“Poverty and Inequality Dynamics in Manaus: Legacy of a Free Trade Zone?”

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Université Paris-Dauphine , June 4, 2015.

Within the “Latin American and Caribbean Week in France” program

Plan of presentation

1. Motivation
2. Data and presentation of the FTZM
3. Descriptive statistics
4. Decomposition methodologies and results
5. Conclusions
6. Next steps

1. Motivation

- The FTZM in Brazil corresponds to an interesting case to study the **impact of SEZs on distributional outcomes.**

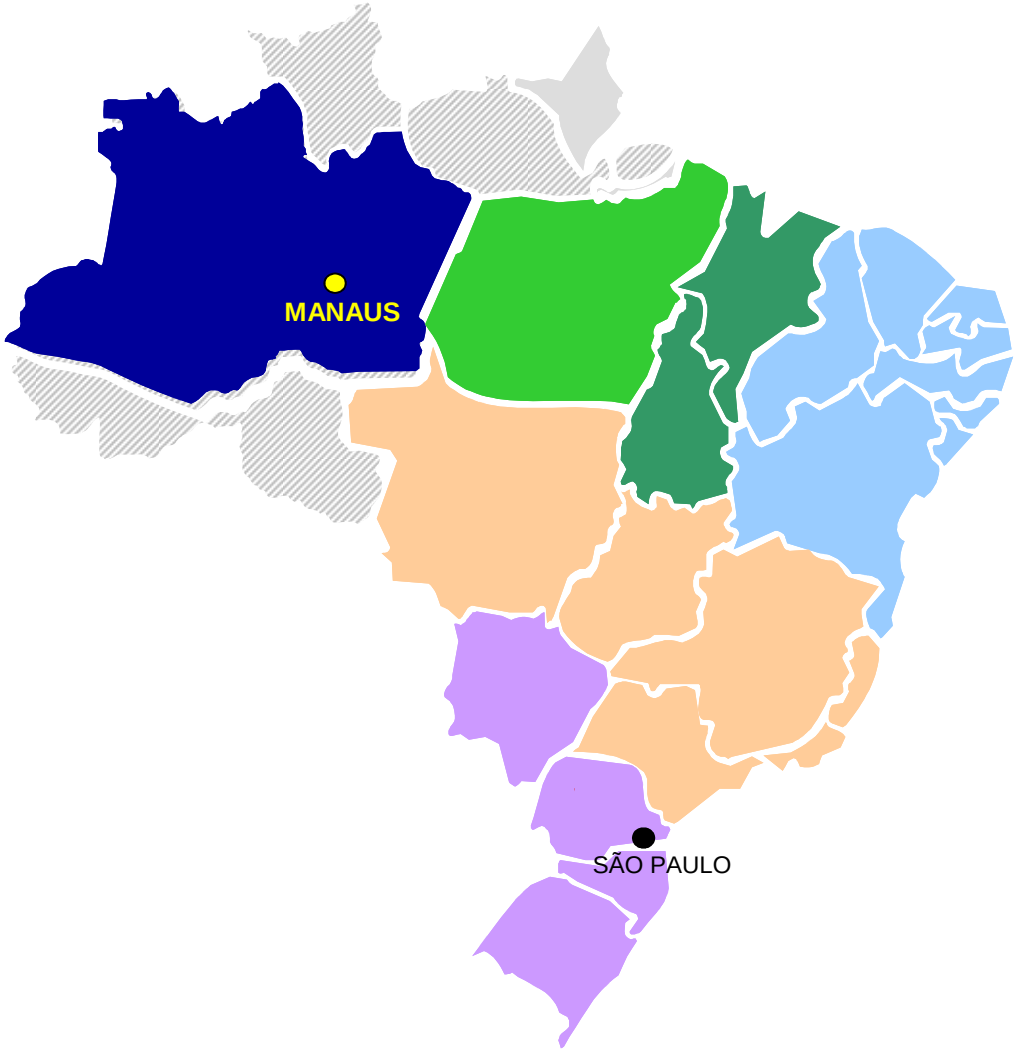
- The creation of the FTZM, in the center of the Amazon Forest, aimed from its origin at contributing to the social and economic development of the **Amazon Region, one of the poor areas of Brazil**.

1. Motivation

- It was also originally created with the aim of **enhancing political integration** of the Amazon Region to the rest of the country.

- The creation of the FTZM led to the development of **an industrial pole in Manaus**, with important effects on the region.

- The 2000-2010 decade is a period of **high growth** for the FTZM with major **employment** creations.



1. Motivation

Our Objective:

➡ To better understand how the good economic performance of the FTZM may have contributed to observed distributional changes in the past decade (2000-2010).

- In terms of poverty? In terms of inequality?
- In the municipality of Manaus? In the rest of the state of Amazonas (RAM) as well?

➡ Thus, we study **the driving forces of changes in income poverty and inequality** through **two micro-decomposition approaches** that have been recently mobilized in the analysis and comparison of poverty and inequality dynamics, in developing and emerging countries, in particular Latin American countries.

- **Our Methods:**

- A Shapley-Shorrocks estimate of the standard Datt-Ravallion (1992) decomposition method : **growth** and **redistribution** components.

- A recently developed decomposition method (Azevedo et al. 2013a and 2013b) to quantify the contributions of changes

  * in **demographics**,
  * in **employment** and
  * in **labor** and **non-labor income**

to the evolution of poverty and inequality indicators.

2. Data

- Data used is from **the publicly released Census samples of 2000 and 2010**.

  ➡ In order to focus on Manaus and remain representative at the municipality level.

- 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.

➡ **Our income variable** : total monthly household per capita income (deflated using INPC deflator).

Some observations are excluded from our sample in order to refine **our income variable.**

To avoid **outliers** and/or extreme **inconsistencies between monetary and non-monetary well-being measures**:

➡ We excluded households in the **top income quintile** and in the **bottom income quintile.**

➡ We excluded households in the **top income quintile** that declare:

- no access to electric light, or
- difficult access to water (thus, no municipal supply or water wells in household), or
- a type of household other than a house, flat or room (thus, improvised, collective, …), or
- no toilet in the household, or
- no more than one asset among the following list: refrigerator, washing machine, phone line, computer, television, car.

Observations with household per capita income **larger than 100.000 R$** were also excluded from the sample.

➡ We excluded households in the **bottom income quintile** that declare:

- having all assets in the previous list or
- a household head with more than 14 years of schooling.

- Overall, about **10% of the sample** is eliminated after all data cleaning procedures (including missing information on any varible used).
- Since we use Census data our final sample sizes are still **very large**:

For Manaus: about 131,000 observations in 2000 (representing about 1,3 million individuals), in 2010, about 77,000 observations (representing about 1,6 million individuals).

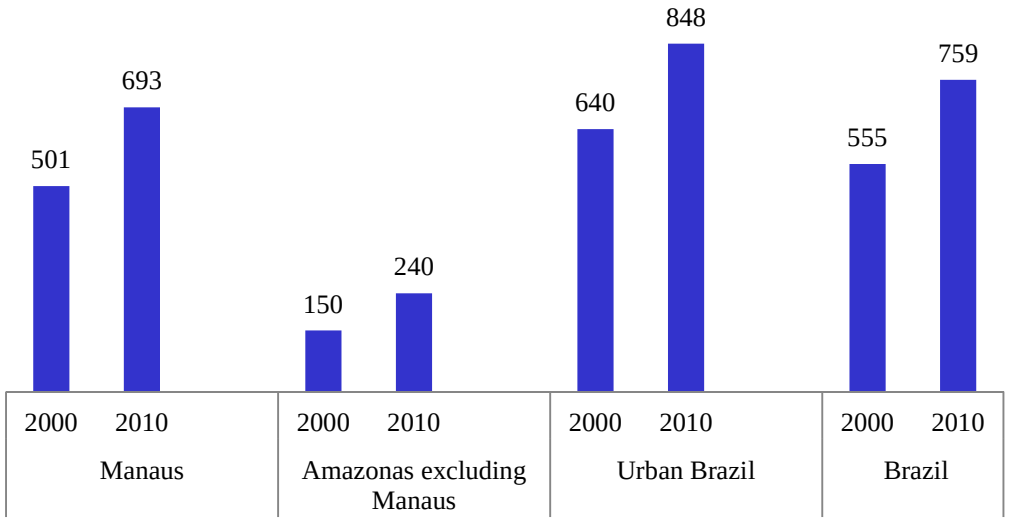
For RAM: about 150,000 observations (representing 1,2 million individuals) in 2000 and about 192,000 observations (representing 1,5 million individuals) in 2010.

For urban Brazil*: about 13,6 million observations (representing about 122,5 million individuals) and about 14,7 million observations (representing 148,4 million individuals).*

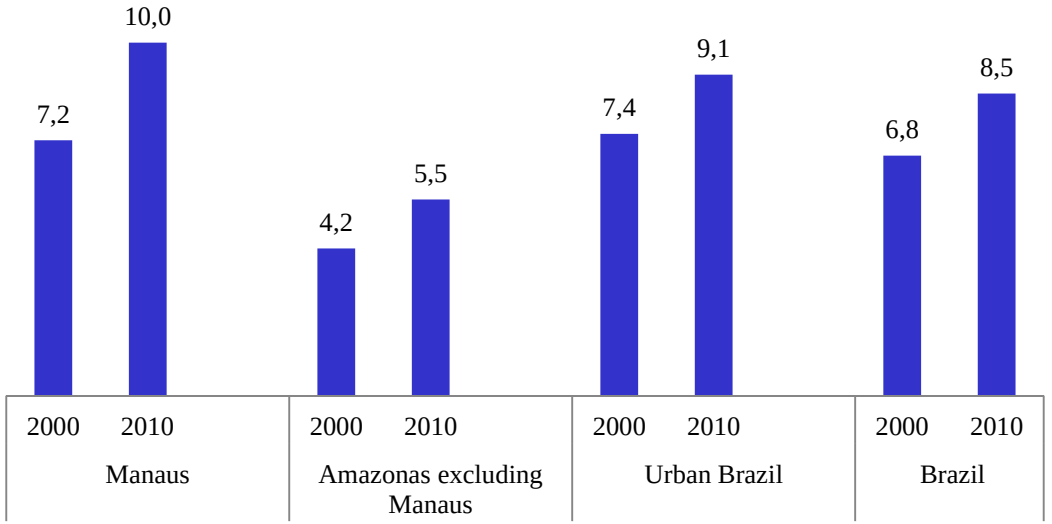
For Brazil*: about 18,1million observations (representing 151,5 million individuals) and about 19,3 million observations (representing around 176,9 million individuals).*

3. Descriptive statistics: mean income & wage levels

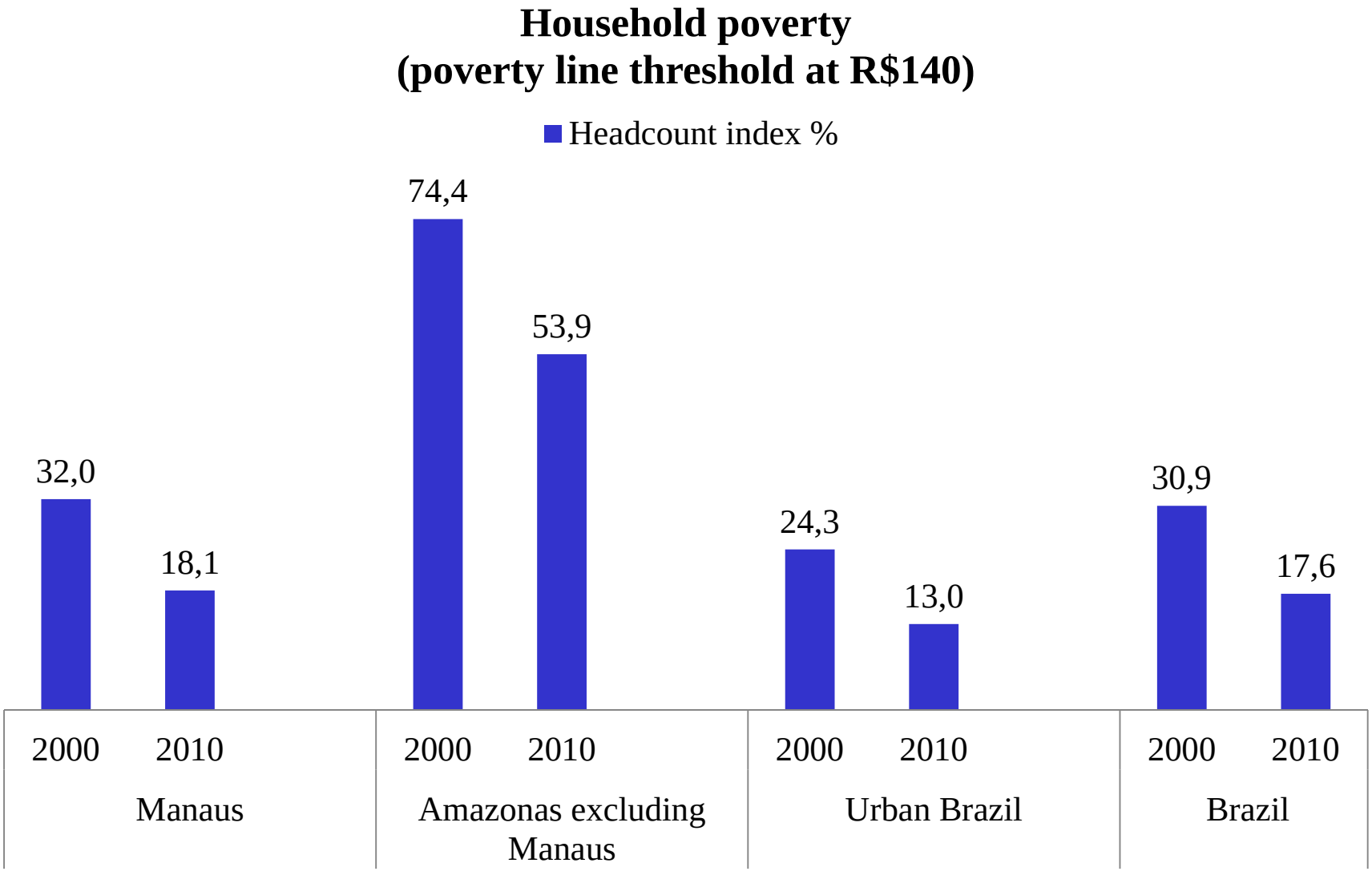
Mean monthly household per capita income



Mean hourly wage



3. Descriptive statistics: poverty levels



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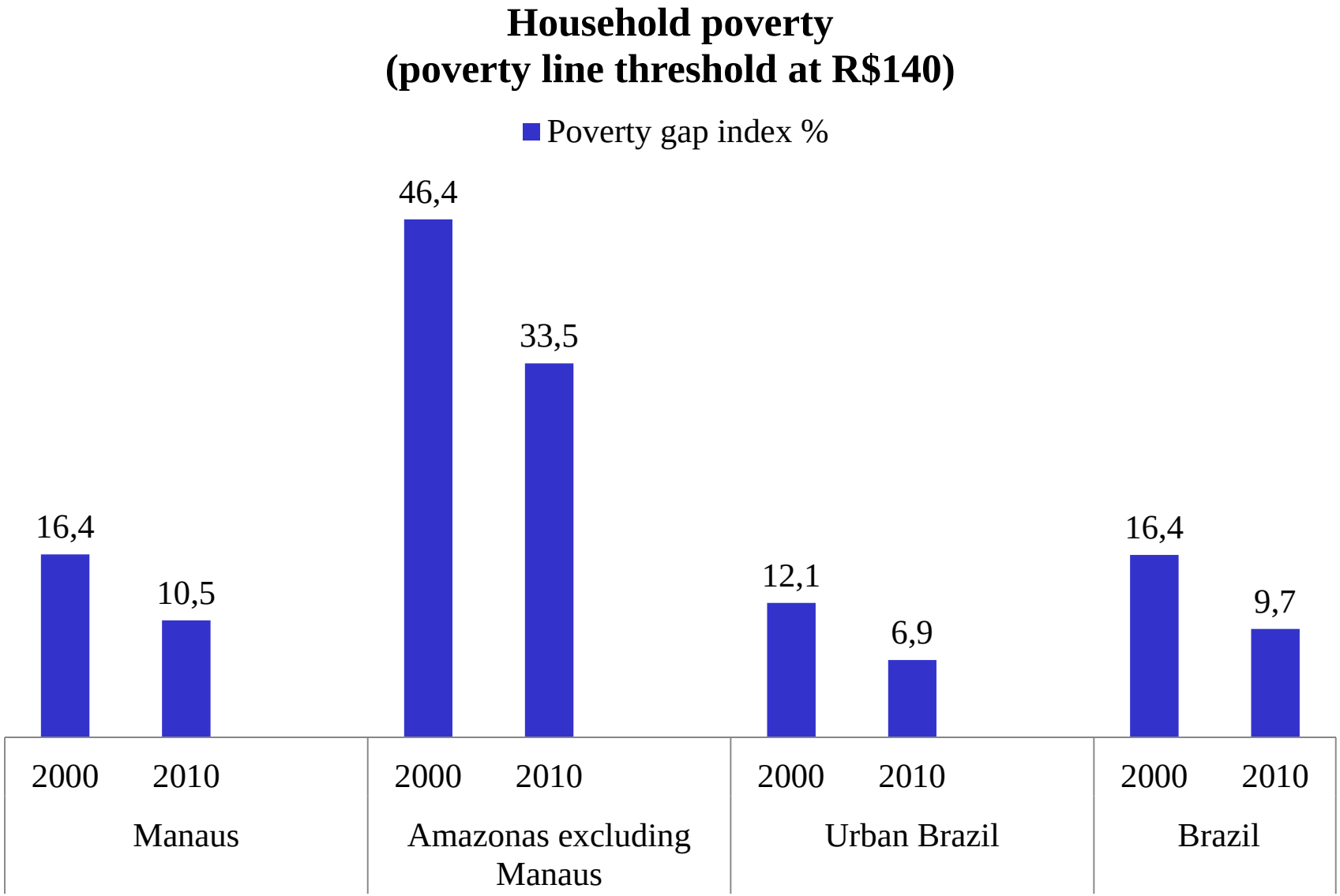
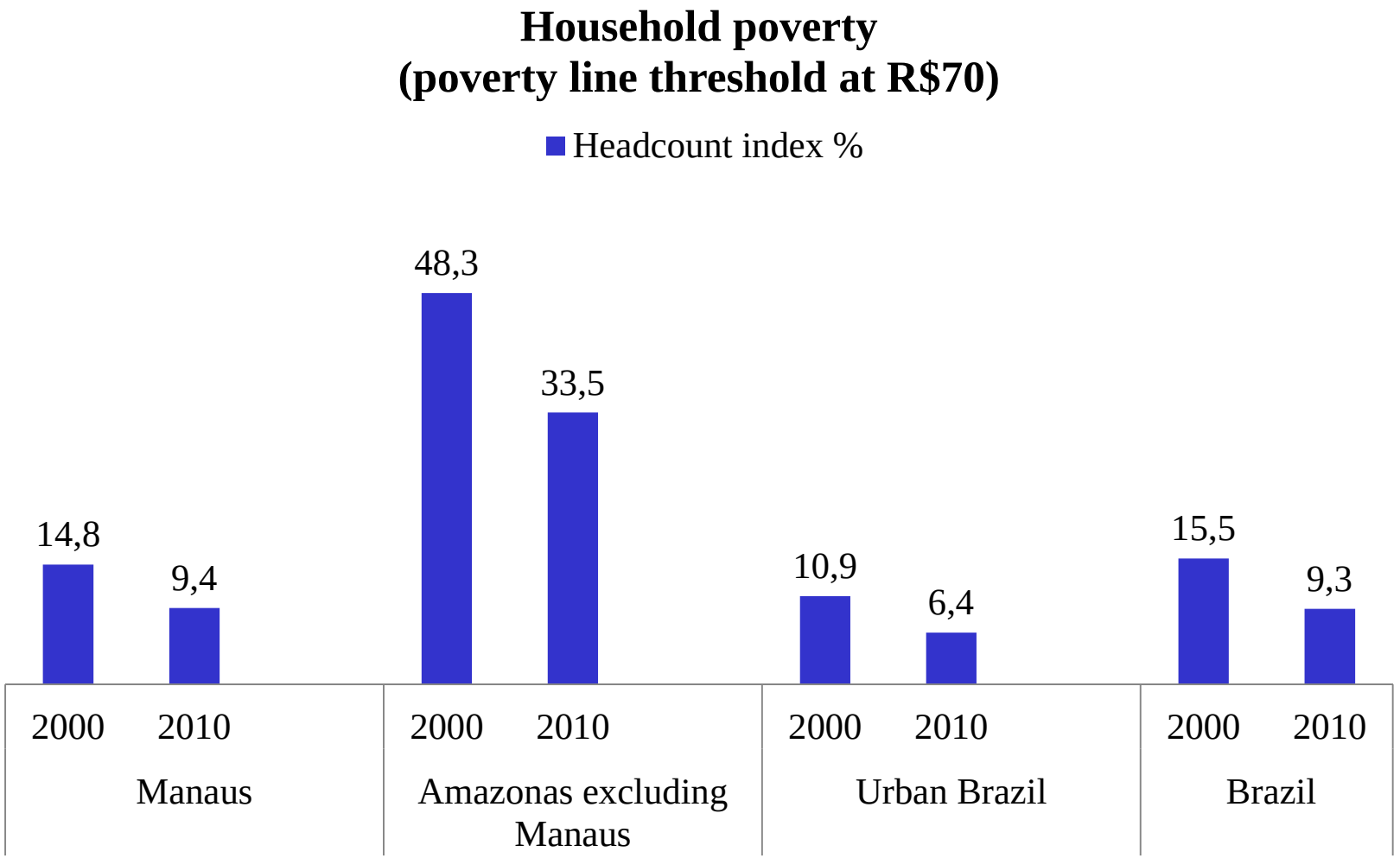
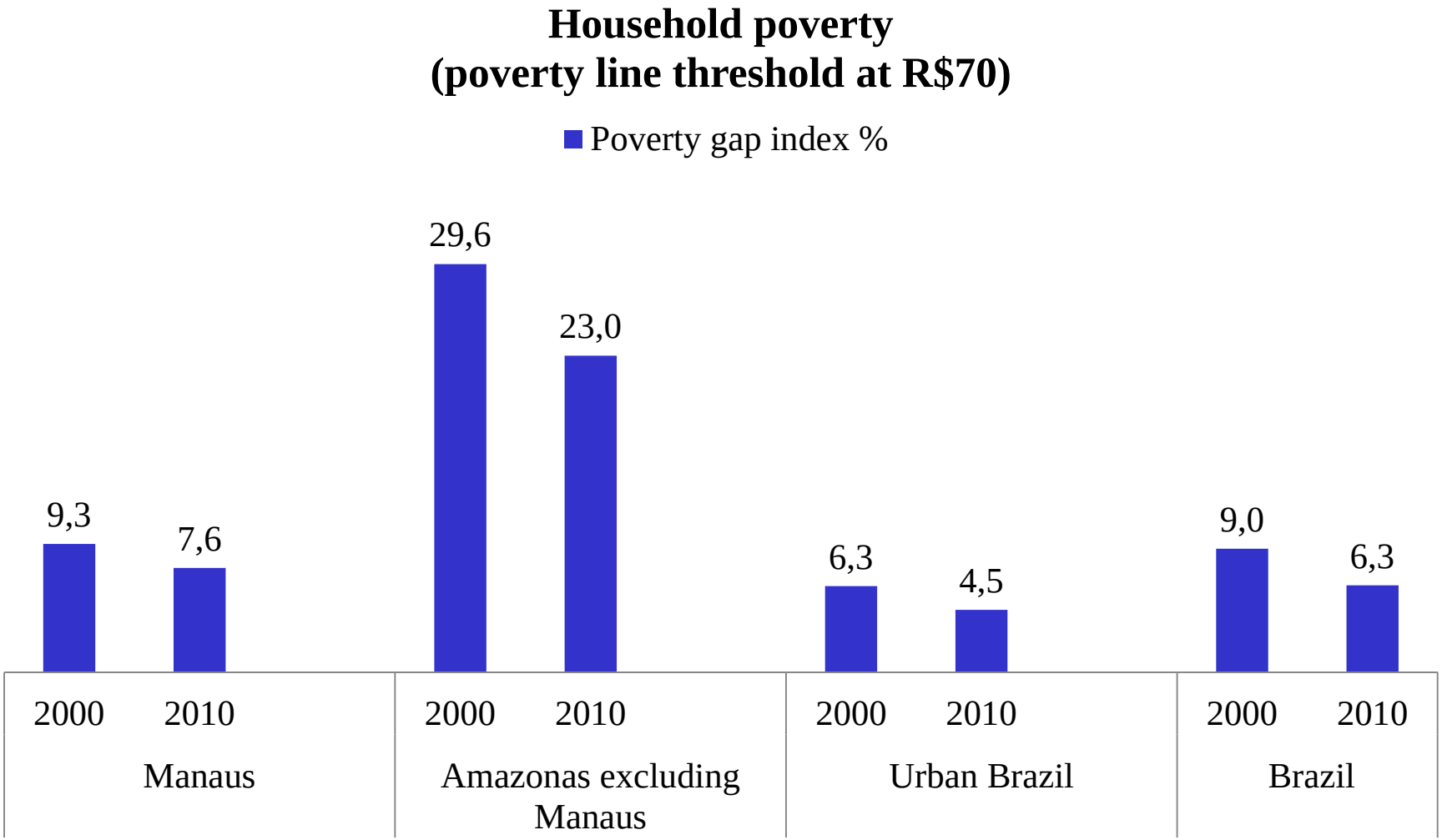


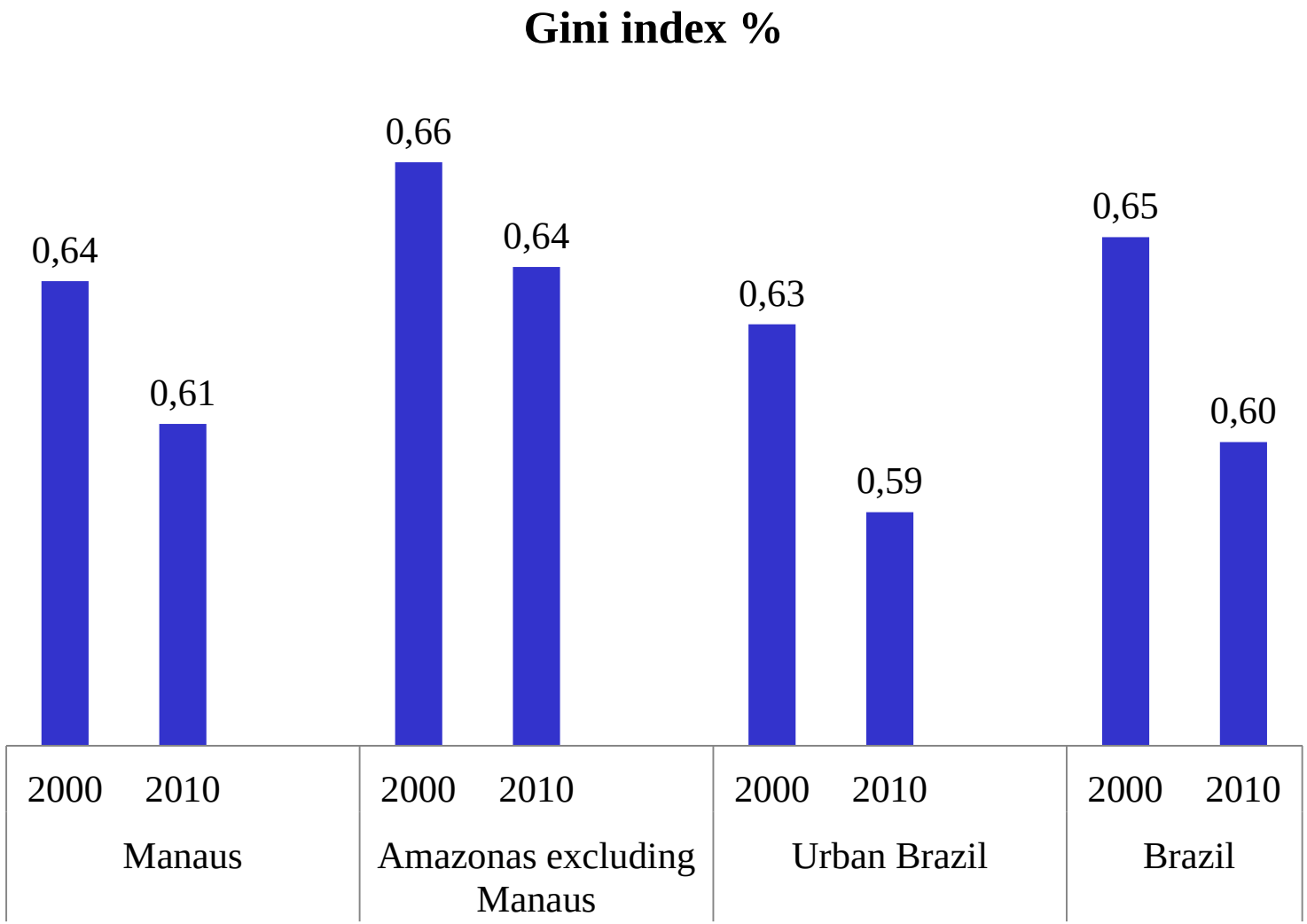
3. Descriptive statistics: poverty levels (cont.)



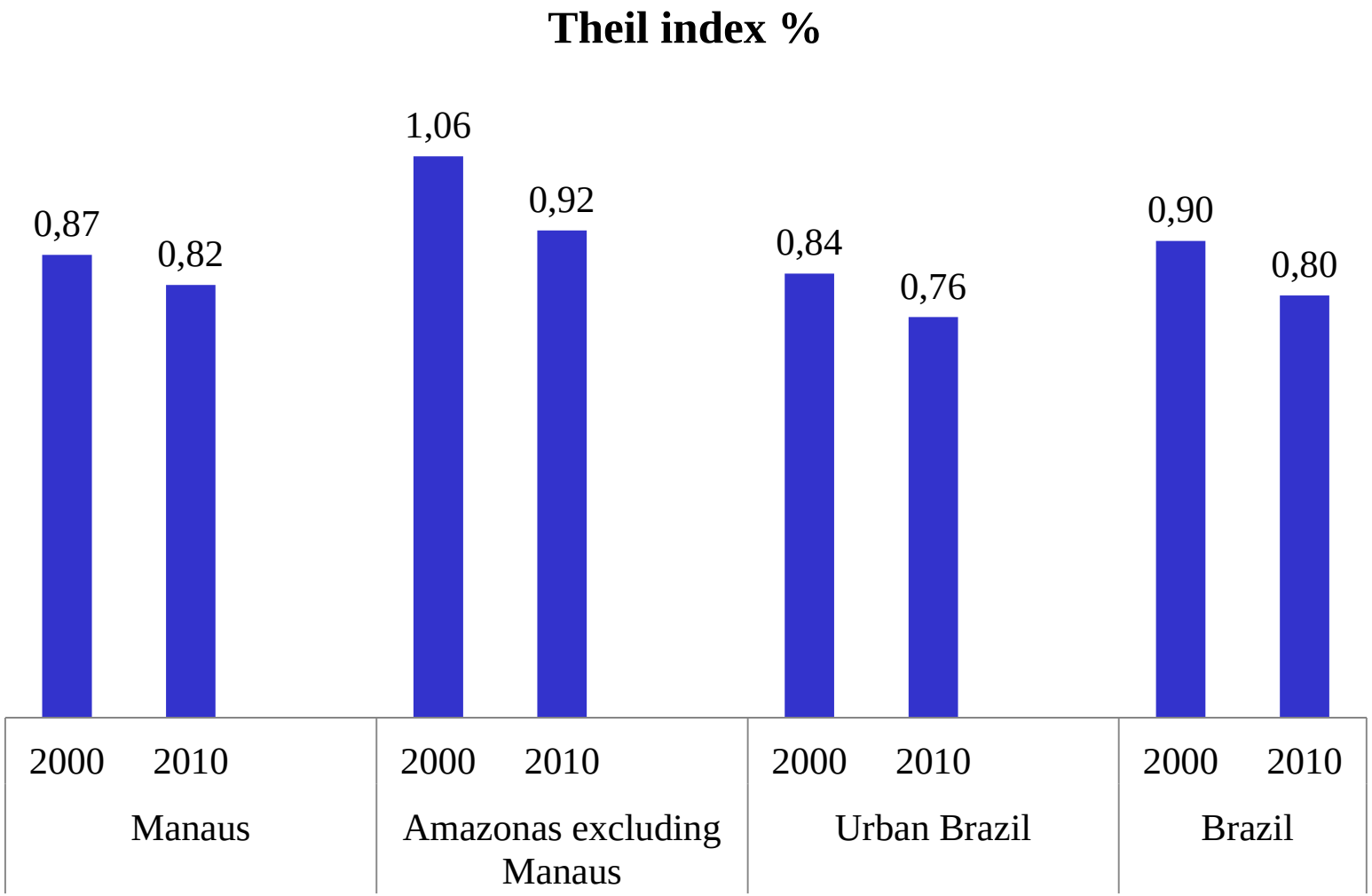
3. Descriptive statistics: poverty levels (cont.)



3.Inequality levels (cont.)



3.Inequality levels (cont.)



In summary:

• **Average household per capita income and hourly wages** have increased everywhere in the past decade.

- **Manaus** experienced a pronounced rise in the last decade (a 38% increase in both mean monthly per capita income and mean hourly wages).
- **For RAM, the situation is different**: although ROA has known high growth of per capita income and hourly wages, levels for both variables are still much lower.

• **Poverty** has decreased everywhere (robust results whatever indicators or threshold).

• Declines of **household income inequality** observed everywhere,

- Reduction less important in **Manaus** than at the national levels (urban and total Brazil).

- It's in the **RAM** that household income inequality is the highest in 2000 as well as in 2010.

In summary:

• To sum up, though poverty and inequality indicators have fallen during the 2000-2010 decade everywhere, income distribution levels and trends are different in Manaus and RAM.

• Manaus generally shows better indicators and is close to the average situation of average Brazil and even sometimes to urban Brazil, while the RAM remains poor and very unequal.

Table. Characteristics of the Total Population

	Manaus		Amazonas excluding Manaus		Urban Brazil		Brazil	
	2000	2010	2000	2010	2000	2010	2000	2010
Total sample population (millions)	1,33	1,59	1,22	1,56	122,50	148,40	151,50	176,90
Urban (% of total)	99,4%	99,5%	51,2%	57,8%	100,0%	100,0%	80,8%	83,9%
Men (% of total)	48,5%	48,0%	51,2%	51,3%	48,1%	47,6%	48,9%	48,3%
Self-declared White/Asian (% of total)	32,3%	27,1%	17,1%	16,1%	55,7%	50,4%	53,4%	48,2%
Average years of schooling	5,2	6,2	2,5	3,8	5,2	6,2	4,7	5,8
Average age	24,4	27,2	20,9	23,4	28,7	31,7	28,2	31,4
Average household size	5,4	5,0	7,3	6,5	4,6	4,1	4,7	4,2
Average number of children in the household	2,0	1,6	3,5	2,8	1,5	1,1	1,7	1,2
Always resident in municipality (%of total)	63,2%	65,8%	83,0%	79,8%	57,2%	56,7%	60,1%	59,0%
Always resident in state (%of total)	73,1%	83,4%	93,1%	95,0%	72,0%	82,0%	74,5%	83,4%
Employed (% of working age population)	49,1%	54,8%	34,3%	38,5%	54,2%	60,2%	52,1%	57,8%

Table. Characteristics of Workers

	Manaus		Amazonas excluding Manaus		Urban Brazil		Brazil	
	2000	**2010**	**2000**	**2010**	**2000**	**2010**	**2000**	**2010**
Men (% of Total)	60,6%	57,4%	72,3%	63,7%	59,9%	56,0%	62,3%	57,5%
Self-declared White/Asian (% of total)	33,2%	27,9%	18,6%	18,5%	57,5%	52,5%	56,1%	51,5%
Formal workers (% of total)	52,8%	60,8%	25,2%	26,4%	57,3%	64,8%	53,5%	61,6%
Average years of schooling	8,1	9,0	4,9	6,7	7,7	8,6	7,1	8,3
Mean hourly wages	7,2	10,0	4,2	5,5	7,4	9,1	6,8	8,5
Women's mean hourly wages	6,4	9,3	4,0	5,5	6,4	8,2	6,1	7,8
Men's mean hourly wages	7,8	10,5	4,2	5,6	8,1	9,8	7,2	9,1
Sector of activity								
Agriculture, forestry, fishing, mining (%)	1,6%	1,2%	38,2%	31,0%	5,8%	5,1%	13,9%	11,5%
Manufacturing (%)	16,5%	17,0%	7,1%	5,7%	14,8%	15,2%	13,7%	14,3%
Construction and utilities (%)	9,3%	9,8%	6,0%	7,4%	9,4%	9,8%	8,7%	9,3%
Wholesale and retail trade (%)	22,2%	21,6%	11,4%	14,1%	20,0%	20,6%	17,9%	18,9%
Transportation and storage (%)	6,6%	6,6%	4,0%	4,5%	5,3%	5,3%	4,8%	4,9%
Communication, finance and business (%)	8,0%	11,3%	2,1%	3,7%	9,6%	10,7%	8,5%	9,6%
Public administration (%)	18,2%	16,8%	20,2%	22,8%	17,4%	17,4%	16,0%	16,3%
Other services (%)	17,6%	15,6%	11,0%	10,8%	17,7%	16,0%	16,5%	15,1%

4. Decomposition methodology and results

Two decomposition methods to study the dynamics of poverty and inequality.

• A Shapley-Shorrocks estimate of the standard Datt-Ravallion (1992) decomposition method : **growth** and **redistribution** components.

• A recently developed decomposition method (Azevedo et al. 2013a and 2013b) in order to gauge **which sources of income or household characteristics have been important contributors to distributional changes**.

➡ Quantify the contributions of changes

* in **demographics**,

* in **employment** and

* in **labor** and **nonlabor income**

to the evolution of poverty and inequality indicators.

Datt and Ravallion (1992) decomposition approach

➡ Splits changes in poverty into the two main mechanisms to reduce it: growth and redistribution components.

$$\Delta P = P(\mu_1, L_1) - P(\mu_0, L_0)$$

$$\textbf{Growth effect} = \Delta\mu = P(\mu_1, L_0) - P(\mu_0, L_0)$$

$$\textbf{Redistribution effect} = \Delta L = P(\mu_0, L_1) - P(\mu_0, L_0)$$

➡ We calculate the "Shapley-Shorrocks" estimate of each component of the Datt-Ravallion decomposition.

Table : Growth-redistribution decomposition (Datt-Ravallion) of household poverty2000-2010

	Manaus	Amazonas excluding Manaus	Urban Brazil	Brazil
Using the R$140 poverty line				
Headcount ratio %				
2000	32,0	74,4	24,3	30,9
2010	18,1	53,9	13,0	17,6
Total change	*-13,8*	*-20,5*	*-11,3*	*-13,3*
Growth	*-8,6*	*-17,4*	*-6,1*	*-7,2*
Redistribution	*-5,2*	*-3,2*	*-5,3*	*-6,1*
Poverty gap index %				
2000	16,4	46,4	12,1	16,4
2010	10,5	33,5	6,9	9,7
Total change	*-5,9*	*-12,9*	*-5,1*	*-6,6*
Growth	*-3,7*	*-11,7*	*-2,6*	*-3,6*
Redistribution	*-2,2*	*-1,2*	*-2,6*	*-3,1*

Source: Authors' calculations using Azevedo's decomposition method, on total household per capita income, in 2010 Brazilian reais.

Using the R$70 poverty line

Headcount ratio %				
2000	14,8	48,3	10,9	15,5
2010	9,4	33,5	6,4	9,3
Total change	*-5,4*	*-14,8*	*-4,5*	*-6,2*
Growth	*-3,0*	*-13,8*	*-2,2*	*-3,1*
Redistribution	*-2,3*	*-1,0*	*-2,3*	*-3,1*
Poverty gap index %				
2000	9,3	29,6	6,3	9,0
2010	7,6	23,0	4,5	6,3
Total change	*-1,8*	*-6,6*	*-1,7*	*-2,7*
Growth	*-1,1*	*-6,7*	*-0,9*	*-1,4*
Redistribution	*-0,7*	*0,1*	*-0,9*	*-1,2*

Source: Authors' calculations using Azevedo's decomposition method, on total household per capita income, in 2010 Brazilian reais.

In summary:

- In **Manaus**, where the reduction in inequality during the decade was less significant, changes in poverty during the same time period are essentially explained by **the growth component**, no matter which poverty indicator or threshold is used (the growth percentage contribution ranging from 56% to 63%).

- In **RAM**, where inequality levels are more persistent and still very high in 2010, the observed reductions in poverty throughout the decade are clearly the result of **distribution-neutral growth**.

- In **Brazil (Urban and Total Populations)**, growth explains a slightly larger part of the observed reduction in poverty; for extreme poverty (less than R$70), growth and redistribution components are found to be rather close to each other.

Azevedo et alii (2013a, 2013b) decomposition technique, based on Barros et alii (2006) :

➡ Quantify the contributions that changes in **demographics**, **employment**, **labor and nonlabor income sources** could have made to observed poverty and inequality changes.

$$y_{pc} = \frac{n_A}{n}\left(\frac{n_E}{n_A}\left(\frac{1}{n_E}\sum_{i=1}^{n} y_i^L\right) + \frac{1}{n_A}\sum_{i=1}^{n} y_i^{NL}\right)$$

y_{pc} : household per capita income
y^L : labor income
y^{NL} : nonlabor income
n : number of household members
n_A : number of adults (from 15 onwards) in the household
n_E : number of employed adults in the household

Table : Descriptive statistics on Azevedo et alii (2013) decomposition elements

	Manaus		Amazonas excluding Manaus	
	2000	2010	2000	2010
Total population:				
Mean monthly household per capita income	501	693	150	240
Mean hourly wage	7,2	10,0	4,2	5,5
Number of hours worked	45,5	39,5	40,7	36,4
Share of adults per household	0,66	0,70	0,54	0,60
Share of occupied adults per household	0,48	0,53	0,34	0,38
Population under poverty line threshold at R$70:				
Number of hours worked	46,4	30,6	38,6	33,2
Share of adults per household	0,53	0,64	0,47	0,53
Share of occupied adults per household	0,18	0,06	0,21	0,12
Population under poverty line threshold at R$140:				
Number of hours worked	47,4	37,0	39,6	34,2
Share of adults per household	0,55	0,59	0,50	0,54
Share of occupied adults per household	0,31	0,21	0,28	0,23

Note: Data for Manaus correspond to the municipality of Manaus. Data for Amazonas correspond to the

Source: Brazilian 2000 and 2010 census data.

Table : Descriptive statistics on Azevedo et alii (2013) decomposition elements

	Urban Brazil		Brazil	
	2000	2010	2000	2010
Total population:				
Mean monthly household per capita income	640	848	555	759
Mean hourly wage	7,4	9,1	6,8	8,5
Number of hours worked	43,7	40,2	43,3	39,7
Share of adults per household	0,71	0,76	0,70	0,75
Share of occupied adults per household	0,52	0,57	0,50	0,55
Population under poverty line threshold at R$70:				
Number of hours worked	41,5	32,9	39,3	32,1
Share of adults per household	0,56	0,65	0,54	0,63
Share of occupied adults per household	0,23	0,11	0,25	0,13
Population under poverty line threshold at R$140:				
Number of hours worked	43,5	36,6	41,5	34,6
Share of adults per household	0,58	0,61	0,57	0,61
Share of occupied adults per household	0,34	0,26	0,34	0,26

Note: Data for Manaus correspond to the municipality of Manaus. Data for Amazonas correspond to the

Source: Brazilian 2000 and 2010 census data.

In summary:

- The **average number of hours** worked **decreased everywhere** (in Manaus, RAM, Urban and Total Brazil) and for **the whole population** as well as for the **poor households**.

- The **share of adults per household** has **increased everywhere** (demographic transition).

➡ However it is **lower in Manaus and in RAM** than in Brazil and in the **poorest households or when including rural areas.**

- The **share of occupied adults per household** increased **everywhere** for the whole population and in all areas considered.

➡ However **reversing trends appear when only the poor or the extreme poor are taken into account** .

➡ In terms of levels, the situation in Manaus is not far from the Brazilian average while in the RAM, the share of occupied adults in the household is much smaller.

➡ Poverty has decreased but evidence of poverty traps due to employability ?

Table: Factor contributions to reduction of poverty

	Manaus		Amazonas excluding Manaus		Urban Brazil		Brazil	
	Headcount %	Poverty gap %	Headcount %	Poverty gap %	Headcount %	Poverty gap %	Headcount %	Poverty gap %
Poverty line threshold at R$140								
2000	32,0	16,4	74,4	46,4	24,3	12,1	30,9	16,4
2010	18,1	10,5	53,9	33,5	13,0	6,9	17,6	9,7
Total change	*-13,8*	*-5,9*	*-20,5*	*-12,9*	*-11,3*	*-5,1*	*-13,3*	*-6,6*
Share of adults per household	14,6	10,8	21,0	19,4	14,4	10,1	15,9	13,6
Share of occupied adults per hh	15,9	5,4	21,7	12,2	13,9	3,2	13,6	3,0
Labor income	43,6	42,9	25,8	14,3	34,8	28,6	31,6	22,0
Non labor income	**25,9**	40,9	31,4	54,2	36,9	58,1	38,9	61,5
Total change	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*

Source: Authors' calculations using Azevedo's decomposition method, on total household per capita income, in 2010 Brazilian reais.

Table: Factor contributions to reduction of extreme poverty

	Manaus		Amazonas excluding Manaus		Urban Brazil		Brazil	
	Headcount %	Poverty gap %	Headcount %	Poverty gap %	Headcount %	Poverty gap %	Headcount %	Poverty gap %
Poverty line threshold at R$70								
2000	14,8	9,3	48,3	29,6	10,9	6,3	15,5	9,0
2010	9,4	7,6	33,5	23,0	6,4	4,5	9,3	6,3
Total change	*-5,4*	*-1,7*	*-14,8*	*-6,6*	*-4,5*	*-1,7*	*-6,2*	*-2,7*
Share of adults per household +	8,5	1,9	21,3	16,5	9,2	1,7	13,9	10,3
Share of occupied adults per house + −	1,7	-27,3	15,5	-8,7	0,6	-26,6	2,8	-23,3
Labor income + −	49,6	19,6	17,8	-14,0	29,1	-7,1	22,3	-15,3
Non labor income +	40,2	105,8	45,4	106,3	61,1	132,0	61,0	128,4
Total change	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*

Source: Authors' calculations using Azevedo's decomposition method, on total household per capita income, in 2010 Brazilian reais.

Table: Factor contributions to reductions of inequality

	Manaus		Amazonas excluding Manaus		Urban Brazil		Brazil	
	Gini %	Theil %	Gini %	Theil %	Gini %	Theil %	Gini %	Theil %
Inequality								
2000	0,64	0,87	0,66	1,06	0,63	0,84	0,65	0,90
2010	0,61	0,82	0,64	0,92	0,59	0,76	0,60	0,80
Total change	*-0,03*	*-0,06*	*-0,02*	*-0,14*	*-0,04*	*-0,08*	*-0,04*	*-0,10*
Share of adults per household	16,7	35,3	14,3	27,9	7,7	20,0	9,3	18,9
Share of occupied adults per hh	6,7	11,8	-52,4	-57,1	-5,1	-9,6	-7,0	-14,6
Labor income	86,7	126,5	4,8	15,0	82,1	80,7	69,8	65,2
Non labor income	-13,3	-73,5	133,3	114,3	15,4	8,9	25,6	30,5
Total change	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*	*100,0*

Source: Authors' calculations using Azevedo's decomposition method, on total household per capita income, in 2010 Brazilian reais.

In summary: results on poverty decompositions

- **Demographic transition (changes in share of adults in HH)** always contributes to a decline in poverty and inequality throughout the decade.

- **Mixed results** for the role of the **share of occupied adults** per household.

➡ *It seems to play a negative role for poverty reduction among the poorest of the poor. Note that descriptive statistics show a fall of this share among the poor.*

In summary: results on poverty decompositions (cont.)

- **Labor income** always contributes to poverty and inequality reduction.
  - only exception is when looking at extreme poverty with the poverty gap in RAM (and Urban and Total Brazil).

➡ *The extremely poor seem to benefit less from the good performance of the labor market….*

- Changes in **nonlabor income** during the decade 2000 – 2010 always lead to a reduction in poverty.
  - for inequality too, except in the case of Manaus.

5. Conclusions

From 2000 to 2010, Manaus, RAM and Brazil have become **richer on average, and less poor**.

Among the possible contributors to these poverty reductions, **labor income** seems to play a much more important role in **Manaus** (as opposed to nonlabor income), compared with RAM and Brazil

➡ The good economic performance of the FTZM might be, at least in part, behind this result.

5. Conclusions

However, since in RAM **poverty is still very high** (and the role of labor income in its reduction less important):

➡ Did the FTZM have weak positive effects on the rest of the region

or

➡ Would the situation have been worse without the FTZM ?

Note that the contribution of nonlabor income to poverty reduction is smaller in the RAM than in Brazil →

➡ Could this be evidence of targeting problems of social transfers in the region?

➡ Some evidence of the need of programs encouraging employability of the poorest of the poor?

6. Next steps

More work is necessary to understand the influence of labor income.

➡ Next step is to use **regression decomposition methods (RIF)** to better understand the role of labor income in the municipality of Manaus.

6. Next steps

Obrigadas !