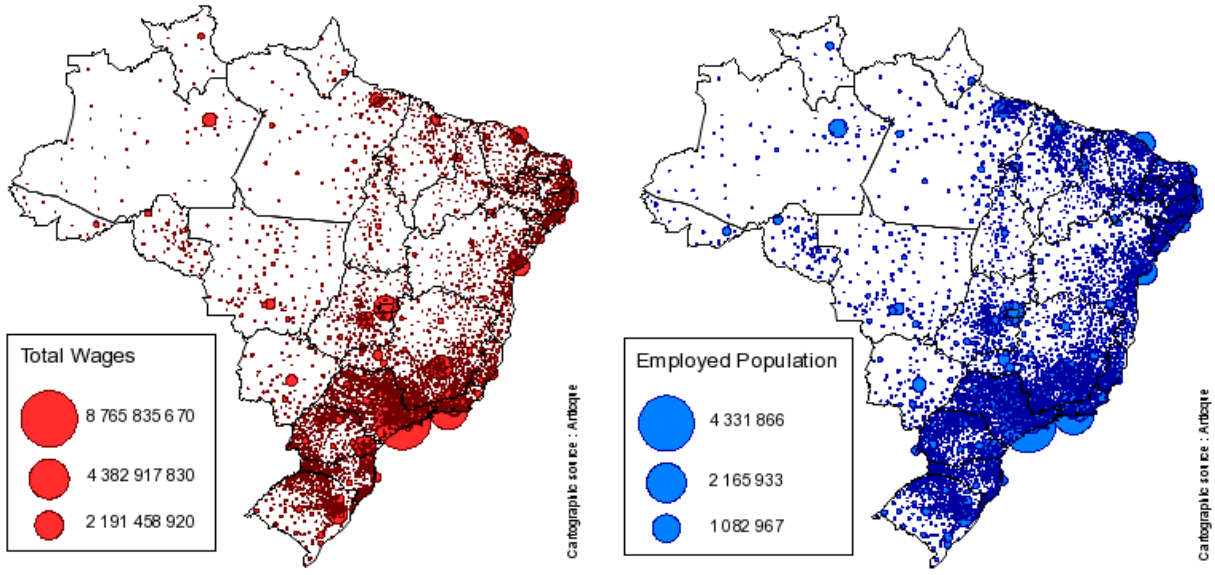

Figure 1 – Spatial distribution of wages and employed population – Brazil 2000
Cartographic source: Articque
Data source: Demographic Census, microdata,IBGE

Wages also play a more important role in the total income of intermediary and richest cities, which can be attributed to higher wages and activity rates in these areas. Overall, average wage at the 10% richest municipalities is 5 times higher than that of the 10% poorest municipalities and it represents 78% of their total income, in contrast with just 65% of the 10% poorest municipalities (Table 2). In the less developed areas, higher fertility rates contribute to

increase the participation of children dependents (CEPAL, 2005). For instance, children with less than 10 years old represent 26% of total population in the 10% poorest and just 17% in the 10% richest municipalities.

In order to analyze spatial differences between and within municipalities, Figure 2 shows the distribution of average wage and Theil's *T* coefficient (within inequality) in the Brazilian territory. Six class intervals have been defined for average wage and Theil's T to discriminate the 5% lowest values, next 20%, 25%, 25%, 20% and 5 highest values.

Overall, results exhibit a continuous extension of richest municipalities spreading in the states of São Paulo, Rio de Janeiro, south of Minas Gerais, South region and on the new border of agricultural development in the Central-West region. On the other hand, there is no evident pattern of spatial inequality within municipalities, suggesting that, although average wages are strongly different between regions, dispersions are not and, thus, the level of development may not affect wage inequality within regions.

Spatial inequality between municipalities can still be examined by Moran's autocorrelation coefficient. High values of Moran's coefficient for average wages suggest a strong and positive relation among neighbors, which means that municipalities with higher average wages tend to be close to each other. Persistence of high level of Moran's coefficient even for different lags, namely for differences between municipalities farther from each other, also suggests the heterogeneity of spatial distribution and the prevalence of strong spatial patterns in the territory. This result can be reinforced visualizing the huge accumulation of the poorest municipalities in the large areas of Northeast region and the richest ones on the South, Southeast and some parts of Central-West region. On the other hand, low Moran's coefficients for Theil's *T* reinforce the absence of spatial patterns of wage inequality within municipalities.

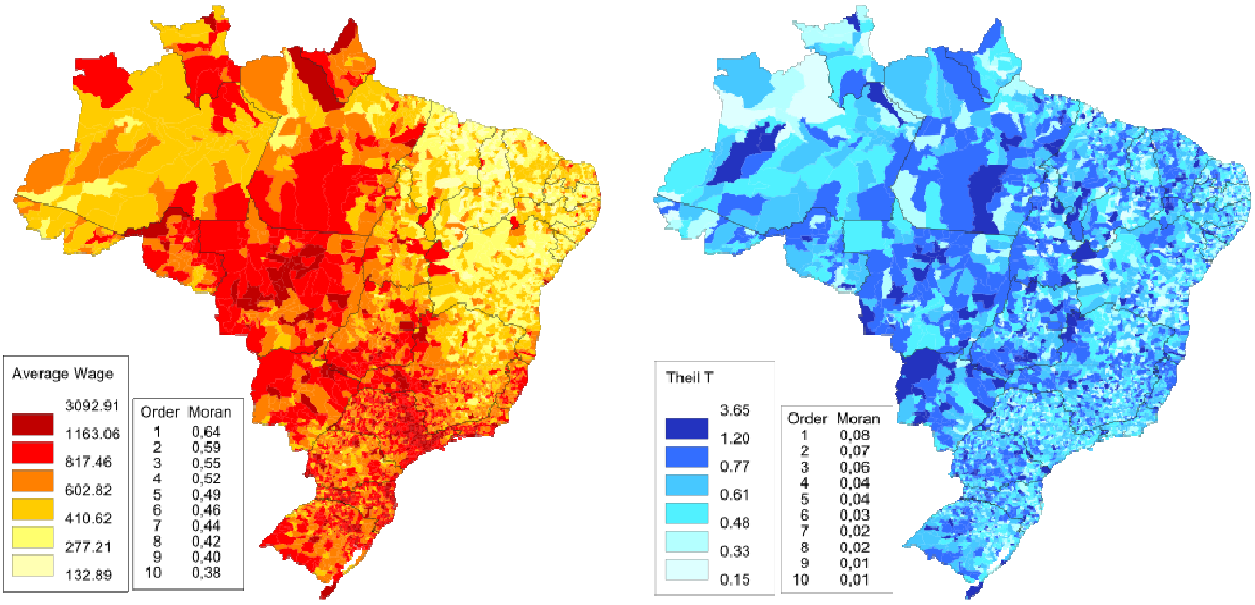

Figure 2 – Spatial distribution of municipalities according to average wages and within Theil's T– Brazil 2000

Cartographic source: Philcarto

Data source: Demographic Census, microdata,IBGE

4. Determinants of wage inequality between municipalities

A multiple regression model permitted to analyze the determinants of municipal average wages (equation 7). Overall, 73% of total variability of the natural logarithm of municipal average wage was explained by all covariates, which shows the relevant contribution of such labor market factors to explain regional disparities. According to the semi-partial determination coefficient, the most influential explanatory variables are, in order of relevance: participation rate, underemployment rate and secondary degree attainment (Table 3).

Participation rate reflects both employment and unemployment situations and it is strongly and positively related to municipal average wages, which suggests that average wages are higher in those Brazilian localities where the share of labor force in working age population is more expressive. Overall, higher participation rates in Brazil tend to prevail in localities where: i) economies are more dynamics, which allow higher employment rates; ii) channels for the exchange of labor market information exist and are more widely used, reducing the number of discouraged workers; iii) seasonal agricultural activities are inexpressive and hence reduce the participation of off-season workers.

On the other hand, underemployment rate is an approximation to express partial lack of work and inadequate employment situations. Thus, its strong and negative relation with municipal average wage point out that average wages are lower where the participation of employed persons with insufficient hours of work is higher. Although there is no accurate information concerning availability and willingness to work additional hours for these workers, results may reflect an underutilization of their productive capacity, including underutilization which arises from a deficient economic system, with negative impacts on wages of the labor market. In Brazil, underemployment has a particular relevance in agricultural and underdeveloped regions, where most workers cannot afford being unemployed even for a short period of time and, in order to survive, must engage themselves in some economic activity in spite of its inadequate conditions, limited hours and low remuneration.

Secondary school attainment is the third variable with higher discriminatory power on municipal average wage and point out that, as suggests LUCAS (1988), higher years of schooling, an approximation to human capital, leads to higher labor productivity. More useful approximation to human capital could be used instead of years of schooling, which does not complain for huge regional differences between schooling levels. For instance, COULOMBE *et al*. (2004) used data of the International Adult Literacy Survey to demonstrate how direct measures of human capital based on literacy scores outperform measures based on years of schooling in growth regressions. Even so, years of schooling show by itself huge differences between educational attainments in Brazil and it is responsible for sensible variation on municipal average wage.

Other labor market conditions also affect worker's bargaining power and, thus, municipal average wages. For instance, in municipalities with low unemployment rates, replacements are more difficult and, thus, employed persons have more bargaining power and higher wages. Informality might act in the same way, tending to be higher in less developed labor markets and hiding, in many cases, inappropriate employment situations. On the other hand, unemployment insurance provided by social security offers protection against eventual loss of employment and gives to formal workers more independence for wage negotiations.

Labor force characteristics such as age structure, woman and white color participations also play important roles in determining wages in Brazil. Age structure is an approximation of the labor force experience and their coefficients suggest that wages are lower in municipalities

with higher participation of young (less than 25 years old) and elderly (60 years old or more) workers. Young usually are employed in unskilled and low-paid jobs and can be replaced by employers at minimum costs. Elderly also have more difficulties to find a job and usually accept lower wages to avoid unemployment. In turn, woman and white participation reflect any segregation, discrimination or socio-cultural differences in the labor market. Women and non-white employees, for instance, tend to work in occupations with lower socio-occupational status and, either in similar occupational positions, these groups can still earn lower wages. Thus, the higher is their participations, the lower is the municipal average wage.

Sectoral structure reveals the status of regional economic development, with direct impacts on the wage structure. Developed regions tends to have higher employment participation on tertiary sector, which is especially discriminated, in Brazil, by the participation activities related to wholesale, retail trade, restaurants and hotels. On the other hand, as higher is the participation of agricultural, mining, manufacturing and construction activities, lower tends to be the municipal average wage.

Table 3 – Least squared estimation for natural logarithm of municipal average wage – Brazil 2000

Variable	β	S_β	p	r^2
Intercept	6.14	0.058	***	
Labor Market Conditions				
Participation rate	1.09	0.049	***	0.025
Unemployment rate	-0.22	0.066	0.001	0.001
Informality rate	-0.41	0.033	***	0.007
Underemployment rate	-1.02	0.047	***	0.024
Labor Force Composition				
Young participation	-0.18	0.091	0.044	0.000
Elderly participation	-1.89	0.209	***	0.004
Secondary degree participation	1.43	0.076	***	0.018
Woman participation	-1.02	0.075	***	0.009
White participation	0.37	0.021	***	0.015
Sectoral Structure				
Mining, manufacturing and utilities	-0.17	0.044	0.000	0.001
Construction	-0.48	0.116	***	0.001
Wholesale, retail trade, restaurants and hotels	1.19	0.076	***	0.012
Transport, storage and communication	0.67	0.228	0.003	0.000
Other activities	0.26	0.058	***	0.001

Data source: Demographic Census, microdata,IBGE
*** Significance at 0.1%

Although explanatory variable explained the most significant share of average wage variability, unpredicted residuals still represent one quarter of total variation. Positive residual means that municipal average wage is higher than expected by labor market conditions and

negative residuals means that municipal average wage is lower than expected. Figure 2 exhibit spatial distribution of residuals in order to identify clusters of municipalities with positive and negative differences.

Both spatial distribution and moderate Moran's coefficients exhibit dependency in spatial patterns and suggest that, besides explanatory factors, regions still play an important role determining wages in the labor market. Because residuals represent non-observable characteristics, these results may suggest that non-observed regional labor characteristic still make difference in determining average wages. It could be due to, for instance, labor unions, non-observed human capital characteristics, historical and cultural differences.

Overall, positive residuals tend to be higher on central-north regions, where average wages are higher than expected by their labor market characteristics. On the other hand, negative residuals tend to occur on Northeast region, especially in the poorest areas, which suggests that average wage is still lower than predicted by its low socioeconomic conditions (MAIA, 2009).

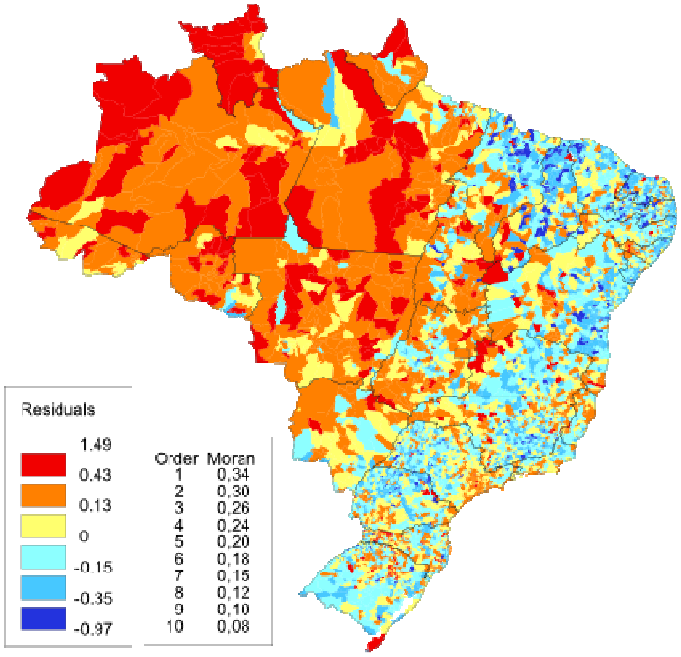

Figure 3 – Spatial distribution of residuals (observable municipal average wages minus predicted values by model) – Brazil 2000
Cartographic source: Philcarto
Data source: Demographic Census, microdata,IBGE

Conclusions

In balance, this paper aimed to analyze the spatial distribution of wage in the Brazilian labor market. Overall, results have stressed the high level of wage inequality between and within municipalities and the important role of regional disparities to the extreme wage inequality in Brazil.

Wages and employment are extremely accumulated in few municipalities and their spatial distributions show evident patterns on the Brazilian territory. High autocorrelation indexes, either for one or more lags, also show an apparent heterogeneity of the wage distribution between municipalities, which suggests a prevalence of high spatial patterns of inequality. However, there is no evidence of spatial autocorrelation for inequality within

municipalities, suggesting that the level of wage inequality is independent of regional development.

In order to understand how labor market characteristics can explain differences between municipal average wages, a multiple regression model was adjusted using covariates related to labor market characteristics. Results revealed the relevant contribution of each explanatory factor to determine the municipal wage, especially participation rate, underemployment rate and years of schooling. Furthermore, the spatial distribution of residues and their autocorrelation indexes showed pertinent patterns of spatial dependency, corroborating the hypothesis that, independently of labor market characteristics, territory still plays an important role in the wage inequality. It could be due to non-observable characteristics, such as labor unions actions, historical and cultural features. If such spatial autocorrelation are not considered, analysis can be subject to significant source of biases.

These results are just an initial step of a wider project to analyze impacts of socioeconomic development on regional inequality in Brazil. Next steps intend to provide evidences of socioeconomic dynamics on regional inequality in Brazil but, overall, initial results suggest that economic development could plays the central role reducing inequalities, allowing, for instance, higher participation rates and reduction of unemployment and underemployment in less developed areas.

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