

# “Poverty and inequality in the Manaus Free Trade Zone”



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*Work in progress*

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## Plan of presentation

1. Motivation
2. Data
3. Descriptive statistics
4. Econometric specification and results
5. Preliminary conclusions
6. Next steps

## 1. Motivation

### Our Objective:

- To study what has happened to **poverty** and **inequality** in the Free Trade Zone of Manaus in the past decade.
- To identify **which individuals** have benefitted (or suffered) most from the development of **the Free Trade Zone between 2000 and 2010**, and what are the most important explanations accounting for observed differences in income and wage distributions.

Thus, we intend to :

- **identify the determinants** of both household income and wage distributions in **Manaus and Amazonas compared to Brazil** and **analyse their evolution during the last decade** in Manaus.

*(results follow)*

- **understand how the observed distributional changes have occurred**, by disentangling the effects of **changes in individuals' characteristics** (such as gender, education, industry sector, ...) from the effects of **changes in returns to these components and to unmeasured characteristics** (residuals), using decomposition methods.

*(work in progress)*

## 2. Data

- Data used come from **the publicly released Census samples of 2000 and 2010**.
- The Census is conducted decennially by the IBGE (Instituto Brasileiro de Geografia e Estatística).
- Definitions of all variables have been harmonized (education, sector of activity, ...) between the two census years.
  - ➔ *We initially wanted to include the 1991 Census, but for example definitions on income variables proved difficult to harmonize.*
- Income data have been deflated using INPC deflator.

### Three samples are considered:

- **Manaus**: in 2000 represents **135.779 individuals with non-missing observation on main covariates**, among which 40.034 “full-time workers” (*defined as individuals among working-age population - from 10 to 65 years old - that declare themselves working at least 20 hours during the reference week*).  
In 2010, **81,690 individuals** among which 24.873 “full-time workers”.
- **Amazonas**: in 2000 **304,049 individuals** among which 66.411 “full-time workers”; in 2010 **284,816 individuals** among which 64.293 “full-time workers”.
- **Brazil**: in 2000 **19,731,839 individuals** among which 6.086.264 “full-time workers”; in 2010 **19,803,574 individuals** among which 6.542.028 “full-time workers”.
  - ➔ *The size of Brazil’s Census samples leads to computational limitations.*

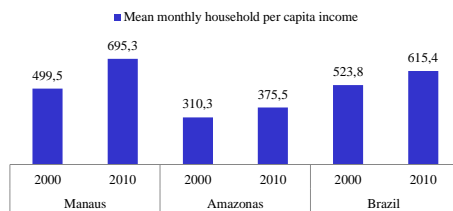
### 3. Descriptive statistics

- 3.1. Mean levels, poverty and inequality measures on:
  - Monthly household per capita income
  - Hourly wages
- 3.2. Shares of population by socio-demographic characteristics:
  - in total population
  - in population of “full-time workers”
- 3.3. Descriptive statistics on labor market characteristics of “full-time workers”.
- 3.4 Inequality decompositions by sub-population groups: between and within inequality components.

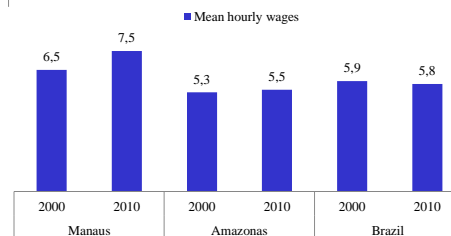
➔ For Manaus, Amazonas and Brazil, in 2000 and 2010.

### 3.1. Mean levels, poverty and inequality

**Mean monthly household per capita income**



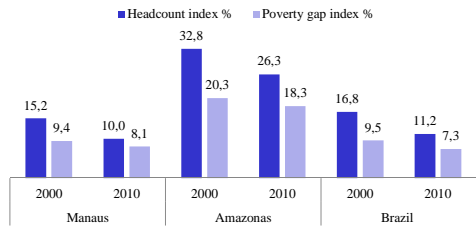
**Mean hourly wages**



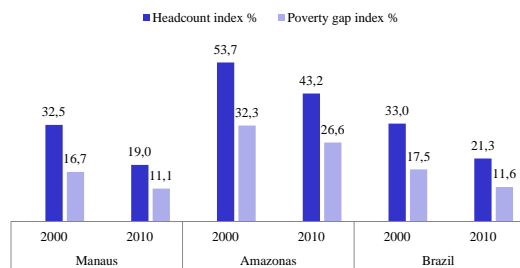
Note: Workers defined as individuals among working-age population (from 10 to 65 years old) that declare themselves working at least 20 hours during the reference week.

### 3.1. Mean levels, poverty and inequality (cont.)

#### Extreme household poverty (poverty line threshold at R\$70)

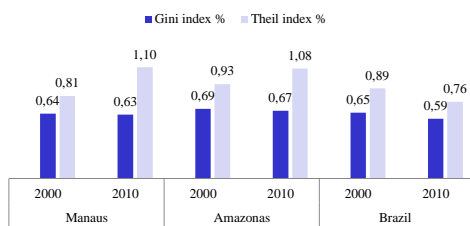


#### Household poverty (poverty line threshold at R\$140)

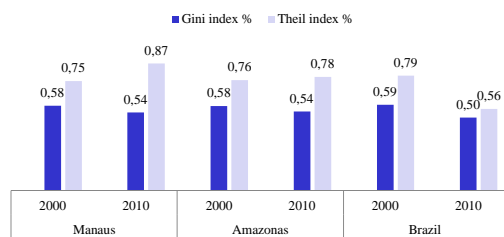


### 3.1. Mean levels, poverty and inequality (cont.)

#### Inequality levels in monthly household per capita income



#### Inequality levels in workers' hourly wages



### In summary:

- **Mean monthly household per capita income** have increased in Manaus, Amazonas and Brazil in the past decade.
- **Mean hourly wages** have importantly increased in Manaus in the past decade, while remained rather stable in Amazonas and Brazil.
- **Poverty** has decreased everywhere (robust results).
- Using Theil index (more sensitive to distribution tails), household income and wage **inequalities** have increased in Manaus and Amazonas, and decreased in Brazil.

## 3.2. Descriptive statistics on socio-demographic var.

TABLE 2 - Descriptive statistics on total population

	2000			2010		
	Manaus	Amazonas	Brazil	Manaus	Amazonas	Brazil
<b>% by gender</b>						
Women	51.28	49.68	50.79	52.31	49.49	50.97
Men	48.72	50.32	49.21	47.69	50.51	49.03
<b>% by age group</b>						
Under 10 years old	23.71	28.76	20.43	19.66	24.47	16.22
10-15 years old	12.88	14.64	12.74	12.91	14.96	11.67
16-24 years old	20.2	18.87	17.7	17.76	17.91	15.85
25-49 years old	33.61	28.44	33.41	36.55	30.76	35.4
50- 65 years old	6.69	6.36	10.46	9.34	8.05	13.53
Over 65 years old	2.92	2.93	5.25	3.79	3.85	7.32
<b>% by ethnic group (self-declared)</b>						
Branco (white)	32.09	23.7	53.43	26.09	18.59	46.79
Preto (black)	2.46	3.21	6.25	4.15	3.98	7.03
Amarelo (asian)	0.32	0.32	0.42	1.16	0.77	1.02
Pardo (brown)	64.57	68.56	39.47	68.35	69.91	44.61
Indigenous	0.56	4.21	0.44	0.25	6.75	0.55

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**TABLE 2 - Descriptive statistics on total population (cont.)**

	2000			2010		
	Manaus	Amazonas	Brazil	Manaus	Amazonas	Brazil
<b>% by level of education</b>						
No schooling	25.38	37.84	26.63	20.57	32.45	21.71
1-3 years (of schooling)	15.18	19.15	19.61	12.22	17.28	18.43
4-7 years	26.71	23.16	27.81	26.18	24.4	27.26
8-10 years	13.69	9	11.67	10.5	8.9	10.58
11-14 years	16.67	9.65	11.22	24.87	14.07	16.83
15 or more years	2.38	1.19	3.06	5.66	2.89	5.19
<b>% by civil status (for population over 10 years old)</b>						
Married	27.22	25.19	37.28	26.23	20.78	35.12
Other (widowed,...)	5.55	4.21	7.81	6.43	4.36	9.5
Single	67.23	70.61	54.9	67.34	74.86	55.38

➡ **The same descriptive statistics on workers have been studied for “full-time workers” (not presented).**

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**In summary:**

- **% by gender:**
  - Slightly higher proportion of women in Manaus both in 2000 and in 2010 ; for female workers the difference is even more important.
  - No remarkable differences over time for total population but female workers represents a higher share everywhere in 2010.
- **% by age:**
  - More children in Manaus and Amazonas than in Brazil.
  - Their number falls everywhere during the decade.

*Note:* Workers defined as individuals among working-age population (from 10 to 65 years old) that declare themselves working at least 20 hours during the reference week.

### In summary:

- % **ethnic group**: self-declaration as “pardo” (highest in Amazonas and Manaus) increases over time while that as “white” decreases.

➡ *More “mixture”? Better acceptance?*

- % by **education**: population better educated in Manaus than in Brazil on average (and in Amazonas less educated). Educated levels have increased everywhere.

- % by **civil status**: slightly more single individuals in Manaus and Amazonas.

*These three last results concern total population, but similar results are observed on “full-time workers” (not presented).*

### 3.3. Descriptive statistics on workers

TABLE 3 - Descriptive statistics on workers: % by subpopulation groups

	2000			2010		
	Manaus	Amazonas	Brazil	Manaus	Amazonas	Brazil
<b>% by gender</b>						
Women	38,52	34,11	35,64	42,1	37,63	39,25
Men	61,48	65,89	64,36	57,9	62,37	60,75
<b>% by age group</b>						
10-15 years old	1,15	1,68	1,63	0,74	2	1,12
16-24 years old	23,08	23,28	22,85	18,25	19,33	19,09
25-49 years old	66,68	64,73	63	67,41	64,9	63,48
50- 65 years old	9,09	10,31	12,52	13,6	13,77	16,33
<b>% by ethnic group (self-declared)</b>						
Branco (white)	32,83	27,13	57,01	27	21,2	51,39
Preto (black)	2,98	3,4	6,69	4,99	4,95	7,58
Amarelo (asian)	0,34	0,33	0,48	1,15	0,88	0,99
Pardo (brown)	63,29	67,59	35,5	66,6	69,65	39,76
Indigenous	0,57	1,55	0,31	0,25	3,31	0,28
<b>% by level of education</b>						
No schooling	4,03	9,57	7,41	3,21	9,28	5,18
1-3 years of schooling	8,91	14,08	14,65	6,41	12,52	13,51
4-7 years of schooling	27,95	29,63	31,73	23,93	26,62	28,18
8-10 years of schooling	18,58	15,74	17,07	10,6	11,16	12,43
11-14 years of schooling	34,25	26,77	22,09	43,44	31,47	30,03
15 or more years of schooling	6,28	4,21	7,07	12,41	8,95	10,65
<b>% by civil status (for population over 10 years old)</b>						
Married	35,34	35,02	45,97	33,97	29,1	42,38
Other (widowed, divorced, separated)	5,18	4,2	6,64	5,93	4,06	7,5
Single	59,48	60,11	60,78	66,83	47,38	50,12



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### 3.3. Descriptive statistics on workers

**TABLE 3 - Descriptive statistics on workers: % by subpopulation groups**

	2000			2010		
	Manaus	Amazonas	Brazil	Manaus	Amazonas	Brazil
<b>% by labor market status</b>						
Employee with a signed card	37,8	27,0	37,3	51,4	27,0	45,0
Employee without a signed card	28,3	30,9	27,3	20,4	30,0	23,7
Employer	2,0	1,6	3,0	1,1	0,9	1,8
Self-employed	23,4	32,6	24,0	19,5	33,3	23,6
Other	8,5	7,9	8,3	7,7	8,9	5,9
<b>% by occupational category</b>						
Armed forces occupations	2,2	2,0	0,9	1,8	1,4	0,5
Managers	4,2	3,3	4,6	4,0	3,2	4,0
Professionals	5,8	4,5	5,6	11,5	10,2	9,1
Technicians	10,6	10,1	7,9	8,5	6,7	6,2
Clerical support workers	10,5	7,9	8,5	9,2	6,0	6,6
Service and sales workers	36,6	32,8	30,6	22,3	17,4	17,0
Skilled agric., forestry & fish.	1,0	14,9	15,2	0,5	16,3	9,8
Craft and related trade workers	23,5	19,6	20,8	13,8	11,0	13,1
Plant and machine operators	2,9	2,8	3,4	10,3	7,4	9,8
Elementary occupations	2,8	2,2	2,6	18,1	20,5	23,8

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**TABLE 3 - Descriptive statistics on workers: % by subpopulation groups (cont.)**

	2000			2010		
	Manaus	Amazonas	Brazil	Manaus	Amazonas	Brazil
<b>% by sector of activity</b>						
Agriculture, forestry and fishing	1.33	15.35	16.14	0.82	20.99	17.7
Mining and quarrying	0.11	0.35	0.43	0.38	0.59	0.58
Manufacturing	16.58	12.76	13.89	17.08	9.78	14.49
Electricity, water and gas	0.93	1.12	0.98	0.93	1.03	0.96
Construction	8.48	7.07	7.74	8.96	7.28	8.49
Wholesale & retail trade; repair of motor vehicles	22.29	17.94	17.39	21.49	16.41	17.54
Transportation and storage	6.84	5.61	4.66	6.68	5.12	4.42
Accommodation and food service activities	6.12	4.93	4.67	5.39	3.56	3.36
Communication, finance and business activities	7.97	5.62	7.86	11.37	6.43	7.29
Public administration and defense; compulsory social security	9.05	9.57	5.9	6.76	8.83	5.8
Education, health and social services	8.92	9.47	9.19	10.27	11.65	9.52
Other service activities	11.37	10.22	11.14	9.88	8.35	9.85

### In summary:

- Higher increase in the proportion of “**formal workers**” in Manaus than in Brazil.

- **Largest sectors of activity in Manaus:**

- 1) “Wholesale & retail trade; repair of motor vehicles”.
- 2) “Manufacturing”.
- 3) “Other service activities” in 2000 → “Communication, finance and business activities” in 2010

- **Among sectors of manufacturing in Manaus, the largest are:**

- 1) Computer, electrical, electronical and optical products
- 2) Food products & beverages in 2000 → Other transport equipment in 2010
- 3) Wearing apparel in 2000 → Fabricated metal products in 2010

➡ *Changes in classification at a disaggregated level across time need to be checked and solved.*

**TABLE 5 - Detailed % workers by sector of manufacturing**

	2000			2010		
	Manaus	Amazonas	Brazil	Manaus	Amazonas	Brazil
<b>% by sector of manufacturing</b>						
8-Food products and beverages	10.43	13.01	17.35	5.50	9.51	17.18
9-Tobacco products	0.00	0.00	0.29	0.00	0.00	0.28
10-Textile	1.39	1.18	6.41	0.94	1.23	4.42
11-Wearing apparel	9.17	9.09	14.61	6.38	7.77	14.35
12-Leather and related products	0.30	0.24	5.54	0.23	0.31	6.14
13-Wood and wood products	3.62	9.48	5.54	1.00	5.62	3.45
14-Paper and paper products	1.51	1.18	1.80	0.53	0.41	1.10
15-Printing and reproduction of recorded media	3.44	2.90	3.89	2.34	1.84	1.79
16-Coke, petroleum products and nuclear fuel; chemicals	4.28	3.68	5.11	1.70	1.33	4.21
17-Rubber and plastic products	4.04	3.21	3.02	3.81	2.76	2.14
18-Other non-metallic mineral products	2.23	3.61	6.41	1.52	4.09	5.11
19-Basic metals	0.48	0.39	1.80	0.82	0.61	1.73
20-Fabricated metal products except machinery & equipment	6.57	5.72	9.50	8.49	7.87	11.39
21-Computer, electrical, electronical & optical products ; Machinery and equipment	36.61	29.23	5.90	24.30	16.67	3.24
22-Motor vehicles, trailers and semi-trailers	1.21	1.02	3.24	2.58	1.74	2.69
23-Other transport equipment	7.84	7.45	0.58	9.37	7.46	0.62
24-Furniture	4.76	6.82	7.27	8.67	13.09	10.70
25-Other industries	2.05	1.80	1.66	20.49	16.05	8.28
26-Repair and installation of machinery and equipment	0.00	0.00	0.00	1.29	1.64	1.17

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**TABLE 4 - Descriptive statistics on workers: mean hourly wages by subpopulation groups**

	2000			2010		
	Manaus	Amazonas	Brazil	Manaus	Amazonas	Brazil
<b>By gender</b>						
Women	5,59	4,86	5,15	6,93	5,29	5,20
Men	7,11	5,55	6,36	8,00	5,58	6,15
<b>By age group</b>						
10-15 years old	1,41	1,26	1,26	2,91	1,86	2,13
16-24 years old	3,22	2,80	2,93	3,91	3,13	3,48
25-49 years old	7,22	5,99	6,69	7,97	5,89	6,07
50- 65 years old	10,45	7,46	8,16	10,59	7,31	7,58
<b>By ethnic group (self-declared)</b>						
Branco (white)	8,69	7,67	7,49	10,77	8,16	7,11
Preto (black)	5,21	4,26	3,55	5,62	4,42	4,23
Amarelo (asian)	23,38	16,31	16,69	7,70	6,33	7,36
Pardo (brown)	5,38	4,42	3,73	6,39	4,84	4,32
Indigenous	5,03	3,13	4,14	5,53	2,81	3,86

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**TABLE 4 - Mean hourly wages by subpopulation groups (cont.)**

	2000			2010		
	Manaus	Amazonas	Brazil	Manaus	Amazonas	Brazil
<b>By level of education</b>						
No schooling	3,03	2,42	2,09	4,57	2,84	2,96
1-3 years (of schooling)	2,99	2,67	2,71	4,02	3,10	3,35
4-7 years	3,25	3,09	3,63	4,24	3,70	3,94
8-10 years	4,21	4,10	4,68	4,56	3,82	4,45
11-14 years	7,92	7,60	8,06	6,19	5,72	5,95
15 or more years	27,54	26,42	23,23	23,82	17,95	16,14
<b>By civil status (for population over 10 years old)</b>						
Married	9,29	7,47	7,66	10,72	7,74	7,13
Other (widowed, ...)	10,51	9,05	7,96	8,94	7,79	7,15
Single	4,53	3,82	3,95	5,62	4,34	4,43
<b>By labor market status</b>						
Employee with signed card	6,48	6,21	6,12	6,39	6,11	5,80
Emp. without signed card	6,62	5,26	4,51	4,40	3,66	3,19
Employer	32,14	29,56	26,97	26,68	25,30	20,61
Self-employed	6,08	4,39	6,00	8,71	4,53	5,91
Other	1,67	1,49	1,86	17,97	11,19	10,90

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**TABLE 4 - Mean hourly wages by subpopulation groups (cont.)**

	2000			2010		
	Manaus	Amazonas	Brazil	Manaus	Amazonas	Brazil
<b>By sector of activity</b>						
Agriculture, forestry and fishing	3,88	2,33	2,95	5,39	2,46	3,48
Mining and quarrying	10,89	7,04	6,05	13,63	7,30	8,81
Manufacturing	6,13	5,53	5,69	5,66	5,01	5,64
Electricity, water and gas	7,02	5,23	7,08	6,82	5,67	6,58
Construction	4,25	3,95	4,48	5,30	4,29	4,84
Wholesale & retail trade; repair motor vehicles	5,99	5,85	6,43	6,11	5,77	5,49
Transportation and storage	6,33	5,64	6,56	6,62	5,20	6,32
Accommodation and food service activities	4,38	4,21	4,85	4,22	4,01	4,34
Communication, finance and business activities	9,24	8,57	10,98	9,03	7,82	9,57
Public administration and defense	11,87	8,96	9,12	15,08	9,17	9,66
Education, health and social services	9,75	7,91	9,09	14,94	9,71	8,77
Other service activities	2,63	2,25	2,96	3,90	3,03	3,43

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**In summary:**

- As expected, each group of workers is *in general* better paid in Manaus.
- Both **men** and **women** were relatively better paid in Manaus than in Brazil.
- Wages grow with **age** and **education**.
- **Self-declared ethnic groups** ‘white’ and ‘amarelo’ are better paid.
- Singles’ wages are lower than those of Married/Other individuals.

➡ *True effect or hides an age effect? Check multivariate analysis.*

### In summary:

- **“Informal” employees** are better paid in Manaus than in Brazil always.
- Workers in **manufacturing** are better paid in Manaus than in Brazil always.
- Better paid **sectors** in Manaus are:
  - *Public administration and defense*
  - *Mining and quarrying*
  - *Education, health and social services*
  - *Communication, finance and business activities*

### 3.4. Inequality decompositions by subgroups of pop.

Table 7 - Inequality decompositions using Theil measures on wages

	Manaus		Amazonas	
	2000	2010	2000	2010
<b>Theil index</b>	<b>0.75</b>	<b>0.87</b>	<b>0.76</b>	<b>0.78</b>
<b>By gender</b>				
Within-group ineq.	0.75 (99.1%)	0.87 (99.7%)	0.76 (99.8%)	0.78 (100.0%)
Between-group ineq.	0.01 (0.9%)	0.00 (0.3%)	0.00 (0.2%)	0.00 (0.0%)
<b>By area</b>				
Within-group ineq.	0.75 (99.9%)	0.87 (100.0%)	0.73 (96.4%)	0.75 (96.5%)
Between-group ineq.	0.00 (0.1%)	0.00 (0.0%)	0.03 (3.6%)	0.03 (3.5%)
<b>By age categories</b>				
Within-group ineq.	0.69 (92.1%)	0.84 (95.6%)	0.71 (93.3%)	0.75 (95.6%)
Between-group ineq.	0.06 (7.9%)	0.04 (4.4%)	0.05 (6.7%)	0.03 (4.4%)
<b>By ethnicity</b>				
Within-group ineq.	0.72 (95.4%)	0.84 (96.4%)	0.72 (94.7%)	0.75 (96.0%)
Between-group ineq.	0.03 (4.6%)	0.03 (3.6%)	0.04 (5.3%)	0.03 (4.0%)
<b>By education levels</b>				
Within-group ineq.	0.48 (64.5%)	0.64 (72.8%)	0.50 (65.2%)	0.59 (75.8%)
Between-group ineq.	0.27 (35.5%)	0.24 (27.2%)	0.26 (34.8%)	0.19 (24.2%)

**Table 7 - Inequality decompositions using their measures on wages (cont.)**

	Manaus		Amazonas	
	2000	2010	2000	2010
<b>Theil index</b>	<b>0.75</b>	<b>0.87</b>	<b>0.76</b>	<b>0.78</b>
<b>By civil status</b>				
Within-group ineq.	0.68 (91.0%)	0.82 (94.4%)	0.70 (92.0%)	0.74 (94.9%)
Between-group ineq.	0.07 (9.0%)	0.05 (5.6%)	0.06 (8.0%)	0.04 (5.1%)
<b>By occupational categories</b>				
Within-group ineq.	0.50 (66.4%)	0.64 (73.7%)	0.51 (67.5%)	0.58 (74.8%)
Between-group ineq.	0.25 (33.6%)	0.23 (26.3%)	0.25 (32.5%)	0.20 (25.2%)
<b>By labor market status</b>				
Within-group ineq.	0.64 (85.1%)	0.77 (88.3%)	0.64 (84.7%)	0.69 (88.6%)
Between-group ineq.	0.11 (14.8%)	0.10 (11.7%)	0.12 (15.3%)	0.09 (11.4%)
<b>By sector of activity</b>				
Within-group ineq.	0.67 (89.6%)	0.77 (88.3%)	0.66 (87.6%)	0.68 (87.4%)
Between-group ineq.	0.08 (10.4%)	0.10 (11.7%)	0.09 (12.4%)	0.10 (12.6%)

### In summary:

• Variables with **the highest between-group Theil inequality elements** are:

- Education levels (35% in 2000 → 27% in 2010)
- Occupational categories (34% in 2000 → 26% in 2010)
- Labor market status (15% in 2000 → 12% in 2010)

• All variables have a **diminishing between-group inequality factor** EXCEPT “**sector of activity**”, which sees its between-group inequality element slightly increase over time (10% in 2000 → 12% in 2010).

➡ *Usual wage determinants seem to be losing explanatory power over time in Brazil? Check with multivariate regressions.*

## 4. Econometric specification and results

- We run **OLS regressions** for Manaus, Amazonas and Brazil for years 2000 and 2010 .
- We also run **quantile regressions** (for 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> percentiles) for Manaus and Amazonas in 2000 and 2010.
- **Unit of analysis:** individuals among working-age population (from 10 to 65 years old) that declare themselves working at least 20 hours during the reference week.
- **Dependent wage variable :** hourly wage of main job.
- **Independent variables:** gender, area, age, “ethnic” group, level of education, work experience, civil status, labor market status, occupational category, sector of activity.

Table: OLS regressions

	2000			2010		
	Manaus	Amazonas	Brazil	Manaus	Amazonas	Brazil
<b>Women dummy</b>	-0.170***	-0.172***	-0.275***	-0.183***	-0.166***	-0.247***
<b>Rural area</b>	-0.246***	-0.033***	-0.173***	-0.067	0.032***	-0.152***
<b>Age; omitted category: 25-49 years old</b>						
10-15 years old	-0.383***	-0.418***	-0.507***	-0.164***	-0.191***	-0.279***
16-24 years old	-0.142***	-0.155***	-0.185***	-0.095***	-0.115***	-0.100***
50- 65 years old	-0.119***	-0.121***	-0.093***	-0.048***	-0.067***	-0.037***
<b>Ethnicity; omitted category: Branco (white)</b>						
Preto (black)	-0.137***	-0.119***	-0.175***	-0.113***	-0.096***	-0.166***
Amarelo (yellow)	0.254***	0.183***	0.227***	-0.011	-0.021	-0.064***
Pardo (brown)	-0.104***	-0.115***	-0.197***	-0.099***	-0.119***	-0.174***
Indigenous	-0.159***	-0.214***	-0.137***	-0.269***	-0.261***	-0.207***
#obs.	40.034	66.411	6.086.264	24.873	64.293	6.542.028
Adjusted-R2	0.502	0.476	0.518	0.465	0.426	0.437

**Table: OLS regressions (cont.)**

	2000			2010		
	Manaus	Amazonas	Brazil	Manaus	Amazonas	Brazil
<b>Education; omitted category: No schooling</b>						
1-3 years (of schooling)	0.150***	0.123***	0.208***	0.002	0.070***	0.135***
4-7 years	0.291***	0.278***	0.452***	0.106***	0.177***	0.308***
8-10 years	0.488***	0.464***	0.661***	0.217***	0.284***	0.426***
11-14 years	0.829***	0.811***	0.980***	0.367***	0.466***	0.579***
15 or more	1.607***	1.647***	1.683***	1.011***	1.025***	1.141***
<b>Experience</b>	0.011***	0.010***	0.010***	0.008***	0.010***	0.008***
<b>Civil status, omitted category: married</b>						
Other (widowed, ...)	-0.028*	-0.011	-0.005***	-0.056***	-0.001	-0.003***
<b>Single</b>	<b>-0.149***</b>	<b>-0.150***</b>	<b>-0.169***</b>	<b>-0.134***</b>	<b>-0.112***</b>	<b>-0.121***</b>
#obs	40.034	66.411	6.086.264	24.873	64.293	6.542.028
Adjusted R2	0.502	0.476	0.518	0.465	0.426	0.437

**Table: OLS regressions (cont.)**

	2001			2010		
	Manaus	Amazonas	Brazil	Manaus	Amazonas	Brazil
<b>Labor market status, omitted category: employee with signed card</b>						
<b>Employee without a signed card</b>	<b>-0.149***</b>	<b>-0.185***</b>	<b>-0.229***</b>	<b>-0.111***</b>	<b>-0.238***</b>	<b>-0.319***</b>
Employer	0.672***	0.690***	0.517***	0.697***	0.604***	0.408***
Self-employed	0.017*	-0.005	-0.059***	-0.016	-0.196***	-0.174***
Other	-0.241***	-0.260***	-0.288***	0.159***	-0.025*	0.011***
# obs	40.034	66.411	6.086.264	24.873	64.293	6.542.028
Adjusted R2	0.502	0.476	0.518	0.465	0.426	0.437



<b>Table: OLS regressions (cont.)</b>						
	2000			2010		
	Manaus	Amazonas	Brazil	Manaus	Amazonas	Brazil
<b>Sector of activity; omitted category: Agriculture, forestry and fishing</b>						
Mining and quarrying	0.502***	0.515***	0.259***	0.396***	0.585***	0.347***
Manufacturing	0.094	0.201***	0.245***	-0.013	0.294***	0.144***
Electricity, water and gas	0.320***	0.384***	0.332***	0.140**	0.480***	0.178***
Construction	0.092	0.217***	0.252***	-0.031	0.299***	0.189***
Wholesale and retail trade; repair of motor vehicles	0.033	0.173***	0.185***	-0.081	0.271***	0.091***
Transportation and storage	0.223***	0.282***	0.370***	0.092	0.328***	0.241***
Accommodation and food service activities	-0.050	0.088**	0.130***	-0.099	0.253***	0.045***
Communication, finance and business activities	0.121**	0.233***	0.316***	0.071	0.432***	0.239***
Public administration and defense	0.465***	0.454***	0.373***	0.336***	0.519***	0.259***
Education, health and social services	0.117*	0.289***	0.241***	-0.016	0.372***	0.121***
Other service activities	-0.054	0.011	0.191***	-0.069	0.164***	0.116***
# obs	40.034	66.411	6.086.264	24.873	64.293	6.542.028
Adjusted R2	0.502	0.476	0.518	0.465	0.426	0.437

<b>Table: OLS regressions (cont.)</b>						
	2000			2010		
	Manaus	Amazonas	Brazil	Manaus	Amazonas	Brazil
<b>Occupational category; omitted category: managers</b>						
Armed forces occupations	-0.487***	-0.242***	-0.016***	-0.312***	0.041	0.019***
Professionals	-0.056**	-0.128***	0.033***	-0.062***	-0.094***	-0.047***
Technicians and associate professionals	-0.291***	-0.289***	-0.141***	-0.197***	-0.247***	-0.181***
Clerical support workers	-0.566***	-0.526***	-0.365***	-0.481***	-0.422***	-0.408***
Service and sales workers	-0.735***	-0.704***	-0.516***	-0.519***	-0.479***	-0.454***
Skilled agricultural, forestry and fish	-0.834***	-0.843***	-0.559***	-0.750***	-0.704***	-0.576***
Craft and related trade workers	-0.732***	-0.691***	-0.477***	-0.504***	-0.491***	-0.411***
Plant and machine operators, and assembl	-0.846***	-0.834***	-0.569***	-0.547***	-0.497***	-0.432***
Elementary occupations	-0.584***	-0.590***	-0.412***	-0.693***	-0.651***	-0.599***
Number of observations	40.034	66.411	6.086.264	24.873	64.293	6.542.028
Adjusted R2	0.502	0.476	0.518	0.465	0.426	0.437

**Table: Quantile regressions**

	Manaus					
	2000			2010		
	q25	q50	q75	q25	q50	q75
<b>Women dummy</b>	-0.134***	-0.160***	-0.201***	-0.119***	-0.164***	-0.191***
<b>Rural area</b>	-0.197***	-0.262***	-0.304***	0.165	0.006	-0.010
<b>Age; omitted category: 25-49 years old</b>						
10-15 years old	-0.459***	-0.343***	-0.242***	-0.399***	-0.155	0.017
16-24 years old	-0.129***	-0.117***	-0.129***	-0.080***	-0.078***	-0.076***
50- 65 years old	-0.126***	-0.113***	-0.123***	-0.032*	-0.021	-0.025
<b>Ethnicity; omitted category: Branco (white)</b>						
Preto (black)	-0.083***	-0.101***	-0.135***	-0.061***	-0.075***	-0.104***
Amarelo (yellow)	0.103	0.230***	0.284***	-0.007	-0.002	0.006
Pardo (brown)	-0.070***	-0.083***	-0.111***	-0.050***	-0.082***	-0.108***
Indigenous	-0.144	-0.119**	-0.114***	-0.131	-0.186**	-0.190*
<b>Education; omitted category: No schooling</b>						
1-3 years of schooling	0.138***	0.135***	0.155***	-0.009	0.006	-0.004
4-7 years of schooling	0.271***	0.265***	0.268***	0.054***	0.083***	0.091***
8-10 years of schooling	0.432***	0.455***	0.481***	0.146***	0.193***	0.198***
11-14 years of schooling	0.717***	0.769***	0.832***	0.247***	0.303***	0.354***
15 or more years of schooling	1.511***	1.556***	1.642***	0.792***	0.912***	1.072***
<b>Experience</b>	0.008***	0.011***	0.014***	0.004***	0.006***	0.009***
<b>Civil status, omitted category: married</b>						
Other (widowed, ...)	-0.017	-0.030	-0.033	-0.033**	-0.041**	-0.078**
Single	-0.127***	-0.138***	-0.150***	-0.096***	-0.119***	-0.149***
Number of observations	40.034			24.873		

**Table: Quantile regressions (cont.)**

	Manaus					
	2000			2010		
	q25	q50	q75	q25	q50	q75
<b>Occupational category; omitted category: managers</b>						
Armed forces occupations	-0.279***	-0.504***	-0.590***	-0.220***	-0.324***	-0.313***
Professionals	-0.029	-0.080**	-0.075	-0.040	-0.076*	-0.075*
Technicians and associate professionals	-0.239***	-0.320***	-0.351***	-0.168***	-0.239***	-0.212***
Clerical support workers	-0.468***	-0.639***	-0.687***	-0.365***	-0.516***	-0.598***
Service and sales workers	-0.632***	-0.812***	-0.881***	-0.413***	-0.557***	-0.633***
Skilled agricultural, forestry and fish	-0.686***	-0.946***	-0.947***	-0.524***	-0.823***	-1.093***
Craft and related trade workers	-0.591***	-0.778***	-0.889***	-0.364***	-0.538***	-0.625***
Plant and machine operators, and assembl	-0.718***	-0.901***	-1.004***	-0.399***	-0.564***	-0.703***
Elementary occupations	-0.489***	-0.632***	-0.663***	-0.520***	-0.720***	-0.866***
<b>Labor market status, omitted category: employee with signed card</b>						
Employee without a signed card	-0.213***	-0.149***	-0.087***	-0.153***	-0.093***	-0.040***
Employer	0.487***	0.684***	0.856***	0.539***	0.725***	0.888***
Self-employed	-0.155***	0.014*	0.161***	-0.150***	-0.010	0.141***
Other	-0.208***	-0.244***	-0.292***	0.181***	0.150***	0.179***

**Table: Quantile regressions (cont.)**

	Manaus					
	2000			2010		
	q25	q50	q75	q25	q50	q75
<b>Sector of activity; omitted category: Agriculture, forestry and fishing</b>						
Mining and quarrying	0.418**	0.443***	0.718***	0.366***	0.441***	0.385***
Manufacturing	0.083	0.055	0.174***	0.095**	0.033	-0.092
Electricity, water and gas	0.215***	0.339***	0.455***	0.227***	0.165***	0.111
Construction	0.104*	0.082***	0.178***	0.100***	0.023	-0.147*
Wholesale and retail trade; repair of motor vehicles	-0.007	-0.019	0.125**	0.007	-0.057	-0.156**
Transportation and storage	0.183***	0.179***	0.349***	0.172***	0.131**	0.031
Accommodation and food service activities	-0.045	-0.090***	0.032	0.012	-0.042	-0.183*
Communication, finance and business activities	0.085**	0.095**	0.218***	0.147***	0.085	-0.045
Public administration and defense	0.397***	0.452***	0.595***	0.363***	0.411***	0.300***
Education, health and social services	0.166***	0.106***	0.160**	0.114**	0.043	-0.120
Other service activities	-0.073	-0.066	0.092*	0.050	0.011	-0.128
<b>_cons</b>	<b>1.108***</b>	<b>1.651***</b>	<b>1.953***</b>	<b>1.137***</b>	<b>1.721***</b>	<b>2.211***</b>
Number of observations	40.034			24.873		

## 5. Conclusions

- The situation in Manaus is very different from both Amazonas and Brazil.
- More work is necessary to understand
  - \* the main determinants of the observed distributional changes,
  - \* and, more specifically, the role of international trade and the free-trade zone.
- Interest of a comparison with São Paulo ?

## 6. Next steps

To use **regression decomposition methods** to understand how the observed distributional changes have occurred, by disentangling :

- the effects of changes in **individuals' characteristics** (such as gender, education, industry sector, ...), **from**
- the effects of changes in **returns** to these components,
- and from **unmeasured characteristics** (residuals)

➡ See DiNardo J., Fortin N., Lemieux T. (1996) and Chernozhukov V., Fernández-Val I., Melly B. (2012).

## References

-DiNardo J., Fortin N., Lemieux T. (1996), "Labor Market Institutions and the Distributions of Wages, 1973-1992: A Semiparametric Approach", *Econometrica*, Vol. 64, N°5, 1001-1044.

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