

# \*Global Social Indicators \*1: HDI, IHDI, PHDI

## Human Development Index (HDI)

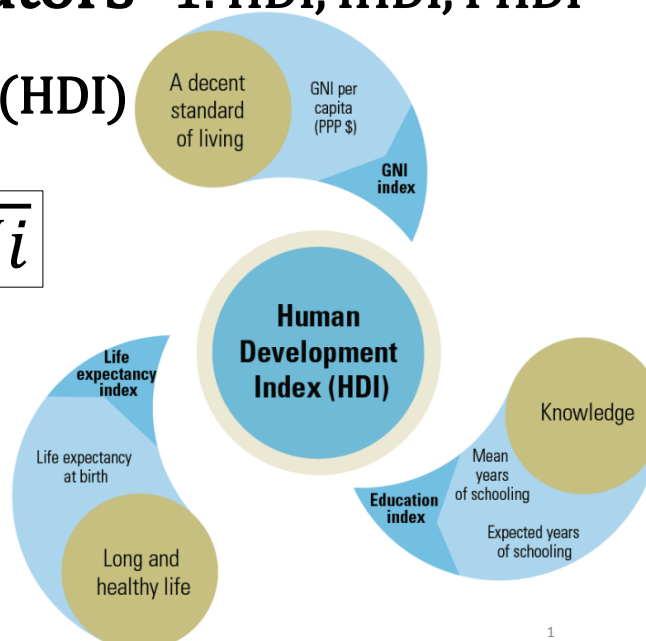
$$HDI = \sqrt[3]{I_h \times I_e \times I_i}$$

Where:

$I_h$  = health index;

$I_e$  = education index;

$I_i$  = income index



Source: Training Material for Producing National Human Development Reports, UNDP Human Development Report Office (2015); Image: <http://hdr.undp.org/en/humandev>

## Dimensions Index Calculation

Dimension	Indicator	Minimum	Maximum
Health	Life expectancy (years)	20	85
Education	Expected years of schooling	0	18
	Mean years of schooling	0	15
Standard of living	Gross national income per capita (PPP 2011 \$)	100	75,000

<- based on Deaton and  
Kahneman

### Equation 1: HDI dimension index calculation

$$\text{Dimension index} = \frac{\text{actual value} - \text{minimum value}}{\text{maximum value} - \text{minimum value}}$$

### Equation 1.1: HDI index calculation for income

$$\text{Dimension Index} = \frac{\ln[\text{actual value}] - \ln[\text{minimum value}]}{\ln[\text{maximum value}] - \ln[\text{minimum value}]}$$

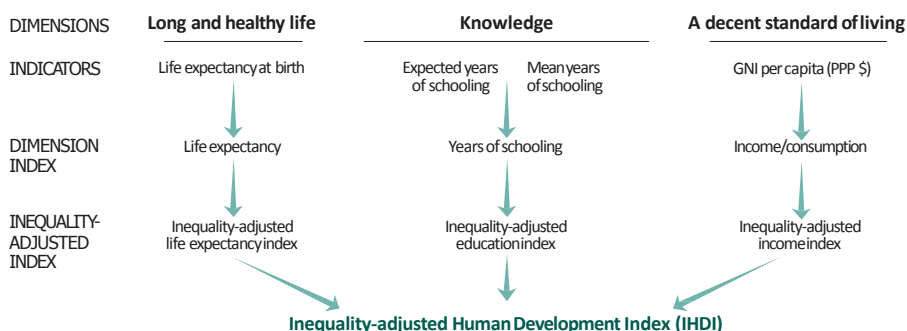
- For **Health**, Equation 1 is applied using the actual life expectancy value
- For **Education**, Equation 1 is applied for both sub-dimensions and then the arithmetic mean of the two is taken.
- For **Income**, Equation 1 is modified to incorporate the natural logarithm (ln). The log transformation has the effect of lowering the contribution of very high incomes to HDI

Source: Training Material for Producing National Human Development Reports, UNDP Human Development Report Office

# Global Social Indexes:

## Inequality Adjusted Human Development Index (IHDI)

**Inequality-adjusted Human Development Index (IHDI)**



3

## Inequality-adjusted HDI (IHDI)

➤ IHDI is based on Atkinson (1970), with inequality ( $A$ ) defined as:

$$Ax = 1 - \frac{\sqrt[n]{X_1 \dots X_n}}{\bar{X}}$$

➤ Inequality-adjusted dimensions indices are calculated multiplying the HDI dimensions indices by their corresponding inequality measure:

$$Ix^* = (1 - Ax) Ix$$

➤ IHDI is the geometric mean of the three inequality-adjusted dimensions indices:

$$IHDI = \sqrt[3]{Ih^* * Ie^* * Ii^*}$$

$$IHDI = \frac{[(1 - A_{Health}) \cdot (1 - A_{Education}) \cdot (1 - A_{Income})]^{1/3} \cdot HDI}{\text{Loss}}$$

Source: Training Material for Producing National Human Development Reports, UNDP Human Development Report Office (2015)

4

Human Development Index Adjusted by Inequality (2018)

Rank HDI 2018	Country	Human Development Index (HDI)	Inequality-Adjusted HDI	
		Value	Value	Difference from HDI rank
1	Norway	0.954	0.889	0
2	Switzerland	0.946	0.882	-1
3	Ireland	0.942	0.865	-6
4	Germany	0.939	0.861	-7
5	Hong Kong	0.939	0.815	-17
6	Australia	0.938	0.862	-4
6	Iceland	0.938	0.885	+4
8	Sweden	0.937	0.874	+2
9	Singapore	0.935	0.810	-14
10...	Netherlands	0.933	0.870	+2
79	Brazil	0.761	0.574	-23 (largest difference)
...188	Central African Republic	0.381	0.222 (Last)	-1
189	Niger	0.377 (Last)	2.272	3

Source: Human Development Report 2019, UNDP

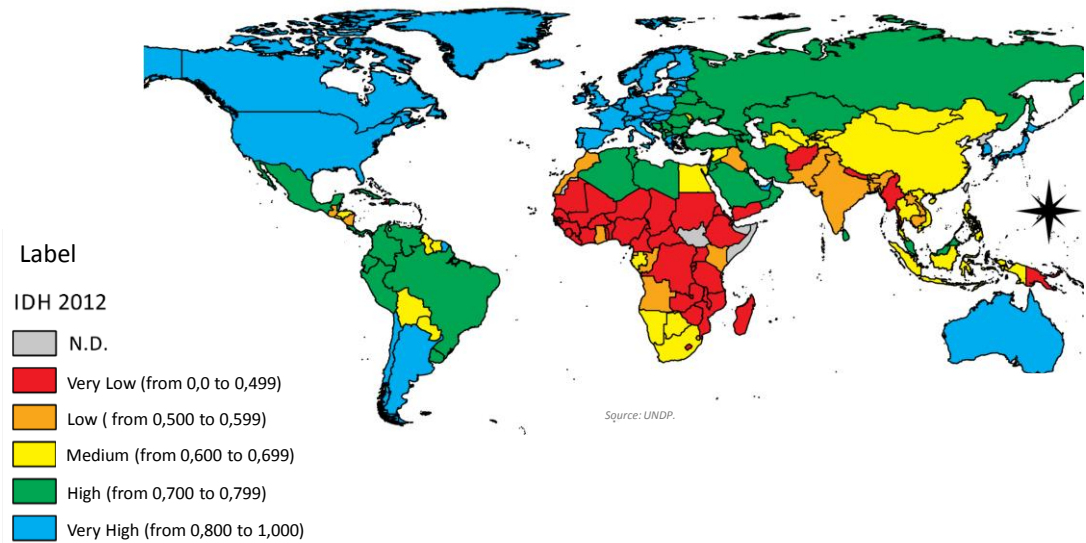
Human Development Index Adjusted by Inequality (2018)

Rank HDI 2018	LAC Country	Human Development Index (HDI)	Inequality-Adjusted HDI	
		Value	Value	Difference from HDI rank
42	Chile	0.847	0.696	-14
48	Argentina	0.830	0.714	-4
57	Uruguay	0.808	0.703	0
76	Mexico	0.767	0.595	-17
79	Brazil	0.761	0.574	-23 (largest difference)
79	Colombia	0.761	0.585	-16
82	Peru	0.759	0.612	-5
85	Ecuador	0.758	0.607	-4
96	Venezuela	0.726	0.600	1

Source: Human Development Report 2019, UNDP

Rank HDI 2018	Country	Inequality-Adjusted Life Expectancy Index		Inequality-Adjusted Education Index		Inequality-Adjusted Income Index	
		Value	Difference from HDI rank	Value	Difference from HDI rank	Value	Difference from HDI rank
79	Brazil	0.763	-4	0.525	-30	0.473	-32

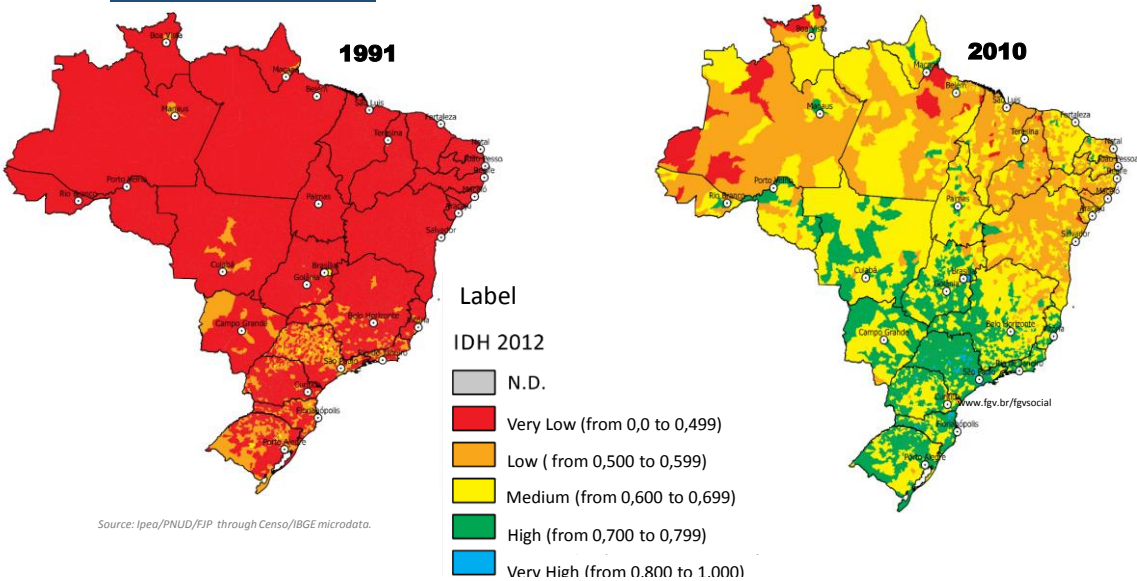
# HUMAN DEVELOPMENT INDEX (HDI) – Education, Health & Income



In 1991, 85,8% of the municipalities had a **very low HDI**. In 2010 only 0,6%.

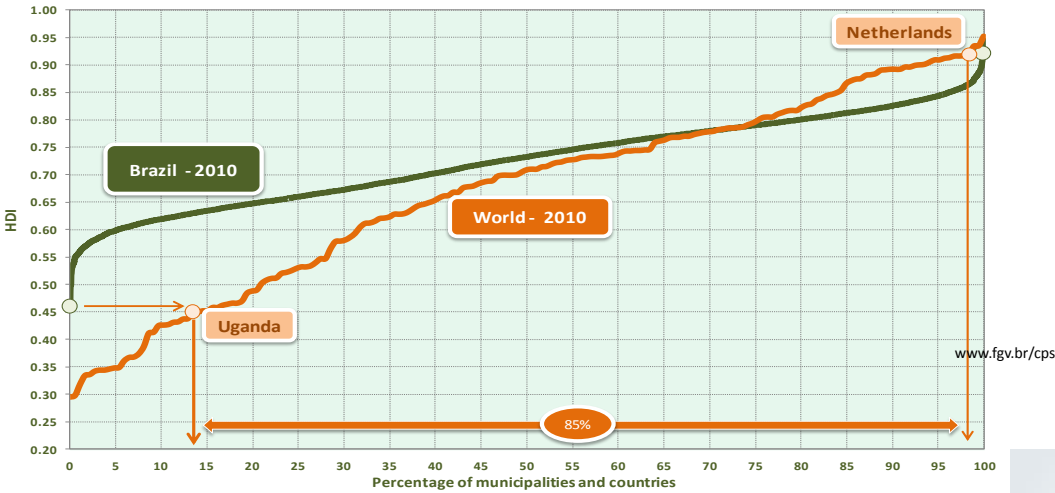
## HDI 1991-2010

## HUMAN DEVELOPMENT INDEX (HDI) – Education, Health & Income



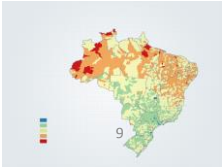
Usage of National data with a Global Vision

Distribution of Brazilian municipalities and countries of the World according to HDI, 2010



Source: SAE/PR, based on Demographic Census 2000 and 2010 and HDI as calculated by the UNDP, Human Development Report

In 2010, it there is 0,6% with very low HDI. But there is still a whole world inside Brasil →.

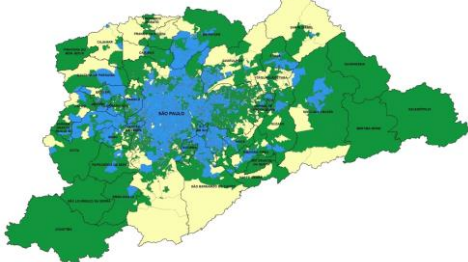
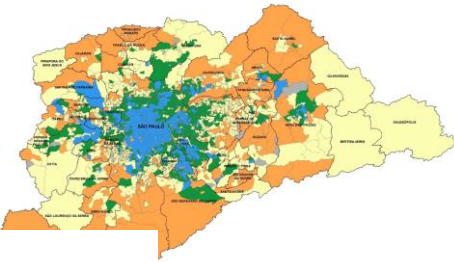


HUMAN DEVELOPMENT INDEX By Neighborhoods

FGV SOCIAL

Great São Paulo 2000

Great São Paulo 2010



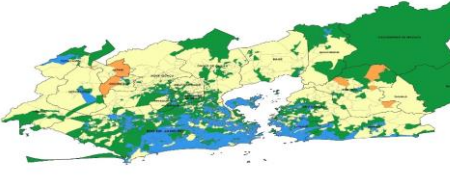
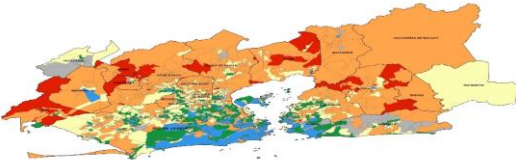
Label

IDH 2012

- N.D.
- Very Low (from 0,0 to 0,499)
- Low ( from 0,500 to 0,599)
- Medium (from 0,600 to 0,699)
- High (from 0,700 to 0,799)
- Very High (from 0,800 to 1,000)

Great Rio 2000

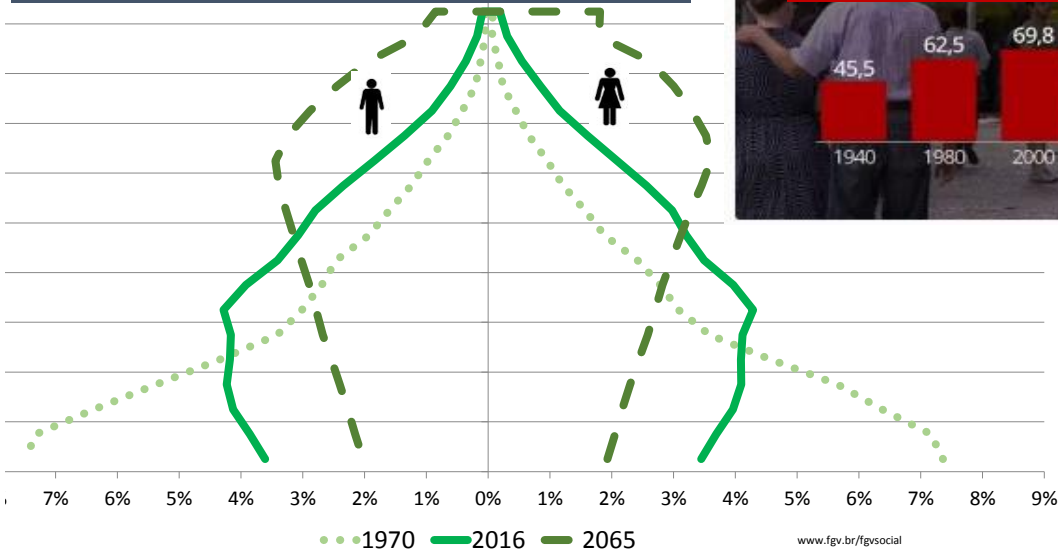
Great Rio 2010



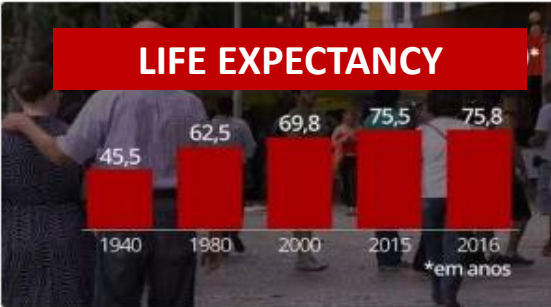
Source: Ipea/PNUD/FJP through Censo/IBGE microdata.

# HDI based Social Progress and Economic (In)Sustainability in Brazil

DIRECTIONS: DEMOGRAPHIC EVOLUTION – BRAZIL

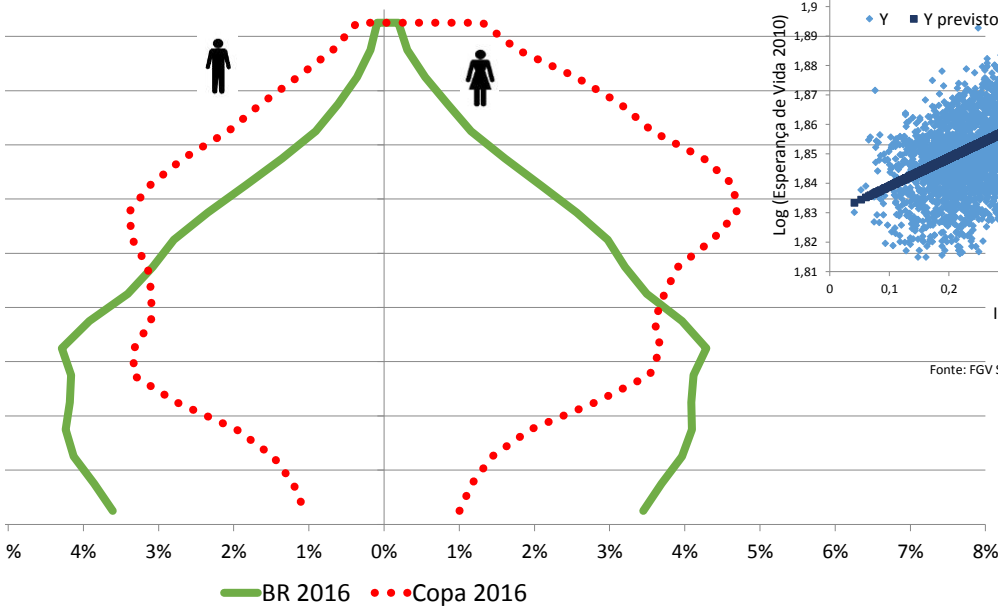


## LIFE EXPECTANCY (1940-2016)

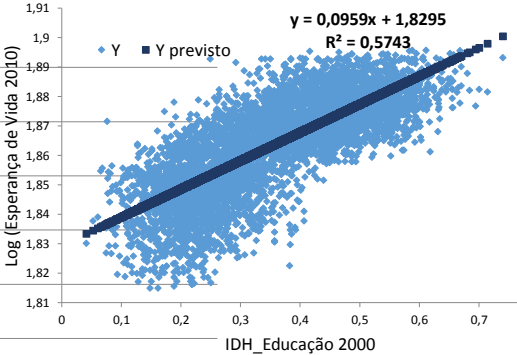


## Population by age and sex (2016)

Brazil and Copacabana



## LIFE EXPECTANCY X LAGGED EDUCATION HDI (Indirect Effect)

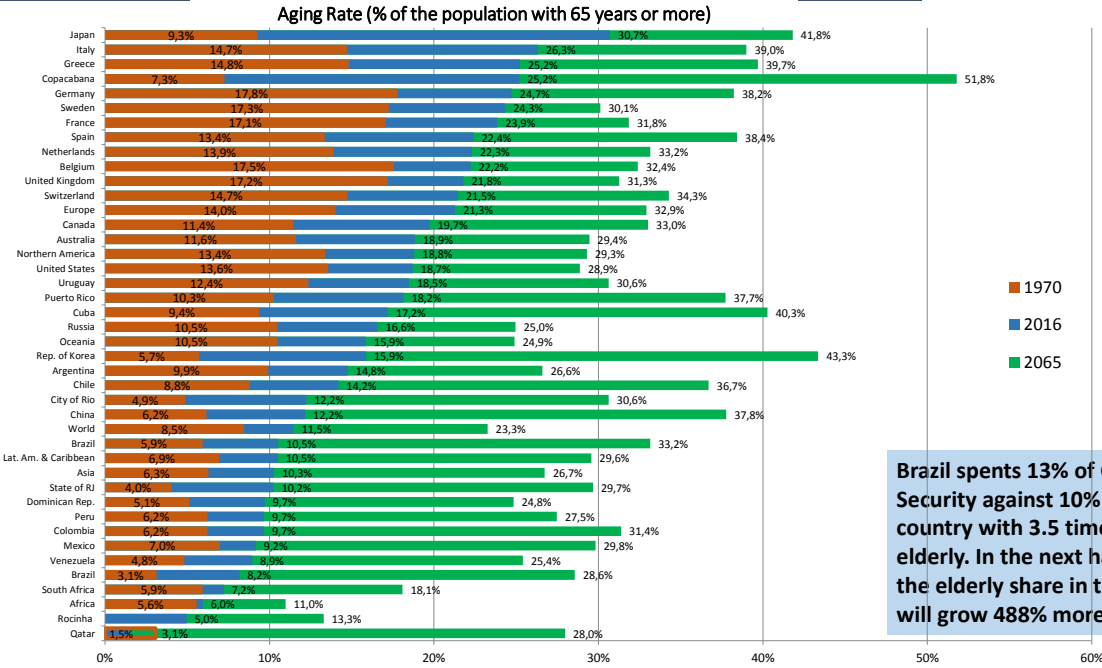


Fonte: FGV Social a partir dos dados do IPEA/PNUD/FJP

www.fgv.br/fgvsocial

DEMOGRAPHIC TRANSITION ACROSS COUNTRIES & PLACES

FGV SOCIAL

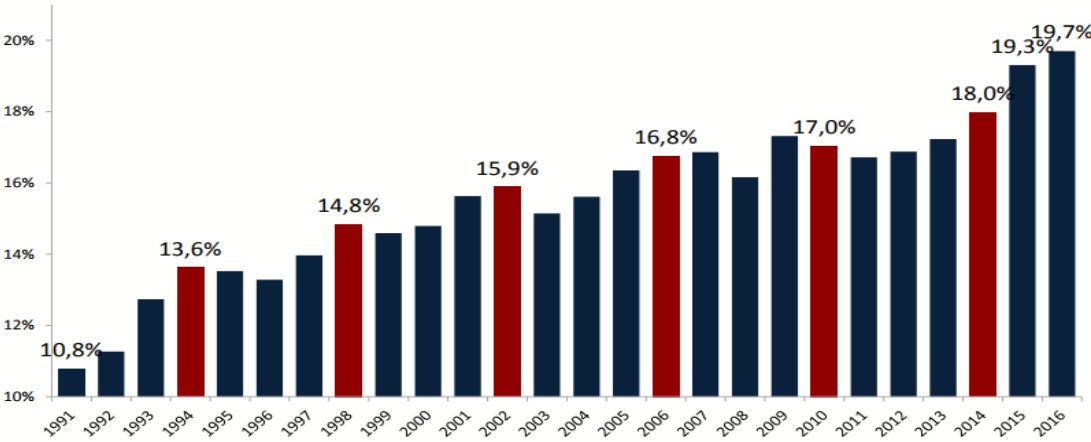


We saw the financial cost/social benefit ratio of different official transfers including social security

THE FISCAL CHALLENGE

Evolution of the Central Government Primary Expenditures (% GDP)

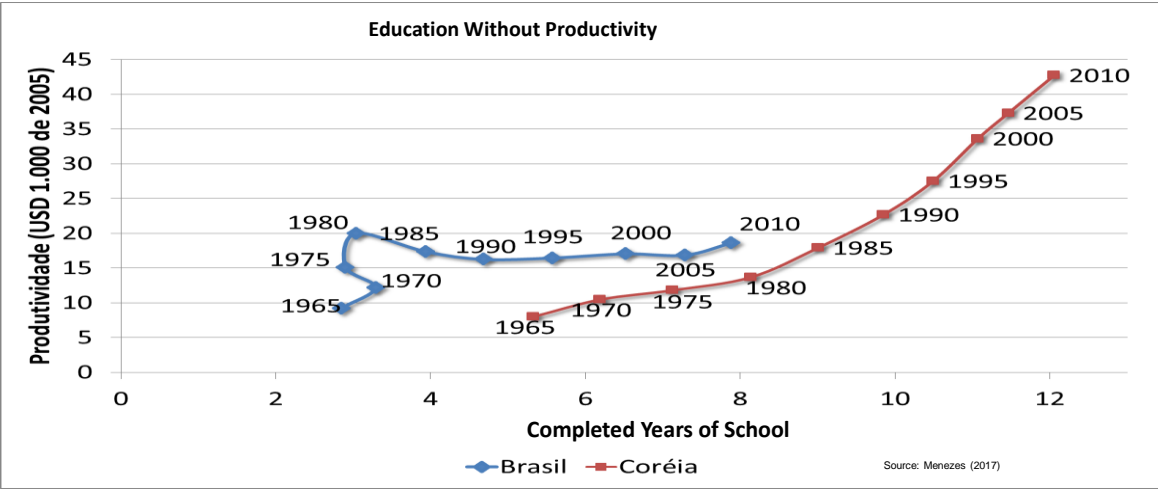
FGV SOCIAL



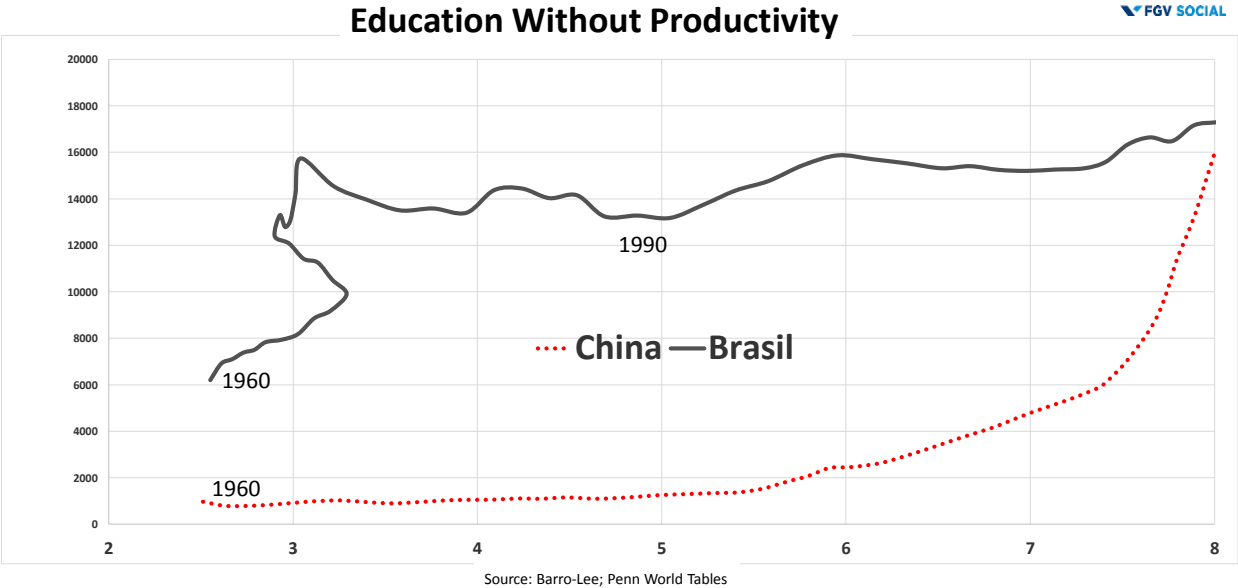
IF NOTHING IS DONE, IT WILL CROSS THE EXPENDITURE CEILING FIXED

**EDUCATION ALSO IMPACTED LITTLE BRAZILIAN PRODUCTIVITY:  
MAIN LONG RUN CHALLENGE with Fiscal adjustment**

FGV SOCIAL



Brazil had a vertical jump in productivity with no gain in schooling (economic miracle 60s & 70s)  
Or na horizontal jump in schooling after redemocratization with no gain in labor productivity)



To end HDI’s trilogy the improvement of labor remuneration (mean and inequality) seen in Rais does not match firm level productivity changes observed in PIA (Pesquisa Industrial Anual)



PHDI

CONSTRUCT A PERCEIVED HUMAN  
DEVELOPMENT INDEX (PHDI)

The Four Qualities of Life

	Outer Quality	Inner Quality
Life Chances	Livability of environment	Life-ability of person
Life Results	Utility of life	Satisfaction with life

Source: Veehoven (2000)

It turns out to be (a posteriori) a good conceptual framework

Work – Principal Components

Splitting - Principal Components  
American Countries 2007

	Rotated Factor Pattern	Factor1 Work_Inner	Factor2 Work_Outer
Are you satisfied with your job or the work you do		96 *	5
In your work do you have an opportunity to do what you do best every day?		96 *	3
Inner components-> contain + information	Can people in this country get ahead by working hard or not?	-4	61 *
	Thinking about the job situation in the city or area where you live today would you say that it is now a good time or a bad time to find a job?	13	69 *
	Are you satisfied or dissatisfied with efforts to increase the number and quality of jobs?	2	72 *

Printed values are multiplied by 100 and rounded to the nearest integer. Values greater than 0.4 are flagged by an '\*'  
Source: Gallup World Poll microdata.

## Health – Principal Components American Countries 2007

	Factor1 Health Inner Current	Factor2 Health_Inner Permanent	Factor3 Health_Outer
MOBILITY (have no problems walking around)	34	72 *	-3
SELF CARE (have no problems with self-care)	7	82 *	0
USUAL ACTIVITIES (have no problems with performing my us - work study housework family or leisure activities)	36	74 *	-1
PAIN/DISCOMFORT(have no pain or discomfort)	69 *	29	1
ANXIETY/DEPRESSION(not anxious or depressed)	58 *	8	6
how good or bad your own health is TODAY	73 *	14	8
Are you satisfied with your personal health	71 *	8	6
In your city or area where you live are you satisfied or dissatisfied with the availability of quality health care	5	3	75 *
Are healthcare services in this country accessible to any person who needs them regardless of their economic situation or not	3	1	66 *
Not have health problems that prevent you from doing any of the things people your age normally can do	58 *	25	-3
If you had to go to a hospital because of an accident or illnesswho would take care of the cost of your assistance? Public or Private	5	-6	33
Do you have confidence in each of the following or not? How about health care or medical systems?	-1	4	76 *

Printed values are multiplied by 100 and rounded to the nearest integer. Values greater than 0.4 are flagged by an '\*'. Source: Gallup World Poll microdata

## CORRELATION BETWEEN INDIVIDUAL INCOME AND PHDI COMPONENTS

### Correlation between Per Capita Income and Principal Components America

### PHDI Components Partial Correlation with Objective Per Capita Income

Inner PHDI Components	Coefficient	p-value
Income_dep_inn	-0.0005886	<.0001
Work_inn	0.0003792	<.0001
Health_inn	0.0003160	<.0001
Health_inn_permanent	0.0000630	0.0050
Outer PHDI Components	Coefficient	p-value
Income_out	0.0001083	0.0004
Work_out	Not Significant	
Health_out	Not Significant	
Education_out	Not Significant	

Source: Microdata from the Gallup World Poll 2006 and Human Development Report

### Correlation Between Disaggregated PHDI PCA and Respective HDI Component

	INCOME DEP INN	INCOME OUT	WORK INN	WORK OUT	HEALTH INN	HEALTH OUT	EDUCATION
CTE	-2,1215 0,0212	0,4959 0,0240	0,9885 0,0224	0,4454 0,0234	0,3779 0,0235	0,9461 0,0225	0,9245 0,0194
CTE + HDI COMPONENT	-1,0093 0,0413	1,3433 0,0447	0,7912 0,0394	1,0933 0,0398	0,4378 0,0414	0,3862 0,0390	0,0876 0,0337
CTE + HDI COMPONENT + SOCIO-DEMOGRAPHICS*	-0,9051 0,0559	2,1301 0,0651	1,1801 0,0565	1,3348 0,0602	1,9013 0,0920	2,7852 0,0891	-0,6411 0,0493

\* Obs: regressions include dummies for presence of children, for elderly, gender, position in the household and hdi components. Standard errors small numbers below estimates

Transform  
components->  
into Standard  
HDI Scale

## Principal Components – Standartized: The PHDI ingredients

Worldwide  
Level:

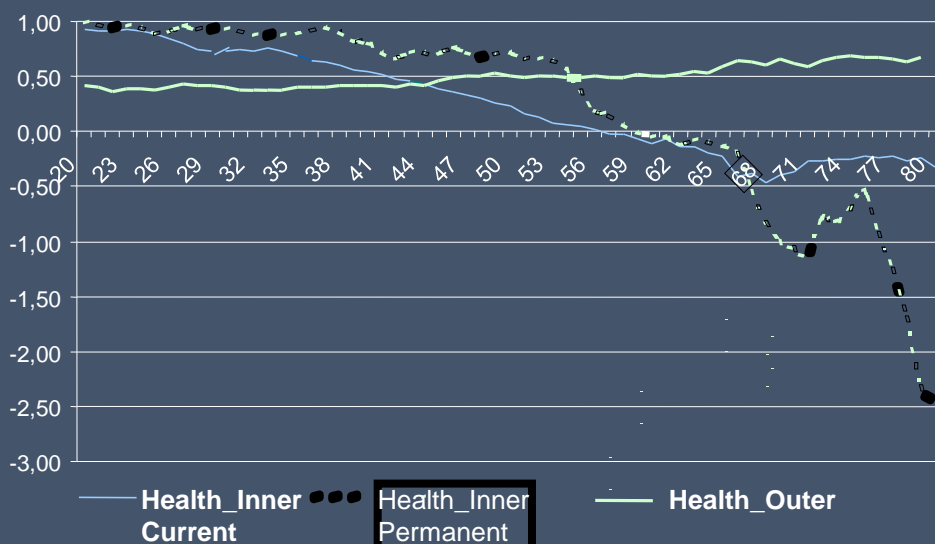
Singapore  
was 1st

Haiti Last

Country	Sample	%	income_dep_i				health_inn_			education_out
			nn	income_out	work_inn	work_out	health_inn	permanent	health_out	
argentina	1000	4.68	0.80	0.67	0.56	0.41	0.51	0.75	0.63	0.25
belize	502	2.35	0.80	0.34	0.60	0.38	0.78	0.38	0.53	0.66
bolivia	1000	4.68	0.36	0.78	0.65	0.65	0.12	0.78	0.41	0.58
brazil	1038	4.86	0.79	0.70	0.76	0.25	0.65	0.53	0.25	0.27
canada	1010	4.73	1.00	1.00	1.00	0.97				
chile	7272	34.03	0.77	0.58	0.46	0.54	0.66	0.60	0.50	0.52
colombia	1000	4.68	0.47		0.33	0.37	0.66	0.78	0.45	0.30
costa rica	1002	4.69	0.73	0.76	0.51	0.72	0.95	0.50	0.94	0.99
dominican rep	1000	4.68	0.20	0.40	0.27	0.34	0.77	0.73		0.67
ecuador	1061	4.97	0.36	0.67	0.60	0.35	0.39	0.95	0.20	0.23
el salvador	1001	4.69	0.16	0.26	0.00	0.10	0.66	0.73	0.41	0.50
guatemala	1000	4.68	0.83	0.46	0.32	0.47	1.00	0.55	0.29	0.36
guyana	501	2.34	0.76	0.27	0.54	0.24	0.62	0.63	0.80	0.69
honduras	1000	4.68	0.06	0.57	0.10		0.77	0.35	0.42	0.59
mexico	999	4.68	0.57	0.75	0.51	0.52	0.65	0.00	0.47	0.00
nicaragua	1000	4.68	0.00	0.45	0.29	0.50	0.22	0.63	0.59	0.70
panama	1000	4.68	0.55	0.56	0.40	0.47	0.93	0.70	0.57	0.80
paraguay	1000	4.68	0.66	0.00	0.62	0.00	0.61	1.00	0.00	0.00
peru	1000	4.68	0.13	0.34	0.16	0.30	0.00	0.85	0.12	0.14
uruguay	1004	4.70	0.66	0.69	0.40	0.33	0.53	0.83	1.00	0.68
venezuela	1000	4.68			0.79	1.00				1.00
Max			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Min			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

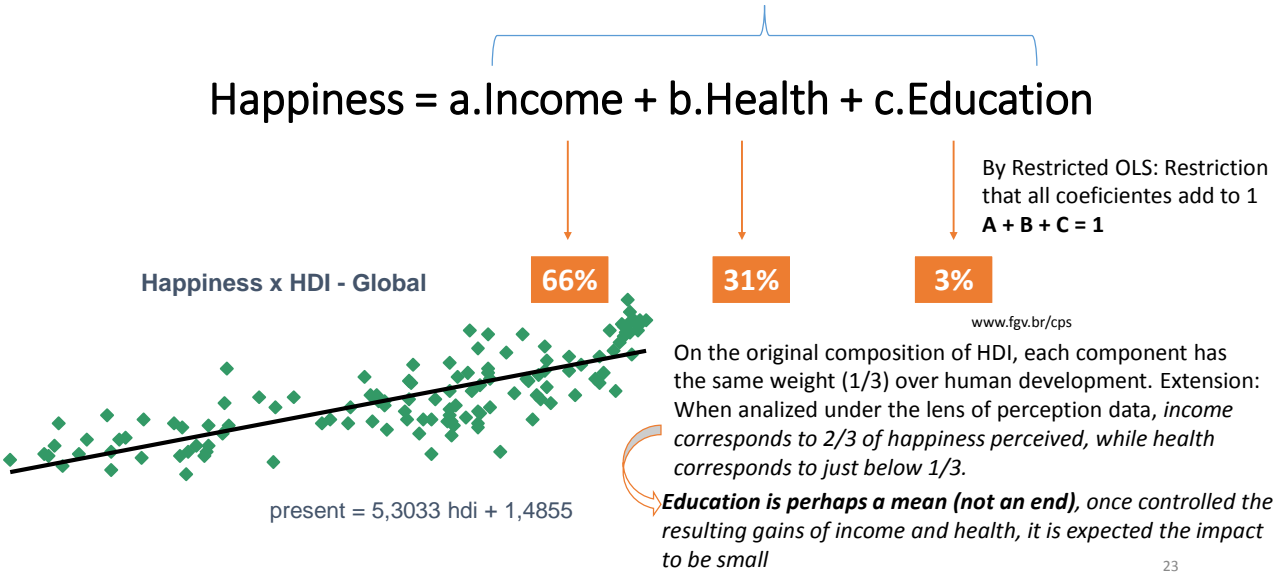
The Life Cycle Pattern of the Perceived Health Components  
Latin American Countries Standardized Principal Components  
and Years of Age

Centered Moving Average of 5 Years



Source: Microdata from the World Gallup Survey 2007

# Weights of HDI Components on Life Satisfaction



## Present Life Satisfaction in Latin America 2007 and the PH

Do Weights Change Across the Life Cycle?

At a microdata level there is interactions between age and respective PHDI components are not statistically significant (for example elderly and health issues or Having children at home and education issues).

Weights do not change across the life-cycle!

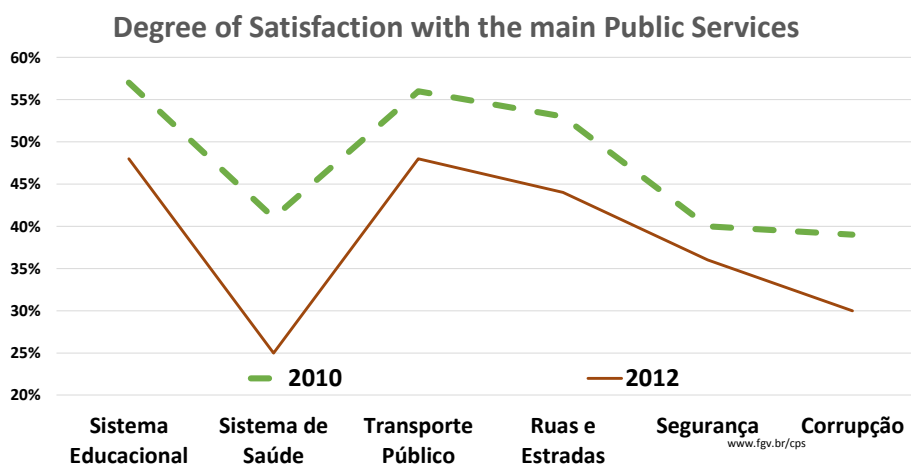
OBS: Personality traits may lead to spurious correlations between subjective indicators

Do you feel you personally stand at the present?			
		Present Life Satisfaction Estimates	
Parameter		Estimate	Standard Error
past life satisfaction			
has children	yes	0.1396	0.0356
has children	zno	0.0000	0.0000
AGE	65 & More	0.3298	0.0854
AGE	z15 A 64	0.0000	0.0000
income_dep_inn		0.5276	0.0181
income_out		-0.2670	0.0201
work_inn		-0.0461	0.0173
work_out		-0.1025	0.0202
health_inn		-0.3371	0.0194
health_inn_permanent		-0.0001	0.0193
health_out		-0.1024	0.0192
education_Out		-0.0045	0.0281
education_Out* has children	yes	0.0334	0.0336
education_Out* has children	zno	0.0000	0.0000
health_inn*AGE	65 & More	-0.0764	0.0598
health_inn*AGE	z15 A 64	0.0000	0.0000
work_inn*AGE	65 & More	0.1327	0.0877
work_inn*AGE	z15 A 64	0.0000	0.0000
Scale		1.0000	0.0000

## The 6 Priorities of the 16 SDGs related Public Policies of Young People *vis-à-vis* not Young Brazilians – My World

Position	Priority (choice of 6 main priorities))	Young (%)	Not Young (%)
1	Quality education	85,20	80,50
2	Improvement of health services	82,70	86,60
3	Access to quality food	70,10	76,10
4	Honest and active government	63,50	65,70
5	Protection against crime and violence	49,00	52,30
6	Better job opportunities	46,90	43,90
7	Improvement in transport and roads	40,90	37,90
8	Support to people who can't work	35,10	38,00
9	Access to potable water and sewerage	27,40	28,60
10	Protection to forests, rivers and oceans	20,10	19,20
11	Access to energy in your home	19,90	19,10
12	Elimination of prejudice and discrimination	19,50	15,90
13	Equality between men and women	11,70	12,50
14	Political freedom	10,50	8,20
15	Access to telephone and internet	10,00	8,30
16	Fight climate changes	7,30	7,10

25



Fonte: FGV Social a partir do Gallup World Poll

### Ways to Weight Priorities:

1. Perceptions on Quality (PHDI)
2. Weights of Objective HDI based on Life Satisfaction
3. Importance Attributed to Different Topics (Policies)

26