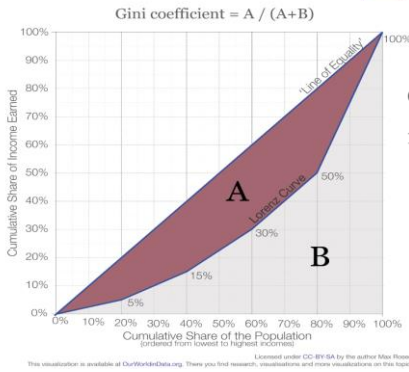# *7.2 How about Pure Inequality?: Ginis and Lorenz - World and Brazil

Marcelo Neri
FGV Social

2

Gini Index and Lorenz Curve

Graph from the Lorenz Curve L(P)

Visual Explanation of the Gini Coefficient

Gini coefficient = A / (A+B)

Analytical Interpretation

Once there are $\dfrac{N(N-1)}{2}$ distinct pairs of people in the sample, Gini's formula is:

$$\gamma = \frac{1}{\mu N(N-1)} \sum_{i>j}^{N} \sum_{j}^{N} |x_i - x_j|$$
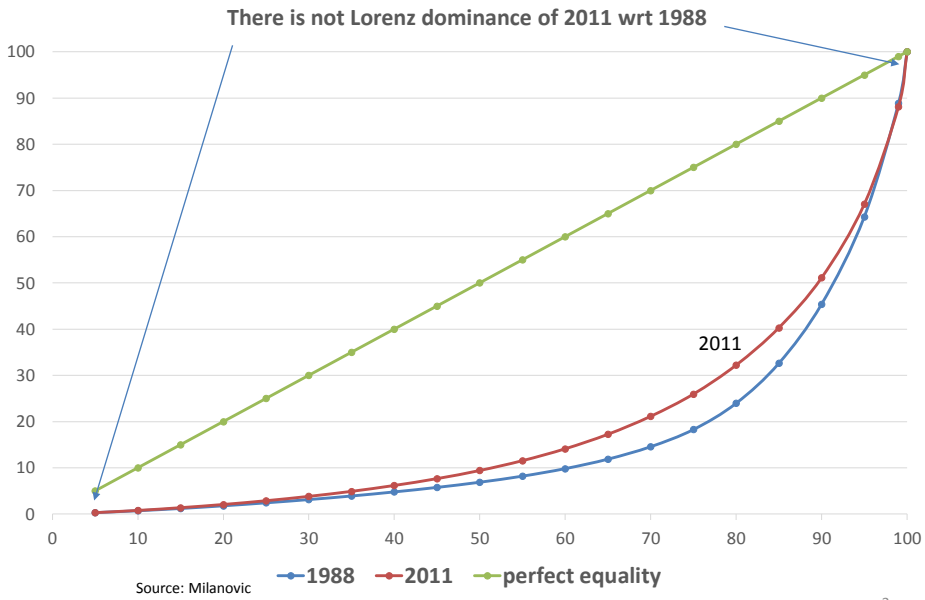
Alternative Formula

$$\gamma = \frac{N+1}{N-1} - \frac{2}{N(N-1)\mu} \sum_{i=1}^{N} \rho_i \, x_i$$

Aggregated Level Analysis of Welfare Function (BES) based on the Gini (δ)
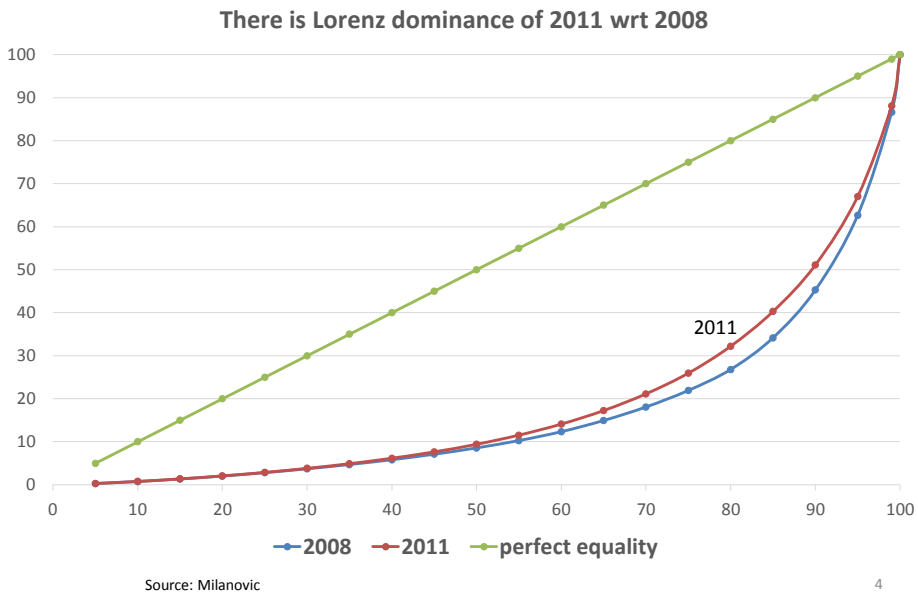
Sen (1976): $\mu(1 - \delta)$

Graff (1981): $\mu(1 - \delta)^\rho$, where $\rho \in [0, 1]$.

2
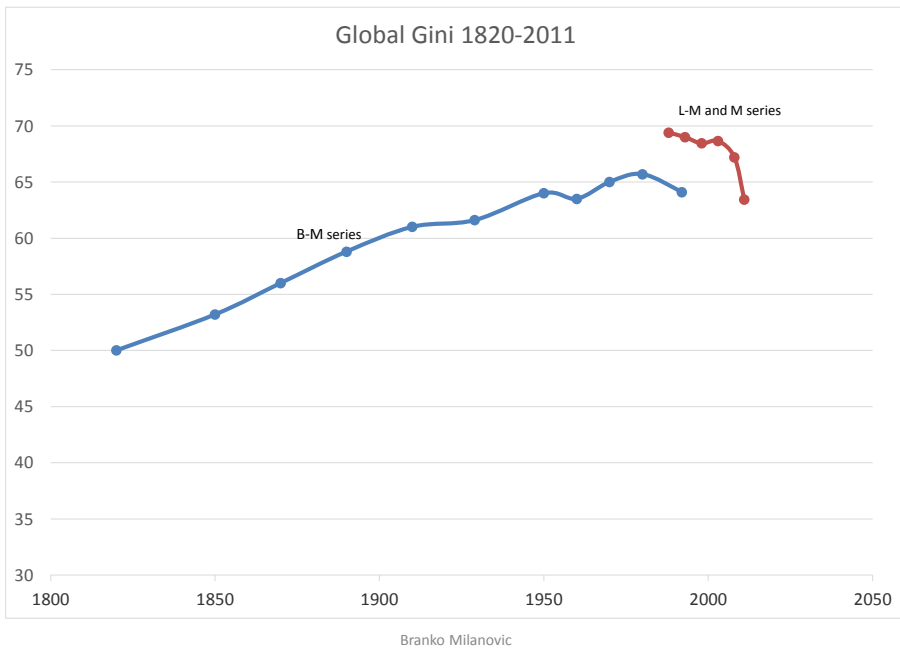
1

Lorenz curves 1988 and 2011 - Global

There is not Lorenz dominance of 2011 wrt 1988

Source: Milanovic

Lorenz curves 2008 and 2011 - Global

There is Lorenz dominance of 2011 wrt 2008

Source: Milanovic

Generalized Lorenz curves 1988 and 2008 - Global

There is generalized Lorenz dominance of 2008 wrt 1988

Generalized Lorenz Curve $L(\mu, P) = \mu\, L(P)$

2008

1988

Average cumulative per capita income

Cumulative percentage of people

Source: Milanovic

5

Global Gini 1820-2011

L-M and M series

B-M series

Branko Milanovic
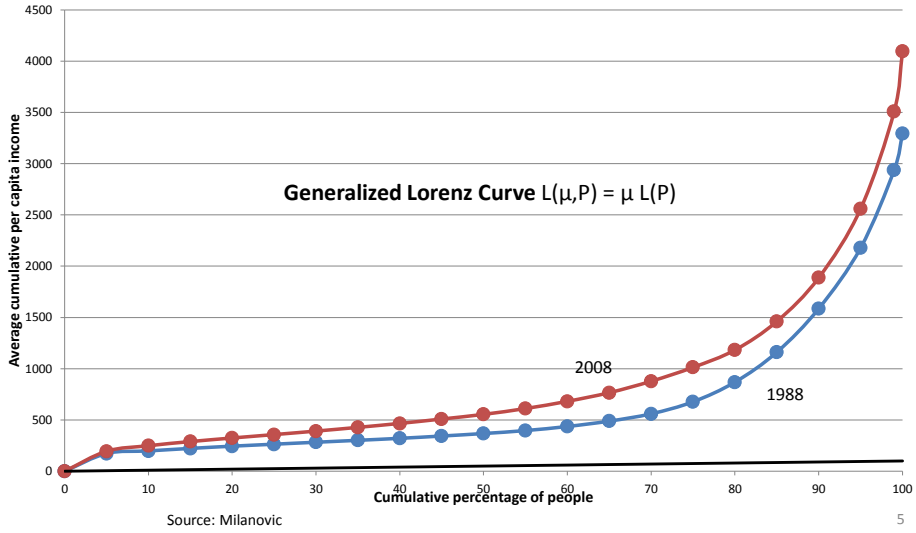
Evolution of World Income Inequality
Different Concepts

China Effect   ChIndia Effect

Overall Inequality

Inequality Across Nations – Weighted by Population

Inequality Across Nations - Unweighted

Gini Coefficient

year
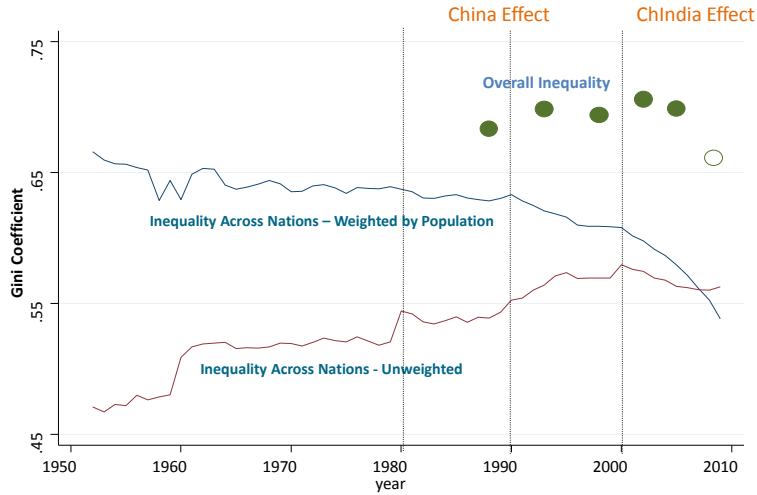
Source: Milanovic (2011)

Brazil is a small World

Brazilian Per capita GDP PPP has grown 3.5% agains 3.6% of the world between 2002 e 2012

China Effect   ChIndia Effect

Inequality Across Nations

Gini Coefficient

0.535
0.581
0.589
0.607
0.594
0.539
0.5144
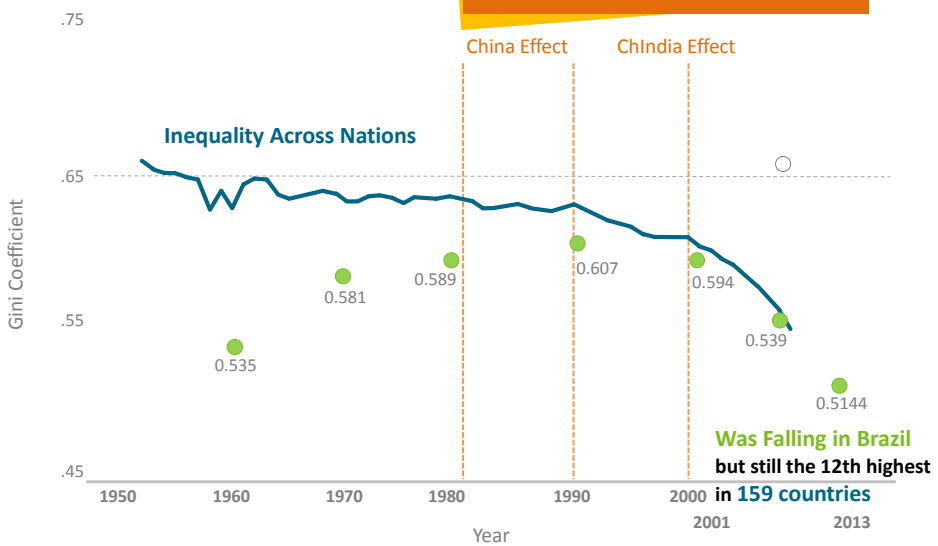
Was Falling in Brazil
but still the 12th highest
in 159 countries

1950   1960   1970   1980   1990   2000   2001   2013

Year

Source: Milanovic (2011) and Neri (2011)
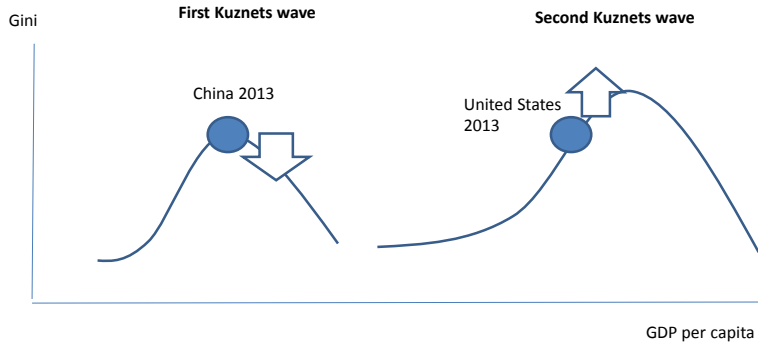
Kuznets relationship for the United States, 1774-2013
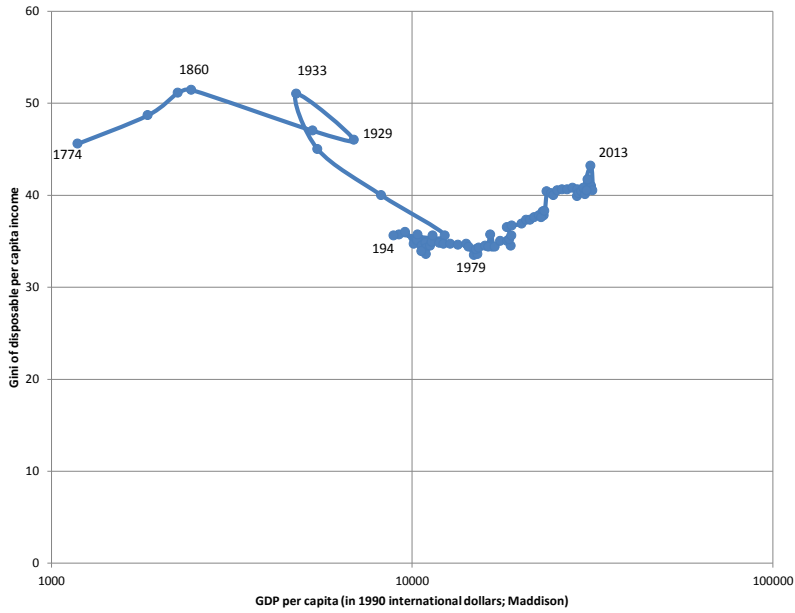
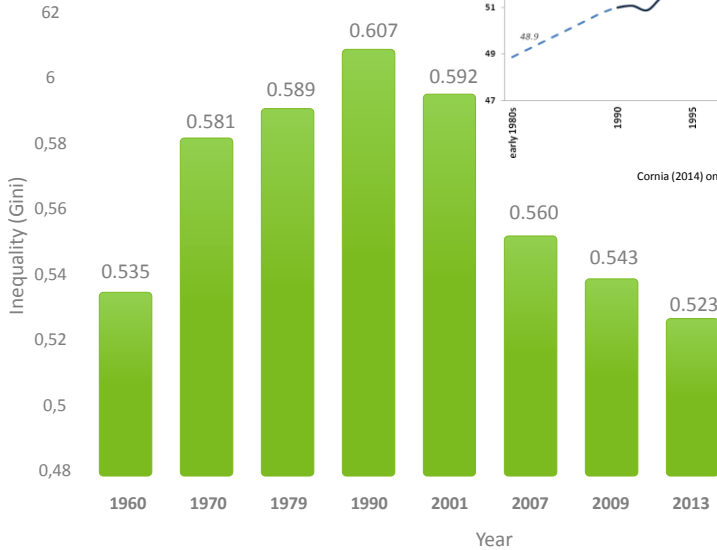**Urban Gini in China: 1981-2014 (based on official household surveys)**
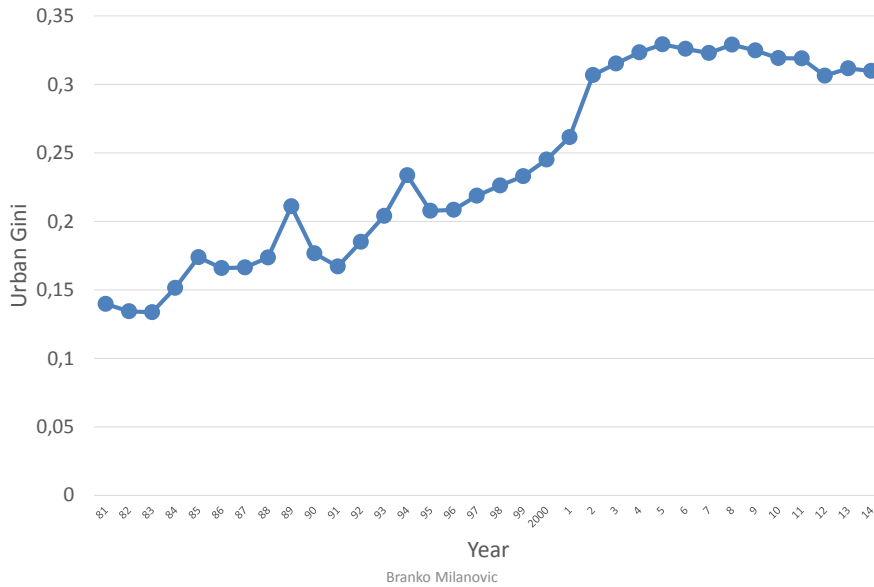
Branko Milanovic

Where are now China and the US?

Gini   **First Kuznets wave**   **Second Kuznets wave**

China 2013   United States 2013

GDP per capita

Long Run & Regional Perspective

Latin America Latina last 3 Decades

Inequality of Per Capita Income (Gini)

- 1960: 0.535
- 1970: 0.581
- 1979: 0.589
- 1990: 0.607
- 2001: 0.592
- 2007: 0.560
- 2009: 0.543
- 2013: 0.523

Year

Inequality (Gini)

48.9 — 51.1 — 54.1 — 50.5 — 48.6

early 1980s, 1990, 1995, 2000, 2005, 2010

Cornia (2014) on CEDLAS & CEPAL
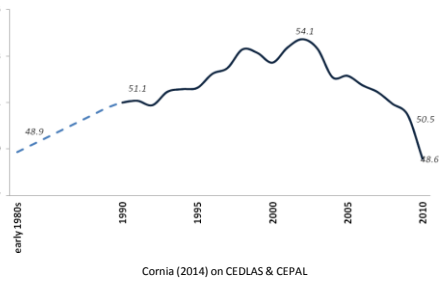
Kuznets curves or Kuznets Waves? Milanovic (2016)

Source: CPS;FGV from PNAD, PME and Census / IBGE microdata and Langoni (1973)

BRAZIL GINI HOUSEHOLD PER CAPITA INCOME – ALL SOURCES
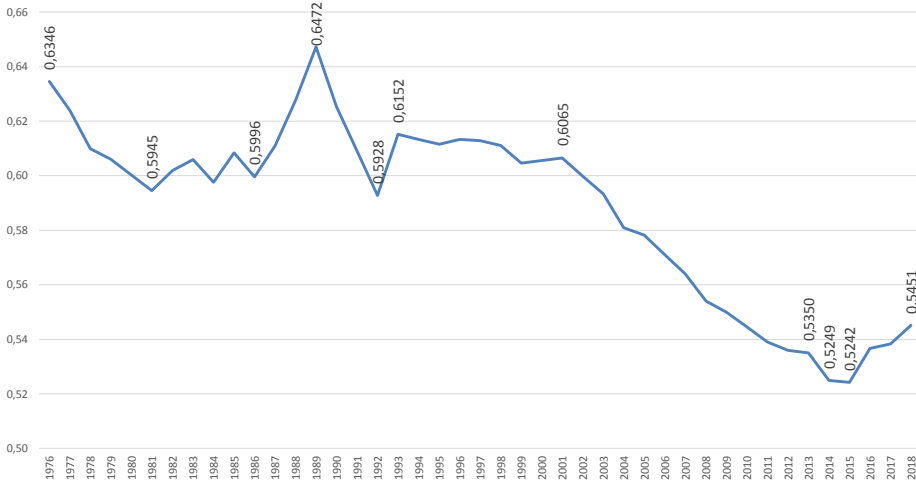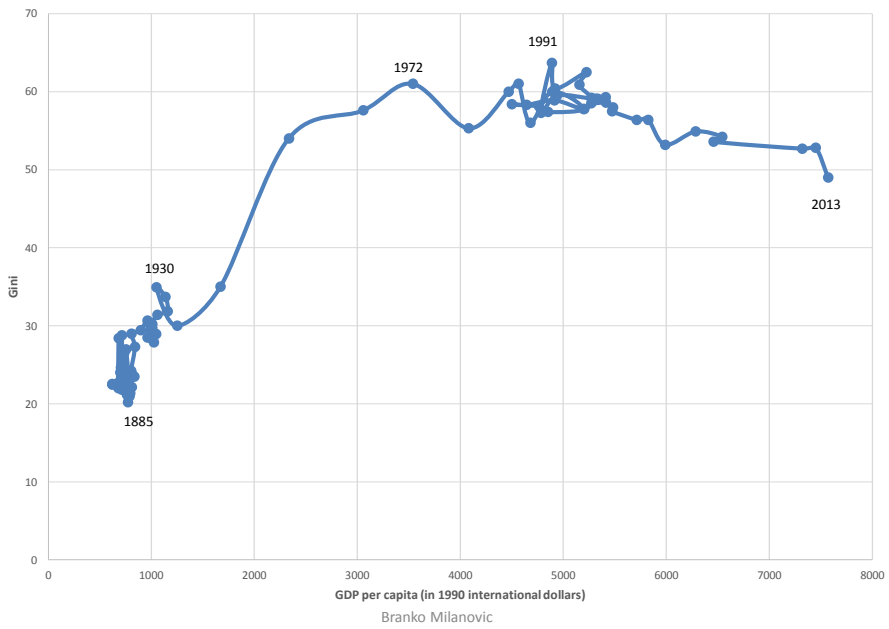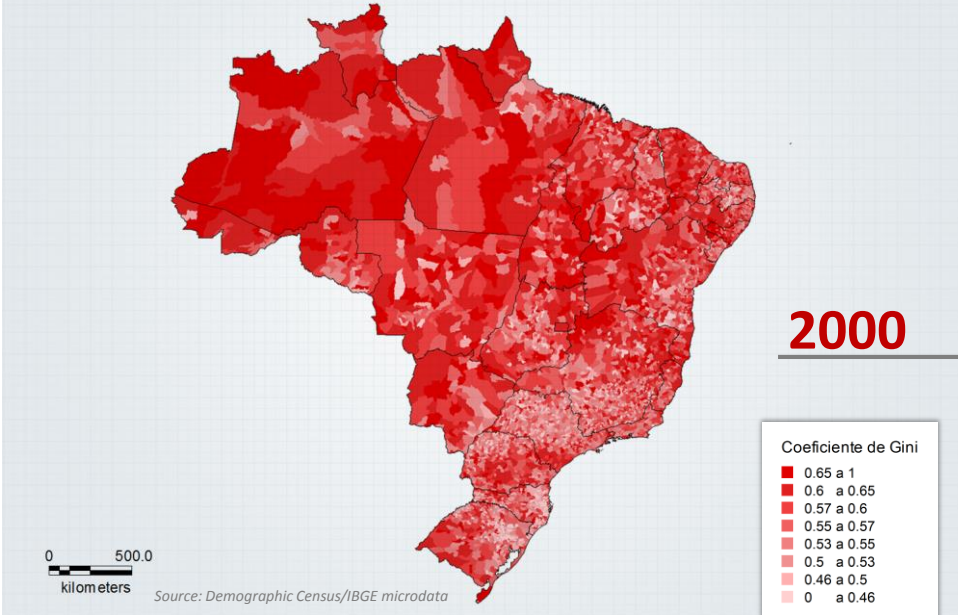

Source FGV Social from PNAD and PNADC/IBGE microdata – Harmonized PNAD 2004-2015 guided

The Kuznets relationship for Brazil, 1839-2013

Branko Milanovic

Inequality by Municipalities

Gini Index of Per Capita Income by Municipality - 2000

2000

Coeficiente de Gini
- 0.65 a 1
- 0.6 a 0.65
- 0.57 a 0.6
- 0.55 a 0.57
- 0.53 a 0.55
- 0.5 a 0.53
- 0.46 a 0.5
- 0 a 0.46

0   500.0
kilometers   *Source: Demographic Census/IBGE microdata*

Inequality by Municipalities

Gini Index of Per Capita Income by Municipality - 2000

Inequality fell in 83% of Latin America countries and 40% of World Countries

Inequality fell in 80% of the 5500 Brazilian Municipalities

2010

Coeficiente de Gini
- 0.65 a 1
- 0.6 a 0.65
- 0.57 a 0.6
- 0.55 a 0.57
- 0.53 a 0.55
- 0.5 a 0.53
- 0.46 a 0.5
- 0 a 0.46

0   500.0
kilometers   *Source: Demographic Census/IBGE microdata*
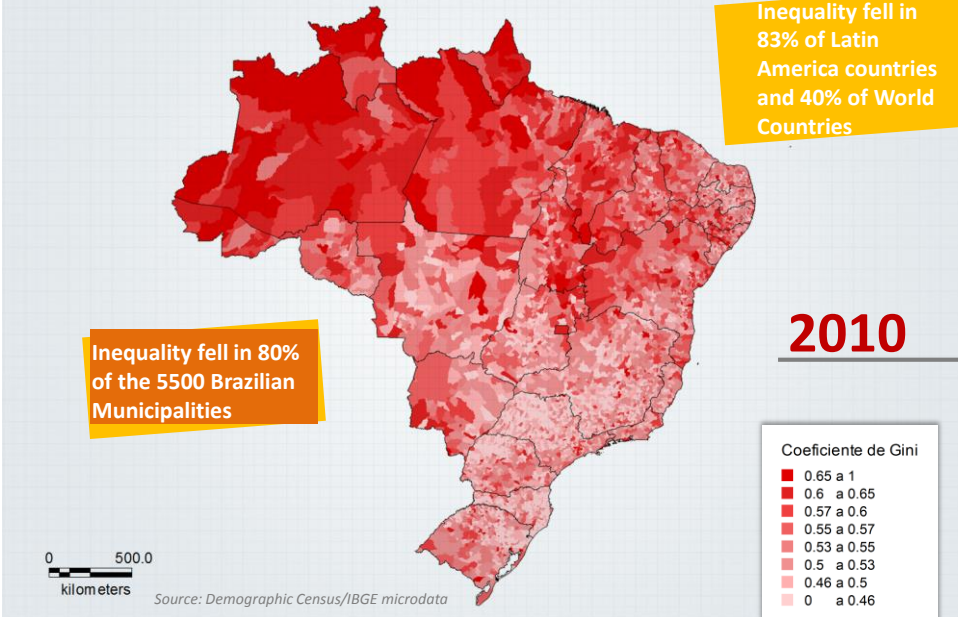
Inequality in Latin America

Figure 1: Gini coefficient - Latin

Figure 1: Gini coefficient - Latin America

Source: Own calculation based on SEDLAC (CEDLAS and The World
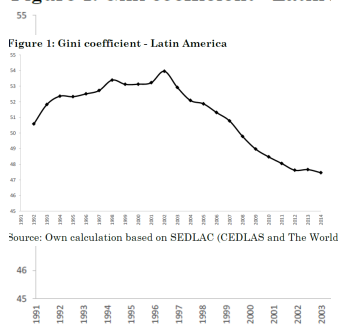
Source: Own calculation based on SE

Table 1: Annual changes in Gini coefficient

	1992-2002	2002-2010	2010-2014
Argentina	0.8	-1.1	-0.5
Bolivia	0.6	-1.5	0.1
Brazil	0.1	-0.7	-0.4
Chile	0.0	-0.4	-0.2
Colombia	0.6	-0.3	-0.5
Costa Rica	0.5	0.0	0.1
Ecuador	0.0	-0.8	-0.9
El Salvador	-0.1	-0.9	-0.7
Honduras	0.6	-0.5	0.4
Mexico	-0.3	-0.5	0.4
Panama	0.1	-0.6	-0.1
Paraguay	0.5	-0.7	0.0
Peru	0.4	-1.0	-0.5
Uruguay	0.6	-0.1	-0.9
Venezuela	0.6	-1.1	0.0
Southern South America	0.4	-0.6	-0.4
Andean region	0.4	-1.0	-0.4
Central America	0.2	-0.5	0.0
Latin America	0.3	-0.7	-0.3

Source: Own calculation based on SEDLAC (CEDLA